ESPNIC 2013

24th Annual Meeting of the European Society of Paediatric and Neonatal Intensive Care

12–15 June 2013
Rotterdam, The Netherlands

ABSTRACTS

Intensive Care Medicine
Volume 39 Supplement 1, 2013
DOI [10.1007/s00134-013-2950-8](https://doi.org/10.1007/s00134-013-2950-8)

Springer

Session Type	Speakers Theme Description	Abstract number
Invited Speaker	Ethics	1–6
Invited Speaker	Haemodynamics and Congenital Heart Disease	7
Invited Speaker	Healthcare	8–10
Invited Speaker	Infection, Systemic Inflammation and Sepsis	11–14
Invited Speaker	Long Term Outcome	15–17
Invited Speaker	Metabolism, Endocrinology and Nutrition	18–19
Invited Speaker	Neuro Critical Care	20
Invited Speaker	Nursing Science Group	21–25
Invited Speaker	Paediatric and Neonatal Intensive Care Nursing	26
Invited Speaker	Pharmacology	27–30
Oral Presentation	Ethics	31–34
Oral Presentation	Haemodynamics and Congenital Heart Disease	35–38
Oral Presentation	Healthcare	39–42
Oral Presentation	Infection, Systemic Inflammation and Sepsis	43–46
Oral Presentation	Long Term Outcome	47–50
Oral Presentation	Metabolism, Endocrinology and Nutrition	51–54
Oral Presentation	Neuro Critical Care	55–58
Oral Presentation	Paediatric and Neonatal Intensive Care Nursing	59–77
Oral Presentation	Pharmacology	78–82
Oral Presentation	Respiratory Failure	83–87
Oral Presentation	Resuscitation and Emergency Medicine	88–91
Poster Session	Ethics	92–98
Poster Session	Haemodynamics and Congenital Heart Disease	99–140
Poster Session	Healthcare	141–216
Poster Session	Infection, Systemic Inflammation and Sepsis	217–289
Poster Session	Long Term Outcome	290–317
Poster Session	Metabolism, Endocrinology and Nutrition	318–353
Poster Session	Neuro Critical Care	354–379
Poster Session	Nursing Science Group	380–391
Poster Session	Paediatric and Neonatal Intensive Care Nursing	392–443
Poster Session	Pharmacology	444–456
Poster Session	Respiratory Failure	457–495
Poster Session	Resuscitation and Emergency Medicine	496–533
Late Breakers	Ethics	534
Late Breakers	Haemodynamics and Congenital Heart Disease	535–539
Late Breakers	Healthcare	540–551
Late Breakers	Infection, Systemic Inflammation and Sepsis	552–561
Late Breakers	Long Term Outcome	562–564
Late Breakers	Metabolism, Endocrinology and Nutrition	565–572
Late Breakers	Neuro Critical Care	573
Late Breakers	Nursing Science Group	574–575
Late Breakers	Paediatric and Neonatal Intensive Care Nursing	576–581
Late Breakers	Pharmacology	582–584
Late Breakers	Respiratory Failure	585–588
Late Breakers	Resuscitation and Emergency Medicine	589–592

Ethics (1–6)

1 – INVITED SPEAKER

HOW DO NURSES AND PHYSICIANS FEEL WHEN THEIR PATIENTS DIE

J. Benbenishty

Hadassah University Hospital, Jerusalem, Israel

For optimal patient end of life outcomes, physicians and nurses should work together, communicating goals of treatment, predicted outcomes and therapy duration, alternative clinical pathways, and communication tactics with patients and their families. Teams do not always have the opportunity to look into themselves to identify what they are feeling when caring for a dying patient.

This interactive session will expose the participants to the use of an art median to raise awareness of self feelings when caring for a dying patient. Art therapy is based on the idea that the creative process of art making facilitates recovery and reparation. It is a form of non-verbal communication of thoughts and feelings. Often it is used to encourage personal growth and help individuals create meaning and achieve insight. We will analyze together our creations, gaining insight to what we are feeling when caring for the dying.

2 – INVITED SPEAKER

MORAL DISTRESS, WHAT IS IT?

C. de Boer¹, M. van Dijk²

¹Neonatal Intensive Care Unit, ²Paediatric Intensive Care Unit, Erasmus University Medical Center, Rotterdam, The Netherlands

Moral distress in the hospital setting is defined as ‘pain affecting the mind, the body, or relationships, resulting from patient care situations in which nurses experience a moral problem’. It also involves acknowledging responsibility and making a moral judgment about the correct action, but as a result of perceived constraints acting in a way that is perceived as morally wrong.

Sources of moral distress vary from pain and suffering for the patient and aggressive care without perceived benefit to end-of-life care issues. More and more sophisticated treatment options for extremely premature neonates or children with congenital anomalies for example, have become available. The often complicated clinical courses and the children’s suffering, however, are typical situations that may induce moral distress. Also, insufficiently skilled colleagues, conflicts, high workload, or lack of clear policies may be sources of moral distress. Studies have reported that half to one third of nurses experienced moral distress.

As a result of moral distress, nurses may face lower work satisfaction and even burnout; consequently, some will resign, or even leave their profession. Moral distress can also negatively affect patient outcomes, in that nurses become emotionally detached and cynical, and are no longer really involved with patients.

The available studies demonstrate that new interventions should be developed and tested. Possible components are: facilitating nurses to express their moral concerns and involving them in moral decision making, educating them on ethical issues, and establishing a clear policy guiding moral practice.

3 – INVITED SPEAKER

THE MORAL FIBRE IN TRANSPORTING CRITICALLY ILL PATIENTS. STRESSFUL?

F. Bickell

PICU, Guy’s and St Thomas’ Foundation Trust, St Thomas’ NHS Foundation Trust, London, UK

As the number of adult and child intensive care transfers increases each year in the UK, transfer teams are progressively exposed to the stressful situations associated with the transfer of unstable patients.

The use of specialised teams whose prime focus is the transportation of critically ill children is now prevalent within the UK. What enables these teams to function in sometimes highly stressful situations and spend the majority of their working lives in unpredictable environments including the back of ambulances and onboard aircrafts?

The moral fibre required to be a member of a transportation team will be extrapolated and examples will be used to illustrate the differing situations these teams may encounter.

The current infra structure that is in place to facilitate the safe transportation of critically ill children and contributes to reducing the stress of these situations for team members will be examined. The use of multidisciplinary team simulation training will be discussed and the effects of this on both team function and dynamics.

4 – INVITED SPEAKER

USING MORAL COURAGE TO SURVIVE THE END OF THE SHIFT

F. Carnevale

Montreal Children’s Hospital, Montreal, QC, Canada

Moral distress is a malaise that can result when health care professionals (HCP) feel they are impeded from acting in the ways that they consider morally necessary. It is increasingly recognized that caring for critically ill children can frequently give rise to moral distress. This can result from administrative, intra- or inter-professional dynamics, and policy factors—among others—that may conflict with HCP beliefs and values. Moral distress is a phenomenon that is rooted in the conscience of HCP, which can serve as an important impetus for ethically necessary changes. Moral courage will be discussed as a phenomenon that can help overcome barriers that impede ethical practices and result in moral distress.

5 – INVITED SPEAKER

DYING WITH DIGNITY USING SPIRITUALITY AS A TOOL

J. Benbenishty

Intensive Care, Hadassah University Hospital, Jerusalem, Israel

How do we define -dying with dignity? Open discussions between Dr’s, Nurses, families, and patients. In addition the nurses’ role is helping families/patients cope.

At the same time families report fear, miscommunication indifferent or inconsistent care

In order to preserve dignity as much as possible we can insure privacy, cultural observations, discussion with families in order to relieve guilt feelings insure proper documentation so that each shift of nurses knows what the families have been through including the decision process through to “good ICU death”. We should all be aware of our actions which lead to grieving period for family.

The principles of a good death are to have emotional and spiritual support. In almost all circumstances we are able to have access to hospice care, have control over who is present at death, to respect the wishes of the dying, to have time to say goodbye, to be able to die rather than pointlessly prolonging life.

One of the tools we can use while caring for the dying is spirituality. We can frame spirituality to mean meaning, connection, integrity and hope.

This talk will discuss how we can promote dying with dignity and the ways nurses can introduce spirituality in all crisis situations including caring for the dying patient and his family.

6 – INVITED SPEAKER

FORGOING LIFE SUPPORT: IMPROVING CARE IN THE FACE OF INEVITABLE DEATH

J. Latour¹, J. Benbenishty², F. Carnevale³, S. Naghib⁴

¹Department of Pediatrics, NICU and PICU, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands, ²Hadassah Medical Organization, Jerusalem, Israel, ³McGill University, Montreal, QC, Canada, ⁴Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Course content: Despite technological advances in pediatric critical care, healthcare professionals face increasingly ethical challenges in withholding and withdrawing treatments. Forgoing life support and end-of-life practices varies within Europe. Consensus statements, developed by several professional associations, have been a way to improve these challenging practices. However, decisions to forgo life support in PICU and NICU remains inconsistent. Every forgoing life support decision needs to be a balanced consideration of medical, nursing, ethical, psychosocial, legal and societal aspects. Parents play an important role in the decision making process. Cultural backgrounds and beliefs seems to influence the empowerment of parents in difficult decisions as well as the attitudes of the physicians and nurses. Physicians and nurses may have different perceptions and both professional groups have differing roles and values. In essence, forgoing life support decision-making and related end of life care aspects are challenging issues in our practice.

Course objective: To provide PICU and NICU interdisciplinary professionals an approach in foregoing life support decision-making processes and communication strategies with parents of children with inevitable death in intensive care settings.

Educational aims: To summarize the current status of forgoing life support and end-of-life care in Europe; To explain the principles and ethical challenges of forgoing life support decisions; To identify essential elements of effective communication with parents and family; To understand the impact of cultural and spiritual diversity in end of life care; To recognize psychosocial and emotional concerns of the child, parents and healthcare professionals.

Haemodynamics and Congenital Heart Disease (7)

7 – INVITED SPEAKER

CARDIOVASCULAR PHYSIOLOGY IN PEDIATRICS

J. Lemson

Intensive Care Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Hemodynamic physiology has been the interest for intensivists since the beginning of intensive care medicine. Interestingly adult intensivists (and anesthesiologists) have always been more interested in hemodynamics compared to pediatric intensivists or neonatologists, this is reflected in the amount of publications in this area but also in the scientific programs of many conferences until now. However hemodynamic derangements do occur in children and indeed some even die of circulatory failure. Moreover it is still unclear how fluid therapy should be used in critically ill children. Therefore a thorough understanding of pediatric hemodynamic physiology seems of importance.

This lectures tries to answer the following questions:

1. Is hemodynamic physiology in young children really different from adults?
2. Is there still a lack of knowledge?
3. Do we need age dependent monitoring and treatment protocols?

Healthcare (8–10)

8 – INVITED SPEAKER

RESPOND COURSE: DEVELOPMENT AND EVALUATION OF A MULTI-PROFESSIONAL COURSE TRAINING HOSPITAL STAFF TO RECOGNISE AND RESPOND TO DETERIORATING CHILDREN

G. Sefton¹, L. Tume¹, P. Arrowsmith², J. Bunn³, M. Horan⁴

¹PICU, ²Resuscitation Training Officer, ³General Paediatrics, ⁴Paediatric Intensivist, Alder Hey Children's NHS Foundation Trust, Liverpool, UK

Background: Within the last decade, missed deterioration of children in hospital has raised concerns (Pearson 2008; NPSA 2007) about education of hospital staff, monitoring of patients, processes for escalation of concern and targeted response to patients. In response to this, a new 1 day **RESPOND course** (**R**ecognising **S**igns of **P**aediatric **h**ospital **i**npatients **D**eterioration) was developed.

Objectives: To describe the development of the RESPOND multi-professional course; using case based scenarios and video footage to develop critical thinking around potential for deterioration, communication strategies and targeting response to the patient. This is the preliminary evaluation the first five courses.

Design: A Written post course anonymised evaluation was conducted immediately after the course and at 3 months. Setting: A large specialist children's hospital in the North West of England.

Participants: 91 participants (junior doctors, medical students, nurses and healthcare assistants) undertook the RESPOND course over four separate days.

Results: Overwhelmingly participants found the course very useful; valuing the use of real cases and multi-professional group work. Improvement was perceived to be in communication between professional, and a proactive approach to patient assessment. The second survey, had poorer response but respondents were still positive about the impact of the course, advocating for it to be mandatory for all new clinical staff to the hospital.

Conclusions: Our preliminary evaluations combined with the reduction of in-hospital cardiac arrest rates, suggest that the multi-disciplinary RESPOND course (in conjunction with the Trust paediatric early warning system) is successful as a targeted strategy to promote patient safety.

9 – INVITED SPEAKER

REGISTRATION OF ADVERSE EVENTS, DOES IT INCREASE PATIENT SAFETY?

C. van der Starre, M. van Dijk, D. Tibboel

PICU, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Introduction: For management of quality and safety, reliable and up-to-date information on the actual harm inflicted on patients is vital. However, a gold standard for detection thereof is lacking.

Objectives: To determine the best feasible method for the detection of adverse events (AEs).

Methods: The Trigger Tool methodology for the detection of AEs, as developed by the Institute for Healthcare Improvement, was adapted for use in the PICU of the Erasmus MC Sophia Children's Hospital. The triggers were collected for all admitted PICU patients from the electronic databases used in our hospital, rather than by a targeted search of randomly selected patient records. During a 2-year period, the AEs detected by the physicians were also recorded. The AEs found with both methods were collected and analyzed.

Results: In 1,223 patients and 11,101 patient days, 804 adverse events were detected in 279 patients which amounts to a ratio of 0.66 AE per patient, and 7.2 AE per 100 patient days. 70 % of the AEs were detected with the Trigger Tool, 35 % were detected by the physicians. There were 244 AEs (30 %) detected by physicians that were not found with the Trigger Tool.

Conclusions: By combining different instruments for detection of AEs, the maximum yield can be achieved, thus creating the best possible overview of the actual harm inflicted on our patients. Further finetuning of the Trigger Tool methodology will likely improve the yield of this method and reduce the need for detection of AEs by healthcare workers.

10 – INVITED SPEAKER

IMPLEMENTATION OF CREW RESOURCE MANAGEMENT IN A LARGE ADULT AND PEDIATRIC INTENSIVE CARE DEPARTMENT

J. Lemson

Intensive Care Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Introduction: Every year over many patients die in hospitals around the world due to medical errors while many more patients suffer from permanent or temporary physical damage. An important part of these errors are attributable to “Human Factors”. Ineffective communication and incorrect preparation for invasive procedures may expose patients to unnecessary risks. The intensive care unit (ICU) environment is especially prone to these errors. Since three decades commercial and military aviation have adopted the Crew Resource Management (CRM) approach to mitigate the negative effects of unavoidable “Human Errors”. The adult and pediatric intensive care department of the Radboud University Nijmegen Medical Centre has adopted the CRM principles.

Implementation: Since 2010 more than 350 medical and nursing ICU staff members completed a two-day awareness course into CRM principles and human factors. Simultaneously, important local obstructions in patient care with regard to communication and patient safety were identified. The most important obstructions were addressed by assigning specific safety tools. Examples are: checklists, briefing and debriefing procedures and a structured patient handover form. Furthermore a system was designed to assure continuous development and adherence to CRM rules.

Since the introduction, checklist procedures are felt to provide improved safety and support. At the same time professional communication between medical and nursing staff can still be improved. The CRM approach described represents a new culture that also requires a new professional behavior, the acceptance of which is not without challenges. We have learned that implementation is a difficult process that requires constant vigilance.

Infection, Systemic Inflammation and Sepsis (11–14)

11 – INVITED SPEAKER

INTEREST AND LIMITATIONS OF PROCALCITONIN IN CHILDREN AND NEWBORN WITH SEPSIS

M. Stocker

Paediatrics, Luzerner Kantonsspital, Luzern, Switzerland

Sepsis is an important cause of morbidity and mortality in the paediatric population and early recognition with appropriate antibiotic therapy are crucial for successful management. On the other hand, inappropriate and prolonged exposure to antimicrobial agents adversely affect patient outcome and antibiotic resistance. Therefore, accuracy in early diagnosis of sepsis and definition of needed duration of antibiotic therapy are key questions in clinical practice. Procalcitonin (PCT) is a surrogate biomarker for estimating the likelihood of a bacterial infection. PCT-guided therapy is a novel approach to optimize antibiotic therapy management. Postnatal and gestational age dependent normal values of PCT challenge the accurate use of PCT in neonatal sepsis. Variable clinical settings influence diagnostic accuracy of PCT and make a context dependent interpretation mandatory. Keeping this in mind, separate evaluation of neonatal early-onset sepsis, neonatal late-onset sepsis and sepsis/meningitis in children are required. In general, PCT shows a higher accuracy in sepsis diagnosis compared to other infection markers and PCT-guided therapy is able to reduce duration of antibiotic therapy. Combination biomarker scores were proposed to overcome some of the limitations of PCT with promising results in preliminary studies. Strengths and limitations of PCT used in different clinical settings and paediatric populations need to be known for appropriate interpretation.

12 – INVITED SPEAKER

INFLAMMATORY RESPONSE TO PEDIATRIC HEART SURGERY

N.J.G. Jansen, A.W.L. Schadenberg, B.J. Prakken

Wilhelmina Children's Hospital, University Medical Centre Utrecht, Utrecht, The Netherlands

Many congenital heart defects require corrective surgery. Due to technical advances, cardiac surgery is increasingly being performed on younger children, involving more complex procedures. The sum of surgical damage, anesthesia, contact with foreign material of cardiopulmonary bypass, ischemia-reperfusion and others, results in activation of the immune system. An activated immune system is essential for recovery; however, exaggeration can lead to either hyper-activation resulting in increased vascular permeability and organ damage or to hypo-activation and immune paralysis with ensuing risk of infection. Which children are prone to develop an unfavorable immunological response is not completely understood. The possible activators of the inflammatory response due to cardiac surgery in children and the different immune components that initiate and regulate this response are highlighted. Furthermore a summary will be given of therapies previously examined or currently being used to control the immune response after surgery. Finally the areas will be discussed that have to be studied to understand what may be the most effective and safe way to handle a complex system such as the post-operative inflammatory response and minimize subsequent morbidity and mortality.

13 – INVITED SPEAKER

NON PHARMACOLOGICAL INTERVENTIONS TO REDUCE BLOODSTREAM INFECTIONS IN INFANTS ADMITTED TO A NEONATAL INTENSIVE CARE UNIT

O. Helder¹, A. van den Hoogen², C. de Boer¹, J. van Goudoever^{3,4}, M. Verboon-Maciolek², R. Kornelisse¹

¹Department of Pediatrics, Division of Neonatology, Erasmus MC-Sophia Children's Hospital, Rotterdam, ²Department of Neonatology, Wilhelmina Children's Hospital, University Medical Centre Utrecht, Utrecht, ³Department of Pediatrics, VU University Medical Center, ⁴Department of Pediatrics, Emma Children's Hospital/Academic Medical Centre, Amsterdam, The Netherlands

Background and aims: Bloodstream infections (BSIs) are associated with increased morbidity and mortality in neonatal intensive care units. We evaluated the evidence for the effectiveness of non-pharmacological interventions to prevent BSI in infants admitted to a neonatal intensive care unit.

Methods: A systematic review was carried out including randomized, controlled clinical trials, interrupted time series and pretest–posttest studies published from January 1990 to January 2013. PubMed, CINAHL, Web-of-Science, Cochrane Central Register of Controlled trials and Embase were searched. The methodological quality of the selected studies was evaluated with the qualitative evaluation form of McMaster University.

Results: Nineteen studies out of 316 generated hits were selected and categorized as research on intravenous (IV) bundles (6 of 7 significantly reduced BSIs), hand hygiene (1 of 5 significantly reduced BSIs), closed IV sets/patches/filters (none of 4 were significantly effective), central venous catheter teams (both were effective), and surveillance (1 was effective in two subgroups: extremely-low-birth-weight infants and gestational age <28 weeks).

Conclusions: Although the methodological quality of most studies was not very robust, we conclude that IV bundles including proper insertion and proper maintenance are most effective for prevention of BSIs in infants. However, differences in IV bundle components and in practices limited the underpinning evidence. There is some evidence that improved hand hygiene subsequently leads to BSI reduction in infants. However, more high quality research is needed to confirm this finding. There is positive but little evidence that the introduction of central venous catheter team results in BSI reduction.

14 – INVITED SPEAKER

THE CARE OF CRITICALLY ILL CHILDREN AFTER HEMATOPOIETIC STEM CELL TRANSPLANTATION

P. Juvet

Pediatrics, Sainte-Justine Hospital, Université de Montréal, Justine University Hospital, Montreal, QC, Canada

Children whose treatment includes hematopoietic stem cell transplantation still represent a subpopulation with a higher risk of mortality. In our presentation, the recent literature and clinical experience on the management of these critically ill children in intensive care units across the world will be analysed including ventilatory and cardiovascular support along with renal replacement therapy. A high variability in practice will be shown and an algorithm published by P Demaret et al. to guide the level of care will be discussed.

Long Term Outcome (15–17)

15 – INVITED SPEAKER

LONG-TERM OUTCOME IN SURVIVORS OF MENINGOCOCCAL SEPTIC SHOCK IN CHILDHOOD

C. Buysse

Pediatrics, Erasmus MC-Sophia, Rotterdam, The Netherlands

Objective: To assess long-term outcome, both physical and psychosocial, in patients who survived meningococcal septic shock (MSS) in childhood.

Design and Patients: All 179 consecutive patients (170 were eligible) with MSS requiring intensive care treatment between 1988 and 2001 in the Erasmus MC-Sophia Children's Hospital. Patients were invited 4–16 years after PICU discharge for a visit to the follow-up clinic.

Results: 145 patients (response rate 82 %) agreed to participate [age PICU admission 3.5 years; follow-up interval 10 years; age follow-up

14.6 years (all medians)]; 120 visited the follow-up clinic, whereas 25 preferred to complete the questionnaires at home.

- 48 % skin scarring due to purpura
- 8 % amputation(s); 6 % lower limb-length discrepancy (important long-term morbidity).
- 35 % neurological impairment(s).
- 1/16 patients with MSS-associated acute renal failure mild chronic renal failure.
- significantly lower scores on nearly all Health Utilities Index attributes, indicating poorer health status.
- significantly unfavourable health-related quality of life scores mainly on physical domains.
- cognitive functioning similar to those of normative reference groups, but impairments on social and practical understanding, visual-motor integration, attention and executive functioning.
- no significant differences between the proportions of patients scoring in the deviant psychopathological range for problem behaviour and same-aged reference groups.
- adolescents, especially those with skin scarring, lower self-esteem.

Conclusions: A considerable number of MSS survivors showed long-term physical and/or (neuro)psychological problems. A standard follow-up clinic by a multidisciplinary team should be organized for MSS survivors in order to provide adequate quality of care.

16 – INVITED SPEAKER

PULMONARY FUNCTION, EXERCISE CAPACITY AND DAILY ACTIVITY IN YOUNG ADULTS AFTER NEONATAL RESPIRATORY FAILURE

M. Spoel¹, M.H. van der Cammen-van Zijp², R. Laas¹, R.M. Wijnen¹, J.C. de Jongste³, D. Tibboel¹, H. IJsselstijn¹

¹Intensive Care and Pediatric Surgery, ²Department of Rehabilitation Medicine and Physical Therapy, ³Department of Pediatrics, Division of Pediatric Respiratory Medicine, Erasmus MC/Sophia Children's Hospital, Rotterdam, The Netherlands

Background: Limited information is available on long-term outcome of lung function, maximal exercise capacity, severity of fatigue, and level of daily physical activity in young adults treated for neonatal respiratory failure.

Methods: We studied 27 young adults [mean (SD) age: 26.8 years (2.9)] with congenital diaphragmatic hernia (CDH) and 30 matched controls. Controls were matched for age at follow-up, gestational age, birth weight, duration of mechanical ventilation and supplemental oxygen. Lung volumes and diffusion capacity were measured and expressed as mean (SD) standard deviation scores. Prevalence of respiratory symptoms was evaluated with the European Community Respiratory Health Survey. Exercise capacity was measured by cycle ergometry; daily physical activity with an accelerometry-based activity monitor; and fatigue by the Fatigue Severity Scale.

Results: Mild airflow obstruction and reduced diffusion capacity was found in both groups with significantly more peripheral airflow obstruction [FEF_{25–75} –1.5 (1.6) in CDH and –0.2 (1.3) in controls, $p = 0.006$] in CDH patients. Airflow obstruction mildly increased from adolescence into adulthood in CDH patients [FEV₁, –0.8 (1.2) and –1.3 (1.4) respectively, $p < 0.04$]. Both groups had a significantly higher prevalence of doctor-diagnosed asthma (27.6 % in

CDH, 30 % in controls, $p < 0.001$). Lung volumes, exercise capacity, daily activity and fatigue were similar in both groups.

Conclusions and recommendations: We found minor differences between groups indicating that residual lung hypoplasia did not play an important role in this cohort. With increased survival rate in CDH patients, long-term longitudinal follow-up of lung function and exercise capacity is important.

17 – INVITED SPEAKER

LONG TERM COGNITIVE OUTCOME OF TBI SURVIVORS

V. Anderson

Psychology & Deputy Director Integrated Mental Health Program, The Royal Children's Hospital, Melbourne, NSW, Australia

Childhood head injury is amongst the most common causes of childhood mortality and morbidity. Until quite recently there has been a perception that early injury is related to better outcome than at any other time during the lifespan. However, recent research findings question this view, suggesting that early insults can derail normal developmental processes and lead to a range of functional consequences that impact on the child and his/her family in an ongoing way, with significant cost to the victim, family and community.

This paper will describe findings from a prospective, longitudinal study of children with head injury, with the primary aims being: (1) to plot recovery trajectories through childhood and into adolescence and early adulthood; and (2) to characterise the nature of residual impairments.

Findings indicated that children with head injury are at risk for serious and permanent functional impairments. Several risk and resilience factors were also identified which suggest the importance of a number of factors, other than injury characteristics, for determining outcome. These include developmental stage, environmental factors (parent function, SES), and pre-injury function and provide direction for designing effective interventions for these children and their families.

Metabolism, Endocrinology and Nutrition (18–19)

18 – INVITED SPEAKER

HOW TO FEED THE CHILD WITH SHORT BOWEL SYNDROME

J. Olieman

Dietetics and Department of Pediatric Surgery, Erasmus Medical Center-Sophia Children's Hospital, Rotterdam, The Netherlands

Short bowel syndrome (SBS) is characterized by increased intestinal transit time, leading to malabsorption of nutrients and potentially growth retardation. Clinical manifestation is determined by residual small bowel length, presence/absence of enterostomy or ileocecal valve, functional colon length and underlying pathology. These factors affect bowel adaptation and therefore feeding options. Thus, recommendations for type of nutrition are variable with the child's age as an additional key factor. Most data on enteral nutrition in SBS

patients are from retrospective studies and case reports; RCT's are scarce. Current state of research in children with SBS was published and evidence-based recommendations where possible were given. In absence of evidence, clinical recommendations were based on expert opinion.

Evidence-based recommendations:

- Enteral nutrition should be initiated a.s.a.p. to promote intestinal adaptation.
- Breast milk or standard polymeric formula (depending on age) is the recommended initial feed.

Clinical experience based recommendations:

- Enteral nutrition should be administered continuously.
- Bottle-feeding (small volumes) should be started a.s.a.p. in neonates to stimulate suck and swallow reflexes. Solid foods may be introduced at the age of 4–6 months to stimulate oral motor activity and to avoid feeding aversion behavior.

Overall, it can be concluded that there is a significant lack of controlled studies for supporting nutritional management of SBS. Such studies are difficult to perform, since the incidence of the disorder is low and its manifestation may vary in every patient. Consequently, dietary management is highly variable.

19 – INVITED SPEAKER

THE DURATION OF THE ACUTE STRESS RESPONSE IN CRITICALLY ILL CHILDREN

K. Joosten

Pediatric Intensive Care, Erasmus MC-Sophia Childrens Hospital, Rotterdam, The Netherlands

Critical illness can be defined as a life threatening condition mostly resulting from infection, sepsis and trauma and accompanied by similar physiological and biochemical responses, which have been termed the systemic inflammatory response syndrome (SIRS). The associated metabolic, endocrine, nervous and immunological changes are also known as the acute stress response.

Depending on the severity of initial insult pronounced neuroendocrine and metabolic alterations will occur. A key feature is increased sympathetic nervous system activity, resulting in increased levels of adrenaline and glucocorticoids. Subsequently, immune cells are activated and pro-inflammatory cytokines secreted, which trigger further metabolic changes. In addition, insulin secretion is increased as well as the counter regulatory hormones glucagon, catecholamines, cortisol and growth hormone. As a result, glucose production is increased via increased glycogenolysis and gluconeogenesis and insulin resistance develops, leading to hyperglycemia. Also, fat is mobilized (lipolysis) and fat oxidation and ketone body formation are increased, while muscle protein breakdown is stimulated to provide amino acids for protein synthesis in proliferating cells, the production of acute phase proteins and other peptides (e.g. cytokines) and for gluconeogenesis.

Traditionally, in critically adult patients the metabolic response to injury and sepsis is characterized by an ebb and flow phase. The course of critical illness in children differs from adults because critical illness may develop quickly and also recovery can be rapidly. Understanding the metabolic, endocrine nervous and immunological changes of pediatric critical illness is important and may improve outcome, as it allows the rational use of pharmaceutical interventions.

Neuro Critical Care (20)

20 – INVITED SPEAKER

HANDS-ON: WHY AND HOW TO DO AND HOW TO INTERPRETE TRANSCRANIAL (TC) DOPPLER ULTRASOUND (DU)

H. Ringe

Pediatric Intensive Care, Humboldt University, Berlin, Germany

Doppler Ultrasound of the cerebral arteries is an easily available bedside method. It is useful after hypoxaemic ischaemic insult, cerebral vascular surgery or head trauma.

Resistive and pulsatile Index are the most frequent taken measurements but cannot be used as single value to judge adequate or failing cerebral perfusion or intracranial pressure. As shown in figure 1 changes in body homeostasis can alter the results.

TC Doppler examples

Therefore an accurate and careful interpretation of Tc DU results needs to consider, blood pressure, general vessel filling, cardiac output, body-temperature, pH and PCO₂.

Nursing Science Group (21–25)

21 – INVITED SPEAKER

IMPLEMENTATION SCIENCE: THE WAY FORWARD IN ICU NURSING

E. Ista

Intensive Care Unit, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Clinical guidelines and evidence-based interventions can help improve nursing care, but many of them are not effectively implemented in practice. This shortcoming may endanger quality and safety of care. Implementation science is the scientific study of methods to

promote the systematic uptake of clinical research findings, guidelines and other evidence-based practices into routine practice. Given the complex and dynamic ICU environment, simple implementation efforts that are effective in other clinical areas may, however, not result in meaningful change in the ICU.

In an effort to bridge the gap between evidence-based nursing and effective implementation of guidelines and protocols I will (1) give an overview of current developments in implementation science and ways to apply these to nursing; (2) describe a general framework for implementation projects; (3) discuss barriers and facilitators for implementation, and describe current evidence for implementation strategies; and (4) discuss strategies to facilitate successful implementation in nursing ICU practice.

Often seen barriers and facilitators for implementation relate to knowledge, cognitions, attitudes, routines, social influence, care provided by multidisciplinary teams, organization, and resources. Strategies focused on individual professionals and voluntary approaches currently dominate implementation research. Recent reviews also signaled education as a dominant strategy for implementation. Although education and related strategies (e.g. feedback, reminders) can be effective, other strategies such as decision support, use of information and communication technology and patient involvement are still left unexplored. Implementation strategies based on barriers/facilitators are more effective.

In conclusion, clarifying implementation determinants and choosing the most effective strategies is needed to improve ICU-nursing.

22 – INVITED SPEAKER

INTERACTIVE SESSION: DEVELOPING A POSITION STATEMENT ON PAIN, SEDATION AND WITHDRAWAL

E. Ista¹, J. Harris²

¹Intensive Care Unit, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands, ²Pediatric Intensive Care Unit, Evelina Children's Hospital, London, UK

Critically ill children requiring mechanical ventilation almost always receive sedative and analgesic drugs. These will reduce possible distress, anxiety, pain, and facilitate intensive care therapy and nursing care. While undersedation will fail to produce the desired effects, oversedation will lead to prolonged PICU-stay and drug tolerance possibly with withdrawal syndrome. Therefore, sedation and analgesia are recognized as important areas of PICU nursing practice. The Pain and Sedation nursing study group of the ESPNIC—Nursing Science section developed a concept position statement Sedation and Withdrawal Assessment in PICU patients. In addition an extensive search of the available literature was performed for supporting evidence. Relevant published studies were identified through broad searches of the MEDLINE, EMBASE and CHINAL databases.

Based on this several, recommendations were defined for domains: (1) pain assessment (type of instrument, frequency of assessment), (2) sedation assessment, (3) withdrawal assessment, and (4) non-pharmacological interventions.

Prior to the ESPNIC congress 2013, we will send a draft version of the recommendations for pain, sedation and withdrawal assessment in PICU patients to nurse attendees to indicate their agreement. During the congress, the results will be discussed in a 1-hour interactive session. Recommendations that do not achieve consensus will be rewritten with feedback of the individuals.

This consensus statement aims to help standardize the assessment processes used for pain, sedation and withdrawal by all nursing staff across PICU's within Europe in order to deliver best practice to our patients.

23 – INVITED SPEAKER

THE CHALLENGES OF CONDUCTING A RANDOMISED CONTROLLED TRIAL OF NURSE LED VENTILATION WEANING

K. Rushforth

PICU (Ward 2), The Leeds Teaching Hospitals NHS Trust, Leeds, UK

Background: Children in a Paediatric Intensive Care Unit (PICU) may require assistance with breathing via a mechanical ventilator. Weaning from ventilatory support is the transition to spontaneous breathing and has traditionally been undertaken by the medical staff. A randomised controlled study was set up to compare doctors with nurse-led protocol-directed weaning with respect to outcomes including weaning time, PICU length of stay, complications and parental satisfaction with care.

Method: Setting: One single 17 bedded PICU at the Leeds General Infirmary during two winter periods October–March 2001–2002 and 2002–2003. Patients: Infants <1 year (n = 7). Intervention: A concealed random allocation process assigned infants to medical-led (n = 4) or nurse-led protocol-directed weaning (n = 3). Primary outcome: number of hours weaning on a ventilator from time of entry to the trial to extubation. A parental satisfaction with care questionnaire was mailed at 3 months post discharge from PICU.

Results: Nurse-led protocol-directed weaning took longer than in the doctor-led group (mean 56 vs. 38 h) but mean total length of stay was less (135 vs. 155 h). No differences in complications were associated with either study group. Parental satisfaction with care achieved 85 % response rate. Parents of children receiving nurse-led weaning (n = 3) appeared to be more satisfied with care than the doctor-led group (n = 3) (median score n = 37 vs. n = 32).

Conclusion: Few firm study inferences can be made because of the small sample size. This trial struggled to recruit. A restrictive randomisation service and limiting the ventilator type were some of the lessons learned from this trial.

24 – INVITED SPEAKER

HOW TO 'HOOK' A STUDY ONTO THE BACK OF AN EXISTING CLINICAL TRIAL

M.A.Q. Curley^{1,2}

¹School of Nursing; Anesthesia and Critical Care Medicine, University of Pennsylvania, Philadelphia, PA, ²Boston Children's Hospital, Boston, MA, USA

An ancillary study is defined as an investigation involving the parent study subjects using any observation other than those set forth in the parent study protocol. Researchers are encouraged to consider ancillary studies within and outside of the parent study network.

Participation in an ancillary study is subject to the approval of (1) the parent study protocol committee (2) the parent study steering committee; and (3) the primary funding agency. Funding for an ancillary study must be secured and can include investigator-initiated research awards, grants from academic institutions, private sources or those performed at no cost. Sufficient funding for all aspects of the ancillary study including cost incurred by the parent study, the Data Coordinating Center (DCC; sample selection, preparing and documenting analysis files, participating in statistical analysis, and integrating the new ancillary data back into the combined parent study database), and to the Clinical Sites for personnel (obtaining consent, collecting and transmitting data and samples) must be provided by the ancillary study investigators. Ancillary studies are subject to the same policies, reviews, and approvals as the parent protocol. In addition, ancillary studies should not cause a deviation from the defined study protocol; complicate the interpretation of the study results; potentially affect subject cooperation or interest in the study; jeopardize the public image of the study; create a significant diversion of study resources locally or at the DCC; in any way negatively influence the cooperative spirit of the collaborating investigators or otherwise compromise the scientific integrity of the study

25 – INVITED SPEAKER

PEDIATRIC STAFF PERSPECTIVES ON ORGAN DONATION AFTER CARDIAC DEATH IN CHILDREN

M.A.Q. Curley^{1,2}

¹*School of Nursing; Anesthesia and Critical Care Medicine, University of Pennsylvania, Philadelphia, PA,* ²*Cardiovascular and Critical Care Program, Boston Children's Hospital, Boston, MA, USA*

Objectives: The aims of this project were to describe whether or not pediatric clinical staff believe that a donation after cardiac death (DCD) program could be consistent with the mission and core values of a children's hospital and to identify what staff consider essential to the acceptability of such a program.

Methods: Qualitative study in which data were gathered from pediatric clinical staff during eight focus groups conducted in one US children's hospital.

Measurements and Main Results: Eighty-eight staff members participated. Six major themes emerged from qualitative analysis of the data: (1) identifying children who could be candidates for DCD; (2) considering the best interests of the dying child; (3) approaching parents about DCD; (4) preparing parents for their child's DCD; (5) the need to do DCD well; and (6) maintaining program integrity. Themes were used to construct a conceptual framework describing a model pediatric DCD program. Pediatric staff voiced numerous concerns. However, they identified "making it happen for families" who voice a desire to participate in organ donation as the primary reason for program adoption.

Conclusions: This study provides a framework for understanding pediatric staff perspectives on DCD programs in children. Results suggest several possible elements that may be helpful in framing interdisciplinary dialogue and informing institutional practices in the design of a pediatric DCD program.

References:

From Curley MAQ., Harrison CH, Craig N, Lillehei CW, Micheli A., Laussen, PC. (2007). Pediatric staff perspectives on organ donation after cardiac death in children. *Pediatric Critical Care Medicine*, 8(3), 212–219.

Paediatric and Neonatal Intensive Care Nursing (26)

26 – INVITED SPEAKER

PREVENTING PRESSURE ULCERS: ARE WE GETTING ANYWHERE

M.A.Q. Curley^{1,2}

¹*School of Nursing; Anesthesia and Critical Care Medicine, University of Pennsylvania, Philadelphia, PA,* ²*Cardiovascular and Critical Care, Boston Children's Hospital, Boston, MA, USA*

Pressure ulcers (PU) represent a serious yet preventable iatrogenic injury. Most healthcare organizations track their PU prevalence rates to describe the quality of care they provide within their institution. These data are also used to benchmark care quality across healthcare organizations. To better understand an institution's PU rate, it is important to understand their patient populations' level of risk for PU. Successful PU prevention programs should be assessed from a perspective of identifying at-risk patients who remain PU free. Tools that describe PU risk should predict patients at risk and patients not at risk for PU development. The Braden Q Scale for predicting pediatric PU risk is a widely used valid and reliable pediatric-specific PU risk assessment tool. Since its publication in 1996, requests for clarification on how best to use the tool across the spectrum of pediatric patients commonly cared for in healthcare organizations have been received. Common clarifications include using the Braden Q Scale as originally designed; specifically, not using untested derivations of the tool and not using the Braden Q Scale to predict medical device-related PU. Validation of a new tool, the Braden Q + D Scale for predicting both immobility-related and medical device-related pediatric PU risk, is currently underway. This session will provide information on how best to score a patient's risk for PU. Accurate assessment of patient risk is the first step in guiding appropriate interventions that prevent PU. Initiating PU prevention strategies for at-risk patients, rather than all patients, will optimize the appropriate use of resources.

Pharmacology (27–30)

27 – INVITED SPEAKER

LONG TERM EFFECTS OF OPIOID IN THE NEWBORN: OF MICE AND MEN

D. Tibboel

Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

In the last decade a number of questions about the safety dosage and long term effects of opioids have been raised resulting in the following actual research questions:

Does early pain especially in the preterm infant result in long term behavioral effects?

What are the consequences of the off-label and/or unlicensed use of drugs throughout childhood?

What is the relation between experimental findings suggesting increased neuroapoptosis in animals following exposure opioids c.q. benzodiazepines and human data?

With regards to neurotoxicity conflicting results have been published in a variety of animal models using different experimental approaches. To date no human long term data have provided convincing evidence that early pain with or without adequate analgesia results in significant behavioral problems in children up till the age of 9 years. Innovative ways of investigation to evaluate pain threshold as well as nociceptive responses such as quantitative sensory testing in combination with fMRI will potentially answer these questions. Well-defined cohorts of former newborns especially preterm borns with detailed knowledge of opioids/benzodiazepine dosages in the newborn period are now available for evaluation with the focus on abnormal executive functions.

28 – INVITED SPEAKER

TOOLS FOR ASSESSING SEDATION WITHDRAWAL IN NICU & PICU

E. Ista

PICU, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Critically ill children admitted to a pediatric intensive care unit (PICU) are bound to experience some degree of discomfort, distress and pain. This is induced not only by frightening or painful interventions, but also by being separated from the parents and having to endure the stressful PICU environment. They routinely receive benzodiazepines (such as midazolam) and opioids (such as morphine, fentanyl) to relieve distress and/or pain. Prolonged administration of these drugs may induce physiological dependency and withdrawal syndrome. After discontinuation, symptoms of withdrawal may appear after 1 h up to 5 days. An estimated 10–34 % of PICU patients are at risk for withdrawal syndrome. Reported prevalence rates of withdrawal syndrome after having received benzodiazepines and/or opioids for 5 or more days range from 35 to 57 %. It is not easy to diagnose withdrawal symptoms in PICU patients because symptoms may overlap with clinical signs of pain or distress, ventilator distress, delirium and noise-induced stress. These key confounders must be excluded before the diagnosis can be confirmed. Assessing seriously ill children for signs of tolerance, dependence or withdrawal notably falls within the professional domain of the pediatric intensive care nurse. The use of a reliable assessment tool could facilitate this task. Two pediatric withdrawal assessment tools related to both types of drugs are currently available, the Withdrawal Assessment Tool version-1 and the Sophia Observation withdrawal Symptoms-scale. Both have promising psychometric properties. Iatrogenic opioid withdrawal in neonates can be assessed with the Neonatal Abstinence Score and the Modified Narcotic Abstinence Scale.

29 – INVITED SPEAKER

PHARMACOTHERAPY IN THE PRETERM INFANT

K. Allegaert

Neonatal Intensive Care Unit, University hospitals Leuven, Leuven, Belgium

Pharmacotherapy aims to attain safe and effective drug prescription, including in preterm infants. This should be based on integrated knowledge concerning the evolving physiological characteristics of

the infant who will receive the drug and the pharmacokinetic and pharmacodynamic characteristics of a given drug. Consequently, clinical pharmacology in preterm neonates is as dynamic and diverse as the neonates we have in our units.

Covariates explaining the variability are at least as relevant as the median estimates. Covariates of pharmacokinetics (PK, i.e. concentration–time profiles) can predict the exposure time course reasonable accurate. However, maturational trends are not similar for all maturational changes. This will be illustrated based on the differences between hepatic and renal maturation, and on the impact of pharmacogenetics on drug disposition and effects in early life.

The subsequent link between PK and PD, (i.e. pharmacodynamics, concentration effect profile) remains much less explored. We aim to illustrate the complexity and the need for neonatal clinical pharmacology based on the gap between current and likely best clinical practice for two commonly administered compounds (aminoglycosides for infection and ibuprofen for patent ductus arteriosus) and one new compound (bevacizumab, to treat threshold retinopathy of prematurity). Finally, when we prescribe specific compounds, we also should take into account issues related to formulations available. In contrast to dedicated ventilations, infusion equipment and incubators for neonates, we still use untailored formulations, containing either very high concentrations of the therapeutic compounds or potential toxic excipients.

30 – INVITED SPEAKER

PROTOCOLIZED VS NON-PROTOCOLIZED WEANING FROM MECHANICAL VENTILATION

P. Juvet

Pediatrics, Sainte-Justine Hospital, Université de Montréal, Montreal, QC, Canada

There is evidence that clinical decision making using protocols decreases practice variation between clinicians and improves patient outcomes. This is proven in adult critical care units with the use of written protocols developed to improve the weaning of respiratory support. In children, the use of written protocols did not have such an impact. Limited adherence to written protocols was suggested as one of the factors reducing the ability to detect a true benefit associated with weaning written protocols. To overcome limited adherence and improve individual customization of respiratory support, computer-driven explicit protocols have been developed. Our presentation gives an update on the current knowledge on weaning protocols (written and computer-driven) and their clinical impact.

Ethics (31–34)

31 – ORAL PRESENTATION

THE POTENTIAL FOR ORGAN DONATION AMONGST A SPECIALIST CHILDREN'S HOSPITAL NEONATAL POPULATION

E. Charles¹, A. Scales^{2,3}, J. Brierley⁴

¹St George's Medical School, ²Paediatric and Neonatal Intensive Care Unit, Great Ormond Street Hospital, ³NHS Blood and Transplant, Great Ormond Street Hospital, ⁴Paediatric and Neonatal Intensive Care Unit, Great Ormond St Hospital, London, UK

Objectives: Neonatal organ donation does not occur in the UK as national guidelines suggest that it is rarely possible to verify death using neurological criteria under 2 months of age. This effectively precludes organ donation following brain death (DBD) in this age range and there is currently no information on UK potential DBD. The other method of organ donation occurs after withdrawal of ICU and death—donation after circulatory death (DCD)—is not well-described in Europe (DCD).

This study estimates the total donation potential amongst infants who died at the relevant gestation in a tertiary children's hospital.

Methods: Retrospective mortality and clinical document database and patient notes review. Inclusion: All infants dying at 37 weeks gestation and 2 months between January 2006 and October 2012. Assessment of DCD and DBD potential was made using predetermined exclusion criteria based on national guidelines for older children, including mode of dying.

Results: Of 84 infants dying: 34 (40 %) identified as potential DCD donors; 11 (13 %) theoretical DBD donors. 39 (46 %) not potential donors. 10 (12 %) had relative contraindications and for remaining 29 (34 %) the mode of death would not have permitted donation.

Conclusion: This study suggests a significant potential for neonatal organ donation (>50 % babies) within a specialist children's hospital. DCD donation potentially yields cardiac, lung, small bowel and liver, DBD the same. Reconsideration of current guidelines relating to diagnosis of brain stem death in infants under 2 months age is urgently required to facilitate consideration of DBD.

32 – ORAL PRESENTATION

PRENATAL COUNSELLING FOR EXTREMELY PRETERM BIRTH ACCURATE KNOWLEDGE OF PREMATURITY OUTCOMES OF PERINATAL PROFESSIONALS

G. Prairie¹, E. Fortin-Pellerin¹, A. Farrands², T. Lemaitre², C. Catelin^{1,2}, A. Gagneur^{1,2}

¹Pédiatrie, Université de Sherbrooke, ²Centre de Recherche Clinique Etienne le Bel, CHU Sherbrooke, Sherbrooke, QC, Canada

Background and aims: An important component of medical management before a preterm delivery is counselling the parents about the probabilities of survival and of neurodevelopment impairment. We hypothesized that differences could be noted among health care providers (HCP) in their estimates of survival and morbidity rates, and therefore conducted this study to determine the accuracy of knowledge of different health care providers involved in prenatal counselling.

Methods: A prospective study was conducted in Sherbrooke University hospital (Québec, Canada), a tertiary neonatal center, on November 2012. HCP involved in prenatal counselling (neonatal and maternity nurses, neonatologists and paediatrics residents, obstetricians and gynaecologists residents) filled a voluntary and anonymous survey. Knowledge about mortality, long-term disability and guidelines from Canadian and American paediatrics society on antenatal counselling were evaluated. The Canadian Neonatal network provides data on preterm infants' mortality and morbidity.

Results: One hundred and eight HCP were involved in the survey. Statistically significant underestimates of survival rates were seen ($p \leq 0.01$) for nurses and obstetricians at 23–27 weeks of gestation and for neonatologists at 25–26 weeks of gestation. Statistically significant overestimates of long-term disability rates ($p \leq 0.01$) were seen for nurses at ≤ 27 weeks of gestation and for neonatologist and obstetricians at ≤ 26 weeks of gestation.

Conclusion: HCP involved in prenatal counselling underestimated survival rates and overestimated major disability rates for infants at 23–27 weeks of gestation. Educational intervention could be helpful to ameliorate prenatal counselling.

33 – ORAL PRESENTATION

THE EXPERIENCE OF PARENTS REGARDING VENTILATORY SUPPORT WITH TRACHEOTOMY DECISION-MAKING FOR THEIR CHILD WITH TYPE 1 SPINAL MUSCULAR ATROPHY

B. Rul^{1,2}, F. Carnevale^{3,4}, B. Estournet^{1,5}, S. Quijano-Roy^{1,5}, I. Desguerre⁶, C. Hervé²

¹Pôle Pédiatrie, Hôpital Raymond Poincaré, Garches, ²Laboratoire d'Ethique Médicale et Médecine Légale EA 4569, Université Paris-Descartes, Paris, France, ³McGill University, ⁴Montreal Children's Hospital, Montreal, QC, Canada, ⁵Faculté de Médecine, Université de Versailles St-Quentin-en-Yvelines, Montigny-le-Bretonneux, ⁶Service de Neurologie Pédiatrie, Hôpital Necker-Enfants Malades, Paris, France

Background: Type 1 Spinal Muscular Atrophy (SMA) (subdivided in France as Type 1 true or bis), is a neuromuscular disorder that progressively paralyzes the child, compromising the child's prognosis as respiratory muscles are affected. The tracheotomy may help prevent death, but entails ethical questions given the severity of the motor disability that will follow. Regardless of whether or not health care professionals (HCP) agree with performing a tracheostomy for this population, they cannot make this decision alone—parents must be included in the decisional process. Considering that HCP teams in France are tending to favor tracheostomy for Type 1 bis SMA, a study was conducted with parents of these children who had been tracheotomized, to better understand how they experienced this decision.

Method: Interpretive phenomenological interviews of 13 parents of 7 tracheostomized children with SMA Type 1 bis, recruited from two children's hospitals in France.

Results: Initially, parents do not want their children to be tracheostomized. They gradually come to accept the proposed tracheostomy because of a profound feeling of powerlessness regarding the illness and their trust toward the HCP. This decision marked an important turning point, which varied across parents in terms of the difficulties they had to overcome.

Conclusion: The pediatric neurologist, the child's referring physician, is the principal interlocutor for such a tracheotomy decision. This decision relies on the treatment discussions that the physician has with the parents.

34 – ORAL PRESENTATION

OBSTETRICIAN RELIGION AND VIEWS ABOUT PERINATAL MANAGEMENT OF TRISOMY 18 IN THE UK

D. Wilkinson^{1,2}, L. de Crespigny², C. Lees³, J. Savulescu², P. Thiele⁴, T. Tran¹, A. Watkins⁵

¹Robinson Institute, University of Adelaide, North Adelaide, SA, Australia, ²Oxford Uehiro Centre for Practical Ethics, University of Oxford, Oxford, ³Addenbrookes Hospital, Cambridge, UK, ⁴Monash University, Frankston, ⁵Mercy Hospital for Women, Melbourne, VIC, Australia

Background and aims: Trisomy 18 (T18) is one of the commonest major chromosomal abnormalities. In many parts of the world the majority of affected pregnancies are terminated. This study aimed to examine obstetric management of T18, and the factors influencing practice

Methods: Fellows/members of RCOG were contacted by email and invited to take part in an anonymous electronic survey. The survey asked basic demographic information, experience, attitudes and knowledge relating to T18, and response to a hypothetical case. Questions about religion were based on the British Social Attitudes survey.

Results: 666/2,885 (23 %) practising obstetricians/gynaecologists answered the survey. Most had managed a case of T18 in the last 2 years. 53 % (275) respondents indicated that they were somewhat, very or extremely religious, while 20 % (101) were somewhat, very or extremely non-religious, and 27 % (139) were neither religious nor non-religious (neutral). Religious obstetricians were more likely than non-religious to cite an ethical or moral objection to termination of pregnancy (TOP) (32 vs 3 %, $p < 0.0001$), and less likely to offer TOP following antenatal diagnosis of T18 (92 vs 99 %, $p = 0.03$). Non-religious respondents were more likely to support non-resuscitation at birth (75 %) than religious (44 %) or neutral (56 %) respondents ($p < 0.0001$). Religious respondents had similar expectations about outcome for fetuses and infants with T18 to non-religious respondents. The religion of obstetricians was not associated with provision of maternal-focused or fetal-oriented obstetric care.

Conclusions: There is variability in UK obstetricians' knowledge of and attitudes towards T18, and this appears to be influenced by obstetrician religion.

Haemodynamics and Congenital Heart Disease (35–38)

35 – ORAL PRESENTATION

PATENT DUCTUS ARTERIOSUS IN EXTREME PRETERM INFANTS; A RETROSPECTIVE MULTICENTER STUDY IN THE NETHERLANDS

E.J.S. Jansen¹, K.P. Dijkman¹, W.P. de Boode², R.A. van Lingen³, W.B. de Vries⁴, D.C. Vijlbrief⁴, C. Schroer⁵, M.M.C. Molenschot⁶, F.C.M. Evens⁷, P. Andriessen¹

¹Neonatology, Máxima Medical Center, Veldhoven, ²Neonatology, Radboud University Nijmegen Medical Center, Nijmegen, ³Neonatology, Isala Clinics, Zwolle, ⁴Neonatology, University Medical Center Utrecht, Utrecht, ⁵Pediatric Cardiology, Máxima Medical Center, Veldhoven, ⁶Pediatric Cardiology, ⁷Pediatric Cardiosurgery, University Medical Center Utrecht, Utrecht, The Netherlands

Background: The most important risk factor for the development of a hemodynamically significant patent ductus arteriosus (PDA) is preterm birth. More extreme preterm infants are admitted to the NICU in the Netherlands due to recent policy changes. This may lead to more infants with a PDA, who after drug treatment failure have to be transferred to a cardiac surgical department for ductal ligation. As no national guideline is present for the treatment of PDA, this may result in local differences in incidence of ductal surgery.

Aim: To determine the incidence of PDA, ductal ligation and adjusted mortality in four perinatal centers.

Method: In a retrospective multicenter study all preterm infants born between 24⁺⁰ to 27⁺⁶ weeks of gestation in 2010 and 2011 were included.

Results: The investigated NICU's had comparable extreme preterm birth. However significant differences were observed in incidence of PDA, drug treatment and need for surgical ligation. Furthermore there were significant differences in adjusted mortality for gestational age and early treatment. No difference in adjusted mortality between the centers was found (Tables 1 and 2).

Table 1 Number of preterm infants treated for PDA

Total live born infants admitted to NICU (n = 368)	UMCU n = 104	UMCN n = 82	Isala n = 76	MMC n = 106
PDA and drug treatment [#]	45 %	63 %	33 %	59 %
Ductal ligation [#]	12 %	5 %	5 %	31 %
Ductal ligation after drug failure [€]	17 %	8 %	16 %	52 %

[#] As percentage of live born; [€]As percentage of PDA and drug treatment; Chi-square PDA treatment, ductal ligation and ductal ligation after drug failure vs. center: $p < 0.005$

Table 2 Adjusted mortality related to PDA treatment (n = 187, binary logistic model)

	Adjusted odds ratio	95 % confidence interval	significance
Gestational age	0.52	[0.34–0.78]	<0.005
Drug treatment [#]	0.34	[0.12–0.97]	<0.05
UMCU [€]	1	n/a	n/a
MMC	0.76	[0.22–2.57]	ns
UMCN	2.04	[0.63–6.64]	ns
Isala	1.69	[0.34–8.29]	ns

[#] Late (≥ 3 days) versus early drug treatment (0–2 days); [€]Reference hospital; n/a not applicable; ns not significant

Conclusion: This study emphasizes the need for a uniform guideline for PDA treatment.

36 – ORAL PRESENTATION

EARLY RIGHT VENTRICULAR DIASTOLIC FUNCTION PREDICTS OUTCOME IN INFANTS WITH CONGENITAL DIAPHRAGMATIC HERNIA

N. Patel, F. Moenkemeyer

Newborn Intensive Care Unit, Royal Children's Hospital, Melbourne, VIC, Australia

Background and aims: In congenital diaphragmatic hernia (CDH), pulmonary hypertension (PAH) is a major cause of morbidity and mortality. PAH increases right ventricular (RV) afterload leading to impaired myocardial function. Using Tissue Doppler imaging (TDI)

this study investigated the relationship between RV function and illness severity and outcome in CDH.

Method: Serial echocardiograms were performed in 20 infants with CDH to assess pulmonary artery pressure (PAP) and RV function. TDI E' and S' myocardial velocities in the RV were measured to assess diastolic and systolic function respectively. Length of stay [LOS] and duration of respiratory support [DRS] were recorded. Correlation and receiver-operating characteristics (ROC) were calculated.

Results: Mean RV E' on day 1–2 of life (RV E' _{D1–2}) correlated significantly with LOS ($r^2 = 0.60$, $P < 0.001$) and DRS ($r^2 = 0.46$, $P = 0.004$). PAP and RV S' did not correlate with outcome measures. Median DRS was 25 days. At ROC analysis a cut-off RV E' _{D1–2} of <4.6 cm/sec predicted DRS > 25 days with 88 % sensitivity and 78 % specificity, ($P = 0.007$, $SE = 0.08$, $AUC = 0.89$). Infants with more severe disease (DRS > 25 days) had significantly lower mean RV E' throughout the first 3 weeks of life.

Conclusions: TDI assessment of RV diastolic function allows early stratification of disease severity and predicts outcome in CDH. RV diastolic dysfunction may be a key pathophysiological determinant of clinical severity in CDH.

37 – ORAL PRESENTATION

DIAGNOSIS AND MANAGEMENT OF HYPOTENSION IN EXTREMELY LOW GESTATIONAL AGE NEWBORNS: THE HIP SURVEY

Z. Stranak, J. Semberova, HIP Trial Collaborators

Institute for the Care of Mother and Child, Prague, Czech Republic

Objectives: To evaluate practices in NICUs concerning the diagnosis, therapeutic intervention and overall management of hypotension in ELGA in the first few days of life.

Methods: A web based questionnaire addressing diagnostic and management criteria was developed by the HIP consortium.

Results: There were 216 completed answers from 38 countries. Hypotension was defined mostly as blood pressure in mmHg below the gestational age in weeks (73 %, 95 % CI 67–80 %). Clinical evaluation was the most relied on diagnostic method among responders (100 %). Ancillary methods were used by over 60 % of the participants (95 % CI 54–67 %) with echocardiography primary method (74 %, 95 % CI 68–81 %). When echocardiography is used, left ventricular output and fractional shortening are the two most common measurement tools. The first step in hypotension treatment is volume administration by 85 % of respondents. Dopamine is the most common inotrope used as the initial therapy (62 %, 95 % CI 55–69 %). If the initial inotropic therapy failed, Dobutamine with Dopamine is the most popular second line treatment combination (28 %). Great variation exists in the second choice of drug to treat circulatory disturbances.

Conclusion: This survey highlights that the definition and management of hypotension in ELGA remains traditional and predominantly conservative, but we were able to document new approaches in some centers. There is an apparent marked increase in utilization of functional echocardiography. In the terms of management Dopamine continues to be the most frequently prescribed vasopressor.

This research has received funding from the EU FP7/2007–2013 under grant agreement no. 260777 (The HIP Trial).

38 – ORAL PRESENTATION

ACUTE KIDNEY INJURY FOLLOWING EXTRACORPOREAL MEMBRANE OXYGENATION WITH CONCURRENT HEMOFILTRATION

A.J.M. Zwiers¹, K. Cransberg², E.D. Wildschut¹, D. Tibboel¹, S.N. de Wildt¹

¹Department of Intensive Care and Pediatric Surgery, ²Department of Pediatrics, The Division of Pediatric Nephrology, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Background: During ECMO treatment fluid retention is common which can be managed by diuretic therapy and/or continuous hemofiltration (HF). However, HF especially in combination with diuretics may increase the risk of prerenal acute kidney injury (AKI).

Aim: This study aims to evaluate AKI following ECMO with concurrent HF, with or without repeated diuretic therapy.

Methods: All neonates (≤ 28 days) treated with ECMO and standard HF between 2007 and 2011 were included. Patients were divided into groups and compared using Mann-Whitney U or Chi Square statistics: Group-1, patients who received no or one single dose of diuretics and Group-2, patients who repeatedly received diuretics. AKI up to 3 days post-ECMO was defined as the maximal serum creatinine (SCr)-based RIFLE category attained (risk, injury, or failure being 150, 200 or 300 % of median SCr reference values for age).

Results: 56 neonates received ECMO support with HF, 6 died following decannulation and 6 others were lost to follow-up. Of the 17 patients in Group-1, 3 (18 %) qualified as risk and 1 (6 %) as injury. Of the 27 patients in Group-2, 3 (11 %) qualified as risk, 4 (15 %) as injury and 9 (33 %) as failure ($p = 0.043$). Baseline characteristics (e.g. diagnosis, RIFLE-score, PIM/PRISM) were similar in both groups whereas length of ICU stay ($p = 0.015$) and mechanical ventilation days ($p = 0.002$) were increased in Group-2.

Conclusion: Incidence and severity of AKI immediately post-ECMO was significantly higher in patients who repeatedly received diuretics during ECMO. Future research should focus on underlying mechanisms (e.g. volume-depletion, nephrotoxicity) of an increased AKI risk in ECMO patients receiving diuretics.

Healthcare (39–42)

39 – ORAL PRESENTATION

BENCHMARKING PICUS: DETECTION OF OUTLIERS DEPENDS ON THE RISK-ADJUSTMENT TOOL USED

I. Visser¹, J.A. Hazelzet¹, N.J.G. Jansen², E.W. Steyerberg³, Dutch PICE study group

¹Erasmus MC-Sophia Children's Hospital, Rotterdam, ²Department of Pediatric Intensive Care, University Medical Center Utrecht-Wilhelmina Children's Hospital, Utrecht, ³Department of Public Health, Center for Medical Decision Making, Erasmus MC-University Medical Center Rotterdam, Rotterdam, The Netherlands

Background: A previous study into the external validity of general PICU mortality risk models in the Netherlands found PIM2 and PRISM3-24 models to be approximately equally valid general risk adjustment tools.

Aim: Assess model effects in detecting outliers when comparing risk adjusted PICU mortality.

Methods: Data obtained from the Dutch national PICU admissions registry (PICE) between 2006 and 2009. Mortality risk adjustment was assessed by PIM2 and PRISM3-24 after re-estimating risk-coefficients for both models to the average mortality rate in the overall study population (PIM2NL and PRISM3-24NL). PICU outliers were detected using funnelplots.

Results: 12,040 Consecutive admissions to 7 PICUs with 421 deaths. National re-estimated models, PIM2NL and PRISM3-24NL detected different outliers. Mortality ratios after adjustment with PRISM3-24NL lay closer to each other than after adjustment with PIM2NL and all within 2SD limits to the national average. After adjustment to PIM2NL three PICUs were detected lying outside 2SD limits but within 3SD limits: one PICU above and two PICUs below 2SD from the national average (figure 1).

Fig. 1 Funnelplot for Dutch PICUs with local reestimated PRISM3-24(NL) and PIM2(NL)

Conclusion: Detection of outliers in PICU benchmarking depends on the choice of adjustment tool.

40 – ORAL PRESENTATION

SOCIAL-ECONOMIC INEQUALITY IN THE PICU? ADMISSION RATES AND RISK ADJUSTED MORTALITY FOR PATIENTS FROM DEPRIVED AREAS

I.H.E. Visser¹, J.A. Hazelzet¹, N.J.G. Jansen², E.W. Steyerberg³, Dutch PICE Study Group

¹Erasmus MC-Sophia Children's Hospital, Rotterdam, ²Department of Pediatric Intensive Care, University Medical Center Utrecht-Wilhelmina Children's Hospital, Utrecht, ³Department of Public Health, Center for Medical Decision Making, Erasmus MC-University Medical Center Rotterdam, Rotterdam, The Netherlands

Background: Gallo et al. (PLoS One; 2012) described social-economic inequalities in general mortality rates across Europe but Parslow et al. (Arch Dis Child; 2009) concluded that patients from more deprived backgrounds in England and Wales did not have higher mortality rates after adjustment for mortality risk.

Aim: Describe incidence and outcome for patients from deprived areas admitted to the paediatric intensive care in the Netherlands.

Methods: Data obtained from the Dutch national PICU registry from 2006 to 2009. Deprived areas as defined by the Netherlands Institute

for Social Research (<http://www.scp.nl/english/>) were used as proxy for lower social-economic status. Mortality rates were adjusted for mortality risk (SMR) using national re-estimated PIM2 and PRISM3-24 (PIM2NL and PRISM3-24NL).

Results: 11,380 admissions (383 deaths) from 7 PICUs were included. Children from deprived areas (20.0 %) were more frequently admitted to the PICU than expected (16.4 %) and had a higher crude PICU mortality rate (4.4 %) than from non-deprived areas (3.1 %) with an crude SMR: 1.30 (95 % CI 1.06–1.58).

After risk adjustment patients admitted from deprived areas had still a higher mortality rate, but not significantly: SMR PRISM3-24NL: 1.14 (0.93–1.39) and SMR PIM2-NL: 1.12 (0.92–1.37), for admissions from non-deprived areas: SMR PRISM3-24NL: 0.94 (0.84–1.06) and SMR PIM2-NL: 0.93 (0.83–1.05).

Conclusion: Children from deprived areas are more frequently admitted to the PICU and have higher risk profiles, which largely explain their higher mortality rates than observed for children from non-deprived areas.

41 – ORAL PRESENTATION

EFFECTS OF PHOTOTHERAPY USING DIFFERENT LIGHT SOURCES ON OXIDANT AND ANTIOXIDANT STATUS OF NEONATES WITH JAUNDICE

Y. Kale, O. Aydemir, U. Celik, A.Y. Bas, N. Demirel

Department of Neonatology, Etlik Zübeyde Hanım Women's Health Teaching and Research Hospital, Ankara, Turkey

Background and aim: Neonates have limited antioxidant protective capacity. It has recently been demonstrated that phototherapy used for treatment of neonatal jaundice produces oxidative stress. Various phototherapy devices using different light sources are available for phototherapy. We aimed to investigate effects of phototherapy applied with different light sources on the global oxidant/antioxidant status in neonates.

Method: A prospective controlled study was conducted. Otherwise healthy term and late-preterm (>35 weeks) neonates younger than 10 days postnatal age hospitalized to receive phototherapy for

Table 1

	Group 1 (n = 29)	Group 2 (n = 29)	Group 3 (n = 29)	p
Birth weight (g)	3,060 ± 464	3,171 ± 394	3,036 ± 429	0.444
Gestational age (weeks)	38 (35–40)	39 (36–40)	38 (35–41)	0.163
Gender (F/M)	11/18	14/15	9/20	0.400
Age at the beginning of therapy (h)	136 (50–190)	120 (48–210)	140 (52–225)	0.419
Total serum bilirubin at the beginning of therapy (mg/dl)	19 ± 2.4	19.4 ± 3	18.6 ± 2.7	0.564
Change in total serum bilirubin after 24 h (mg/dl)	5.8 (3.1–9.5)	9.4 (1.8–13)	5.6 (1.8–11)	<0.001
TAC at the beginning of therapy (mmol Trolox equiv/L)	3.20 (2.00–4.30)	3.10 (3.00–3.60)	3.20 (3.00–3.80)	0.241
TOS at the beginning of therapy (μmol H ₂ O ₂ /L)	10.7 (1.7–37.5)	6.4 (2.1–37.5)	9.2 (1.1–35.3)	0.760
OSI at the beginning of therapy	0.02 (0.01–0.11)	0.02 (0.01–0.12)	0.03 (0.01–0.11)	0.790

Table 2

	TAC (mmol Trolox equiv/L)			TOS (μ mol H2O2/L)			OSI		
	TAC1	TAC2	P	TOS1	TOS2	P	OSI1	OSI2	P
Group 1	3.20 (2.00–4.30)	3.00 (1.80–3.90)	<0.001	10.7 (1.7–37.5)	22 (2.7–38.5)	<0.001	0.02 (0.01–0.11)	0.07 (0.01–0.15)	<0.001
Group 2	3.10 (3.00–3.60)	2.80 (1.70–3.50)	<0.001	6.4 (2.1–37.5)	16.7 (1.8–34)	<0.001	0.02 (0.01–0.12)	0.06 (0.01–0.11)	<0.001
Group 3	3.20 (3.00–3.80)	3.00 (2.40–3.20)	<0.001	9.2 (1.1–35.3)	14.8 (1.8–36.1)	0.057	0.03 (0.01–0.11)	0.05 (0.01–0.10)	0.038

nonhemolytic jaundice were enrolled. Infants who received conventional phototherapy with fluorescent lamps were defined as group 1, those who received intensive light emitting diode (LED) phototherapy as group 2, and fiberoptic phototherapy as group 3. The serum total antioxidant capacity (TAC) and total oxidant status (TOS) were measured before and 24 h after phototherapy. Oxidative stress index (OSI) was calculated.

Results: Twenty nine patients were included in each group. At the beginning of phototherapy serum TAC, TOS and OSI levels were similar in all groups. After phototherapy serum TAC decreased significantly in all three groups ($p < 0.001$). Total oxidative stress increased significantly in group 1 ($p < 0.001$) and group 2 ($p = 0.001$) where as a statistically insignificant increase was observed in group 3 ($p = 0.057$). After phototherapy OSI increased significantly in group 1 ($p < 0.001$), group 2 ($p = 0.001$), and group 3 ($p = 0.038$).

Conclusion: These results suggest that oxidative stress increases after phototherapy with fluorescent lamp and LED devices, and to a lesser extend with fiberoptic devices. Phototherapy decreases antioxidant capacity regardless of the light source and intensity

42 – ORAL PRESENTATION

PIM3: AN UPDATED MODEL FOR PREDICTING MORTALITY IN PEDIATRIC INTENSIVE CARE

L. Straney¹, A. Clements², R.C. Parslow³, G. Pearson⁴, F. Shann⁵, J. Alexander⁶, A. Slater^{6,7}, the ANZICS Paediatric Study Group and the Paediatric Intensive Care Audit Network

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, ²School of Population Health, The University of Queensland, Brisbane, QLD, Australia, ³Centre for Epidemiology and Biostatistics, University of Leeds, Leeds, ⁴Birmingham Children's Hospital, Birmingham, UK, ⁵Royal Children's Hospital, Melbourne, VIC, ⁶Australian and New Zealand Intensive Care Society, ⁷Royal Children's Hospital, Brisbane, QLD, Australia

Objective: To provide an updated version of the Pediatric Index of Mortality 2 (PIM2) for assessing the risk of mortality among children admitted to an intensive care unit (ICU).

Methods: We conducted an international, multi-centre, prospective cohort study using data from sixty ICUs that accept pediatric admissions in Australia, New Zealand and the United Kingdom. We included all children admitted in 2010 and 2011 who were aged <16 years at the time of admission and either died in ICU or were discharged. 53,112 patient admissions were included in the analysis. A revised prediction model was built using hierarchical logistic regression. Variable selection was based on significance at the 5 % level and overall improvement of the model's discriminatory performance and goodness of fit.

Results: The final model discriminated well (area under the curve (AUC) 0.88, 95 % CI 0.88–0.89), however the model performed

better in Australia and New Zealand than in the UK (AUC was 0.91, 0.90–0.93 and 0.85, 0.84–0.86 respectively). The model predicted well across different diagnostic groups and unit sizes. At the unit level, the concordance between the number of deaths observed and expected was 0.942.

Conclusions: PIM2 over-predicted the risk of mortality in children admitted to ICU in 2010 and 2011. PIM3 provides an international standard based on a large contemporary dataset for the comparison of risk-adjusted mortality among children admitted to intensive care.

Infection, Systemic Inflammation and Sepsis (43–46)

43 – ORAL PRESENTATION

EFFECT OF HYDROCORTISONE IN TERM NEONATES WITH VASOPRESSOR RESISTANT SEPTIC SHOCK. A RANDOMIZED CONTROLLED TRIAL

N.B. Mathur, M. Nimesh

Department of Pediatrics, Maulana Azad Medical College, New Delhi, India

Objectives: This study evaluated the occurrence of adrenal insufficiency and the effect of hydrocortisone in term neonates with vasopressor resistant septic shock on cumulative dose and duration of inotropes compared with administration of placebo (controls).

Methods: This pilot randomized placebo controlled open label trial was conducted in a tertiary referral neonatal unit and was approved by institutional ethical committee. Neonates with major congenital malformations were excluded. Eighty term neonates with septic shock requiring dopamine 15 μ g/kg/min were randomized (computer generated with concealed sequence) to receive hydrocortisone or placebo (equal volume saline).

Result: The baseline characteristics of both groups were comparable. Occurrence of relative adrenal insufficiency (serum cortisol <18 μ g/dl) was 29 % (16 % in study group and 13 % in controls). Mean duration of dopamine, dobutamine and adrenaline was lesser in hydrocortisone group (21 $\pm$ 14 versus 23 $\pm$ 20 h, 22.9 $\pm$ 13.3 versus 24.6 $\pm$ 21.6 h and 12.9 $\pm$ 9 versus 25.5 $\pm$ 23 h respectively). Cumulative doses of dopamine, dobutamine and adrenaline were lesser in hydrocortisone group. Dobutamine was required in only 21 cases in hydrocortisone group versus 29 in controls. Adrenaline was required in only 13 cases in hydrocortisone group versus 19 in controls. However, the differences were not significant.

Conclusions: Adrenal insufficiency was observed in 29 % term neonates with vasopressor resistant septic shock. There was earlier reversal of shock with lower dose, duration and number of inotropes required in the hydrocortisone group. However, the differences were not significant. Larger multicentric trials are recommended.

44 – ORAL PRESENTATION

LIPOPOLYSACCHARIDE BINDING PROTEIN (LBP) AS MARKER OF FETAL/NEONATAL INFLAMMATORY RESPONSE SYNDROME AFTER PRETERM PREMATURE RUPTURE OF MEMBRANES

M. Pavcnik Arnol¹, M. Lucovnik², L. Kornhauser Cerar², T. Premru Srsen², M. Derganc¹

¹Department of Pediatric Surgery and Intensive Care, ²Department of Obstetrics and Gynecology, Division of Perinatology, University Medical Center, Ljubljana, Slovenia

Background and aims: Fetal inflammatory response syndrome (FIRS) is a risk factor for adverse neonatal outcome. We studied the diagnostic accuracy of lipopolysaccharide binding protein (LBP) for detecting FIRS in preterm neonates born after preterm premature rupture of membranes (PPROM).

Methods: Prospective observational study in the level III NICU; 42 neonates born to mothers with PPRM at gestational age between 23 + 6 and 31 + 6 weeks were enrolled. LBP, CRP, IL-6 and WBC count with differential were measured in cord blood at delivery, using Immulite[®] LBP and Immulite[®] IL-6; DPC, USA. Neonates were classified into FIRS (n = 22) and no FIRS (n = 20) group according to IL-6 level. Neurological examination at 12 months' corrected age was performed according to a standardized protocol.

Results: LBP was significantly higher in neonates with FIRS than in those without FIRS at delivery (median 21.6 mg/L vs. median 2.3 mg/L; $p < 0.0001$). Area under the ROC curve (AUC) for FIRS at delivery was 0.98 (95 % CI 0.88–1.0) for LBP, 0.92 (95 % CI 0.80–0.99) for CRP and 0.82 (95 % CI 0.64–0.94) for immature to total neutrophil ratio. Serum LBP concentration in cord blood at delivery was significantly higher in neonates with abnormal neurological exam at 12 months than in those with normal neurological exam (median 19.5 mg/L vs. median 3.75 mg/L; $p < 0.015$).

Conclusions: In preterm neonates born to asymptomatic women with PPRM, LBP in cord blood at delivery is an excellent diagnostic biomarker of FIRS with prognostic potential.

45 – ORAL PRESENTATION

THE COMBINATION OF PANCREATIC STONE PROTEIN AND PROCALCITONIN IMPROVES DIAGNOSIS OF EARLY-ONSET NEONATAL SEPSIS

L.J. Schlapbach^{1,2}, R. Graf³, A. Woerner², M. Fontana⁴, U. Zimmermann-Baer⁵, D. Glauser⁵, E. Giannoni⁶, T. Roger⁷, C. Mueller⁸, M. Nelle², M. Stocker⁴

¹Paediatric Critical Care Research Group, Paediatric Intensive Care Unit, Mater Children's Hospital, Brisbane, QLD, Australia, ²Neonatal and Pediatric Intensive Care Unit, Department of Pediatrics, University of Berne, Bern, ³Swiss HPB Center, Department of Surgery, University Hospital Zurich, Zurich, ⁴Neonatal Intensive Care Unit, Children's Hospital Lucerne, Lucerne, ⁵Clinic of Neonatology, Department of Pediatrics, Cantonal Hospital Winterthur, Winterthur, ⁶Service of Neonatology, ⁷Infectious Diseases Service, Centre Hospitalier Universitaire Vaudois and University of Lausanne, Lausanne, ⁸Institute for Pathology, University of Berne, Bern, Switzerland

Objectives: Early-onset sepsis (EOS) represents one of the main causes for NICU admission in newborns and imposes a considerable

burden on health care systems. Sensitivity and specificity of procalcitonin (PCT) are only moderate in EOS due to the physiologic PCT increase after birth. Pancreatic stone protein (PSP) is a promising sepsis marker in adults.

Methods: Prospective multicentre study including 137 infants >34 weeks gestational age admitted with suspected EOS. PSP, PCT, sTREM-1, MIF and CRP were measured at admission.

Results: PSP was significantly higher in infected compared to uninfected infants (median 11.3 versus 7.5 ng/ml, $p = 0.001$). The ROC area under the curve resulted at 0.69 (95 % CI 0.59–0.80, $p < 0.001$) for PSP, at 0.77 (95 % CI 0.66–0.87, $p < 0.001$) for PCT, 0.66 (95 % CI 0.55–0.77, $p = 0.006$) for CRP, 0.62 (0.51–0.73, $p = 0.055$) for sTREM-1 and 0.54 (0.41–0.67, $p = 0.54$) for MIF. In multivariate models, increased PSP levels showed the strongest association of all markers with EOS and $PSP > 9$ ng/ml independently of PCT predicted EOS ($p < 0.001$). Combining both markers significantly increased the ability to diagnose EOS. The bioscore combining PSP and PCT performed best with an AUC of 0.83 ($p < 0.001$) and was superior to PCT or PSP alone. The combined PSP/PCT score had a NPV of 100 % if both markers were below cut-off and a PPV of 71 % if both were positive.

Conclusions: The performance of PSP and PCT was far superior compared to traditional markers and a combination bioscore improved diagnosis of sepsis. PSP is a promising biomarker in combination with PCT in EOS.

46 – ORAL PRESENTATION

EFFICACY OF ANAKINRA PROPHYLAXIS IN THE EXPERIMENTAL BRONCHOPULMONARY DYSPLASIA MODEL OF NEWBORN RATS

S. Yurttutan¹, M.Y. Oncel¹, R. Ozdemir², B. Uysal³, I.I. Gonul⁴, F.E. Canpolat¹, U. Dilmen^{1,5}

¹Division of Neonatology, Zekai Tahir Burak Maternity Teaching Hospital, Ankara, ²Division of Neonatology, Inonu University, Malatya, ³Physiology, Gulhane Military Medical Academy, School of Nursing, ⁴Pathology, Gazi University Medical Faculty, ⁵Department of Pediatrics, Yildirim Beyazıt Medical Faculty, Ankara, Turkey

Background: Chronic lung disease (CLD) is a significant cause of respiratory morbidity in premature infants. Uncontrolled and exaggerated inflammatory activity is an important branch of pathogenesis of CLD in preterm infants.

Objective: To evaluate of anakinra prophylaxis which is provide interleukin-1 receptor antagonist in an experimental CLD model of newborn rats.

Methods: Twenty-eight rat pups were divided into three groups: control (n = 10), hyperoxia (n = 10), and hyperoxia-anakinra (n = 8). The hyperoxia groups were exposed to >95 % oxygen from days of life 1–10. On day 10, the animals were processed for lung histology and tissue analysis. Lung morphology was assessed by alveolar surface area. The degree of lung inflammation and antioxidant capacity were assessed by quantifying TNF- α , TGF-Beta, malondialdehyde (MDA), superoxide dismutase (SOD) from lung homogenate. **Results:** Anakinra was not prevented lung damage when the evaluated alveolar surface area of study groups ($p > 0.05$). The mean level of lung MDA was significantly higher in anakinra-treated group compared to hyperoxia group and control group (both; $p < 0.05$). Lung homogenate SOD activities in anakinra-treated group were significantly lower than hyperoxia group ($p < 0.05$). Furthermore, anakinra-treated pups had higher levels of TNF- α and TGF- β 1 in lung homogenate from the hyperoxia groups ($p < 0.05$).

Conclusion: Anakinra prophylaxis resulted in worsed alveolar architecture, decreased SOD activities, increased MDA, TNF- α and TGF- β levels in an animal model of CLD. We suggest that anakinra prophylaxis does not seem to be preventive in the development of CLD in animal model of newborn rats.

Long term Outcome (47–50)

47 – ORAL PRESENTATION

EFFECT OF ZINC SUPPLEMENTATION ON NEURO-DEVELOPMENT, MORBIDITY, SERUM ALKALINE PHOSPHATASE AND GROWTH OF PRETERM NEONATES: A RANDOMIZED CONTROLLED TRIAL

N.B. Mathur, D.K. Agrawal

Department of Pediatrics, Maulana Azad Medical College, New Delhi, India

Objectives: Preterm infants have a high risk of zinc deficiency and high nutrient demand. The objective of the present study was to assess the impact of zinc supplementation on neuro-development (Primary objective), serum alkaline phosphatase, episodes of infection, and growth in preterm neonates compared with no zinc supplement group (Controls) at 3 month corrected age.

Methods: This pilot open labelled randomized controlled trial was conducted at referral neonatal unit of a tertiary teaching hospital. The study was approved by the institutional ethical committee. 100 pre-term neonates were randomized either to receive zinc (2 mg/kg/day) or not. Rest of the management was similar in both groups. Neuro-developmental status (Amiel-Tison assessment), episodes of infections and anthropometry were evaluated at enrollment, 40 weeks post conceptional age (PCA) and 3 months corrected age. Serum alkaline phosphatase was estimated at enrollment and 3 months corrected age. Statistical analysis was done using SPSS 12.

Results: At 40 weeks PCA, more of zinc supplemented infants demonstrated alertness and attention pattern normal for their age ($p = .021$), while signs of hyper excitability at 40 week PCA ($p = .001$) and 3 months corrected age were less common ($p = .003$). At 3 months corrected age, serum alkaline phosphatase was significantly higher in the zinc group ($p = .046$). A two and half times lower incidence of infections was observed in zinc supplemented group compared to controls ($p = .05$). No significant difference was observed in anthropometry.

Conclusion: Zinc supplementation in preterm infants till 3 months corrected age improved alertness and attention, decreased hyper excitability and reduced infections.

48 – ORAL PRESENTATION

DURATION OF MECHANICAL VENTILATION AND NEURODEVELOPMENTAL OUTCOME IN EXTREMELY PRETERM INFANTS: PRELIMINARY DATA FROM THE SWISS NEONATAL NETWORK

L. Schlapbach^{1,2}, E. Proietti², M. Adams³, S. Grunt⁴, C. Borradori-Tolsa⁵, M. Bickle-Graz⁶, H.-U. Bucher³, B. Latal⁷, G. Natalucci³, Swiss Neonatal Network & Follow-Up Group

¹Paediatric Critical Care Research Group, Paediatric Intensive Care Unit, Mater Children's Hospital, Brisbane, QLD, Australia, ²Neonatal and Pediatric Intensive Care Unit, Department of Pediatrics, University of Berne, Bern, ³Department of Neonatology, University Hospital Zurich, Zurich, ⁴Division of Neuropaediatrics, Development and Rehabilitation, University Children's Hospital Berne, Bern, ⁵Department of Paediatrics, Geneva University Hospital, Geneva, ⁶Division of Neonatology, Department of Paediatrics, Centre Hospitalier Universitaire Vaudois, Lausanne, ⁷Child Development Centre, University Children's Hospital Zurich, Zurich, Switzerland

Background and aims: Invasive ventilation (IV) of extremely premature infants harbours potentially harmful effects, such as decreased cerebral blood flow, ventilator-induced lung injury, and increased risk of nosocomial infections. We assessed the impact of the duration of IV on outcome at 2 years of age in a recent national cohort of extremely premature infants.

Methods: This study is based on the national registry of preterm infants born in Switzerland between 24^{0/7} and 27^{6/7} weeks during 2000–2008. Neurodevelopmental disability (ND) was assessed using Bayley Scales of Infant Development-II and the Gross Motor Function Classification System. Adverse outcome (death or severe ND), and unfavourable outcome (death or any ND) were analysed using multivariable logistic regression with adjustment for perinatal factors known to affect outcome.

Results: Of 856 infants surviving to 36 weeks postmenstrual age, follow-up information was available in 81 %. 74 % of infants required IV (median duration 4 days), and 21 % developed bronchopulmonary dysplasia (BPD). 440 (63 %) showed normal development, 246 (37 %) unfavourable outcome, and 90 (13 %) adverse outcome. IV duration was one of the strongest predictors of BPD ($p < 0.001$). The duration of IV was significantly associated with adverse outcome (per day of IV: multivariate OR 1.03; 95 % CI 1.01–1.05, $p = 0.005$) and with unfavourable outcome (OR 1.02, 95 % CI 1.00–1.04, $p = 0.03$).

Conclusions: Prolonged duration of IV increased the risk for poor outcome of extremely premature infants independently of other neonatal morbidities. Whether IV duration is primarily a marker of disease severity, or whether it may directly contribute to poor outcome merits further investigation.

49 – ORAL PRESENTATION

MOTOR PERFORMANCE, EXERCISE CAPACITY AND PERCEIVED MOTOR COMPETENCE IN EIGHT-YEAR-OLD CHILDREN AFTER NEONATAL VENO-ARTERIAL EXTRACORPOREAL MEMBRANE OXYGENATION (VA-ECMO)

L.C.C. Toussaint¹, M.H.M. van der Cammen-van Zijp^{1,2}, D. Tibboel², S.J. Giscler², H. Ijsselstijn²

¹Rehabilitation Medicine and Physical Therapy, ²Intensive Care and Department of Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Objectives: Survivors of neonatal extracorporeal membrane oxygenation (ECMO) treatment are at risk for motor problems and decreased physical endurance. We aimed to study motor performance, exercise capacity and perceived motor competence in eight-year-old neonatal ECMO survivors.

Methods: Participants (born 1993–2002) joined our structured longitudinal follow-up program. We used the Movement-Assessment-Battery for Children (M-ABC), the Bruce protocol, and the m-CBSK questionnaire.

Results: Primary diagnoses were: meconium aspiration syndrome (MAS; $n = 54$), congenital diaphragmatic hernia (CDH; $n = 17$); persistent pulmonary hypertension (PPHN; $n = 17$); other diagnoses ($n = 12$). M-ABC: 68/97 (70.1 %) had a normal overall percentile score, 13/97 (13.4 %) were classified as borderline, and 16/97 (16.5 %) had a definite motor problem (distribution differed from reference population, $p < 0.001$). Subgroups: normal in 40/52 (76.9 %) with MAS, 9/17 (52.9 %) with CDH, 11/17 (64.7 %) with PPHN and 8/11 (72.7 %) with other diagnoses. Bruce ($n = 89$): mean (SD) SDS endurance time -1.01 (1.13); significantly below normal: $p < 0.001$. Exercise capacity was below normal in all subgroups. M-CBSK questionnaire ($n = 56$): mean (SD) SDS 0.08 (0.88); not different from reference population ($p = 0.50$). The overall percentile score of the M-ABC correlated with SDS endurance time ($p = 0.002$, $r = 0.34$). No correlation was found between m-CBSK and M-ABC or Bruce scores ($p = 0.25$, $r = 0.16$ and $p = 0.49$, $r = 0.10$ respectively).

Conclusion: Eight-year-old neonatal ECMO survivors have a higher prevalence of impaired motor performance (mainly children with CDH and PPHN) and decreased exercise capacity. Motor performance and exercise capacity correlate. Despite of impaired motor performance, results of m-CBSK suggest that these children feel satisfied with their motor performance.

50 – ORAL PRESENTATION

POSTNATAL DEPRESSION AND PRETERM BIRTH. WHAT MOTHERS NEED?

N. Weisglas-Kuperus, F.M. Sampaio de Carvalho, I. Reiss

Neonatology, Erasmus MC Sophia Children's Hospital, Rotterdam, The Netherlands

Background: After preterm birth mothers are at high risk for postnatal depression. We studied the effect of maternal depression as well as infant and environmental characteristics on later child outcome.

Method: The study group consisted of all Dutch native speaking mothers of surviving very preterm infants of gestational age < 32 weeks, born from January 2007 to January 2009 ($n = 316$). At 6 weeks of corrected age maternal depression was assessed by the Edinburgh Postnatal Depression Scale. Child characteristics were gestational age, birthweight (SGA < -2 SD) and gender. Environmental factors were SES and HOME environment. At 2 years of age mental development (MDI) was assessed by the Bayley Scales of Infant Development BSID III), attention and internalizing behavior by the Child Behavioral Check List (CBCL).

Results: Depressive symptoms (EPDS score > 12) were found in 75 of the 316 (24 %) mothers and was higher with lower gestational age (< 27 weeks 40 %, 27–29 weeks 24 %, > 29 weeks 17 %). Follow-up was available for 85 % of the children. Children of mothers with an EPDS score < 12 scored lower for internalizing (T score mean = 44.3 SD 9.5 vs 47.9 SD 8.7) as well as for attention problems (T score mean = 55.0 SD 6.2 vs. 57.0 SD 7.0) and had better mental development (MDI mean = 102.9 SD 9.5 vs 97.4 SD 10.9) at 2 years of age than depressive mothers (EPDS score > 12).

Conclusion: In the NICU maternal depression should be systematically assessed and adequately treated for a better outcome of mother and child.

Metabolism, Endocrinology and Nutrition (51–54)

51 – ORAL PRESENTATION

DOES GLUCOCORTICOID TREATMENT DURING CARDIAC SURGERY IN CHILDREN AFFECT SERUM AMINO ACID CONCENTRATIONS?

C.T. de Betue¹, B.C. Oosterloo², S.C. Verbruggen², N.E. Deutz³, K.F. Joosten²

¹*Intensive Care and Pediatric Surgery, ²Intensive Care, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands,*

³*Department of Health & Kinesiology, Texas A&M University, College Station, TX, USA*

Objectives: Glucocorticoid treatment during pediatric cardiac surgery may negatively affect protein metabolism. We evaluated the effect of glucocorticoid treatment on per-operative serum amino acid concentrations.

Methods: Arterial blood was sampled in children with congenital heart disease before cardiac surgery ($t = -5$ min), directly after surgery ($t = 0$) and at $t = 12$ h and $t = 24$ h after surgery. Serum cortisol and amino acid concentrations were determined. Patients who received glucocorticoids (G+) were compared with patients who did not (G-). Results as median (IQR), Mann-Whitney U test.

Results: 67 % of the 49 included children [age 1.7 (0.5–8.7) year] received glucocorticoids. Baseline characteristics were not different between groups. Serum cortisol concentrations were significantly higher at $t = 0$ in the G+ group (G+, 6,953 (4,734–8,154); G-, 242 (111–517) nmol/L; $p < 0.001$). The sum of all amino acids at $t = 12$ h (G+, 2,384 (2,120–2,763); G-, 2,049 (1,986–2,230) $\mu\text{mol/L}$; $p = 0.016$) and $t = 24$ h (G+, 2,465 (2,333–3,050); G-, 2,294 (2,077–2,353) $\mu\text{mol/L}$; $p = 0.001$) were significantly higher with glucocorticoids. Of special interest, citrulline concentrations were significantly higher in the G+ group at $t = 12$ h [G+, 26 (21–29); G-, 19 (12–24) $\mu\text{mol/L}$; $p = 0.034$] and $t = 24$ h [G+, 22 (17–29); G-, 14 (10–19) $\mu\text{mol/L}$; $p < 0.001$], as well as arginine concentrations at $t = 12$ h [G+, 74 (64–86); G-, 65 (60–67) $\mu\text{mol/L}$; $p = 0.017$].

Conclusions: Glucocorticoid treatment during cardiac surgery in children blunts the reduction in serum amino acid concentrations post-surgery. Especially citrulline concentrations, the sole precursor of de novo arginine production, were preserved. This may prevent arginine, needed for nitric oxide production and immune function, from becoming an essential amino acid.

52 – ORAL PRESENTATION

INDIRECT CALORIMETRY REVEALS THAT BETTER MONITORING OF NUTRITION THERAPY IN PEDIATRIC INTENSIVE CARE IS NEEDED

M. Dokken¹, T. Rustøen², A. Stubhaug^{2,3}

¹*Department of Pediatric Intensive Care, ²Division of Emergencies and Critical Care, Oslo University Hospital, ³Faculty of Medicine, University of Oslo, Oslo, Norway*

Background and aims: Monitoring nutritional therapy is essential in the care of critically ill children, but the risk of nutritional failure

seems to remain. The aims of the present study were to examine the prevalence of underfeeding, adequate feeding, and overfeeding in mechanically ventilated children and to identify barriers to the delivery of nutritional support.

Methods: Children aged 0–14 years who fulfilled the criteria for indirect calorimetry were enrolled in this prospective, observational study and were studied for up to 5 consecutive days. Actual energy intake was recorded, and compared with the required energy intake (measured energy expenditure plus 10 %); energy intake was classified as underfeeding (<90 % of required energy intake), adequate feeding (90–110 %), or overfeeding (>110 %). The reasons for interruptions to enteral and parenteral nutrition were recorded.

Results: In total, 104 calorimetric measurements for 140 total days were recorded for 30 mechanically ventilated children. Underfeeding, adequate feeding, and overfeeding occurred on 21.2, 18.3 and 60.5 % of the 104 measurement days, respectively. There was considerable variability in the measured energy expenditure between children, (median, 37.2 kcal/kg/day; range 16.81–66.38 kcal/kg/day), but the variation within individual children was small. Respiratory quotient had low sensitivity of 21 and 27 % for detecting underfeeding and overfeeding, respectively. Fasting for procedures was the most frequent barrier that led to interrupted nutritional support.

Conclusions: The high percentage of children (~61 %) who were overfed emphasizes the need to measure energy needs by using indirect calorimetry.

53 – ORAL PRESENTATION

WEIGHT-FOR-AGE DISTRIBUTION AND CASE-MIX ADJUSTED OUTCOMES OF 14,205 CRITICALLY ILL CHILDREN

N.J. Prince^{1,2}, K. Brown³, R.C. Parslow⁴, M.J. Peters^{1,2}

¹Paediatric and Neonatal Intensive Care Units, Great Ormond Street Hospital for Children NHS Trust, ²Critical Care Group-Portex Unit, Institute of Child Health, University College London, ³Cardiac Critical Care Unit, Great Ormond Street Hospital for Children NHS Trust, London, ⁴Paediatric Epidemiology Group, Centre for Epidemiology and Biostatistics, Leeds Institute of Genetics, Health and Therapeutics, University of Leeds, Leeds, UK

Introduction: Extremes of “weight-for-age” are common in children admitted to intensive care. Recent literature suggests poorer outcomes in children who are significantly underweight. For overweight children, the effect is less clear. Weight-for-age may be an independent risk factor for mortality.

We investigated the following null hypotheses:

1. weight distribution of the PICU population does not differ from that of the general population
2. weight-for-age does not influence risk-adjusted mortality.

Methods: We retrospectively calculated weight-for-age z-scores for all admissions to GOSH PICU between March 2003 and December 2011. Risk-adjusted SMRs were calculated using PIM2 (estimate of expected probability of mortality) and observed mortality.

Results: 14,205 records were analysed. The mean z-score weight-for-age was -1.11 ($p = 0.009$). Extremes of weight-for-age were more prevalent in the PIC cohort than the reference population.

A plot of weight-for-age z-score vs. SMR (figure 1) demonstrated increased mortality at both extremes of weight-for-age. Mean and moderately raised weight-for-age were associated with the lowest mortality.

Fig. 1 Weight-for-age z-score vs. standardised mortality ratio (SMR)

Conclusion: We have demonstrated that the PIC population weight-for-age distribution does differ from that of the general population, with a significantly lower mean. Furthermore, extremes of weight-for-age at admission are a risk factor for mortality. These findings were consistent across age and gender sub-groups.

54 – ORAL PRESENTATION

EFFECTS OF ZINC SUPPLEMENTATION IN PRETERM NEONATES: A RANDOMIZED, PLACEBO-CONTROLLED STUDY

G. Terrin¹, A. Passariello², M. De Curtis³, F. Messina⁴, M.G. Conti³, E. Bacchio³, A. Russo³, A. Scipione³, R. Berni Canani⁵

¹Department of Gynecology-Obstetrics and Perinatal Medicine, University ‘La Sapienza’, Rome, ²Department of Intensive Care, Hospital ‘Dei Colli’, Naples, ³Department of Pediatrics, University ‘La Sapienza’, Rome, ⁴Department of Perinatal Care, Evangelic Hospital ‘V. Betania’, ⁵Department of Pediatrics, University of Naples ‘Federico II’, Naples, Italy

Objectives and study: To investigate the efficacy of zinc in reducing morbidity and mortality of preterm neonates.

Methods: Prospective, double-blind, randomized controlled study enrolling very low birth weight neonates randomly allocated at 7 days of life to “active treatment” (oral zinc supplementation at 10 mg/kg/day, in a multivitamin preparation) or to “placebo” (similar multivitamins preparation without zinc). The main endpoint was morbidity, defined by the presence of at least one of the following conditions: late-onset sepsis, necrotizing enterocolitis, bronchopulmonary dysplasia, intraventricular hemorrhage, periventricular leucomalacia and retinopathy of prematurity. Secondary outcomes were mortality and growth at discharge.

Results: We enrolled 97 neonates in the active treatment group and 96 in the placebo group. Morbidity was significantly reduced for the neonates receiving oral zinc supplementation (44.3 %) compared with placebo (61.5 %, $p = 0.017$). Occurrence of necrotizing enterocolitis was higher in the placebo group (6.3 %) compared with active treatment group (0 %, $p = 0.014$). Mortality risk was increased in neonates receiving placebo compared to those supplemented with zinc (2.37, 95 % CI 1.08–5.18, $p = 0.006$). Body-weight at discharge was higher in the zinc-group ($2,208 \pm 501$ g) compared with placebo-group ($1,889 \pm 639$ g, $p = 0.001$).

Conclusion: Zinc reduces morbidity and mortality and improves body growth in preterm neonates.

Neuro Critical Care (55–58)

55 – ORAL PRESENTATION

THIOPENTAL COMA FOR INTRACTABLE INTRACRANIAL HYPERTENSION: A SURVEY OF UK PAEDIATRIC INTENSIVE CARE PRACTICE

F. Abdel-Salam, R. Agbeko

Paediatric Intensive Care Unit, The Great North Children's Hospital, Newcastle upon Tyne, UK

Objectives: High-dose barbiturates may be used to treat intractable raised intracranial pressure (ICP) following traumatic brain injury (TBI) when maximal first-tier interventions have failed. However paediatric studies are limited with no consensus regarding optimal monitoring. We sought to describe current thiopental coma practice in UK paediatric intensive care units (PICUs).

Methods: An online survey was distributed via UK Paediatric Intensive Care Society Study Group (PICS-SG), registered as an audit. Mandatory multiple-choice and open questions covered indications for thiopental coma, administration methods, monitoring effectiveness, side-effects and thiopental cessation.

Results: Fifteen of 32 UK PICUs completed the survey including 11/16 (69 %) PICUs admitting >10 children annually requiring ICP monitoring. Thiopental coma for intractable intracranial hypertension following TBI is used in 12/15 responder units. Five units (42 %) do not use a protocol to guide management.

Response in ICP is the main outcome measure to monitor effectiveness of thiopental coma in 8 (66 %) units; this is combined with EEG monitoring in 6 units. Three units specified administering thiopental boluses to desired ICP response, then titrating infusions to achieve burst suppression on EEG. Recognised side-effects include hypotension (11/12), infection (7/12) and gastrointestinal disturbance (5/12). Reasons to stop thiopental coma include adequate ICP control (10/12), achieving burst suppression (7/12) and unacceptable side-effects (7/12).

Conclusions: There is wide variation in practice in thiopental coma use in intractable raised ICP in UK PICUs. This study highlights the need for collaboration to rationalize thiopental use in intractable intracranial hypertension in paediatric brain injury.

Acknowledgements: UKPICS-SG and participating units.

56 – ORAL PRESENTATION

EARLY MICROCIRCULATORY ALTERATIONS AFTER START OF THERAPEUTIC HYPOTHERMIA ARE ASSOCIATED WITH MORTALITY IN POST-CARDIAC ARREST CHILDREN

E.A.B. Buijs¹, E.M. Verboom¹, M.G. Mooij¹, A.J.M. Zwiers¹, C.M.P. Buysse¹, C. Ince², D. Tibboel¹

¹Intensive Care-Department of Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, ²Intensive Care, Erasmus MC, Rotterdam, The Netherlands

Background & aim: In adults receiving therapeutic hypothermia (TH) following cardiac arrest (CA), deteriorated microcirculatory perfusion (MP) and peripheral capillary refill time (pCRT) are associated with mortality. We aimed to study MP and pCRT during and after TH in pediatric CA patients in relation to mortality.

Methods: Buccal MP (Sidestream Dark Field Imaging) and pCRT (evaluated by nursing staff) were measured at 0–12 (T1) and 12–24 h (T2) following start of TH, during re-warming (T3), and at normothermia (T4). Primary parameters were small (S; Ø: 0–10 µm) and non-small (NS; Ø: 11–100 µm) perfused vessel density (PVD-S, PVD-NS), microvascular flow index (MFI-S, MFI-NS), and normal pCRT (<2 s). Data are presented as median (IQR) or number (%) and analyzed using non-parametric tests (*p < 0.05 vs. T1, #p < 0.05 vs. T2, †p < 0.05 vs. T3).

Results: Twenty-three patients, 11 non-survivors, were included. From T1 to T2, PVD-S and PVD-NS were unaltered (Figure 1). T3 PVD-NS and T3 and T4 PVD-S were increased compared to T1 and T2. MFI-S and MFI-NS increased at T2–T4. Compared to T1–T3, pCRT normalized at T4. Non-survivors had lower T1 PVD-NS (4.9 vs. 6.6, p = 0.035), MFI-S (2.08 vs. 2.69, p = 0.037), and MFI-NS (2.38 vs. 2.73, p = 0.048).

Conclusions: Low MP early after TH start is associated with mortality. After TH stop, MP and pCRT increased and remained increased irrespective of outcome.

Fig. 1 MP during and after TH

57 – ORAL PRESENTATION

BRAIN CELL APOPTOSIS IN THE NEONATAL PIG AFTER 6 HOURS ANAESTHESIA WITH ISOFLURANE

I. Fierens¹, K. Broad², M. Ezzati¹, J. Hassel¹, G. Kawano², J. Rostami², G. Raivich², R. Sanders³, N.J. Robertson¹

¹Institute for Women's Health/Neonatal Intensive Care, ²Institute for Women's Health, University College London Hospital, ³Wellcome Centre for Imaging Neuroscience, University College London, London, UK

Background: Exposure of the neonatal brain to a variety of anaesthetics is associated with neuroapoptosis in rodent and non-human primate experiments with clinical studies being suggestive of cognitive impairment. These data has worried the anaesthetic community especially with growing numbers of surgery during this vulnerable period.

The neonatal piglet model closely mirrors the period of rapid brain growth in the human brain.

Aims: To investigate if the newborn piglet brain is vulnerable to anaesthetic exposure with isoflurane during a clinically relevant period.

Methods: 12 newborn piglets (aged <24 h) randomised to:

(i) naïve (nai) (n = 6)

(ii) anaesthesia (ane) (n = 6) Anaesthesia induced with IM midazolam followed by intubation and ventilation with 2 % isoflurane as well as IV fentanyl (3–6 mcg/kg/h) for 6 h. Tight (invasive) monitoring of physiological parameters and bloodgases.

Piglets were sacrificed either immediately (i) or 6 h afterwards (ii). Immunohistochemistry on the brain was performed for TUNEL (cell death) and Iba-1 (microglial activation) and cells were counted in 9 brain areas.

Results: Compared to naïve, 6 h exposure to 2 % isoflurane, was associated with an increase in TUNEL + cells ($p < 0.05$; Mann–Whitney test) and Iba-1 stained cells ($p < 0.05$).

Fig. 1 nai/ane

Conclusion: Six hours of anaesthesia with isoflurane increased cell death and microglial activation in the newborn piglet brain. Further research on brain protective strategies is required.

58 – ORAL PRESENTATION

SAFETY AND EFFICACY OF CHLORAL HYDRATE VERSUS MIDAZOLAM AS SEDATIVE AGENTS FOR DIAGNOSTIC PROCEDURES IN CHILDREN

O.M. Hijazi¹, A.E. Ahmad², J. Al Anazi³, H.E. Al Hashemi⁴, M. Al Jeraisy⁵

¹Cardiac Sciences, King Abdulaziz Cradiac Center, ²Epidiology and Biostatistics for Health Sciences, ³King Abdul Aziz Medical City, National Guard Health Affairs, King Saud Ben Abdel Aziz University for Health Sciences, Riyadh, Saudi Arabia, ⁴Pediatrics, Pediatric Intensive Care Unit, Farwania Hospital, Kuwait, ⁵Pharmacy, King Saud Ben Abdel Aziz University for Health Sciences, Riyadh, Saudi Arabia

Objectives: To compare sedation outcomes for chloral hydrate (CH) and midazolam (MD) as sedative agents for diagnostic procedures.

Design: A prospective, randomized, double-blinded study.

Setting: Pediatric Day Care Unit (DCU), King Abdul Aziz Medical City, Riyadh, Saudi Arabia.

Patients: Two hundred seventy five pediatric who needed sedation for diagnostic procedures.

Intervention: After meeting inclusion criteria and getting informed consent, patients were given the study drug. Patients were monitored for sedation outcomes.

Measurement and main results: A total of 292 sedations performed between July 2005 and October 2006 were included in the study. Due to missing data, 286 sedations were included in the final analysis 144 were in the CH arm, and 142 were in the MD arm. Both the MD and CH groups were comparable with respect to demographic and baseline characteristics (p values >0.05). Compared with the MD group, the CH group had a higher sedation success rate, diagnostic procedure completion, and sedation adequacy rate (p values <0.05). Also CH had a shorter time to sedation, a shorter length of stay in DCU, and longer sedation duration (p values <0.05). In both study groups, patients who required a 2nd dose tended to be older and heavier. No major side effects were encountered.

Conclusion: CH achieved a shorter time to sedate, a higher success rate, less need for a 2nd dose, and decreased the time spent in the DCU compared to sedation using MD. Older and heavier patients are more likely to require a 2nd dose of the study drug to be sedated.

Paediatric and Neonatal Intensive Care Nursing (59–77)

59 – ORAL PRESENTATION

INCIDENCE OF BREASTFEEDING IN LATE PRETERM NEWBORNS: THERE'S PLACE FOR IMPROVEMENT?

G. Banderali, F. Betti, C. Brambilla, R. Giacchero

Neonatal and Subintensive Care Unit, San Paolo Hospital, University of Milan, Milan, Italy

Background: Breastfeeding is the feeding practice recommended for late preterm newborns, nevertheless neonatal factors and maternal factors can delay or prevent the initiation of breastfeeding. Feeding difficulties (easy fatigability, inadequate autoregulation skills, uncoordination of oropharyngeal movements) require great competence for suction.

Aims: To investigate breastfeeding rates in a population of late preterm newborns in association with principal neonatal factors (gestational age, birth weight, birth weight for gestational age, unit of hospitalization) at Neonatal care unit and Neonatal sub intensive care unit of San Paolo Hospital, University of Milan.

Methods: This observational study recruited a sample of late preterm newborns (G.A. 34–36⁺ weeks) born between January 1st 2010 and June 30th 2012 (n = 194).

Results: Breastfeeding initiation is lower for late preterm population (78.4 %) than term newborns (94.3 %).

Late preterm newborns in Neonatal care unit, also because of the possibility to practise rooming in, have increased exclusive breastfeeding rates.

Breastfeeding rates are directly proportional to gestational age and to birth weight. Low birth weight is a risk factor for unsuccessfully exclusive breastfeeding.

Breastfeeding rates in SGA newborns are lower than in AGA newborns. LGA newborns have increased rates of exclusive breastfeeding.

Conclusions: Late preterm newborns are at greater risk of being artificially fed.

Findings of this study agree with other scientific evidences (Arch Dis Child Fetal Neonatal Ed. 2008; 93(6):F448–50).

Promotion of WHO/UNICEF ten steps, a personalized nutritional plan and an evidence based time of discharge could be strategies to improve breastfeeding rates in late preterm newborns.

60 – ORAL PRESENTATION

TRAINING NEONATAL NURSING STAFF IN CONTINUOUS ELECTROENCEPHALOGRAPHY IN A LEVEL III NICU

C. Bouwens, T. de Haan, J. Wielenga

IC Neonatology, Emma Children's Hospital/Academic Medical Centre, Amsterdam, The Netherlands

Background and aim: Amplitude-integrated electroencephalography (aEEG) is a bedside single lead EEG monitoring tool to assess neonatal brain function and evaluate the presence of neonatal seizures. The aim of this project was to improve the current level of knowledge in nursing staff concerning the use of the digital aEEG monitor (Olympic CFM 6000). Main teaching targets were the assessment and classification of known background patterns (BP) and sleep-wake cycling (SWC); dealing with pitfalls (PF) and recognizing the presence of neonatal seizures (S).

Methods: This research was performed from September 2011 to October 2012 within the tertiary NICU of the Academic Medical Centre, Amsterdam, the Netherlands. A working group obtained expert knowledge in handling the aEEG monitor and correct interpretation of results. Clinical lectures for the nursing staff (N = 58) were implemented through theoretical background- and bedside teaching. A pre-lecture baseline (N = 35) and post-lecture test (N = 24) were held by written exam.

Results: The level of knowledge in recognizing BP, SWC, S and PF showed a clinically significant improvement (respectively 56.3, 84.7, 91.0, and 100 %) compared to the baseline measurement (respectively 34.8, 80.0, 89, and 97.1 %). General knowledge of aEEG showed also significant improvement.

Conclusion: This study underlines the value of clinical training for nursing staff to improve daily care for NICU patients. BP recognition remained the most difficult to recognize. Motivating nursing staff to complete and participate in essential post test evaluation proved difficult and possibly influenced the results.

61 – ORAL PRESENTATION

TO STUDY THE ROLE OF TWO DIFFERENT CONCENTRATIONS OF SUCROSE IN REDUCING PAIN DURING INITIATION OF VENIPUNCTURE IN ELBW BABIES

V. Datta^{1,2}, J. Hemrom¹

¹Paediatrics, ²Neonatology, Lady Hardinge Medical College, Delhi University, New Delhi, India

Objective: To study the effect of 0.2 ml of 12 and 24 % oral sucrose on reducing pain during venepuncture in ELBW infants and the side effects associated with this administration.

Methods: A Double blind RCT was conducted on clinically stable ELBW (<1,000 g) neonates regardless of gestational age within first 48 h of life. Neonates were divided into two study groups (30 neonates in each group) and administered either 0.2 ml of 24 % sucrose (active control) or 0.2 ml of 12 % sucrose 2 min prior to venepuncture. The entire procedure was video-recorded and Neonatal Facial Coding System (NFCS) used to evaluate pain. The NFCS was coded at pre-procedure, intra-procedure, post 30 s, 1 min and 2 min of procedure. The side effects were noted.

Results: 60 ELBW neonates were enrolled, randomized and analyzed. The baseline characteristics of the group were comparable. The NFCS scores (Mean $\pm$ SD) in 12 versus 24 % sucrose were 0.63 ± 1.35 and 0.46 ± 0.86 in the pre-procedure observation the intraprocedure observation was 4.8 ± 1.18 in 12 % and 4.46 ± 1.5 in 24 % sucrose. Post 30 s observation was 1.1 ± 1.64 in 12 % and 0.7 ± 1.2 in 24 % sucrose. No statistically significant difference between the NFCS scores was observed even at Post 1 min & Post 2 min of the procedure. 5 immediate adverse effects were observed (HR changes, transient desaturations and vomiting) however, no significant difference observed in adverse effects across the two study limbs.

Conclusions: 0.2 ml of 12 % oral sucrose appears to be not-inferior to 0.2 ml of 24 % oral sucrose in reducing pain during venepuncture in ELBW neonates. There is no difference in side effects with either concentration of sucrose.

62 – ORAL PRESENTATION

PAIN AND SEDATION ASSESSMENT OF PATIENTS MECHANICALLY VENTILATED WITH THE COMFORT BEHAVIOUR SCALE (CBS): PRELIMINARY RESULTS OF A VALIDATION STUDY

D. Fagioli, F. Broccati, G. Antonielli, C. Barberini, A. Borgiani, F. Cancani, D. Carbonari, L. Cirulli, A. Comanducci, S. Cristoforo, M. Cuttini, P. De Vita, M. Franci, O. Gawronski, M. Monoscalco, M. Pace, L. Ravà, F. Stoppa, E. Tiozzo, L. Trainelli, S. Tucci, C. Zambrini, I. Dall'Oglio

Bambino Gesù Children Hospital, Rome, Italy

Pain and sedation assessment in PICU is particularly important for nursing care and therapeutic success since it prevents risks associated to insufficient or excessive analgosedation. Optimal levels of mechanically ventilated children's comfort is an every day challenge for PICU staff.

The objective of this study is to evaluate the validity and reliability of CBS in the Italian pediatric context.

24 patients admitted at one of the Intensive Care Units of the Emergency Department of Bambino Gesù Children's Hospital have been observed. The patients were mechanically ventilated and analgosedated through continuous infusion of ipnotics and opioids. Two nurses observed together, but independently each patient before and after the procedure of tracheal suctioning, assessing vital signs, pain and sedation through the CBS and the Nurse Interpretation of Sedation Scale. In 14 cases there was a third nurse assessing the patient through the CBS with the objective to test the scale's reproducibility. A total of 50 observations was made. The study has been approved by the Ethics Committee and parent's of patients have signed informed consent.

The 24 observed patients had a mean age of 7.46; 54 % were female, reason for admission was major surgery and acute respiratory failure. Median value of PIM was 2.1. The level of agreement between the two scales was high (88–78 %). Comparison between vital signs and

CBS values variations indicates that there isn't a total and continuous expected increase or reduction. Inter rater reliability was high ($K = 1$, $K = 0.558$). Internal consistency was positive (Cronbach's alpha 0.8).

63 – ORAL PRESENTATION

IMPACT OF RECONSTITUTION SOLVENT ON THE ACCURACY OF VANCOMYCIN SYRINGES PREPARED FOR INTRAVENOUS ADMINISTRATION IN A NEONATAL INTENSIVE CARE UNIT

A. Foinard¹, B. Décaudin^{1,2}, D. Lannoy^{1,2}, N. Simon^{1,3}, C. Barthélémy¹, L. Storme⁴, P. Odou^{1,2}

¹Laboratoire de Biopharmacie, Pharmacie Galénique et Hospitalière, Faculté des Sciences Pharmaceutiques et Biologiques, ²Institut de Pharmacie, CHRU Lille, ³Unité de Pharmacologie Antitumorale, Centre Oscar Lambret, ⁴Service de Réanimation Néonatale, Hôpital Jeanne de Flandre, CHRU Lille, Lille, France

Objectives: A recent study in the NICU of Lille University Hospital showed the inaccuracy when preparing of vancomycin syringes by nurses. The objective of this study is to assess the impact of reconstitution solvent on the accuracy of vancomycin syringes.

Methods: The commercial drug used was formulated as a powder for solution for intravenous infusion (vancomycin 250 mg, Mylan, France). We evaluated two types of solvent for the reconstitution of the vancomycin powder: 0.9 % sodium chloride (solvent used in the unit) and water for injections (solvent recommended by the manufacturer). Vancomycin syringes dosed at 40 mg were prepared according to the NICU protocol. Vancomycin amounts were determined by an UV spectrophotometric method. A Kruskal–Wallis test was used to compare the impact of two solvents with or without stirring of vials after reconstitution ($n = 6$).

Results: Our results expressed as median values [min–max] in mg showed a significant difference between water for injection versus with 0.9 % sodium chloride and with or without stirring ($p < 0.001$).

Table 1

Preparation conditions	Vancomycin amount (mg)
Water for injections + 5 % dextrose with stirring	34.85 [34.20–35.32]
0.9 % sodium chloride + 5 % dextrose with stirring	33.27 [32.70–33.83]
Water for injections + 5 % dextrose without stirring	34.94 [34.16–35.03]
0.9 % sodium chloride + 5 % dextrose without stirring	30.33 [25.48–33.07]

Conclusion: Our main hypothesis is that the observed variability is mainly due to the reconstitution solvent. Thus, we recommended at present water for injections with stirring of vial.

64 – ORAL PRESENTATION

ANALYSIS OF NEONATAL CASES WITH HYPERNATREMIC DEHYDRATION

N. Guzoglu¹, A. Kizilelma¹, F.N. Sari¹, N. Uras¹, U. Dilmen^{1,2}

¹Zekai Tahir Burak Maternity Teaching Hospital, ²Yildirim Beyazıt University, Ankara, Turkey

Aim: The incidence of hypernatremic dehydration due to lactation failure in newborns that causes higher morbidity and mortality has been increased in recent years. The aim of the study was to identify the preventive approaches for hypernatremic dehydration by determining demographic characteristics and epidemiologic risk factors in newborns with hypernatremic dehydration.

Methods: In this study, 87 term neonates with serum sodium level ≥ 150 mEq/L admitted to our clinic between January 2009 and June 2012 were evaluated retrospectively.

Results: Of the study infants mean birth weight were $3,424.5 \pm 395$ g. Mean age of the infants and mean weight loss at admission were 4.3 ± 2.8 days and 12.2 ± 4.2 %; respectively. The percentage of spontaneous vaginal delivery and primiparous mothers were 51.7 and 75.8 %; respectively. Ninety-seven percentages of the infants fed with breast milk exclusively. The most common complaints of babies were fever, jaundice, and poor absorption, while did not have symptoms when the time of hospital admission. During the study period, one infant had the diagnosis of intra cranial venous thrombosis and one infant had the diagnosis of lower extremity venous thrombosis. The mean sodium, urea and creatinine levels at admission were 155.2 ± 6.2 mEq/L, 89.1 ± 73.9 mg/dl and 0.89 ± 0.65 mg/dl; respectively.

Conclusion: Hypernatremic dehydration due to lactation failure mains to be serious problem in newborns. Routine newborn examination in the first few days is important for early diagnosis and prevention of hypernatremic dehydration. Infants with fever, jaundice and poor sucking, hypernatremic dehydration should be considered. Moreover, determination of Na level should be helpful in requisite cases.

65 – ORAL PRESENTATION

LONG LINE RELATED BLOODSTREAM INFECTIONS IN NEONATAL INTENSIVE CARE UNITS

A.M. Ismail¹, N. O'Connor², A.M. Murphy³, P. Hidiro³, B. Paturi³

¹Department of Paediatrics, ²Department Of Microbiology, ³University Hospital Limerick, Limerick, Ireland

Introduction: Line related sepsis is probably the commonest serious complication of long lines. The incidence of line related sepsis appears to be 4–12 per 1,000 catheter. Risk is increased by longer duration of catheterization, catheter material, frequency of line breaks, multiple lumens, technique of line fixation. The rate of infection may be reduced by staff education. Incorporation in long lines with heparin, or other substances with antimicrobial qualities.

Objective: Our objective is to see the long line-associated bloodstream infections which results morbidity and adverse outcomes in NICU.

Methods: Culture results from the tip of the long line inserted from November 2007 to October 2012 in university hospital limerick from neonatal data base, HIPE search, microbiology laboratory data, can-vasing from the neonatologist, chart reviews.

Results: Culture results during this study period showed 515 long line tips received from 273 patients. 116 Female (42 %), 157 male (58 %), mean age at first tip culture: 8 days. Average number of tips per patient = 1.9, median = 2, the culture result are 269 (52 %) has no growth, 116 (23 %) mixed skin flora, 72 (14 %) coagulase negative *Staphylococcus* (CoNS) < 10⁵, 26 (5 %) has CoNS > 10⁵, 7 (1 %) *Enterococcus faecalis* & CoNS, 6 (1 %) scanty commensal, 5 (1 %) candida & CoNS. Only 20 patients from long line culture “yielded significant” isolates from blood cultures.

Conclusion: Long line provide secure vascular access in newborn infants, but are associated with serious complications. Line related sepsis, may be minimised by using polyurethane long lines, minimising line breaks, using single, shortening duration of use, staff education and using of IV vancomycin.

66 – ORAL PRESENTATION

HOW MUCH INSPIRATORY PRESSURE IS GENERATED WHEN HAND VENTILATING INTUBATED CHILDREN WITH A SELF-INFLATING BAG?

C. Karsten-Waagmeester¹, R. de Wilde¹, S. van den Boogert², P.P. Roeleveld¹

¹Pediatric Intensive Care Unit, ²Medical Technology, Leiden University Medical Centre, Leiden, The Netherlands

Background and Aims: Manual ventilation (MV) with a self-inflating bag (SIB) in intubated children is common practice. However, we do not know what peak inspiratory pressures (PIP) are actually generated during MV with a SIB and there is no ‘in vivo’ data available in the literature. We want to gain insight in the actual PIP generated during MV with a SIB in ventilated children.

Methods: We conducted a prospective observational study at the Pediatric Intensive Care Unit (PICU) of the Leiden University Medical Center (LUMC), Netherlands. During a 3 month period, ventilated children (0–16 years), needing MV with a SIB during tracheal suctioning were attached to a specifically developed pressure recorder (patent applied).

Results: We recorded PIP in 45 children during 138 episodes of MV with a SIB. The Mean PIP during MV was significantly higher (32.4 ± 6.0 cmH₂O) than the Mean PIP with which the patient was ventilated (16.5 ± 3.4 cmH₂O), $p < 0.001$.

Peak pressures varied between 11 and 100 cmH₂O and varied among users. PIP was well above the 40 cmH₂O in 13 % of all 4,395 measured pressures, despite a pressure release valve.

Conclusion: We have shown that, despite pressure release valves, very high pressures can be generated during MV with a SIB in intubated children and that generated pressures vary distinctly between users. High PIP can cause lung damage and should be avoided if possible. Therefore it is essential that manometers should always be used in conjunction with a SIB.

67 – ORAL PRESENTATION

PERCEPTION OF PEDIATRIC CRITICAL CARE NURSES ON THE INITIATION OF A NURSING-LED FEEDING PROTOCOL

A.H.P. Kirk, B.S.P. Ng, A.N. Lee, B. Ang, J.H. Lee

KK Women's and Children's Hospital, Singapore, Singapore

Background: Critically ill children frequently receive inadequate nutritional support. Feeding protocols have been shown to help achieve optimal nutritional care. We aim to evaluate critical care nurses' understanding and preferred teaching methods before introduction of a nurse-led feeding protocol in our pediatric intensive care unit (PICU). We hypothesized that nursing experience and education level are important factors in readiness to adopt this protocol.

Method: All PICU nurses were invited to participate in an online survey (19 questions) to investigate perceptions on implementation of a feeding protocol and preferred teaching methods. Simple logistic regression and Fisher exact test were used for analysis with statistical significance taken as $p < 0.05$.

Results: Seventy-four nurses completed the survey. Fifty-four had nursing degrees. Mean years of PICU experience was 6.2 (5th, 95th percentile: 1, 15). 74 % ($n = 55$) felt that they did not have sufficient knowledge of a feeding protocol; 86 % ($n = 64$) were keen to explore implementing a feeding protocol. There was no association between readiness to adopt the feeding protocol with ICU nursing experience (OR: 0.99; 95th CI 0.84–1.18) and education level (OR 1.43; 95th CI 0.31–6.68). Preferred teaching methods are bedside teaching (61 %), didactic lectures (51 %) and distribution of protocol manuals (50 %).

Conclusion: Nursing experience and education level are not significant factors in adoption of a feeding protocol in the PICU. Understanding preferred teaching methods is necessary to help enhance effectiveness of teaching prior to introduction of a new protocol in the PICU.

68 – ORAL PRESENTATION

THE IMPACT OF ANALGESIA AND SEDATION GUIDELINES IN AN IRISH PICU

C. Magner¹, M. van Dijk², R. Segarudo³, D. Doherty⁴, S. Cowman⁵

¹Paediatric Intensive Care Unit, Our Lady's Children's Hospital, Dublin, Ireland, ²Quality of Care, Department of Pediatric Surgery and Pediatrics, Erasmus MC Sophia, Rotterdam, The Netherlands, ³Biostatistic, University College Dublin, ⁴PICU, OLCHC, CUHTS, ⁵Nursing, RCSI, Dublin, Ireland

Objectives: The use of analgesia and sedation guidelines in adult intensive care settings has been associated with significant patient benefits¹. In the paediatric setting the evidence to support this change in practice is inconclusive^{2,3,4,5}. Neither is it likely to succeed without the support of clinical staff⁶.

The aim of this study was to determine how the implementation of analgesia and sedation guidelines in PICU affected:

- The amount of analgesics and sedatives administered to selected post-operative cardiac patients
- Their length of ventilator dependence and PICU stay
- Staff approaches to analgesia and sedation practices and guideline compliance.

Methods: A mixed methods, before and after design was employed. Data from cardiac non-equivalent control ($n = 61$) and intervention ($n = 64$) patient groups were collected for the first 72 h post-op. Before and after guideline implementation staff surveys were conducted. Chi square tests, t-tests and Mann–Whitney U tests were used for group comparisons.

Results: The mean morphine infusion rate on admission to PICU was significantly reduced after the intervention for these post-operative cardiac patients (Before: 69.5 (SD 28.9) vs after: 55.4 mcg/kg/h SD 19.5) ($p = 0.002$). PICU staff satisfaction increased after guideline introduction (satisfaction before 26.9 % vs after 59.7 %, $p < 0.001$) consistent with 70.3 % compliance with the key elements of the guidelines.

Conclusion: The introduction of analgesia and sedation guidelines are synonymous with a significant reduction in morphine infusion rates in the initial post-op period. Clinical staff value and adhere to the guidelines.

	Before	After	p-value
Morphine infusion in mcg/kg/hr, t=24-48 hours, mean (SD)	36.7 (11.1)	33.4 (9.0)	0.06
N=	61	64	
Morphine infusion in mcg/kg/hr t=24-48 hours, mean (SD)	18.2 (11.1)	16.1 (10.8)	0.07
N=	53	54	
Morphine infusion t=48-72 hours, mean (SD)	24.6 (16.7)	17.1 (12.4)	0.53
N=	17	15	

Fig. 1

69 – ORAL PRESENTATION

NEONATAL WITHDRAWAL SCORES IN NICU PATIENTS AFTER IATROGENIC OPIOID EXPOSURE DIFFER BY AGE-ADJUSTED GESTATIONAL AGE

P.S. Perampalam, A.G. Agthe

Pediatrics, University of Maryland Medical Center, Baltimore, MD, USA

Background: Opioids are frequently used for analgesia and sedation in the NICU. An exposure of ≥ 5 days can lead to physiologic dependence; the abrupt discontinuation or rapid tapering may result in iatrogenic neonatal abstinence syndrome (NAS). The modified Finnegan Scale (MFS) is the most commonly used screening tool for NAS but was designed for prenatally opioid exposed term infants. Its validity in premature and/or critically ill NICU patients remains unknown.

Objective: To determine the effect of gestational age on NAS scoring as measured on the MFS among NICU patients.

Methods: In a retrospective cohort study, we included all consecutively infants, admitted to a level III NICU between August 2008 and December 2011, who were exposed for ≥ 5 days to fentanyl or morphine infusions and were scored on a MFS.

Results: A total of 68 infants were included. Birth weight was 1,817 (g) $\pm$ 935; 470–3,800 with gestational ages 32.4 (weeks) $\pm$ 5.4; 23.7–40.9 (mean $\pm$ SD; range). The total number and frequency of each item are shown in figure 1.

Age-adjusted Gestational Age	<33 n (%)	33-36 n (%)	37-40 n (%)	41-44 n (%)	>44 n (%)
NAS Scores ALL	341	1316	1009	1054	1355
Scores > 0	281	1250	950	1013	1238
mean (SD)	4.37 (3.5)	4.98 (5.2)	5.14 (3.2)	5 (2.99)	4.25 (2.9)
median (range)	4 (0-18)	5 (0-18)	5 (0-18)	5 (0-24)	4 (0-15)
High Pitched Crying	28 (10)	125 (10)	279 (29.4)	125 (12.3)	80 (6.5)
Poor Sleeping	63 (22.4)	204 (16.3)	229 (24.1)	351 (34.6)	444 (35.9)
Hyperactive Moro	92 (32.7)	336 (26.9)	191 (20.1)	103 (10.2)	63 (5.1)
Tremors Disturbed	171 (60.9)	758 (60.6)	337 (35.5)	293 (28.9)	131 (10.6)
Tremors Undisturbed	63 (22.4)	286 (22.9)	152 (16)	44 (4.3)	49 (4)
Increased Muscle Tone	111 (39.5)	811 (64.9)	546 (57.5)	758 (74.8)	604 (48.8)
Excoriation	27 (9.6)	97 (7.9)	175 (18.4)	177 (17.5)	103 (8.3)
Myoclonic Jerks	12 (4.3)	35 (2.8)	10 (1.1)	7 (0.7)	0
Generalized Convulsions	1 (0.4)	3 (0.2)	5 (0.5)	7 (0.7)	5 (0.4)
Sweating	2 (0.7)	2 (0.2)	28 (2.9)	135 (13.3)	461 (37.2)
Fever	46 (16.4)	157 (12.6)	91 (9.6)	73 (7.2)	157 (12.7)
Frequent Yawning	9 (3.2)	6 (0.5)	29 (23.1)	4 (0.4)	5 (0.4)
Mottling	2 (0.7)	66 (5.3)	137 (14.4)	20 (2)	74 (6)
Nasal Stuffiness	13 (4.6)	146 (11.7)	132 (13.9)	185 (18.3)	120 (9.7)
Sneezing	26(9.3)	86 (6.9)	62 (6.5)	45 (4.4)	37 (3)
Nasal Flaring	8 (2.8)	49 (3.9)	39 (4.1)	47 (4.6)	96 (7.8)
Respiratory Rate > 60/min	117 (41.6)	469 (37.5)	256 (26.9)	359 (35.4)	507 (41)
Excessive sucking	64 (22.8)	138 (11)	330 (34.7)	329 (32.5)	405 (32.7)
Poor feeding	0	87 (7)	135 (14.2)	72 (7.1)	15 (1.2)
Regurgitation / Vomiting	2 (0.7)	31 (2.5)	71 (7.5)	19 (1.9)	80 (6.5)
Loose / Watery stools	22 (7.8)	48 (3.8)	135 (14.2)	140 (13.8)	246 (19.9)

Fig. 1 Graph

Conclusions: NAS scores are GA dependent. Since the MFS was designed for term infants it is important to adjust NAS scores for infants that are either still premature or already beyond 44 weeks.

70 – ORAL PRESENTATION

PEDIATRIC WARTIME: FIRST LEARNING OF 63 PEDIATRIC INTENSIVE CARE UNIT ADMISSIONS IN THE FRENCH MILITARY HOSPITAL OF KABUL

A. Salvadori¹, P. Pasquier², A. Jarrassier², J. Renner², J.V. Schall², P. Chazalon², S. De Rudnicki¹, S. Mérat²

¹Military Teaching Hospital Val de Grâce, Paris, ²Military Teaching Hospital Bégin, Saint Mandé, France

Objectives: Children management during wartime is a challenge for non-specialized medical teams in pediatric trauma. The purpose of this study is to describe the features of pediatric wartime admissions in intensive care unit at the French military hospital of Kabul.

Methods: A retrospective study of all intensive care unit pediatric admissions between June 2011 and August 2012 was conducted.

Results: 261 patients were analyzed. Pediatric patients represented 24 % of all admissions (63 patients). Mean age was 8.9 $\pm$ 4.1 years old and mean ISS was 25 $\pm$ 13. Traumatic diagnoses were responsible for 92 % of all pediatric admissions. The primary mechanism was explosion (43 %) followed by gunshot wound (22 %) and motor vehicle crash (13 %). Twenty-four patients (38 %) sustained abdominal injuries with more than a half was penetrating. 23/63 (37 %) had thoracic injuries among which 11 (48 %) was penetrating. 21/63 (33 %) sustained head injuries, 20/63 (32 %) had traumatic brain injury and 17/63 (27 %) was had multiple penetrating injuries. Twenty-six patients were mechanically ventilated with a mean

duration of mechanical ventilation of 3 ± 4 days. 89 % required surgery, 87 % a body scan and 43 % were transfused. The mean length of stay was 3 ± 2.5 days. 3 patients died during the study period.

Conclusion: Our study confirms a significant number of pediatric wartime admissions (24 %). The primary mechanism encountered in the field was explosion and gunshot wound.

Reference:

Spinella PC, Borgman MA, Azarow KS. Pediatric trauma in an austere combat environment. *Crit Care Med* 2008;36(7 Suppl):S293–6.

71 – ORAL PRESENTATION

NURSE MECHANICAL VENTILATION WEANERS VIEW'S ON PROTOCOL-DIRECTED WEANING ON A UK PICU

A. Scally¹, L. Tume^{1,2}

¹PICU, Alder Hey Children's NHS Foundation Trust, Liverpool,

²University of Central Lancashire, Preston, UK

Background: Nurse led protocol-directed weaning in PICU has been found to reduce weaning times and length of PICU stay [1, 2]. Comprehensive training for this role has been undertaken by 40 senior nurses on our PICU. However, there is a perceived reluctance to initiate the weaning protocol.

Objectives: To identify nurses' perceptions of barriers to protocol-directed ventilation weaning and extubation on PICU.

Methods: A cross sectional electronic survey consisting of open and closed ended questions was sent to all trained protocol-directed ventilation weaning nurses on a large UK PICU.

Results: The response rate was 90 % (36/40) of which 58 % had completed their practical competencies. Factors delaying competency completion included being in a senior role (in charge) (41 %), high clinical workload (45 %), and patient allocation (not suitable for weaning) (82 %). The barriers to ventilation weaning and extubation were perceived to be similar and included the protocol being too restrictive (71.5 %), taking too long with too many blood gases (52 %), and perceived lack of medical support (43 %).

Conclusion: The nurses view's indicated that they had adequate training to fulfill the role but identified that the restrictive protocol, their role on a shift, non-weanable patient allocation and communication with medical colleagues needs improvement.

References:

- Schultz TR et al. (2001) Weaning children from mechanical ventilation: a prospective randomised trial of protocol-directed versus physician-directed weaning. *Respiratory Care* 46 (8): 772–782
- Webster J (2000) Nurse-led weaning from ventilation and extubation in the paediatric cardiothoracic intensive care unit. *Nursing Critical Care* 5 (3): 116–124.

72 – ORAL PRESENTATION

A COMPARISON OF DOCTORS AND NURSES VIEWS ON NURSE LED MECHANICAL VENTILATION WEANING ON A UK PICU

A. Scally¹, L. Tume^{1,2}

¹PICU, Alder Hey Children's NHS Foundation Trust, Liverpool,

²University of Central Lancashire, Preston, UK

Background: Nurse led protocol-directed ventilation weaning (NLVW) is established on our PICU. However, the process of NLVW is not always initiated in practice and we wanted to investigate the reasons for this.

Aim: To compare the views of PICU doctors and nurse ventilation weaners on nurse led mechanical ventilation weaning on a large UK PICU.

Method: Two cross sectional electronic surveys (one for the nurses and one for the doctors) consisting of open and closed ended questions was sent to all trained protocol-directed ventilation weaning nurses and to all medical staff on PICU.

Results: The response rate from the survey of nurses was 90 % (36/40) and from the medical survey 51 % (19/37). The majority (88 %) of medical staff were positive towards NLVW and experienced nurses weaning ventilation, but there were some concerns expressed about extubation and who would re-intubate if this was required. 90 % of doctors rated their encouragement of the nurses to wean ventilation moderately to highly. Yet 43 % of the nurses reported feeling at the time 'unsupported' by the medical staff in this role. The medical survey highlighted that they often did not know who could wean on a shift and felt that the nurses should be more proactive in identifying themselves and getting the weaning orders prescribed.

Conclusion: A comparison of doctors and nurses views highlighted the need for improved communication about weaning at the beginning of a shift, less restrictive NLVW protocol and a more effective partnership between both disciplines.

73 – ORAL PRESENTATION

PARENTHOOD AND PARENTING STRESS AFTER PRETERM BIRTH: LOSING AND REGAINING A TAKEN-FOR-GRANTEDNESS. A MIXED METHODS STUDY

N. Schuetz Haemmerli¹, S. Lemola², E. Cignacco¹

¹Institute of Nursing Science, ²Institute of Psychology, University of Basel, Basel, Switzerland

Background: Psychological problems are common in parents after preterm birth, and they are known to affect parenting on a long-term basis. Research about experiences after preterm birth and parenting stress in early childhood focused predominantly mothers while relatively neglecting fathers.

Objectives: This study aimed at exploring mothers' and fathers' experiences after preterm and term birth and at comparing their parenting stress 2–3 years after birth.

Methods: A mixed methods study with quantitative data embedded in a major qualitative approach was used. Parenting stress was compared between mothers and fathers of 54 families after preterm birth and 65 families after term birth. Interviews were conducted within a purposive subsample.

Results: The different experiences of parents after preterm birth included losing a taken-for-grantedness regarding a healthy child, the development of the parental role, and their expectations of being a family. To regain this taken-for-grantedness the parent's confidence had to be rebuilt, and external empowerment was needed. Birth, hospitalisation, discharge and the first weeks at home emerged as highly vulnerable phases. Parents of preterm and full-term children reported similar parenting challenges 2–3 years after birth and no difference was found in parenting stress ($F(101.324) = .629, p = .430$).

Conclusions: The birth of a preterm child evokes considerable physical and emotional strain in parents during the first year of the child's life. The results have implications for practice in order to

implement existing interventions and develop new interventions to enhance parental coping and self-confidence, collaboration and relationship with health care providers, and to optimize transitional care.

74 – ORAL PRESENTATION

NURSES' VIEWS OF RESEARCH AND IMPACT ON WORKLOAD WITHIN PICU

S. Siner, L. Byrne, E. Scott

PICU, Alder Hey Children's NHS Foundation Trust, Liverpool, UK

Background: An increasing number of research studies are being conducted within the PICU setting [1, 2] with bedside nurses having greater involvement in study tasks.

Aims: To examine the effect of increased study activity on nurses' views of research.

Methods: A 17-item electronic survey was sent to all nurses in a large UK PICU to ascertain their views on the conduct of clinical research in the PICU setting.

Results: 76 of 153 [50 % response rate] nursing staff completed the survey. 99 % of respondents believed that half or more of staff felt happy to be involved in research on PICU. 96 % stated that research is beneficial to clinical practice with 4 % being unsure. 93 % of the respondents had looked after a patient on a research study. 65 % of this subgroup specified that interventional studies had a moderate to major adverse impact upon their clinical workload; only 11 % attributed the same degree of impact to non-interventional studies. At the time of the survey 76 % nurses retained a positive view of research with a further 14 % having gained a more positive view. There were no significant differences between junior and senior staff views.

Conclusions: With the increasing number of trials in PICU, nurses acknowledge that some trials have an adverse impact on their clinical workload but overall their views toward research remain positive.

References:

1. MHRA/Department of Health. Strategy on Medicines for Children (2004)
2. Smyth, RL. Edwards AD. A major new initiative to improve treatment for children. *Arch Dis Child* 2006;91:212–13

75 – ORAL PRESENTATION

THE SOPHIA OBSERVATION WITHDRAWAL SYMPTOMS-PEDIATRIC DELIRIUM SCALE (SOS-PD) AS A SCREENING TOOL

H. te Beest, M. van Dijk, D. Tibboel, E. Ista

Intensive Care Unit, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Objectives: Considering that symptoms of pediatric delirium (PD) and withdrawal syndrome may overlap in critically ill children, we modified our validated Sophia Observation withdrawal Symptoms—

scale to assess both. In this study we will evaluate the applicability of the SOS-PD Scale in critically ill children.

Methods: We retrospectively evaluated data collected from January 2012 until December 2012. The delirium items of the SOS-PD scored in the 48-h period from 24 h before to 24 h after diagnosing PD were retrieved from the nursing records. The SOS-PD scale comprises two subscales, i.e. 'withdrawal' and PD with 15 and 16 symptoms, respectively. They have 10 symptoms in common. An expert panel defined the cut-off score for PD subscale as a total (15) score of ≥ 4 or a positive score on 'hallucination'.

Results: Twenty-three children were diagnosed with delirium, confirmed by a psychiatrist. Their median age was 11 years (range 15 months to 17 years); 12/23 (53 %) were male. PD-subscale scores per patient ranged from 1 to 8 points, with a median of 5. Based on the cut-off score, the SOS-PD scale identified 91 % (21/23) of those as delirious and 13 of 21 of those patients scored positive on 'hallucination'. Frequencies of the PD symptoms ranged from 4 % for grimacing up to 74 % for agitation.

Conclusions: This study suggests that the SOS-PD scale is suitable for early screening of delirium in critically ill children. A prospective study is needed for further psychometric evaluation.

76 – ORAL PRESENTATION

SURVEY OF ATTITUDES AND PRACTICES OF BLOOD TRANSFUSION IN SURGICAL INFANTS

M. Thyoka¹, R. Gentles², R.S. Agbeko²

¹Paediatric Surgery, ²Paediatric Intensive Care, Great North Children's Hospital, Newcastle upon Tyne, UK

Objectives: Red blood cell (RBC) transfusion is common among critically ill surgical infants. Little evidence exists to support the decision making process. Our aim was to assess attitudes and practices of RBC transfusion in a tertiary centre.

Methods: Single centre anonymous online self-administered questionnaire survey. Population; paediatric intensive care (PICU) nursing staff, paediatric surgeons, paediatric anaesthetists, neonatologists and paediatric intensivists. Questions pertained to attitudes and practices of RBC blood transfusion in critically ill surgical infants. Answers were structured using a 5 point Likert score scale and limited free text. Critically ill surgical infants were defined as children <1 year of age, per-operatively admitted to PICU.

Results: There were 50/114 (44 %) respondents; 25 (50 %) were medical staff. 38/50 (76 %) respondents completed the full survey. All clinical staff had direct involvement with RBC transfusions in the 12 months prior to survey, 24 % (9/38) were involved in more than ten transfusions. Few respondents (6/38 [16 %]) were aware of blood transfusion guidelines specifically for surgical infants. The majority (26/38 [68 %]) believed a critical Haemoglobin level existed to trigger initiation of blood transfusion. Clinical status (36/38 [95 %]) and need for inotropic support (32/38 [84 %]) were the commonest patient factors respondents agreed or strongly agreed would influence their decision to transfuse.

Conclusion: This survey highlights the lack of consensus for transfusion triggers in the critically ill surgical infant. A decision to transfuse is mostly guided by clinical and haemodynamic status. Further data are required to underpin transfusion guidelines specific to this population.

77 – ORAL PRESENTATION

LESS WITHDRAWING AND MORE APPROACHING BEHAVIOR IN PRETERM INFANTS AFTER IMPLEMENTATION OF AN EARLY INTERVENTION IN THE NICU

I.J. Tølløfsrud¹, I.H. Ravn^{1,2}

¹Neonatal Intensive Care, Oslo University Hospital, Ullevaal,

²Department of Nursing, Faculty of Health Sciences, Oslo, Norway

Background and aims: In 2009, Standard Care (SC) for preterm infants was extended by implementing a modified Mother-Infant-Transaction-Program (MITP) into Revised Standard Care (RSC) in the NICU, Oslo University Hospital, Ullevaal.

All nurses were trained to coach parents in five core elements of the MITP, starting in the babies' first week of life.

1. Recognize and respond to the infant's cues of stress, disorganization and well being.
2. Regulation of sleep- and awake- stages.
3. Practical responds to the infant's cues during a bath.
4. Engaging and sustaining interactive attention.
5. Adjusting to the environment at home, consolidation of the program.

Aims of this study were to test if implementation of a modified MITP may influence the infants' temperamental behaviour at 7 months corrected age reported by their mothers and fathers.

Methods: Infant temperament was measured with the Short Temperament Scale for Infants (STSI) on the subdomains Approach, Rhythmicity, Cooperation-Manageability, Activity-Reactivity and Irritability (Newnham, C.A. 2009). Mothers (n = 41) and fathers (n = 41) of 43 infants in the RSC-group, and mothers (n = 40) and fathers (n = 39) of 40 infants in the SC-group reported separately. Data were analysed using descriptive, comparing, nonparametric and loglinear statistics.

Results: Mothers in the RSC-group reported their infants to be significantly less withdrawing and more approaching compared to mothers in the SC-group (p .047). No significant group-differences were found in the other subdomains, or between the fathers.

Conclusions: Modified MITP seem to have a positive effect on preterm infants' withdrawing and approaching behavior reported by their mothers.

Pharmacology (78–82)

78 – ORAL PRESENTATION

QUANTIFYING DELIVERY OF ALBUTEROL WITH HIGH FLOW NASAL CANNULA

M.A. Alalwan, J.B. Fink, R. Harwood, L. Bryant, M. Sheard, A. Ari

Georgia State University, Atlanta, GA, USA

Background and aims: During aerosol therapy with high flow nasal cannula (HFNC), drug is administered by mask with or without HFNC in place. The purpose of this study was to compare aerosol delivery via mask with and without HFNC in place using pMDI and jet-nebulizer (JN) or with mesh-nebulizer (MN) through HFNC.

Methods: HFNC at 3 lpm oxygen was administered to 9-month airway model with collecting filter at trachea attached to a breath

simulator (Vt: 100 mL, RR: 30 bpm). Albuterol sulfate (2.5 mg/3 mL) was administered either with JN (Misty-neb) powdered at 8 l/min using facemask or with MN (AeronebSolo) placed at the inspiratory inlet of a heated-humidifier at 37 °C. Four actuations of Ventolin-HFA-pMDI (90 µg/puff) were administered via valved holding chamber with mask (AeroChamber). Aerosol was administered through HFNC via MN or indirectly via mask (with and without the HFNC in the nares) using pMDI or JN (n = 3). Drug was eluted from the filter and quantified via spectrophotometry.

Results: Table shows mass and % of albuterol dose (mean ± SD) deposited distal to the trachea. Removing HFNC from the nares before aerosol treatment increased drug delivery with JN and pMDI (p < 0.05) via mask, but was less than MN via HFNC (p < 0.01).

Table 1

	Jet Nebulizer via mask		pMDI via mask		Mesh Neb via HFNC
	HFNC	No HFNC	HFNC	No HFNC	
Inhaled mass (µg)	72.8 ± 5.8	151.3 ± 38.1	21.8 ± 1.0	142.4 ± 32.3	345.1 ± 8.5
Inhaled dose %	2.9 ± 0.2	6.1 ± 1.5	6.0 ± 0.3	39.5 ± 8.9	17.20 ± 0.15

Conclusions: Aerosol therapy via HFNC delivered more drug than mask with or without HFNC in place.

79 – ORAL PRESENTATION

OPTIMIZING PAEDIATRIC DRUG USE

B. Anneveld¹, R. Havenaar¹, L. Hanff², J. Bongers²

¹TNO, Zeist, ²Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Background: In daily practice paediatric oral drugs are often administered in unlicensed manner (e.g. crushed in food), while effects on bioavailability are unknown. Aim is to optimize paediatric drug use by knowledge on bioavailability utilizing in vitro gastrointestinal models.

GI conditions

Age	Preterm neonate <0 m	Neonate 0–1 m	Infant 1–6 m	Toddler 6–24 m	Adolescent 12–18 years
1st meal 0–3 h	Water	Formula milk	Formula milk	Milk + cereals	High fat meal
Gastric juice	1 ml	2 ml	3 ml	5 ml	10 ml
Saliva	5 ml	15 ml	20 ml	25 ml	60 ml
Meal	54 ml	93 ml	107 ml	115 ml	230 ml
t1/2 gastric emptying	13	50	60	70	80
Gastric pH 1st meal	5	6.7 → 4.0	6.7 → 3.2	6.7 → 2.4	6.7 → 1.7
Intestinal pH	6.5	6.5	6.5	6.5	
GI secretion 1st meal	–	50 %	75 %	100 %	100 %

Methods: Gastrointestinal physiology parameters for different paediatric age groups (Table) were programmed in an in vitro GI-tract model 'TIMpaediatric'. After administration with water or age-related foods, the availability for absorption of drugs from (manipulated) dosage forms was investigated.

Results: Fast stomach emptying for pre-term neonate resulted in early absorption of caffeine, corresponding with in vivo ($r = 0.99$). Paracetamol showed a similar dose–response effect and t_{max} compared to in vivo. Manipulation of esomeprazole tablets lead to early release and low availability due to degradation by gastric acid.

Fig. 1 Mean bioaccessible paracetamol after intake of 15 mg/kg b.w. as suspension, syrup and crushed tablets for three age groups (paracetamol)

Fig. 2 Mean bioaccessible esomeprazole after intake of crushed and intact gastro-retentive tablet (esomeprazole)

Conclusions: TIMpaediatric showed good resemblance with the in vivo situation for availability of caffeine for pre-term neonate; dose response for paracetamol for neonate, infant, toddlers, and effect of drug manipulation on bioavailability.

References:

Gaicoia 1989 Dev.Pharm.Th.; Hopkins 1990 Arch. Dis. Childhood; Siegel 1984 J.Ped.

80 – ORAL PRESENTATION

INNOVATIVE PAEDIATRIC PHARMACOLOGY; VALIDATION OF AN EVIDENCE-BASED DOSING ALGORITHM FOR MORPHINE IN NEONATES AND INFANTS

E.H. Krekels^{1,2}, I. Ceelie², A. Dahan³, M. Danhof¹, M. van Dijk², S.N. De Wildt², D. Tibboel², C.A.J. Knibbe^{1,2,4}

¹Leiden/Amsterdam Centre for Drug Research, Leiden, ²Erasmus MC-Sophia Children's Hospital, Rotterdam, ³Leiden University Medical Centre, Leiden, ⁴St. Antonius Ziekenhuis, Nieuwegein, The Netherlands

Introduction: Validated morphine dosing algorithms are lacking for neonates and infants. A paediatric population pharmacokinetic model showed morphine clearance to non-linearly increase with bodyweight and be reduced by 50 % in neonates younger than 10 days [1, 2]. We prospectively evaluated the efficacy of the resulting age-adjusted morphine dosing algorithm in term neonates up to infants of 1 year of age. **Methods:** After major non-cardiac surgery, continuous morphine IV infusion of 2.5 µg/kg^{1.5}/h was given in neonates younger than 10 days and 5 µg/kg^{1.5}/h in older patients. Morphine IV rescue was given according to a validated age-appropriate pain protocol. Outcome measures were

- 1) morphine rescue dose;
- 2) average actual morphine infusion rate;
- 3) morphine and metabolite concentrations.

Results: Of infants younger (n = 18) and older (n = 20) than 10 days 27.8 vs. 90 % (p < 0.001) of patients needed additional morphine rescue, respectively. The total rescue dose was 0 (0–539) µg/kg vs. 193 (0–1,183) µg/kg (median (range), p < 0.001). Median actual morphine infusion rate was 4.4 (3.6–5.0) µg/kg/h vs 14.4 (7.4–15.7) µg/kg/h (median (range), p < 0.001). Morphine and metabolite concentrations were accurately predicted by the paediatric population morphine model.

Conclusions: Compared to traditional morphine dosing in µg/kg/h, the model-based dosing algorithm correcting for age-related differences in morphine pharmacokinetics may prevent overdosing in the youngest neonates, but still seems to result in underdosing in infants. [1] Knibbe CA et al. Clin Pharmacokinet 2009;48(6):371–85.

[2] Krekels EH et al. Clin Pharmacokinet. 2011 Jan 1;50(1):51–63.

81 – ORAL PRESENTATION

A SNAPSHOT OF SEDATION MONITORING PRACTICES IN A TERTIARY PAEDIATRIC INTENSIVE CARE UNIT IN THE UK

R. Mithyantha, S. Mahoney

PICU, Alderhey Childrens Hospital, Liverpool, UK

Background: Critically ill children requiring intensive care (PICU) experience psychological and physical discomfort which impacts upon short-term recovery, length of hospital stay and may lead to long-lasting effects. Monitoring for adequate but not over—sedation and analgesia forms an essential aspect of paediatric critical care.

Methods: Sedation monitoring was evaluated in a multidisciplinary 22 bed regional PICU. Data was prospectively collected over a

4 week period in 2012. Sedation and analgesia were monitored using the COMFORT and PAIN scales respectively.

Results: Data was collected from 61 patients (18 neonates, 23 infants and 20 children). 22/61 (36.1 %) were cardiac patients. COMFORT score was documented for 924 h (97.6 %), of which during 136 h (14.6 %) the sedation status was recorded as “paralysed”. The COMFORT score was ideal (17–26) during 473 h (60 %) and reflected marginal over-sedation (15–16) during 251 h (31.5 %). This trend towards over-sedation status was longer amongst cardiac patients vs non-cardiac (127/254 vs 188/535 h; $p < 0.001$). No patient was under-sedated (score 27–40).

Conclusions: There is good adherence to use of COMFORT score. Cardiac patients demonstrated comparatively higher sedation scores reflecting possible suboptimal sedation status. Post op cardiac patients may be more haemodynamically unstable; COMFORT score uses haemodynamic variables and this may be a reason for the higher scores rather than a true reflection of sedation status (47.5 % showed scores 15–16 compared to 50.4 % who had ideal sedation scores). Should we use modified scales such as COMFORT-B scales for evaluating cardiac patients?

82 – ORAL PRESENTATION

INDIVIDUAL PHARMACOKINETICS OF PHENOBARBITAL IN CRITICALLY ILL NEONATES TREATED WITH WHOLE BODY HYPOTHERMIA

P. Pokorná^{1,2}, V. Vobruba¹, O. Černá¹, P. Srnský¹, D. Lorenčík¹, P. Klement¹, D. Tibboel², O. Slanař³

¹Department of Pediatrics-PICU/NICU, General Faculty Hospital, Prague, Czech Republic, ²Intensive Care and Department of Pediatric Surgery, Erasmus MC-Sophia Childrens Hospital, Rotterdam, The Netherlands, ³Department of Pharmacology, General Faculty Hospital, Prague, Czech Republic

Objectives: Hypoxic-ischemic events and/or hypothermia might result in changes of PK parameters: clearance (CL) and volume of distribution (Vd) Phenobarbital (PHE) is increasingly used as drug for neonates undergoing whole body hypothermia (WHT).

Aim: To evaluate individual PK of PHE and determine the impact of covariates on PK of PHE.

Methods: Prospectively neonates undergoing WHT (target temperature range 33–34 °C) were included (2007–2012). Treatment consisted of open label PHE with a loading dose of 2.5–30 mg/kg, followed by a maintenance dose of 3–5 mg/kg, every 12 h intravenously. Arterial blood samples ($n = 84$) were collected. Plasma profile of administered PHE was determined using a validated HPLC method. PK parameters: clearance (CL), volume of distribution (Vd), and elimination half-life ($t_{1/2}$) of PHE were estimated using a non-compartment analysis, PC Programme (MWPharm Version 4.0). Results are reported as mean (SD) and Student's t test analysis.

Results: Twenty six term neonates were divided in two groups: group₁ (14/26) treated with PHE only; group₂ treated with PHE + phenytoin (12/26). In group₁ the mean (SD) predicted total CL₁ was 0.0054 (0.0016) L/kg h⁻¹; Vd₁ 0.529 (0.163) L/kg. In group₂ CL₂ was 0.0016 (0.0013) L/kg h⁻¹; Vd₁ 0.517 (0.083) L/kg; CL was significantly reduced in group₂ vs group₁ ($p = 0.043$). The dosage regimen of PHE was individualized in all neonates (18/26); (25) % with PHE plasma levels outside the therapeutic window (C_{pi} PHE = 10–40 µg/ml).

Conclusions: In neonates undergoing WHT dosage regimen of PHE should be based on individual therapeutic drug monitoring data.

Respiratory Failure (83–87)

83 – ORAL PRESENTATION

TARGETING ARTERIAL BLOOD PRESSURE WITH DOPAMINE AND NOREPINEPHRINE DOES NOT IMPROVE MICROCIRCULATORY PERFUSION IN CONGENITAL DIAPHRAGMATIC HERNIA PATIENTS

E.A.B. Buijs¹, A.J.M. Zwiers¹, M.G. Mooij¹, U.S. Kraemer¹, I.K.M. Reiss², C. Ince³, D. Tibboel¹

¹Intensive Care-Department of Pediatric Surgery, ²Division of Neonatology and Department of Pediatrics, Erasmus MC-Sophia Children's Hospital, ³Intensive Care, Erasmus MC, Rotterdam, The Netherlands

Background & aim: Little is known about the effects of cardiotoxic and/or vasopressor drugs on microcirculatory perfusion (MP) in children. Improving MP in critically ill adults was associated with improved outcome. This study aimed to evaluate the MP effects of dopamine and norepinephrine for increasing mean arterial blood pressure (MAP) in congenital diaphragmatic hernia (CDH) patients.

Methods: In this observational cohort study buccal MP (Sidestream Dark Field Imaging) was assessed before start of both dopamine and norepinephrine (T0), after start of dopamine (T1), and subsequently after start of norepinephrine (T2). Small (S; Ø: 0–10 µm) and non-small (NS; Ø: 11–100 µm) perfused vessel density (PVD-S, PVD-NS) and microvascular flow index (MFI-S, MFI-NS) were determined. MAP and heart frequency (HF) were recorded at T0–T2. Data are presented as median (IQR) and analyzed using parametric tests.

Results: We included 10 CDH patients receiving 7 (5) mcg/kg min dopamine at T1 and 13 (5) mcg/kg min dopamine and 0.1 (0.2) mcg/kg min norepinephrine at T2. MAP increased from T0 to T2 (see Table 1; ^A $p < 0.05$ vs. T0, ^B $p < 0.05$ vs. T1). HF remained unaltered between T0 and T1, but increased thereafter. In contrast, there were no changes over time in PVD-S, PVD-NS, MFI-S, or MFI-NS.

Conclusion: Targeting MAP with dopamine and norepinephrine does not result in microcirculatory improvement in CDH patients.

Table 1 MP effects of dopamine and norepinephrine

	MAP (mmHg)	HF (bpm)	PVD-S	PVD-NS	MFI-S	MFI-NS
T0	40 (14)	141 (35)	8.4 (7.0)	5.7 (3.5)	2.75 (0.58)	2.78 (0.32)
T1	47 (13)*	135 (34)	9.5 (3.6)	5.7 (3.2)	2.85 (0.33)	2.88 (0.20)
T2	53 (19)*#	175 (34)*#	9.8 (4.3)	5.4 (2.1)	2.67 (0.58)	2.84 (0.26)

84 – ORAL PRESENTATION

MICROCIRCULATORY PERFUSION IN CHILDREN REQUIRING VENOARTERIAL OR VENOVENOUS EXTRACORPOREAL MEMBRANE OXYGENATION

E.A.B. Buijs¹, C. Ince², M.G. Mooij¹, A.J.M. Zwiers¹, R.J.M. Houmes¹, E.D. Wildschut¹, D. Tibboel¹

¹Intensive Care-Department of Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, ²Intensive Care, Erasmus MC, Rotterdam, The Netherlands

Background & aim: Extracorporeal membrane oxygenation (ECMO) should not only provide macrocirculatory and/or respiratory support, but also microcirculatory support. Because venoarterial ECMO (VA) differs intrinsically from venovenous ECMO (VV) and different patient selection criteria apply, we hypothesized that microcirculatory perfusion (MP) is decreased before cannulation and increases immediately thereafter in VA whereas in VV there are no longitudinal differences.

Methods: Buccal MP was assessed using Sidestream Dark Field Imaging before start (T0), at day 1–3 (T1–T3), and before (T4) and after stop (T5) of VA or VV. Small (S; $\varnothing$: 0–10 μ m) and non-small (NS; $\varnothing$: 11–100 μ m) perfused vessel density (PVD-S and PVD-NS) and microvascular flow index (MFI-S and MFI-NS) were determined. Data are presented as median (range) and analyzed using non-parametric tests (* $p < 0.05$).

Results: We included 31 VA and 17 VV patients. From T0 to T1, PVD-S, PVD-NS, MFI-S, and MFI-NS were neither increased in VA nor in VV (Figure 1). From T2 onwards, PVD-NS increased in VV whereas in VA it increased from T3 onwards. MFI-S and MFI-NS for VA and VV increased from T3 onwards, the exception being T4 VV MFI-S and T5 VA MFI-NS. PVD-S did not change in VA or VV.

Conclusions: In VA and VV, MP recovers 24–48 h after cannulation and is sustained after decannulation. Goal directed therapy may accelerate MP recovery, also in VV patients.

Fig. 1 MP before, during, and after VA or VV

85 – ORAL PRESENTATION

TIDAL VOLUME IS AN INADEQUATE SURROGATE FOR LUNG STRAIN

M. Kneyber^{1,2}, H. Zhang², A. Slutsky²

¹Beatrix Children's Hospital, Groningen, The Netherlands, ²Keenan Research Institute, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, ON, Canada

Background and aims: Ventilator-induced lung injury (VILI) may be caused by inadequate lung strain of the ratio of tidal volume (V_T)

over functional residual capacity. It was reported that infant rats were less susceptible than adult rats when ventilated with a V_T of 30 mL/kg. We hypothesized that differences in lung strain explained the different occurrence of VILI between infant and adult rats.

Methods: Infant (± 26 days), juvenile (± 6 weeks) and adult (± 12 weeks) male Sprague–Dawley rats were studied in an ex vivo lung model. Height and weight were measured. Lungs were excised, total lung capacity (TLC) measured. Data are expressed as mean $\pm$ standard error. Statistical analysis was done using one-way ANOVA with post hoc testing to compare between groups. $P < 0.05$ were accepted as statistically significant.

Results: $N = 79$ rats were studied. TLC and total lung weight were not proportional to bodyweight ($p < 0.001$), but were proportional to height ($p < 0.001$). As such, the V_T -to-TLC ratio was weight-dependent at a V_T of 30 mL/kg ($p < 0.001$), signifying less strain in the infant rat (0.47 ± 0.04) compared with the adult rat (0.91 ± 0.02).

Conclusions: Lung strain (V_T -to-TLC ratio) at constant transpulmonary pressure was different between infant and adults rats when the delivered V_T was dictated by 30 mL/kg, suggesting it is an inadequate surrogate for lung strain in the context of studying VILI throughout different age categories.

86 – ORAL PRESENTATION

SECRETORY PHOSPHOLIPASE A2 AFFECTS BIOLOGICAL AND CLINICAL OUTCOMES IN INFANTS WITH ARDS

D.D. Luca¹, A. Minucci², E. Lopez-Rodriguez³, F. Vendittelli², E. Stical⁴, G. Conti⁴, M. Piastra⁴, M. Echaide³, E.D. Capoluongo², J. Perez-Gil³

¹Pediatric Intensive Care Unit, Department of Anesthesiology and Intensive Care & Laboratory of Clinical Molecular Biology,

²Laboratory of Clinical Molecular Biology, University Hospital "A.Gemelli", Catholic University of the Sacred Heart, Roma, Italy,

³Department of Biochemistry, Faculty of Biology, Universidad Complutense, Madrid, Spain, ⁴Pediatric Intensive Care Unit, Department of Anesthesiology and Intensive Care, University Hospital "A.Gemelli", Catholic University of the Sacred Heart, Roma, Italy

Background/aims: Secretory phospholipase A2 (sPLA2) is crucial for lung injury but scanty data are available in pediatrics. This study is part of an international project on sPLA2 in pediatric critical respiratory diseases, whose plan has been published elsewhere [1]. Study aims:

- 1) to measure sPLA2 and identify its subtypes;
- 2) to study its biochemical and biophysical effects;
- 3) to correlate sPLA2 with clinical outcomes.

Methods: Bronchoalveolar lavage (BAL) was performed in 24 ARDS infants and 14 controls with no lung disease. Samples were assayed for sPLA2 and related molecules and corrected using urea ratio. Subtypes were identified through western blotting; captive bubble surfactometry was also performed. Clinical data were realtime downloaded during the PICU stay.

Results: TNF α (814 [506–2,499] vs 287 [111–1,315] pg/mL; $p = 0.04$), sPLA2 activity (430 [253–600] vs 149 [61–387] IU/mL; $p = 0.01$), free fatty acids (4.3 [2.8–8.6] vs 2 [0.8–4.6] mM; $p = 0.026$) and surface tension (25.6 ± 6.1 vs 18 ± 1.8 mN/m; $p = 0.006$) were higher in patients than in controls. Phospholipids are lower in patients than in controls (76.5 [54–100] vs 1,094 [536–2,907] mg/mL; $p = 0.0001$). Three sPLA2 isotypes were identified (-IIA, -V, -X) in about 80 % of cases and, in lower amount, in 60 % of controls. sPLA2-IB was found only in 75 % of patients. sPLA2

correlates with fatty acids ($p = 0.823$; $p < 0.001$), surface tension ($p = 0.55$; $p < 0.028$), PICU stay ($p = 0.54$; $p = 0.001$), PRIS-MIII₂₄ ($p = 0.79$; $p < 0.001$), predicted mortality ($p = 0.76$; $p < 0.001$), duration of ventilation ($p = 0.53$; $p = 0.002$) and oxygen therapy ($p = 0.54$; $p = 0.001$).

Conclusions: sPLA2 is raised in pediatric ARDS and constituted of four subtypes. sPLA2 correlates with inflammation and surface tension and with major clinical outcomes.

[1] Study group on Secretory Phospholipase in Paediatrics (SSPP). Secretory phospholipase A2 pathway in various types of lung injury in neonates and infants: a multicentre translational study. BMC Pediatrics 2011, 11:101.

87 – ORAL PRESENTATION

EFFECT OF STEP-WISE PEEP MANOEUVRE VERSUS SUSTAINED INFLATION AT BIRTH ON GAS EXCHANGE AND LUNG MECHANICS IN PRETERM LAMBS

D. Tingay^{1,2,3}, A. Rajapaksa¹, E. Zonneveld¹, D. Black¹, E. Perkins^{1,2}, M. Sourial², P. Davis^{1,4}

¹Neonatal Research, Murdoch Childrens Research Institute, Parkville, ²Neonatology, Royal Children's Hospital, ³Paediatrics, University of Melbourne, Melbourne, ⁴Neonatal Research, Royal Women's Hospital, Parkville, VIC, Australia

Objectives: To evaluate the effect of four resuscitation strategies on oxygenation, lung mechanics and injury.

Methods: At birth, 127 days GA lambs ($n = 9$ –10/gp) were ventilated in air for 60-min with either:

1. Control: Positive pressure ventilation (PPV; PEEP 8 cmH₂O) and volume targeted ventilation (VTV; 7 mL/kg).
2. SI: 20-s, 40 cmH₂O sustained inflation then PPV + VTV.
3. SI ± Surf: As per SI group plus CurosurfTM at 10-min.
4. Step-wise PEEP (SEP): PPV + VTV with 2 cmH₂O PEEP increases every 10-inflations from 6 to 20 cmH₂O, then decrements to 8 cmH₂O.

VTV and FiO₂ titrated to maintain PaCO₂ 45–60 mmHg and SpO₂ 88–94 %. Lung mechanics and regional volumes (V_L: Electrical Impedance Tomography) were recorded with arterial blood gases.

Results: SEP resulted in better oxygenation and mechanics than SI and Control (Table), and lower lung protein compared to all groups (mRNA and histology data to be presented at meeting). At 5-min, all groups had more uniform V_L than Control. Gravity-dependent derecruitment was evident by 60-min in all groups.

Table 1 Oxygenation, mechanics and total protein

	Oxygenation Index		C _{dyn} (mL/kg cmH ₂ O ⁻¹)		Static C _{RS} (mL/kg cmH ₂ O ⁻¹)	Static vital capacity (mL/kg)	Total protein (mg/mL)
	5-min	60-min	5-min	60-min			
Control	20.1 (11.0)	35.2 (22.1)	0.16 (0.04)	0.21 (0.03)	0.78 (0.30)	31 (12)	1.07 (0.47)
SI	16.5 (8.3)	28.2 (10.4)	0.20 (0.02)	0.22 (0.04)	0.73 (0.19)	29 (7)	1.10 (0.55)
SI + Surf	15.0 (13.1)	24.4 (20.6)	0.18 (0.05)	0.25 (0.04)	0.88 (0.30)	35 (12)	1.15 (0.88)
SEP	6.8 (2.9)*	13.9 (11.3) [†]	0.23 (0.03)*	0.27 (0.05) [†]	1.04 (0.20) [†]	42 (8) [†]	0.56 (0.43)*

Data mean (SD), * $p < 0.05$ cf others, [†] $p < 0.05$ cf Control and SI (t tests)

Conclusions: Step-wise PEEP approach may optimise lung aeration at birth, especially in the surfactant deficient lung.

Resuscitation and Emergency Medicine (88–91)

88 – ORAL PRESENTATION

GUIDELINE ADHERENCE AND SKILL PROFICIENCY IN NEONATAL RESUSCITATION

M. Hogeveen¹, T. Peeters¹, J. Loeffen², T. Antonius¹

¹Paediatrics/Neonatology, ²Paediatrics, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: Neonatal resuscitation is a frequently occurring event. International guidelines describe the neonatal life support algorithm (NLS).

Methods: We prospectively studied adherence to guideline and skill proficiency in a cohort of 44 Dutch pediatricians. We developed a standardized neonatal scenario and a computer controlled manikin to obtain feedback on quality of skills and adherence: NeoGame. Multiple sensors detect all interventions. Depending on the quality, timing, order and frequency of these interventions a mathematic model calculated response of heart rate, saturation and return of spontaneous breathing. Data were digitalized and recorded videos were analyzed.

Results: Results are expressed as median (min; max). Start inflation breaths was 55 (36; 206) s (NLS 30 s); start compressions 108 (67; 254) s (NLS 60 s). Ventilation frequency was 19 (10; 39)/min. Administration of epinephrine was 377 (211; 677) s and time to recovery was 444 (271; 719) s. The airway was open 85 (39; 100) % of time. Inflation breaths lasted 1.7 (1.1; 2.8) s (NLS 2–3 s). Compressions were in right position and depth in 38 (10; 69) %.

Fig. 1

Fig. 2

Conclusions: Using our NeoGame we observed that inflation breaths were too short and ventilation rates too low. Furthermore compressions were inadequate in majority of cases. We will study interventions to improve performance.

89 – ORAL PRESENTATION

OUTCOME OF HYPOTHERMIC CARDIAC ARREST IN CHILDREN AFTER DROWNING: LESSONS FROM THE DUTCH DATABASE

J.K. Kieboom¹, M.C. Kneyber¹, J.J. Bierens², H.J. Verkade¹, M.J. Albers³

¹Pediatrics, Beatrix Children's Hospital, University Medical Center Groningen, Groningen, ²Anesthesiology, Van Heumlaan 10, Vught, ³Elisabeth Ziekenhuis, Tilburg, The Netherlands

Objective: To determine the outcome of hypothermic cardiac arrest in pediatric drowning and assess prolonged resuscitation and season as prognostic factors.

Methods: The Dutch database on pediatric drowning contains information of all children admitted to the 8 Dutch University Medical Centers between 1993 and 2012. For this study only children who suffered hypothermic (body temperature <34 °C) cardiac arrest after drowning in outside waters were included. Traffic accidents were excluded. The primary outcome measure was survival without severe neurological damage.

Results: 160 children with hypothermic cardiac arrest were included, 17 (10.6 %) children had good outcome and 143 (89.4 %) children had poor outcome (116 died, 10 survived in persistent vegetative state and 17 with severe neurological damage). Outcome was best in winter. None of the 98 (61 %) children who received prolonged resuscitation (>30 min) had good outcome.

Outcome per season

	Summer	Spring/Autumn	Winter	Total
Good outcome	3 (4 %)	9 (13 %)	5 (29 %)	17 (11 %)
Poor outcome	72 (96 %)	59 (87 %)	12 (71 %)	143 (89 %)
Total	75 (47 %)	68 (42 %)	17 (11 %)	160

Conclusions: Good outcome of hypothermic cardiac arrest after drowning was 10.6 %. Prolonged resuscitation was performed in 61 % of children and did not end in good outcome in any child. Season strongly correlated with outcome, with poorest outcome in summer. Our data question the ultimate therapeutic value of prolonged resuscitation in hypothermic cardiac arrest after drowning, especially after drowning in summer.

Thanks to the Network of Excellence of PICU's in the Netherlands.

90 – ORAL PRESENTATION

AGE BASED MATHEMATICAL FORMULA FOR ESTIMATION OF HEART RATES IN CHILDREN

M.V. Sheththalli¹, M. Parry²

¹Paediatrics, Royal Gwent Hospital, Newport, ²Department of Paediatrics, Ysbyty Gwynedd, Bangor, UK

Background: Heart rate is an important vital sign used to predict the severity of illness in an acutely ill child and is an integral part of triage in Paediatric patients. The Advanced Paediatric Life support (APLS) reference charts and the Centile Charts of heart rates are complicated and cumbersome for its use in busy clinical settings. In this study we aimed to derive a easily memorable first of its kind 'age based mathematical formula' for estimating the abnormal heart rates.

Methods: Best fit linear derivative technique was used to derive the new formulae to estimate abnormal heart rates in children from the published Centile Charts. We validated this 'new formulae' against the Centile Charts and APLS reference ranges using the 571 observations of heart rates collected from discharge observation charts.

Results:

(n = 571)	APLS Charts	'New formulae'	Comparison of test statistics
Sensitivity	61.79	74.15	McNemar's χ^2 (1) = 5.26; Prob > χ^2 = 0.0218
Specificity	93.56	84.02	McNemar's χ^2 (1) = 31.12; Prob > χ^2 = 0.0000
Area under ROC curve	0.777 (CI 0.724–0.828)	0.790 (CI: 0.742–0.839)	χ^2 (1) = 0.26; Prob > χ^2 = 0.6094

The new formulae derived has increased sensitivity and the area under ROC curve is not different from APLS method as tabulated in the results table.

Conclusion: Age based mathematical formula has been derived which can be safely used by clinicians to estimate abnormal heart rates in children in acute clinical settings. This is given by the formulae:

- 1) **HR (MAX) = 150 – (3 × AGE)**
- 2) **HR (MIN) = 110 – (3 × AGE) or**
HR (MIN) = HR (MAX) – 40

(where Age = age in years at last birthday)

91 – ORAL PRESENTATION

DELIVERY ROOM RESUSCITATION IN THE UNITED KINGDOM: POST SURVEY FOLLOW-UP

T. Whitby¹, V. Whitby², I. Sinha³

¹Department of Paediatrics, St Helens and Knowsley Teaching Hospitals NHS Trust, ²Department of Accident and Emergency, Royal Liverpool and Broadgreen University Hospitals NHS Trust, ³Department of Women's and Children's Health, Institute of Translational Medicine, University of Liverpool, Liverpool, UK

Background: In 2011, on the basis of clinical research studies, the Resuscitation Council (UK) recommended that term infants should be resuscitated initially in room air, and preterm infants in blended oxygen guided by pulse oximetry.

Aims: We aimed to examine whether UK hospitals follow the Resuscitation Council 2011 (UK) guidelines and how quickly new practices are implemented.

Methods: In March 2011 a telephone survey of delivery room resuscitation practice was undertaken in all UK NHS hospitals that provide neonatal services. All units that had resuscitated infants in 100 % FiO₂ were re-surveyed in March 2012. Senior neonatal nurses or paediatricians were interviewed.

Results: Of 208 hospitals contacted in 2011, 195 (93.8 %) participated. Of these, 70 (35.9 %) resuscitated neonates initially in 100 % FiO₂. In 2012, of the 70 hospitals resurveyed, 68 (97.1 %) participated. Significantly fewer hospitals, specifically 13/68 (19.1 %), continued to routinely resuscitate neonates in 100 % FiO₂. In 50/68 (73.5 %) hospitals all infants were resuscitated initially in room air. The remaining 5/68 (7.4 %) units resuscitated infants in 22–50 % FiO₂ blended oxygen.

An oxygen blender was available in 47/68 (69.1 %) hospitals. Notably, oxygen blenders were not available in 12/13 (92.3 %) units that resuscitated initially in 100 % FiO₂.

By 2012, full compliance with the Resuscitation Council (UK) guidelines had been achieved to 22/68 (32.4 %) hospitals, compared to 7/195 (3.6 %) in 2011.

Conclusions: A significant proportion of UK hospitals have changed their practices and implemented the Resuscitation Council 2011 (UK) guidelines. This survey shows it takes time to implement new routines and change human behaviours.

Ethics (92–98)

92 – POSTER SESSION

ETHICAL ISSUES IN SEVERE PERINATAL ASPHYXIA

A. Avasiloaiei, M. Stamatin

Mother and Child Care Department, Gr. T. Popa University of Medicine and Pharmacy, Iasi, Romania

Severe perinatal asphyxia represents a major source of neonatal mortality and neurologic sequelae in survivors.

Aim: To emphasize the incidence of sequelae and hospitalization costs for newborns with severe perinatal asphyxia.

Materials and methods: This is a prospective study on 34 term newborns with severe perinatal asphyxia, admitted to the

Cuza-Voda NICU over 3 years. The following parameters have been assessed: birth weight, Apgar scores, pH and cord blood gases, methods of resuscitation, neurologic disorders during hospitalization, postasphyxial multiorgan injury, outcome during hospitalization and length of hospitalization. The surviving newborns were included in the follow-up programme and examined periodically up to 2 years.

Results: The incidence of severe perinatal asphyxia was 0.16 %. Neurologic disorders diminished from 100 % at birth to 82.35 % after 72 h. The number of newborns with advanced stages of hypoxic-ischaemic encephalopathy increased from 8.8 % at birth to 50 % at 72 h. The mean duration of hospitalization was 17.24 days and the average hospitalization costs were 6,585 Euros (the average individual gross monthly revenues in Romania are 480 Euros). There were 5 deaths in our study lot (14.71 %). Of the survivors, 15 newborns (44.12 %) were discharged with severe neurologic disorders. At the end of the follow-up programme, 33.3 % had no neurologic disorders, while 66.6 % had moderate and severe neurologic disorders.

Conclusions: The intensive care of the newborns with severe perinatal asphyxia should not take into account the severity of the condition or hospitalization costs, due to the high regenerative capabilities and resistance to hypoxia of the neonatal brain.

93 – POSTER SESSION

EXTERNAL VENTRICULAR ASSIST DEVICE IN PAEDIATRICS: ETHICAL ISSUES IN TWO CASE REPORTS

I. de Barbieri¹, S. Libelli², C. Zaggia¹

¹Terapia Intensiva Pediatrica, Azienda Ospedaliera di Padova, Padova, ²University of Padua, Padua, Italy

Background and aim: External Ventricular Assist Devices (VADs) are used in case of life-threatening illness in children with severe cardiac failure after exhausting conservative therapy options. Our aim was to report two clinical cases of children with external VADs who had different outcomes and to describe a possible ethical approach to these situations needing multidisciplinary care.

Methods: Case report.

Discussion: T. was 2 years old when diagnosis of Parvovirus myocarditis causing severe heart failure was made. Excor[®] Pediatric (Berlin Heart GmbH) was implanted as bridge to transplantation, which was successfully carried out after 7 months. D. was born with left ventricular hypertrophy and aortic valve critical stenosis. He underwent heart surgery in the following months with poor outcomes, so that Excor[®] Pediatric was implanted. D. died 1 month later because of recurrent bilateral pneumothorax, cerebral haemorrhage and sepsis. Comparing these cases, some thought is needed about these patients' clinical history and in particular about the clinical course of action, chosen both in consideration of their existent pathology and of the quality of life we intend to offer to a child and its parents.

Conclusions: A teamwork, with its integration of different perspectives, can enhance the capacity to take clinically—and ethically—correct decisions, aiming at the patient's own good and at preserving their dignity. Nurses have a pivot role in the multidisciplinary team and can give an important contribution thanks to their capacity of overview of the patient in its entirety, in a Family Centered Care perspective.

94 – POSTER SESSION

CLARITY OF DECISIONS REGARDING RESUSCITATION IN END OF LIFE CARE PLANNING

C. Frost¹, S. Ray², J. Brierley³

¹Clinical Site Practitioner, Great Ormond St Hospital, ²Paediatric Intensive Care Unit, ³Paediatric Intensive Care Unit, Great Ormond Street Hospital, London, UK

Background and aims: 85 % of children with life-limiting illnesses dying in hospital do so in an intensive care unit (ICU). This can often be due to poor end of life care (EOLC) planning. There is no standard guidance for EOLC planning in children in the U.K. Discussions are usually initiated by medical teams responsible for the children. Resuscitation is carried out by clinical emergency teams (CET), who are rarely involved in these discussions and are compelled to act despite clinical or moral objections.

We aim to examine the clarity of EOLC planning regarding resuscitation in children with life-limiting illnesses in a children's hospital.

Methods: Retrospective review of cases in which limits to resuscitation were discussed in a tertiary level children's hospital. 'Unclear' decisions were defined as those that

- (a) do not conform to EPLS guidelines,
- (b) involved a time limitation to resuscitation, and
- (c) deemed that ICU admission was inappropriate even though no limits to resuscitation were set.

Results: 17/59 (28.8 %) discussions regarding limits to resuscitation were deemed to be unclear. 3/17 specified a time limit to resuscitation: 5 cases either specified resuscitation till parents present, or discontinuation after discussion with parents by the bedside. 8/17 cases specified that the child was not a candidate for ICU, despite 2 recommending full resuscitation.

Conclusions: Limits to resuscitation are often made without clarity with regards to their aims. CETs should be involved in decision making regarding limits to resuscitation and be allowed to express clinical or moral objections to any such decisions.

95 – POSTER SESSION

THE DO NOT RESUSCITATE ORDER IN POLISH PAEDIATRIC PATIENTS: A SINGLE CENTRE EXPERIENCE

A. Gasiewska-Drazba¹, M. Migdal¹, D. Gruszfeld², K. Witulska¹

¹Anaesthesiology and Intensive Care, ²Neonatal Intensive Care Unit, Children's Memorial Health Institute, Warsaw, Poland

Objectives: Recommendations of the Polish Paediatric Society on ethical aspects of the end of life therapies in paediatric patients, including Do NOT Resuscitate order (DNR) has been published in 2011. Aim of the study was to assess frequency of the DNR procedures prior to and after publication of the recommendations.

Methods: Study was conducted in tertiary paediatric hospital, with 600 beds, approximately 35,000 patients admitted each year. Retrospective search on medical records of all patients who died in the hospital during years 2010 and 2012 has been performed.

Results: During analyzed years total number of deaths were 101 and 78 respectively. In the 2010 most frequently deaths occurred in the paediatric ICU-39 (13 deaths following DNR), surgical ICU-22 (6

following DNR) and neonatal ICU 23—(2 after DNR). Another 16 deaths occurred in 6 different wards (8 following DNR). In 2012 deaths occurred most frequently in the PICU—28 (9 after DNR), surgical ICU-20 (12 DNR) and NICU 15 (10 DNR). In another words 15 deaths occurred (including 13 DNR). Comparing years 2010 and 2012 percentage of deaths following DNR order in the intensive care units were in the same range (35 and 33 % respectively) but changed significantly outside of intensive units (50 versus 87 %).

Conclusions: The DNR order was well known among ICUs staff prior the publication of the Polish Paediatric Society recommendations' on ethics. Increasing number of such procedures observed in paediatric wards confirm usefulness of this document.

96 – POSTER SESSION

LIMITATIONS OF PICU: CHILD-DEATH, WITHDRAWING AND WITHHOLDING TREATMENT, AND ETHICAL ISSUES FOR CONSIDERATION

K. Green

BSMS, Brighton, UK

Aims: The aims were to observe the limitations of aggressive organ support in children on PICU, including observation and reflection upon the practice of withdrawal and withholding care, and with careful consideration of the psychological and ethical issues contributing to clinical decisions and outcomes. The RCPCH Withholding or Withdrawing Life Sustaining Treatment (WWLST) in Children Framework was used as a backdrop to the 'study'.

Methods: The ethical issues raised, relevant guidelines and previous research papers around the topic were studied and considered. Time was spent observing clinicians and discussing their thoughts and deliberations, attending MDT meetings and ethics committee meetings to discuss particular cases. A comprehensive case study of one particular child where WWLST was considered and undertaken was conducted.

Results: There were 5 children in whom withdrawal of futile care was considered. The essential factors considered were futility of treatment, reversibility of pathology, parental wishes and, most importantly, the child's best interests. Mean time to withdrawal after recognition of PICU-futility was 5 days (3–21) The RCPCH withdrawing treatment framework was used in each case.

Conclusions: Whilst WWLST forms a significant part of practice on PICU, many children are kept alive for days or weeks despite irreversible pathology. Doctors are trained to sustain life, but more paediatric training in medical ethics and WWLST ought to be undertaken. A wider public understanding regarding the limitations of invasive treatment might ease the expectations on PICU doctors whilst also reducing the suffering of children and families. PICU delivers medicine and not miracles.

97 – POSTER SESSION

D.N.R. ISLAMIC PERSPECTIVE

B. Kurdi

HMC, Doha, Qatar

Background: Religious and cultural issues often play a more vital role in decision making by parents and physicians than economic

considerations, especially in Arab nations. Physicians are often reluctant to even broach the subject of DNR with parents, this has led to a significant increase in the number of handicapped survivors.

Objectives: To check the effect of the opinion of Islamic scholar on parents or patient who are hesitated to take the decision for DNR.

Method: We offer DNR for parents of 25 cases in the last 12 mo (6 cases were extreme preterm 23 week with bilateral IVH grad 4, and 4 cases were trisomy 18,13 with congenital anomalies, and 7 cases with sever form of multiple congenital anomalies, 8 cases with untreatable medical disease).

Results: When we are certain that further resuscitation is futile and is a waste of resources for many cases such as (sever congenital anomalies, etc.) most of the parents refused DNR initially, but after discussing the islamic Perspective and DNR, 16 of them agreed for DNR.

Conclusion: The opinion of the majority of the scholars of Islam is that the treatment of diseases or medication is not obligatory, A DNR order is permissible (mobah) in cases of a high degree of certainty that resuscitation is futile and will not result in net and lasting benefit to the Patient, but does not mean to stop the fundamental support like antibiotic, feeding, and IV fluid.

98 – POSTER SESSION

KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICAL ETHICS OF FACULTY OF A MEDICAL UNIVERSITY IN KARACHI, PAKISTAN

Z.A. Shaikh

Community Medicine, Dow University of Health Sciences, Karachi, Pakistan

Background: The complaints against unethical behavior of medical students/professionals are proliferating. Though bioethics has gained priority in formal medical education, but is not much recognized everywhere. To design an ethical curriculum, it is necessary to assess the basic knowledge and attitude of medical teachers regarding bioethics, and equip them to impart same skills to the students to workout ethical dilemmas.

Objectives: To assess knowledge, attitude and practice of medical teachers regarding medical ethics, and to sensitize the academicians for training of the teachers and making bioethics an integral part of the curricula.

Study design: Cross-sectional

Settings: Three medical colleges of Dow University of Health Sciences, Karachi, Pakistan

Inclusion criterion: Assistant Professors and above; and lecturers doing their MPhil/PhD.

Duration of study: January–September, 2010.

Sampling Technique: Simple Convenient Method.

Sample Size: 202.

Results: Among the study participants, 82 % knew the existence of ERC in their institution. For research work, 55 % got prior approval from ERC, 32 % declared conflict of interest, 17 % taught/discussed medical ethics with students; 21 % took informed consent, 35 % had idea of vulnerable population, 43 % did not want to give full information to the study participants, and 70 % recognized difference between medical research and care.

According to 77 %, the authors' list included only those who had contributed, but 17 % also included supervisors/seniors and 6 % colleagues.

Conclusion: Health care providers frequently encounter ethical issues. The medical teachers were not fully equipped with appropriate

knowledge of bioethics. It should be included in curriculum and teachers be trained for the same.

Haemodynamics and Congenital Heart Disease (99–140)

99 – POSTER SESSION

QTC AND QTD CHANGES AFTER CARDIOPULMONARY BYPASS SURGERY IN CHILDREN

E.H. Aburawi¹, A.-K. Souid¹, P. Liuba², E. Pesonen²

¹*Pediatrics, United Arab Emirates University, College of Medicine and Health Sciences, Al-Ain, United Arab Emirates,* ²*Paediatrics, Lund University, Skane University Hospital, Lund, Sweden*

Background: Systemic inflammation and altered myocardial repolarization are common consequences of cardiopulmonary bypass surgery. The aim of the study was to assess the impact of cardiopulmonary bypass surgery on corrected QT (QTc) and QT dispersion (QTd) intervals. The possible role of inflammation on these variables was investigated.

Methods: ECGs were registered and C-reactive protein (CRP) as well as white blood cell (WBC) count were measured in 36 children with ventricular septal defect (VSD) or atrial septal defect (ASD) 1 day before and 5 days after surgery. QTc and QTd were calculated.

Results: QTc increased after surgery in 24 (67 %) patients (mean $\pm$ SD = 31 ± 25 ms, range 7–125); whereas QTc decrease was noted in 8 (22 %) patients (28 ± 28 ms, range 1–77). After surgery, QTc was *abnormally* prolonged in 8 (22 %) patients (461 ± 18 ms, range 445–487) with normal QT times before surgery. Only one of these 8 patients had abnormally prolonged QTc before surgery. *Abnormally* prolonged QTc returned to normal in 3 of the 4 patients with prolonged QTc. A trend for increased QTd was also noted. The changes did not correlate with CRP, WBC count, bypass time or aortic cross-clamp time.

Conclusions: Impaired myocardial repolarization (*abnormally* prolonged QTc) appeared after surgery in 22 % of pediatric patients. The natural history and clinical significance of these alternations, however, deserve further studies. Prolongation of QTc may predispose patients to post-operative arrhythmias.

100 – POSTER SESSION

EARLY CHANGES IN MYOCARDIAL REPOLARIZATION AND CORONARY PERFUSION AFTER CARDIOPULMONARY BYPASS SURGERY FOR ASD REPAIR IN CHILDREN

E.H. Aburawi¹, A.-K. Souid², P. Liuba³, E. Pesonen³

¹*United Arab Emirates University, College of Medicine and Health Sciences,* ²*Pediatrics, United Arab Emirates University, College of Medicine and Health Sciences, Al-Ain, United Arab Emirates,* ³*Paediatrics, Lund University, Skane University Hospital, Lund, Sweden*

Background: In adults, impaired myocardial repolarization and increased risk of arrhythmia are well known consequences of Cardiopulmonary bypass surgeries. The aim was to assess ventricular repolarization and coronary flow (CF) after atrial septal defect (ASD) surgery in children.

Methods: Patients with ASD ($n = 12$) were assessed 1 day before and 5 days after ASD repair. Myocardial repolarization (corrected QT interval, QTc, QT dispersion, QTd, and PQ interval) was determined on 12-lead ECG. Peak flow velocity in diastole (PFVd) in proximal left anterior descending (LAD) artery was assessed by transthoracic Doppler echocardiography (TTDE).

Results: Ten of 12 (83 %) children had normal myocardial repolarization before and after surgery. QTc interval increased by 1–9 % after surgery in 5 (42 %) patients, decreased by 2–11 % in 5 (42 %) and did not change in 2 (16 %) patients. QTc positively correlated with bypass time ($R = 0.686$), aortic cross-clamp time ($R = 0.308$) and changes in PFVd ($R = 0.741$). QTd interval increased by 33–67 % after surgery in 4 (33 %), decreased by 25–50 % in 6 (50 %) and did not change in 2 (16 %) patients. QTd positively correlated with bypass time ($R = 0.493$), aortic cross-clamp time ($R = 0.356$) and changes in PFVd ($R = 0.387$). PQ interval increased by 5–30 % after surgery in 4 (33 %), decreased by 4–29 % in 6 (50 %) and did not change in 1 (8 %) patient. PQ positively correlated with bypass time ($R = 0.636$), aortic cross-clamp time ($R = 0.226$) and changes in PFVd ($R = 0.314$).

Conclusions: Changes in ventricular repolarization and CF are noted after ASD repair in children. The clinical significance of these alternations requires further investigation.

101 – POSTER SESSION

HYPERTENSION: PREVALENCE, AETIOLOGY AND MANAGEMENT IN PICU/NICU

J. Andrews, J. Brierley, G. Subramanian

Great Ormond St Hospital, London, UK, London, UK

Background and aims: Increasing paediatric Systemic hypertension (SH) has not been explored in ICU. In children SH is usually secondary; commonly to renal, cardiac or endocrine causes.

This study compares prevalence, aetiology and SH management over two periods in a tertiary PICU/NICU (specialist neuroscience & haematology/oncology unit).

Methods: Retrospective case-note/database review of ICU admissions: (A) 2004–5 and (B) 2010–11. Search terms: hypertension, high blood pressure & 14 highly used anti-hypertensive drugs. Medical records & electronic charts analysed and cases fulfilling the American Academy of Paediatrics hypertension criteria and treated were included. No change in threshold treatment for hypertension occurred.

Exclusions: Pulmonary hypertension.

Descriptive statistics presented: percentages, means, and standard deviations (SDs). 2-sample Student's t test performed for between-group comparisons.

Results: Of 146 children fulfilling AAP criteria only 83 were treated for SH. Other results are tabulated below.

Conclusion: There is a significant rise in children treated for SH. The unit in question had decreased admissions due to structural work, but a clear increase in SH. Further longitudinal data is required to determine whether this sustained. Neurological causes continue to remain the commonest cause of managed SH in this PICU/NICU.

Table 1

	A) 2004–2005	B) 2010–2011	P-value
Total admission	2,563	1,915	
Patients treated for SH (N, %)	18 (0.70)	65 (3.39)	<0.0005
Mean age (years, months)	6 years 8 months (SD $\pm$ 6 years 1 month)	4 years 9 months (SD $\pm$ 5 years 3 month)	0.74
Female:male	1:1	1:2.25	
Aetiology			
Neurological (N, %)	4 (22.2)	25 (38.5)	0.20
Renal (N, %)	12 (66.7)	18 (27.7)	0.003

Table 2

	A) 2004–2005	B) 2010–2011	P-value
Anti-hypertensive used			
IV Nifedipine (N, %)	10 (28.6)	27 (21.1)	0.35
IV Hydralazine (N, %)	5 (14.3)	24 (18.75)	0.54
IV Glyceryl Trinitrate (N, %)	2 (5.71)	15 (11.7)	0.31
IV Sodium Nitroprusside (N, %)	0 (0)	11 (8.59)	0.07
IV Labetalol	2 (5.71)	11 (8.59)	0.58

102 – POSTER SESSION

SILDENAFIL WEANING POST-DISCHARGE IN CONGENITAL DIAPHRAGMATIC HERNIA

J. Behrsin¹, N. Patel²

¹Newborn Intensive Care Unit, ²Newborn Intensive Care, Royal Children's Hospital, Melbourne, VIC, Australia

Background: Sildenafil is used to treat pulmonary hypertension (PAH) in infants with congenital diaphragmatic hernia (CDH). However there is limited data to guide sildenafil dosing and weaning rate in CDH. This is of concern in light of a recent report of increased risk associated with high dose sildenafil regimens in non-CDH PAH [1].

Methods: Retrospective cohort study of sildenafil usage, dosing and weaning in infants with CDH at our institution. A sildenafil dose of 1.5 mg/kg/day was considered to be within safe limits based on current evidence [1].

Results: Seventeen percent (19/122) infants were discharged on sildenafil of median dose of 8 mg/kg/day (2.91–5.78 mg). Weaning rate was 0.1 (0.01–0.5) mg/kg/week. Infants ceased therapy at 343 days median duration. At 1 year of age 29 % were receiving a dose of sildenafil >1.5 mg/kg/day (Figure 1). One infant died from severe PAH.

Discussion: Sildenafil therapy at discharge is common in severe CDH. Variation in dosing and weaning rates highlights the need for

standardised assessment and treatment of PAH after discharge, to optimise benefits and minimise adverse effects of sildenafil.

Fig. 1 % patients receiving >1.5 mg/kg/day

References:

1. Barst R, Ivy D, Gaitin et al. A randomised double blind placebo controlled dose-ranging study of oral sildenafil citrate in treatment naïve children with pulmonary arterial hypertension. *Circulation* 2012. 125(2) 324–34.

103 – POSTER SESSION

HEMODYNAMIC ASSESSMENT IN PATIENTS WITH RIGHT-TO-LEFT SHUNTS BY NEW ULTRASOUND DILUTION TECHNIQUE

M. Boehne, M. Baustert, V. Paetzel, H. Köditz, F. Schmidt, S. Schoof, M. Sasse, P. Beerbaum, H. Bertram

Department of Pediatric Cardiology and Intensive Care Medicine, Hannover Medical School, Hannover, Germany

Objectives: With increasing feasibility of indicator dilution techniques in critically ill children, the recognition and interpretation of dilution curves and derived volumes in the presence of right-to-left shunts become more and more essential. In addition to the measurement of cardiac output and blood volumes novel ultrasound dilution technique (UDT) offers the opportunity to detect and quantify shunts. We analyzed indicator dilution curves and volumetric parameters of patients with proven right-to-left shunts (echocardiography, oximetry) and compared those with curves from patients without shunts.

Methods: In 27 children (range 1 month to 17 years) with congenital heart defects (n = 13 with right-to-left shunts, n = 14 with no shunt lesions) UDT measurements were performed. Indicator dilution curves were analyzed for their appearance time, morphology and derived volume measurements.

Results: All 13 cases of right-to-left shunts were correctly identified by COstatus monitor. Compared to non shunt curves, appearance time was significantly shorter in right-to-left shunt curves ($P < 0.05$). Shunt-curves can be morphologically subdivided into four groups

with specific characteristics for the determination of cardiac output, pulmonary to systemic blood flow ratio and blood volumes:

- a) Normal shape
- b) Hump on upslope
- c) Double-hump
- d) Abnormal width with or without hump.

Conclusions: UDT might be a valuable tool to detect and monitor the presence of right-to-left shunts on PICU. Early appearance time is the only feature of a right-to-left shunt curve. Presence of right-to-left shunt affects measurement of cardiac output and blood volumes which has to be taken into account while interpreting the values.

104 – POSTER SESSION

THE EFFECT OF ANTENATAL STEROID ADMINISTRATION TIME ON POSTNATAL BLOOD PRESSURE IN VERY LOW BIRTH WEIGHT INFANTS

Y. Çınar Yakar, R. Duran, B. Acunaş, N. Aladağ Çiftdemir, Ü. Vatansever, N. Süt

Trakya University, Edirne, Turkey

To investigate the effect of the administration time of antenatal steroids (ANS) on blood pressure in very low birthweight infants, 120 infants weighing <1,500 g were evaluated retrospectively. The study groups were classified as Group I (n = 40, without ANS), Group II (n = 40, ANS <48 h before birth) and Group III (n = 40, ANS between 48 h and 7 days before birth). Systolic, diastolic and mean pressures measured by oscillometric method during the first 72 h after birth (with 2-h intervals) and heart rates were recorded. There was no difference among the study groups in terms of antenatal, perinatal and neonatal factors which can effect blood pressure except for respiratory distress syndrome which was less frequently seen in Group III ($p = 0.016$). Systolic pressure was higher on the 42nd and 48th hours ($p = 0.046$, $p = 0.006$), and diastolic pressure during the 6th–12th hour ($p = 0.005$, $p = 0.022$) and mean pressure on the 48th hour ($p = 0.013$) in Group II. During the first 72 h, the mean diastolic pressure was found to be lower in Group III ($p = 0.034$). whereas mean peak heart rate was lower among those in group I ($p = 0.035$) all of which were clinically irrelevant.

Although clinically insignificant, systolic, diastolic and mean blood pressure values were found to be higher in infants whose mothers received ANS <48 h before birth, close monitoring may be required for these infants during the first 48 h of life.

105 – POSTER SESSION

THE FEASIBILITY OF 2D SPECKLE TRACKING ECHOCARDIOGRAPHY IN PRETERM INFANTS

K. de Waal^{1,2,3}, A. Lakkundi^{2,3}, I. Wright^{1,2,3}

¹Neonatology, John Hunter Children's Hospital, ²University of Newcastle, ³Hunter Medical Research Institute, Newcastle, NSW, Australia

Background: Myocardial function consists of shortening, thickening and twisting. The myocardium moves and changes its position, and will undergo deformation and change its shape as not all parts move with the same velocity. True cardiac function therefore, can be measured by adding deformation parameters (strain and strain rate) to conventional motion parameters. Speckle tracking echocardiography (STE) is a new echocardiographic modality that utilises non-Doppler techniques to quantify both. We evaluated STE of the left ventricle (LV) in preterm infants.

Methods: Apical 4 chamber clips (4CH) and short axis clips (SAX, papillary muscle) were analysed. Speckle tracking was performed using TomTec software with manual tracing of cardiac borders. The software automatically provided segmental and global analysis of motion and deformation. Tracking accuracy was scored visually.

Results: 88 clips from 25 infants (median gestational age 28 weeks) were analysed. Tracking accuracy of 4CH was 96 % for longitudinal and 85 % for radial parameters, with increasing accuracy from base to apex. The mean (SD) longitudinal peak strain (%) and strain rate (1/s) were -17.3 (2.6) and -1.72 (0.22) and increased from base to apex. Mean (SD) peak radial strain and strain rate were 17.2 (4.1) and 1.39 (0.31) and decreased from base to apex. For SAX the accuracy was 96 % for circumferential and 89 % for radial parameters, with mean (SD) values of -24.1 (2.4), -2.18 (0.43), 27.5 (7.6) and 2.46 (0.29) for strain and strain rate respectively.

Conclusions: STE is feasible in preterm infants, but optimal image acquisition is paramount. Longitudinal parameters in 4CH and circumferential in SAX were most robust.

106 – POSTER SESSION

WILL THE FOREARM DO FOR DINAMAP MEASUREMENTS IN CHILDREN?

F.A. Desmond, B. O' Hare

Department of Anaesthesia and Critical Care Medicine, OLCHC, Dublin, Ireland

Introduction and objectives: Measuring blood pressure is integral to perioperative monitoring in anaesthetic practice. When for patient, surgical or equipment reasons upper arm blood pressure measurements may be difficult we postulate that forearm blood pressure (BP) measurements would provide an accurate and reliable alternative. Previous adult data did not support our hypothesis; paediatric data is lacking¹.

Methods: Institutional review board approval was granted and full informed consent sought from all participants. A calibrated GE Critikon DINAMAP DPC101 X-EN oscillometer was used to compare BP measurements in the arm and forearm of anaesthetised children prior to the commencement of the procedure. The upper arm followed by the forearm was measured, with an appropriately sized cuff. 3 systolic, diastolic and mean BPs were measured. An appropriately powered study required 34 subjects, 35 were recruited.

Results: 35 ASA 1–2 elective surgical patients in a paediatric tertiary centre whose ages ranged from 1 to 10 years and weights ranged from 8 to 53 kg were studied. Bias, precision and spread data are presented in Table 1.

Average upper arm BP measurements

	Bias		Precision		MSE	
	Upper arm	Forearm	Upper arm	Forearm	Upper arm	Forearm
Systolic BP	0.000	−3.248	3.156	8.033	9.962	75.083
Diastolic BP	0.000	3.286	2.631	4.695	6.921	32.841
MAP	0.000	1.343	2.544	6.854	6.470	48.778

Discussion and conclusion: Our data would suggest that although there is a statistical difference between upper arm and forearm measurements of BP, this may not be clinically relevant, specifically for mean arterial pressure measurements. In anaesthetised, haemodynamically stable children mean blood pressure readings derived from the same side upper arm and forearm may be used interchangeably. There is more work to be completed, but there is potential for this to be used in a critical care setting.

107 – POSTER SESSION

VALUE OF ECHOCARDIOGRAPHY FOR THE DIAGNOSIS AND MONITORING OF EVOLUTION OF PERSISTENT PULMONARY HYPERTENSION IN NEWBORN

A.G. Dimitriu¹, M. Stamatina², L. Dimitriu³

¹Pediatric Cardiology, UMF 'Gr. T. Popa', Iasi, ²Neonatology, UMF 'Gr. T. Popa', ³Cardiology, Medex Medical Center, Iasi, Romania

Purpose: Evaluation the value of the echocardiographic exam for the diagnosis of the persistent pulmonary hypertension (PPHN) in the newborn infant.

Methods: Patients 41 newborns (aged 0–8 days) with PPHN that was analyzed the PPHN causes, PaO₂, ECG, chest X-ray, Doppler echocardiography which was repeated after 5–7 days in all patients.

Results: The main PPHN causes: severe perinatal hypoxia, meconium aspiration syndrome, hyaline membrane disease, hypothermia, neonatal sepsis, infant of diabetic mothers, congenital cardiac malformations (7). Physical exam: cyanosis in the first 12 h, tachypnea and/or a severe respiratory distress, systolic murmur on the left border of sternum. ECG: age related aspects, impaired left ventricular relaxation. Chest X-ray: cardiomegaly (all cases). PaO₂: low values in all patients. Echocardiographic aspects: enlargement of the right chambers; severe tricuspid regurgitation (the peak velocity 3–4 m/s); mitral regurgitation (12/41 cases), left-to-right shunt across foramen ovale and/or ductus arteriosus (30/41), enlargement of the pulmonary artery and severe pulmonary regurgitation with a gradient 50–60 mmHg (all cases), septal hypertrophy (11/41); impaired left ventricular relaxation with normal systolic function; congenital heart diseases (7 cases). Repeated echocardiography revealed in most of the cases diminished or no right-to left shunt across ductus arteriosus or foramen ovale correlate with clinical improvement and disappearance of cyanosis.

Conclusions: Echocardiography beside clinical exam and history of the disease, is an important element for the diagnosis and follow up of evolution by the treatment of PPHN in the newborn with cyanosis and this investigation must be performed early after birth.

108 – POSTER SESSION

LEFT VENTRICULAR HYPOKINESIA (LVH) IN CHILDREN WITH SEPTIC SHOCK (CSC)

K. El Halimi^{1,2}, H. Bouguetof^{1,2}, M.A. Negadi^{1,2}, D. Boumendil^{1,2}, Z. Mentouri^{1,2}

¹University Hospital of Oran, ²Laboratory of Pediatric Accidentology, Oran, Algeria

Objectives: If Initial fluid resuscitation remains the first treatment step for most children with septic Shock associated with vasopressor drugs but the using of inotrope to supply myocardial dysfunction is not uncommon. Treatment must establish an efficient myocardial contractility. So Transthoracic Echocardiography (TTE) is a key for diagnosis of LVH.

The aim is to describe how and when detect LVH in CSC?

Methods: In this prospective study, the evaluation of the Cardiac Output and contractility in CSC, were obtained by TTE. Each patient had an evaluation of the left ventricular function at the admission, after introduction and increases dose of vasopressor or apparition of clinical symptoms of Acute Circulatory Failure (ACF) at the first 3 days (D1, D2, D3).

Intervention: associated treatment inotrope when an acute circulatory failure was related to impaired myocardial contractility responsible of decrease CO.

Results: In 22 children with septic shock, 06 LVH were detected with median ejection fraction at baseline and after treatment by inotrope was respectively [(EF) 40 % (35–45) VS 57.5 % (50–65)]. One of them had global dysfunction:”, tricuspid annular plane systolic (TAPS) was respectively at baseline and after treatment [11 VS 12.5]. Time of developing LVH was: D1 in 04 cases and D3 in 02 cases.

Conclusions: TTE has an important role in the management of CSC in PICU at bedside. Its became an inevitable tool allows detection of myocardial dysfunction.

109 – POSTER SESSION

ACUTE FOR PULMONALE (ACP) EVALUATION IN PEDIATRIC INTENSIVE CARE UNIT (PICU)

K. El Halimi^{1,2}, H. Bouguetof^{1,2}, D. Boumendil^{1,2}, M.A. Negadi^{1,2}, Z. Mentouri^{1,2}

¹University Hospital of Oran, ²Laboratory of Pediatric Accidentology, Oran, Algeria

Objectives: ACP is an acute overload of the right ventricle due to pulmonary hypertension. This form of acute right heart failure associated: pulmonary artery hypertension; dilation of the RV and septal dyskinesia. Transthoracic echocardiography (TTE) at bedside allows evaluation of the RV function and to detect the ACP

The aim is to describe how evaluate the RV and detect the ACP?

Methods: In this prospective study, a systematic evaluation of the RV by TTE was performed in patients with ARDS, embolism, sever sepsis and septic shock. TTE measurements was: tricuspid annular plane systolic (TAPS), end diastolic area (EDA RV/LV), pulmonary artery pressure (PAP) and septal interventricular was analysed to detect septal dyskinesia

Intervention: Inotrope was necessary when patients had RV dysfunction and EDA RV/LV >1. Vasopressors when patients had normal RV function and EDA RV/LV between 0.6 and 1.

Results: 36 children with ARDS, severe sepsis, septic shock, embolism had a TTE evaluation. We detected in 07 patients ACP: median TAPS 12.5 (9–14), Median EDA RV/LF 1.1 (0.6–1.4), 4 patients received inotrope with TAPS 11 (9–11.5) and EDA RV/LF 1.2 (1.1–1.4), 3 patients receive vasopressor with TAPS 13.7 (13.5–14) EDA RV/LF 0.75 (0.6–0.8).

Conclusions: The systematic monitoring of the right ventricular function (RV) by TTE in patients with ARDS, sever sepsis and septic shock is indispensable and recommended in the PICU.

110 – POSTER SESSION

NEAR-INFRARED SPECTROSCOPY MEASUREMENT OF MESENTERIC OXYGENATION: INDICATOR OF HAEMODYNAMICS IN CONGENITAL HEART DISEASE

P. Fister, G. Nosan, D. Paro Panjan

Department of Neonatology, University Clinical Center Ljubljana, Ljubljana, Slovenia

Background and aims: Neonates with congenital heart disease (CHD) with low cardiac output and diminished perfusion states resulting in redistribution of cardiac output away from the mesenteric circulation are at risk of intestinal ischemia. Our objective was to evaluate feasibility of regional mesenteric oxygenation monitoring as an indicator of mesenteric perfusion.

Methods: Two term newborns with CHD and low cardiac output were followed clinically and monitored by NIRS to detect possible mesenteric ischemia. Two sets of optodes were placed on the forehead (cerebral SO_2 -c SO_2), one on the abdomen, 2 cm left to umbilicus (mesenteric SO_2 -m SO_2), and one on the back lumbally, 3 cm from the midline (kidney SO_2 -k SO_2). SO_2 was measured in the acute phase of necrotizing enterocolitis and in the convalescent phase. Relative values of c SO_2 and m SO_2 were expressed as cerebro-mesenteric oxygenation ratio (CMOR). Readings were compared to recordings of a healthy newborn.

Results: Mean m SO_2 values in the two patients with CHD were lower in the acute phase of necrotizing enterocolitis in comparison to values in the convalescent phase. Mean m SO_2 values in both phases were lower in comparison to values in a healthy term newborn. Mean CMOR in two newborns with CHD were higher in the acute phase of necrotizing enterocolitis in comparison to values in the convalescent phase and in a healthy newborn.

Conclusions: NIRS may be used for monitoring mesenteric perfusion in newborns with CHD and low cardiac output but further studies are needed to establish the value of our results.

111 – POSTER SESSION

NONINVASIVE MONITORING OF HEMOGLOBIN CONCENTRATION IN PEDIATRIC CRITICAL PATIENTS

P. García-Soler, J.M. Camacho-Alonso, G. Milano-Manso

Pediatric Critical Care Unit, Complejo Hospitalario de Málaga, Málaga, Spain

Background and aims: One of the major concerns in patients at high risk of bleeding is to detect it and optimize hemoglobin (Hb), leading to repeated blood tests. Our objective is to describe our experience with a new method of a noninvasive continuous measurement of Hb concentration in these patients.

Methods: Prospective observational study in children at risk of bleeding in a PICU, from January to December 2012. SpHb monitoring was performed continuously (Pulse Co-Oximeter Radical/7.8.0.1, Masimo Corp., Irvine, CA). When each blood sample was taken, we collected the data from Radical-7, using the automated Hb measurement in the laboratory as a reference method (SiemensAD-VIA2120i). The agreement between two methods was evaluated by Pearson correlation and Bland–Altman analysis. Data are reported as mean values and SD (normally distributed) and median values and interquartile range (distribution non-normal).

Results: 284 samples were drawn from 80 sedated patients, with a median age of 14.5 months (3–60), and a median weight of 8.5 kg (4.4–18.5). SpO₂ was 98 % (96–100 %), heart rate 123.5 ± 24.2 bpm, rectal temperature 36.2 ± 2 °C and perfusion index median of 1.5 (0.93–3.32). Mean Hb on the laboratory analyzer was 11.7 ± 2.05 g/dl and mean Hb on the pulse oximeter (SpHb) was 12.32 ± 2 g/dl, with a correlation coefficient 0.72 ($p < 0.05$). The median of differences between both methods was 0.66 ± 1.4 g/dl. Limits of agreement of Bland–Altman plot were −3.7 and 2.4.

Conclusions: SpHb offers moderately acceptable accuracy although the limits of agreement are wide. The primary benefit is the continuous monitoring of the trend in patients at risk of bleeding.

112 – POSTER SESSION

POSTOPERATIVE NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN PREDICTS ACUTE KIDNEY INJURY AFTER PEDIATRIC CARDIAC SURGERY

M.A. Gil-Ruiz¹, J. López¹, A.J. Alcaraz¹, S.N. Fernández¹, J. Pérez², A. Castillo^{1,3}, R. González¹, J. López-Herce¹

¹Pediatric Intensive Care Unit, ²Pediatrics, Gregorio Marañón General University Hospital, ³Pediatric Intensive Care Unit, Albacete General University Hospital, Madrid, Spain

Backgrounds and aims: Serum creatinine is a delayed marker for acute kidney injury (AKI) after cardiac surgery. Rapidly detectable AKI biomarkers could allow early intervention and improve outcomes. We investigated the temporal pattern and predictive value of urine neutrophil gelatinase-associated lipocalin (uNGAL), for early identification of AKI in children undergoing cardiac surgery.

Methods: Prospective observational cohort study involving 106 children undergoing surgery for congenital cardiac lesions.

Urine samples were obtained before and at intervals postoperatively. AKI was defined according to pediatric RIFLE criteria. The temporal patterns of both uNGAL absolute concentration and the normalized to urine creatinine concentration (uNGAL/cr) were correlated with the development of AKI and other clinical outcomes. We evaluated the predictive ability of uNGAL and of uNGAL/cr by area under the curve (AUC), when added to an AKI clinical predictive model.

Results: AKI occurred in 42 patients (39.6 %). uNGAL significantly increased in AKI patients at 1 h, 3 h and 15 h postoperatively. Optimal cutoff for uNGAL at 1 h was 100 ng/ml. uNGAL and uNGAL/cr correlated with surgical variables and clinical outcomes. AKI prediction improved when uNGAL was added to a clinical model (AUC increased at 1 h from 0.85 to 0.91, at 3 h to 0.92).

uNGAL and uNGAL/cr values were not significantly different between patients with prerenal and sustained AKI.

Conclusions: uNGAL is a predictive biomarker for AKI after pediatric cardiac surgery and may permit earlier intervention improving outcome of AKI. uNGAL normalized to urine creatinine improves the prediction of AKI severity, but offers no advantage in AKI diagnosis.

113 – POSTER SESSION

EFFECT OF HIGH ALTITUDE ON CARDIOPULMONARY TRANSITION IMMEDIATELY AFTER BIRTH IN HEALTHY NEWBORN

H. Habib

King Abdulaziz University Hospital, Jedaah, Saudi Arabia

Objective: To evaluate the effect of high altitude on the cardiopulmonary transition immediately birth.

Methods: The arterial oxygen saturation were recorded by Pulse oximetry immediately after birth and continuously until the time at which the upper and lower limb saturation were equal. Data were compared with similar work done at sea.

Results: At altitude of 1,640 m the mean SpO₂ in right hand was 68 % and in the right foot the mean SpO₂ was 60 % immediately after birth. SpO₂ values reached equality point after 20 min (8–45 min). Data was compared with similar studies done at sea level which was found to be significantly delayed at high altitude.

Conclusion: At high altitude neonatal cardiopulmonary transition is significantly delayed compared with sea level. A lower preductal and postductal oxygen saturation cut-off levels than those used at sea level should be adopted when dealing with neonates born at high altitude.

114 – POSTER SESSION

CENTRAL VENOUS SATURATION AS A SURROGATE FOR MIXED VENOUS SATURATION DURING MONITORING CRITICALLY ILL CHILDREN

O.M. Hijazi¹, A. Jijeh¹, H. Taweel¹, R. Martin², W.-L. Loh², S. Ismail¹, M. Kabbani¹

¹Cardiac Sciences, ²Nursing, King Saud Ben Abdel Aziz University for Health Sciences, Riyadh, Saudi Arabia

The standard site for collection of mixed venous blood is the pulmonary artery (PA). However, many critically ill children do not have pulmonary artery catheter in place. There is debate about the value of central venous (CV) blood collected from central venous catheters replacing PA samples.

Objectives: To determine the validity of using the easily accessible CV blood as a practical alternative for the standard PA samples to assess the critically ill patients.

Design: Prospective, observational cohort study.

Setting: Pediatric Cardiac Critical Care Unit (PCICU) at King Abdul Aziz Cardiac Center, Riyadh, Saudi Arabia.

Patients: Hundred twenty patient admitted to PCICU who had lines inserted as indicated per their clinical conditions.

Interventions: Arterial and central venous blood samples were collected as needed. Patients clinical and laboratory data were collected at the time of each data collection.

Results: A total of 369 data collection set collected from 120 patients, age 9.6 ± 15.9 months, weight 5.7 ± 3.6 kg. Upper body CV saturation was lower than lower body CV saturation 64.0 ± 11.8 vs. 71.92 ± 13.2 % p value 0.0001. Patients with arteriovenous saturation difference >30 % had significantly lower urine output (4.3 ± 2.9 vs. 5.4 ± 3.2 ml/kg/h p value 0.004).

Conclusion: Upper body CV saturation is lower than upper body CV saturation. Patients with arterio-venous saturation gap >30 % had lower urine output. Central venous saturation should be considered as a surrogate for PA samples when not accessible.

115 – POSTER SESSION

ULTRASOUND GUIDED VASCULAR ACCESS IN CRITICAL CARDIAC CHILDREN: TIPS AND PITFALLS

A.M. Jijeh, G. Shaath, M.S. Kabbani, M. Elbarbary, S. Ismail

Pediatric Cardiac ICU, King Abdulaziz Cardiac Center, Riyadh, Saudi Arabia

Introduction: Vascular access in pediatric age group is a challenging procedure especially in compromised children and those who require multiple vascular cannulations. We reported our experience in vascular access under ultrasound guidance in children with congenital heart disease and we discussed the technique of line insertion and its difficulties in small infants.

Methods: In pediatric cardiac intensive care unit we enrolled prospectively all trials of vascular access guided by ultrasound from January 2010 till September 2010. Age, weight, the time from first needle puncture to wire insertion, site of insertion, number of attempts, type of the line and complications were documented.

Results: 77 vascular access trials were performed in 43 patients. They included 15 arterial and 62 venous cannulations. Mean age and weight of patients were 15 months (6 days–11 years, median 2.5 months) and 7.2 kg (2–46 kg, median 3.8) respectively. Success rates were 93 and 95 % for arterial and venous cannulation respectively. Mean time from first needle puncture to wire insertion was 3.9 min (0.5–15 min, median 2 min). 55 central lines cannulation (75 %) were successful from the first puncture, 17 (23 %) were successful from the second puncture and one case (2 %) required 3 punctures. Lower body weight did not affect success rate as 30 patients (45 %) were <3.5 kg with 96.6 % success cannulation rate. There were no associated complications.

Conclusion: Ultrasound guided vascular cannulation in critically ill pediatric patients is very useful. It is associated with high success rate and minimal complications.

116 – POSTER SESSION

CARDIOPULMONARY BYPASS ASSOCIATED ACUTE KIDNEY INJURY AFTER OPEN HEART SURGERY IN CHILDREN

J. Krastins¹, Z. Straume¹, J. Auzins¹, A. Petersons², A. Petersons³

¹Pediatric Intensive Care, ²Pediatric Surgery, University Children's Hospital, ³Internal Diseases, Riga Stradins University Hospital, Riga, Latvia

Introduction: Cardiac surgery with cardiopulmonary bypass (CPB) is commonly perceived as a risk factor for decline in renal function. Hypothermia, hypoxia, hypotension, non-pulsatile blood flow during CPB, use of ACE inhibitors, inotropic and (or) vasoactive support affects kidney and contributes to the acute kidney injury (AKI).

Objective: To evaluate the incidence and outcome of AKI in children with congenital heart disease (CHD).

Methods: We enrolled 30 patients, 12 boys and 18 girls with CHD. Their median body weight was 6.8 kg, and median age 7 months. SCr was determined and preoperative and postoperative creatinine clearance (ClCr) was estimated using Schwarz formula (eClCr). Urine was collected to measure ClCr, using the difference in urine (UCr) and SCr concentrations (mClCr). Urine output, body temperature, duration of aortic cross clamping and cardiopulmonary bypass was recorded.

Results: Median intraoperative urine output was 2.4 ml/kg/h. Median CPB time was 147 min., median aortic cross-clamping time was 95 min., cooling during CPB to 29.75 °C. Postoperative SCr increased to 35 μ mol/l vs. preoperative SCr 29 μ mol/l, $P < 0.0001$. GFR declined from preoperative 98.4 ml/min./1.73 m² to postoperative 80.98 ml/min./1.73 m², $P < 0.0001$. We find statistically significant difference ($P = 0.042$) in measured 39.88 ml/min./1.73 m² versus estimated ClCr (eClCr) 80.98 ml/min./1.73 m². Observed incidence of AKI was 46.6 % (14/30 patients met KDIGO criteria for AKI).

Conclusion: Open heart surgery in children has severe, but transient effect on expression of renal biomarkers. Observed incidence of AKI was 46.6 % (14 patients met KDIGO criteria of AKI from 30 of our patients).

117 – POSTER SESSION

PATENT DUCTUS ARTERIOSUS IN THE NEW ERA: CONSERVATIVE MANAGEMENT WITH FUNCTIONAL ECHOCARDIOGRAPHY SURVEILLANCE

J.B. Letshwiti¹, J. Miletin^{1,2}

¹Coombe Women and Infants University Hospital, Dublin, Ireland,

²Institute for the Care of Mother and Child, Prague, Czech Republic

Background and aims: Patent Ductus Arteriosus (PDA) in preterm infants is associated with numerous morbidities and increased mortality. Treatment with cyclooxygenase inhibitors and/or surgical ligation has failed to show major improvements in short term or long term outcomes. Our objective was to document PDA course in a cohort of patients managed conservatively, with a high threshold for medical or surgical treatment using the addition of regular functional echocardiography.

Methods: This was a retrospective chart review between January 2011 and December 2011 in Coombe Women and Infants University Hospital. Functional echocardiography was introduced as a standard investigation for all neonates born below 1,500 g within the first week of life, commencing in January 2011. Further reviews were done according to the PDA significance.

Results: One hundred and thirty-nine infants with birth weight below 1,500 g were admitted during the study period. Two infants with congenital abnormalities were excluded. Eighty-eight infants (64 %) were diagnosed with PDA and 11 patients (8 %) had a PDA at discharge from the hospital. We performed 387 functional echocardiography investigations. Only one patient required surgical ligation (0.7 %) and four patients were treated with Ibuprofen (3 %). Ten patients (7 %) did not survive to discharge. Seventeen (12 %) had chronic lung disease, four (3 %) developed surgical necrotising enterocolitis, five (4 %) had

severe peri/intraventricular haemorrhage or cystic periventricular leukomalacia. These results compare favourably to the Vermont-Oxford database with a significant reduction in PDA treatment.

Conclusions: A conservative approach to PDA treatment is a feasible option, reducing PDA treatment while using functional echocardiography.

118 – POSTER SESSION

COMPARISON BETWEEN PRESSURE RECORDING ANALYTICAL METHOD AND THERMODILUTION METHOD TO MEASURE CARDIAC OUTPUT IN AN INFANT ANIMAL MODEL

J. Lopez, J. Urbano, R. Gonzalez, M.J. Solana, J. Lopez-Herce

Pediatric Intensive Care, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Backgrounds and aims: Non invasive pressure recording analytical method (PRAM) for measuring cardiac index (CI) has recently appeared. The aim of this study is to compare PRAM with femoral artery thermodilution (FATD) in a pediatric animal model of hypoxia. **Methods:** Thirty five mechanically ventilated piglets with a median (inter-quartile) weight of 9 (8.5–10.8) kg were studied. Femoral artery and vein were cannalized under sedation. CI was measured simultaneously using PRAM and FATD, after calibration with two infusions of 5 ml-cold saline ($<8^{\circ}\text{C}$). Measurements were repeated before and 5 min after ventilator withdrawal to induce asphyxia.

Results: Thirty two paired measurements were compared. The mean (SD) CI was $4.27 (1.54) \text{ L min}^{-1}$ with FATD as opposed to $4.10 (1.59) \text{ L min}^{-1}$ using PRAM. The mean bias was -8.3% (95 % Limits of agreement 118.6 to -135.2%) with a percentage error of 104 %. Before ventilator withdrawal (24 paired measurements), the CI was $4.04 (0.94) \text{ L min}^{-1}$ with FATD and $4.46 (1.42) \text{ L min}^{-1}$ using PRAM. The mean bias in this case was -15.2% (67.4 to -97.7%) with a percentage error of 82 %. After ventilator withdrawal (8 paired measurements), the CI was $4.97 (2.62) \text{ L min}^{-1}$ with FATD and $3.04 (1.66) \text{ L min}^{-1}$ using PRAM. The mean bias was 12.3% (227.7 to -203.2%) with a percentage error of 117 %.

Conclusions: In this experimental infant animal model, poor agreement existed between PRAM and FATD CI measurements.

119 – POSTER SESSION

RIGHT VENTRICULAR DIASTOLIC FUNCTION INFORMS TIMING OF SURGICAL REPAIR IN CONGENITAL DIAPHRAGMATIC HERNIA

F. Moenkemeyer, N. Patel

Newborn Intensive Care Unit, Royal Children's Hospital, Melbourne, VIC, Australia

Background: Determining optimum timing for surgical repair in congenital diaphragmatic hernia (CDH) is challenging. Pulmonary hypertension (PAH) is a determinant of disease severity in CDH, and leads to secondary right ventricular (RV) dysfunction. This study investigated patterns of RV dysfunction in CDH before and after surgery, using Tissue Doppler Imaging (TDI).

Method: In 20 infants with CDH, TDI RV E' velocities were measured to assess RV diastolic function, on paired days in the first week of life and post-op period. Infants were grouped by disease severity according to duration of respiratory support: DRS < 25 and DRS > 25 days.

Results: In infants with more severe disease (DRS < 25) RV E' was significantly lower in the first week of life, except day 3–4 (Figure 1). After surgery RV E' deteriorated and was significantly lower in the DRS > 25 group on day 3–4 post op (Figure 2).

Conclusions: RV diastolic dysfunction identifies infants with severe CDH. Delaying surgery until day 3–4 allows improvement of RV function prior to post-operative deterioration.

Fig. 1 RV E' velocity in first week

Fig. 2 RV E' velocity after surgery

120 – POSTER SESSION

SIMULATION OF REALISTIC CONTINUOUS VENOVENOUS HEMOFILTRATION SCENARIOS BY MEANS OF A NEW SIMPLE AND EFFECTIVE SIMULATOR

M. Mora Matilla¹, A. Rodríguez Nuñez², J. López Herce³, S. Mencia³, M. Fernández Sanmartín², L. Sánchez Santos⁴, I. Oulego Erroz¹

¹Complejo Asistencial Universitario de León, León, ²Clinical University Hospital of Santiago de Compostela, FEGAS Advanced Simulation Center, Santiago de Compostela, ³Pediatric Critical Care Unit, Gregorio Marañón Hospital, Madrid, ⁴FEGAS Advanced Simulation Center, Galicia's Public Emergency System, Santiago de Compostela, Spain

Introduction: Advanced simulation facilitates the training on the management of complex life support procedures without risks to patients. Until now, the only way to train the management of continuous veno-venous hemofiltration (CVVHF) was the direct learning on real patients. Our objective was to create a simulator of CVVHF that could be integrated with current advanced simulators to permit the repetitive and effective training of providers and improve patient safety.

Methods: A device to simulate CVVHF related clinical conditions was invented. It permits the control “on the fly” of all the pressures measured by the CVVHF monitor, separately or in combination. The instructor simultaneously could manipulate the CVVHF and the patient simulator. Specific scenarios were designed.

Results: 80 participants in 4 courses on renal replacement therapies were included (RRT). Lectures, workshops, skillstations, animal laboratory (rabbits and pigs) and high-fidelity simulation (Simbaby®) scenarios were included. 32 scenarios that generated usual conditions and complications related to the therapy with CVVHF, were carried out. Our device permitted the change of the CVVHF monitor pressures in real time according to clinical situation and participants' actions. No device failures were observed and no scenario needed to be halted. Participants considered our device a useful training tool. Scenarios reproduced correctly clinical conditions.

Discussion: CVVHF control simulator allows a realistic generation of RRT scenarios. It permits abrupt or progressive, individual or combined, circuit pressure changes, giving to the instructor a total control of the scenario. This device could be integrated in the software of these simulators.

121 – POSTER SESSION

A LETHAL COURSE OF HYPERTROPHIC CARDIOMYOPATHY IN NOONAN SYNDROME DUE TO A NOVEL *KRAS* MUTATION AND RAS-MAPK PATHWAY HYPERACTIVATION

G. Nosan¹, S. Bertok², S. Vesel³, H.G. Yntema⁴, I. van der Burgt⁴, D. Paro Panjan¹

¹Department of Neonatology, ²Department of Endocrinology, Diabetes and Metabolic Diseases, ³Unit of Cardiology, University Children's Hospital, Ljubljana, Slovenia, ⁴Department of Human Genetics, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background and aims: The Noonan syndrome (NS) is an autosomal dominant genetic disorder with a very heterogeneous clinical picture, comprising a congenital heart defect (CHD) in 50–80 % of affected individuals. The phenotype diversity is a consequence of nine different genes (*PTPN11*, *SOS1*, *KRAS*, *RAS*, *RAF1*, *BRAF*, *SHOC2*, *MEK1*, *CBL*) involved in the pathogenesis of NS. The most common CHD are pulmonary valve stenosis and hypertrophic cardiomyopathy (HCM), which is present in about 20 % of NS patients. The rapidly progressive HCM, resulting in early death or need for heart transplantation, occurs only sporadically in NS.

Methods: A DNA genotyping of a NS patient with rapidly progressive HCM and lethal exitus at the age of 4 months due to a cardiorespiratory failure was performed.

Results: A heterozygous unclassified missense variant in exon 3: c.179G > T (p.Gly60Val) was detected in the *KRAS* gene.

Conclusions: The *KRAS* mutation is a rare cause of NS with a usually mild clinical course and an infrequent association with CHD. There are some exceptions, when a specific mutation of this gene causes a severe phenotype with a malignant clinical course.

A novel *KRAS* mutation in exon 3: c.179G > T (p.Gly60Val) should be recognised as a unique malignant form of NS. The lethal clinical course in our NS patient with *KRAS* mutation may be connected with RAS-MAPK pathway hyperactivation, consequently promoting cell growth and proliferation, leading to a rapidly progressive HCM.

122 – POSTER SESSION

INTRAVENOUS PARACETAMOL TREATMENT IN THE MANAGEMENT OF PATENT DUCTUS ARTERIOSUS IN EXTREMELY LOW BIRTHWEIGHT INFANTS

M.Y. Oncel¹, S. Yurttutan¹, H. Degirmencioglu¹, N. Uras¹, N. Altug², O. Erdevi³, U. Dilmen¹

¹Neonatology, ²Pediatric Cardiology, Zekai Tahir Burak Maternity Teaching Hospital, ³Neonatology, Ankara University School of Medicine, Ankara, Turkey

Background and aims: Treatment options for the closure of a haemodynamically significant patent ductus arteriosus (hsPDA) include medical therapy such as ibuprofen and indomethacin and surgical ligation. To evaluate the efficacy of intravenous paracetamol in preterm infants with hsPDA whose feeding was contraindicated or had feeding intolerance.

Methods: Preterm infants with hsPDA who were started on intravenous paracetamol treatment with parental consent. Paracetamol was administered at a dose of 60 mg/kg/day, in 4 divided doses, for a period of 3 days. In the absence of closure of hsPDA, treatment was extended up to 6 days, after which echocardiographic examination was performed.

Results: A total of 10 preterm infants were included in the study with a median gestational age of 27^{4/7} weeks (minimum–maximum: 24–29) and a median birth weight of 775 g (590–990). The first dose of intravenous paracetamol was given after a median of 6 days (2–15). On echocardiographic examination, median internal ductal diameter was 2 mm (1.5–3), with a median left atrium-to-aortic root ratio of 1.95 (1.6–2.2). Intravenous paracetamol resulted in successful closure of hsPDA in all patients.

Conclusions: This study is the first case series in the literature, which is used intravenous paracetamol treatment of hsPDA. We believe that intravenous paracetamol could be used as an alternative drug for infants. Further prospective randomized-controlled trials are needed to evaluate the efficacy of intravenous paracetamol for the closure of hsPDA.

123 – POSTER SESSION

REGIONAL CEREBRAL OXYGEN SATURATION AS A MARKER OF HEMODYNAMIC STATE FOLLOWING CARDIAC SURGERY

J. Parrilla Parrilla¹, J.A. Garcia Hernandez¹, A. Aldemira Liz¹, M.T. Charlo Molina¹, J. Cano Franco¹, A. Cayuela-Dominguez², M. Loscertales Abri¹

¹Pediatric Intensive Care Unit, ²Research Support Unit, Hospital Infantil Virgen del Rocío, Seville, Spain

Objective: Regional cerebral oxygen saturation (rSO₂) is a measure of the general state of perfusion and oxygenation. We aim to analyze the relationship between this and various hemodynamic and respiratory parameters.

Patients and methods: Forty-three patients, operated on between October 2011 and July 2012, were included in this prospective observational descriptive study. The following parameters were measured: mean arterial pressure, both arterial and central venous oxygen saturation and partial pressures of oxygen and carbon dioxide, and lactate levels. From these parameters, the oxygenation index and the oxygen extraction ratio were calculated. These measurements were studied to evaluate whether rSO₂ correlated significantly with the other parameters.

Results: The average age and weight of the patients were 27.3 months and 9.2 kg respectively. The rSO₂ correlated positively with both central venous oxygen saturation ($r = 0.73$, $p < 0.01$) and mean arterial pressure ($r = 0.59$, $p < 0.01$), and negatively with the oxygen extraction ratio ($r = -0.7$, $p < 0.01$). No correlation was found with the respiratory parameters. Concordance analysis established an acceptable Kappa index (>0.4) between the rSO₂ and central venous oxygen saturation, and between the rSO₂ and oxygen extraction ratio.

Conclusion: Regional cerebral oxygen saturation correlates well with hemodynamic parameters—mean arterial pressure, venous saturation, and the tissue oxygen extraction. However, it does not correlate with respiratory parameters.

124 – POSTER SESSION

VOCAL CORD PALSY FOLLOWING AORTIC ARCH SURGERY: INCIDENCE, DIAGNOSIS AND IMPLICATIONS

C. Peevers

Bristol Children's Hospital, Bristol, UK

Vocal cord paralysis is a known entity often described as a complication of neck surgery, mainly thyroidectomy. A less frequent site of injury to the recurrent laryngeal nerve is the chest during cardiac surgery, particularly involving the aortic arch. Recurrent laryngeal injury after cardiac surgery is often overlooked as a cause of post-operative respiratory insufficiency or hoarseness.

The true incidence of vocal cord dysfunction may be hard to draw in case of lack of a routine post-operative laryngeal examination for patients with dysphonia. In the paediatric population it significantly affects feeding, with many babies requiring NG feeds and prolonged hospital admission. Patients with unilateral vocal cord paralysis present with respiratory insufficiency, stridor and obstructive symptoms.

The reported incidence of vocal cord palsy following cardiac surgery via median sternotomy ranges between 1.7 and 67 % depending on the type of surgery and the weight of the infant at the time of surgery. We conducted an audit of aortic arch surgery, looking at incidence of vocal cord palsy, its detection and outcome. Analysing 115 aortic arch surgeries we found our local rate was 19 %, most of these detected during inpatient admission. Some cases however were diagnosed following discharge. Most cases had symptoms of stridor or respiratory distress. However, cases missed were described only as poor feeders. This raises the possibility of screening all cases of aortic arch surgery in paediatric patients with elective laryngoscopy.

125 – POSTER SESSION

ULTRASOUND GUIDED ACCESS TO THE BRACHIO-CEPHALIC VEIN IN NEONATES, INFANTS AND SMALL CHILDREN

M. Pittiruti¹, D. Biasucci², A. Mancino², S. Pulitanò², D. Celentano³

¹Department of Surgery, ²Emergency Department Pediatric Intensive Care Unit, ³Pediatric Intensive Care Unit, 'A. Gemelli' Teaching Hospital Catholic University of The Sacred Heart, Milan, Italy

Background: Ultrasound (US) guidance is becoming the standard technique for central venipuncture in neonates, infants and children. Though much of the initial experience in this field has been carried out with internal jugular vein (IJV) and subclavian vein (SV), in neonates and in small children the largest vein to access may be the brachio-cephalic vein (BCV), which can be easily visualized in the superior mediastinum and punctured 'in-plane' by US guidance.

Methods: We have reviewed all US guided insertions of central venous catheters (CVC) performed in neonates and in children <6 years in our Pediatric Intensive Care Unit and in our Pediatric Oncology Department. PICCs were excluded from the analysis. The vein to puncture was chosen after US evaluation. Kits for micro-introduction (21 G needles, soft straight tip 0.018 guide-wire, 3–4 Fr micro-introducer-dilator) were used in all patients.

Results: In 165 patients (age: 15 < 1 month, 70 1–12 months, 80 1–6 years), we inserted 183 CVC: in 167 cases, after US examination of all possible vein approaches, we esteemed that BCV was the largest and easiest vein to access. All insertions were successful, with no punctured-related complications (no pneumothorax, no accidental arterial punctures). In most cases (95 %), the BCV was punctured at first pass of the needle.

Conclusion: In the vast majority of patients <6 years, the BCV is the vein with the largest caliber and the easiest and the safest for US guided venipuncture.

126 – POSTER SESSION

POSTNATAL ADAPTATION OF PULMONARY CIRCULATION IN EXTREMELY LOW BIRTH WEIGHT INFANTS: PILOT STUDY

J.R. Purna¹, J. Miletin^{1,2}

¹Coombe Women and Infants University Hospital, Dublin, Ireland,

²Institute for the Care of Mother and Child, Prague, Czech Republic

Background and aims: In healthy term neonates, pulmonary pressures fall rapidly following birth and first breaths. However in the extremely low birth weight (ELBW; below 1,000 g) infants, there is very little information about the pattern of this physiological adaptation. The aim of our study was to prospectively measure pulmonary pressures following delivery.

Methods: All ELBW infants admitted to the neonatal intensive care unit in the Coombe Women and Infants University hospital were eligible for enrolment. Targeted echocardiography was performed at three, six and 12 h of age to measure the size and flow pattern in the PDA and the tricuspid regurgitation (TR) in m/sec as an indirect assessment of pulmonary hypertension (PH).

Results: Between November 2012 and January 2013 12 infants were enrolled. The mean gestational age of our cohort was 26.5 weeks of gestation and the mean birth weight was 832.5 g. All infants had a PDA present on all measurements with mean ductal size 2.5 mm at 3 h of age, decreasing to 1.9 mm at 12 h of age ($p = 0.02$). Mean TR at 3 h of age was 1.6 m/s, falling to 1.2 m/s at 12 h of age ($p = 0.15$). Five infants had TR above 2 m/s (estimated pulmonary pressure above 20 mm Hg) after 3 h of age, suggestive of delayed transition.

Conclusions: PH with impaired transition could play a role in stabilisation of extremely preterm neonates. Further data are needed to confirm this finding with possible targeted approach to infants with delayed transition.

127 – POSTER SESSION

MOBILE ECMO OF NEONATAL, PAEDIATRIC & ADULT PATIENTS: THE GLENFIELD EXPERIENCE

S. Robinson, C. Harvey, C. Westrope, S. Speggorin, M. Gratrix, G. Faulkner, G. Peek

Glenfield Hospital-Leicester University Hospitals NHS Trust, Leicester, UK

Objectives: Extracorporeal Membrane Oxygenation (ECMO) is a proven, beneficial therapy amongst neonatal, paediatric and adult patients. Being able to offer a mobile ECMO (mECMO) service across the United Kingdom allows greater and earlier access to this life saving therapy. Our aim is to review our experience of this unique service.

Methods: Between January 2009–December 2012, all patients accepted for mECMO support in whom conventional transfer was deemed too high risk, were enrolled. Demographic data, diagnosis, adverse events, clinical details, transport times and outcome were analysed.

Results: 100 patients (101 mECMO transfers) matched the inclusion criteria (42 neonates, 17 children and 41 adults). Seven were transferred between other institutions.

The commonest neonatal conditions included;

Meconium aspiration syndrome ($n = 15$, 15 %, Survival 100 %) Congenital diaphragmatic hernias ($n = 12$, 12 %, Survival 75 %) Bronchiolitis ($n = 7$, 7 %, Survival 86 %)

In the paediatric subgroup;

Pneumonia ($n = 4$, 4 %, Survival 100 %)

Pertussis ($n = 4$, 4 %, Survival 25 %)

Whilst in the adult population,

Pneumonia/ARDS ($n = 36$, 36 %, Survival 94.4 %)

H1N1 positive ($n = 7$, 19.4 %, 86 % Survival).

Survival amongst all mECMO patients treated at Glenfield was 88.2 % which is in keeping with the unit ECMO mortality. Proportionally more mECMO patients died in the paediatric subgroup due to the high frequency of pertussis (mECMO, Glenfield and ELSO survival data all 20–30 %). No patients died during transport.

Conclusions: Glenfield Hospital is the largest UK provider of mobile ECMO and this report details one of the largest mobile ECMO programmes and series in the world. It is a safe, valuable resource that in this format provides earlier access to ECMO and potentially safer transport of critically ill patients.

128 – POSTER SESSION

HEART RATE VARIABILITY THE BASIC MARKER OF VEGETATIVE REGULATION AT CHILDREN WITH MITRAL VALVE PROLAPSE

L. Romanciuc^{1,2}, N. Revenco¹, A. Holban¹

¹Pediatrics Department, State Medical and Pharmaceutical University “N. Testemitanu”, ²Cardiology Department, Research Institute for Maternal and Child Healthcare, Chisinau, Moldova

Objectives: The estimation of heart rate variability as basic marker of vegetative regulation at children with mitral valve prolapse.

Methods: The study included 190 children: I group 160 (84.2 %) children with mitral valve prolapse, average age (13.32 ± 0.23) years and II group 30 (15.79 %) healthy children, average age (12.2 ± 0.72) years, who were examined with ECG, ECG Holter monitoring over 24 h and heart rate variability.

Results: Rhythm disorders: supraventricular extrasystoles have been determined in 32 (16.84 %) children, with prevails in the I group in 29 (18.12 %) vs 3 (10.0 %) II group and ventricular extrasystoles in 12 (7.50 %) only I group ($p > 0.05$). Ambulatory ECG monitoring for 24 h have been determined supraventricular extrasystoles in 86.25 % cases with MVP vs 13.33 % healthy children ($p < 0.001$), ventricular extrasystoles in 18.75 % cases I group vs 3.33 % II group ($p < 0.05$), sinus tachycardia in 75.50 % children with MVP vs 43.33 % healthy children ($p < 0.001$) and supraventricular tachycardia in 43.38 % cases I group vs 13.33 % II group ($p < 0.001$). Spectral parameters of the heart rate variability at children have been calculated during 24 h period and there were observed a prevalence of waves with low and very low frequency at children with MVP.

Conclusions: Results of the study showed that MVP are associated with supraventricular extrasystoles in 86.25 % cases. Analysis of the heart rate variability on ECG Holter monitoring over 24 h, demonstrates prevalence of waves with low and very low frequency at children with MVP, an autonomic imbalance characterized by sympathetic over activity.

mECMO diagnosis and survival

	Condition	Number (n)	Percentage (%)	Survival (%)
Neonatal	Meconium aspiration syndrome	15	15	100
Neonatal	Congenital diaphragmatic hernia	12	12	75
Neonatal	Bronchiolitis	7	7	86
Paediatric	Pneumonia	4	4	100
Paediatric	Pertussis	4	4	25
Adult	Pneumonia/ARDS	37	37	94
Adult	(H1N1 positive)	7	7	86

129 – POSTER SESSION

CLINICAL UTILITY OF TROPONIN LEVEL IN CRITICALLY ILL CHILDREN

G. Sambandamoorthy¹, P. Holloway², D. Inwald¹

¹Paediatric Intensive Care Unit, ²Clinical Chemistry, Imperial College NHS Trust, London, UK

Background and aims: Currently there are minimal data on utility of serum troponin levels in PICU. The aim of this study was to investigate troponin level and outcome in critically ill children admitted to a regional PICU.

Methodology: Retrospective case notes review of children admitted to the general PICU at Imperial College Healthcare NHS Trust between January 2009 and September 2012 who had troponin measurements. During this period troponin was determined in children with a clinical suspicion of cardiac myocyte damage or necrosis. Data collected included troponin level, diagnosis, inotrope score, ventilator free days at 30 days (VFD30) and PICU mortality. Data were analysed with SPSS software. Data were non parametric and are reported as medians and IQRs.

Results: 149 children had troponin levels, of which 31 died. Median age was 2 years (0.6–5). Diagnostic categories were cardiac (27), neurological (18), respiratory (38), sepsis (59) and “other” (7). Troponin was higher in patients who died (710 ng/L, IQR 60–3,390) than survivors (60 ng/L, IQR < 30–300), $p < 0.001$ (Mann–Whitney U) and higher in the cardiac group (700 ng/L, IQR 180–2,900) than other diagnostic groups (50 ng/L, IQR < 30–260), $p < 0.001$, Kruskal–Wallis). Troponin correlated with inotrope score ($\rho = 0.24$, $p = 0.004$) and VFD30 ($\rho = -0.254$, $p = 0.002$). The AUC of the receiver operating curve for death was 0.73 ($p < 0.001$), with a troponin >500 ng/L having 58 % sensitivity, 82 % specificity and 37 % positive predictive value for death.

Conclusion: Troponin is a useful test in critically ill children, with high levels associated significantly with an underlying cardiac diagnosis, cardiovascular organ dysfunction and death.

130 – POSTER SESSION

FEASIBILITY OF SEPSIS TRIALS DURING RETRIEVAL TO INTENSIVE CARE

G. Sambandamoorthy, P. Ramnarayan

Children Acute Transfer Services, Great Ormond Street Hospital for Children NHS Trust, London, UK

Aim: To analyse the clinical management and outcome of children with severe sepsis referred to the children acute transport service (CATS) to identify possible challenges with future interventional trials.

Methods: Retrospective case notes review of referral to our services between May 2012 and October 2012. Data collected included physiological status at referral, total fluid bolus and inotrope use, length of stay in PICU, duration of ventilation and inotropes and discharge outcome.

Results: 548 patients were retrieved to PICU, of which 50 met ‘severe sepsis’ criteria (Surviving Sepsis 2012). 42 patients were referred as ‘sepsis’, 8 patients with other diagnoses. By PICU discharge, 2 patients had non-sepsis diagnoses.

At PIC referral (n = 50)

Age in months	8.2 (1.3–37.8)
Shock index (heart rate/systolic BP)	1.83 (1.48–2.32)
Base deficit (mmol/L)	7.2 (3.5–13)
Lactate (mmol/L)	3.9 (2.4–6.6)
Total fluid boluses (ml/kg)	30 (20–40)

At PICU admission (n = 50)

Total fluid boluses (ml/kg)	50 (40–80)
Receipt of >1 vasoactive agent*	22 (44 %)

PICU course (n = 38)

Length of unit stay in days	7 (4–10)
Length of invasive ventilation in days	4 (3–8)
Length of vasoactive agents in days	2.5 (1–5)
Discharged alive from PICU*	34 (89.5 %)

* Number (%). All other values are median (IQR)

Conclusion: Future clinical trials involving PIC retrieval services need to take into account the difficulties with accurate case identification and the interventions that occurs before PIC referral.

131 – POSTER SESSION

PREDICTORS OF REINTERVENTION IN NEONATES WITH CRITICAL PULMONARY STENOSIS OR PULMONARY ATRESIA WITH INTACT VENTRICULAR SEPTUM

G.A. Shaath, M. Al Mutairi, O. Tamimi, A. Alakhfash, M. Abolfotouh, F. Alhabshan

Pediatric Cardiac ICU, King Abdulaziz Cradiac Center, Riyadh, Saudi Arabia

Objectives: Describe the short and midterm outcome and to determine the predictors of reintervention in neonates with critical pulmonary stenosis (PS) or pulmonary atresia with intact ventricular septum (PA/IVS).

Background: The transcatheter intervention for critical PS and PA/IVS resulted in improvement in the patient’s survival and the quality of life. The procedure is not free of complications and there is still a significant rate of reintervention.

Method: All neonates with critical PS or PA/IVS who underwent interventional cardiac catheterization between November 2004 and January 2009 were reviewed retrospectively. We performed a comparison between those who required reintervention and those who did not, to identify the predictors of reintervention.

Results: Forty-three neonates were included, 23 (53.5 %) had critical PS and 20 (46.5 %) had PA/IVS. Twenty-six patients (60 %) were males, the mean age was 11.6 8 days, and the mean weight was 3.2 6 0.6 kg. Two patients died (4.6 %). The mean follow-up period was 19 6 13 months for 42 patients. Fifteen patients (36 %) required reintervention, 11 of them (73 %) had PA/IVS, and 4 (27 %) had critical

PS. Reintervention was more inpatients with PA/IVS than those with critical PS ($P = 0.003$). Other predictors for reintervention included hospital stay 7.5 days ($P = 0.001$) and tricuspid valve regurgitation peak gradient in day one post first intervention (TR1) 43 mmHg ($P = 0.03$).

Conclusion: Interventional cardiac catheterization shows favorable outcome for patients with critical PS and PA/IVS. Predictors for reintervention included the diagnosis of PA/IVS, hospital stay 7.5 days after first intervention and TR1 gradient 43 mmHg.

132 – POSTER SESSION

ULTRASONOGRAPHY ASSESSMENT OF VOCAL CORDS MOBILITY IN CHILDREN AFTER CARDIAC SURGERY

G.A. Shaath, A. Jijeh, A. Alkurdi, S. Ismail, M. Elbarbary, M.S. Kabbani

Pediatric Cardiac ICU, King Abdulaziz Cardiac Center, Riyadh, Saudi Arabia

Objectives: Upper airway obstruction after pediatric cardiac surgery is not uncommon. In the cardiac surgical population, an important etiology is vocal cord paresis or paralysis following extubation. In this study, we aimed to evaluate the feasibility and accuracy of ultrasonography (US) assessment of the vocal cords mobility and compare it to fiber-optic laryngoscope (FL).

Materials and methods: A prospective pilot study has been conducted in Pediatric Cardiac ICU (PCICU) at King Abdulaziz Cardiac Center (KACC) from the 1st of June 2009 till the end of July 2010. Patients who had cardiac surgery and manifested with significant signs of upper airway obstruction were included. Each procedure was performed by different operators who were blinded to each other report. Results of invasive (FL) and non-invasive ultrasonography (US) investigations were compared.

Results: Ten patients developed persistent significant upper airway obstruction after cardiac surgery were included in the study. Their mean $\pm$ SEM of weight and age were 4.6 ± 0.4 kg and 126.4 ± 51.4 days, respectively. All patients were referred to bedside US screening for vocal cord mobility. The results of US were compared subsequently with FL findings. Results were identical in nine (90 %) patients and partially different in one (10 %). Six patients showed abnormal glottal movement while the other four patients demonstrated normal vocal cords mobility by FL. Sensitivity of US was 100 % and specificity of 80 %.

Conclusion: US assessment of vocal cord is simple, non-invasive and reliable tool to assess vocal cords mobility in the critical care settings. This screening tool requires skills that can be easily obtained.

133 – POSTER SESSION

NONINVASIVE ASSESSMENT OF THE SKIN MICROCIRCULATION IN NEONATES BY USING SIDESTREAM DARK FIELD IMAGING: PILOT STUDY

M. Stanclova^{1,2}, Z. Kokstein¹, R. Parizkova³, Z. Turek³, C. Lehmann⁴, V. Cerny^{3,4}

¹Department of Pediatrics, University Hospital Hradec Kralove,

²Charles University in Prague, Faculty of Medicine in Hradec Kralove,

³Department of Anesthesiology and Intensive Care Medicine, University Hospital Hradec Kralove, Hradec Kralove, Czech Republic,

⁴Department of Anesthesia, Pain Management and Perioperative Medicine, Dalhousie University, Halifax, NS, Canada

Background: Microcirculatory changes are known to play an important role in various pathophysiological states. Sidestream dark field (SDF) imaging is a relatively new noninvasive technique allowing visualisation of microcirculation at the bedside. To date, only a few studies have focused on newborns, especially on preterm babies. There haven't been any published data about the microcirculation parameters in healthy term newborns with the use of SDF imaging yet. Our study aimed at assessing the skin microcirculation in healthy newborns and at examining the reliability and reproducibility by using this method.

Methods: SDF imaging was used to obtain the data in healthy term neonates during the 3rd day of life. The probe with a sterile disposable cap was applied to the inner upper arm. Images of skin perfusion were stored on a hard-drive and analysed off-line using AVA 3.0 software (MicroVision Medical, Amsterdam, The Netherlands). Total number of analysable video sequences from 5 neonates was 17. We calculated following microcirculatory indices: vessel density of total and perfused vessels.

Results: Presented data are expressed as mean ($\pm$ SE). The total all and small vessel density (in mm/mm^2) were $18.0 (\pm 0.69)$ and $19.0 (\pm 0.7)$, respectively. The perfused small vessel density was $15.0 (\pm 4.4)$.

Conclusion: These results indicate that SDF imaging provides a reliable and reproducible method to study the skin microvasculature in newborns and suggest many opportunities in various clinical settings for further studies.

Acknowledgments: Supported by the project (Ministry of Health, Czech Republic) for conceptual development of research organization 00179906

134 – POSTER SESSION

“FAST TRACK” POSTOPERATIVE PROTOCOL FOR HYPOPLASTIC-LEFT-HEART-PATIENTS WITH COMPREHENSIVE STAGE II

B. Steinbrenner¹, S. Recla¹, A. Orth¹, T. Logeswaran¹, M. Müller², H. Akintürk³, J. Thul¹, D. Schranz¹

¹Pediatric Heart Center, ²Cardiac Anesthesiology, ³Cardiac Surgery, University Clinic Giessen, Giessen, Germany

For nearly 20 years the Norwood procedure was the only approach for palliation of hypoplastic left heart. Despite modifications in term of right-ventricle-to-pulmonary-artery-conduit instead of modified Blalock-Taussig-shunt the risks and complications resulting from cardiopulmonary bypass (CPB) and circulatory arrest in early neonatal period remained unsolved. They still impact unfavorably longterm success and overall morbidity and mortality.

The alternative “hybrid procedure” for hypoplastic left heart avoids open heart surgery in the vulnerable early neonatal period by banding the pulmonary arteries and subsequent percutaneous stenting of the ductus arteriosus (comprehensive stage I). Major open heart surgery with neo-aortic reconstruction and bidirectional cavopulmonary connection (comprehensive stage II) is shifted into later life (4–6 month of age).

In the postoperative phase adequate hemodynamic monitoring, early extubation and non-invasive respiratory support, eligible analgesia, deliberate pharmacotherapy focusing optimal ventricular preload and function and a balanced fluid management represent the cornerstones of therapy.

The presented postoperative protocol reflects our center experience to optimize cardiac function and enhance pulmonary blood flow in face of counteracting factors as systemic inflammatory response, pain, insufficient spontaneous breathing after comprehensive stage-II-operation.

135 – POSTER SESSION

EFFECT OF PERSISTENT PATENT DUCTUS ARTERIOSUS ON MORTALITY AND MORBIDITY IN VERY LOW-BIRTHWEIGHT INFANTS

L. Tauzin¹, C. Joubert¹, A.-C. Noel², A. Bouissou³, M.-E. Moulies¹

¹CHT New Caledonia, Nouméa, ²University Hospital Centre, Reims, ³University Hospital Centre, Tours, France

Aim: Because New Caledonia is geographically isolated from the nearest cardiac surgical centre, surgical closure of ductus arteriosus is not performed in very low-birthweight (VLBW) infants who have a persistent patent ductus in spite of having undergone treatment with ibuprofen. This study aimed at investigating the possible effect of persistent patent ductus in VLBW infants.

Methods: The study included 177 VLBW infants born at 25–31 weeks of gestation from January 2006 to May 2011. Mortality and major morbidities were compared between infants with a persistent patent ductus ($n = 33$) and those without it ($n = 104$). Statistical associations between potential neonatal risk factors and significant morbidities were identified using multivariate regression analyses.

Results: Rates of mortality and major morbidities, including the rate of bronchopulmonary dysplasia, necrotizing enterocolitis, intraventricular haemorrhage grades I–II and III–IV, periventricular leukomalacia, late-onset infections and failure of hearing screening, were insignificantly higher in VLBW infants with a persistent patent ductus than in those without it.

Conclusion: This study adds further evidence that persistent patent ductus arteriosus has no significant effect on mortality and morbidity in VLBW infants born at ≥ 25 weeks' gestational age.

136 – POSTER SESSION

MEASUREMENT OF CARDIAC OUTPUT IN CHILDREN BY PRESSURE RECORDING ANALYTICAL METHOD

J. Urbano^{1,2}, J. López^{1,2}, R. Gonzalez^{1,3}, M.J. Solana^{1,3}, S.N. Fernandez¹, M. García¹, J. López-Herce^{1,2}

¹Pediatric Intensive Care Unit, Gregorio Marañón General University Hospital. Gregorio Marañón Health Research Institute., ²Maternal and Child Health and Development Research Network (REDSAMID), ³Health Research Fund, Carlos III Research Institute, Madrid, Spain

Objectives: The objective of this study was to evaluate a new method for noninvasive cardiac output (CO) measurement by the pressure recording analytical method (PRAM) in children. Few studies have been reported in pediatric population.

Methods: Ninety-five measurements in forty-seven patients between 1 and 168 months of age and with no severe hemodynamic disturbances were studied. Heart rate (HR), mean arterial pressure (MAP), and cardiac index (CI) measurements were registered by PRAM every 6–8 h, with a maximum of 4 measurements per patient. Additionally, core-to-skin temperature gradient and vasoactive-inotropic score (VIS) were measured.

Results: Dicrotic notch was detected in 62 % of the measurements. CI was 4.1 ± 1.4 L/min/m² (range 2.0–7.0 L/min/m²). There was a weak negative correlation between CI and height ($r = -0.247$, $P = 0.017$), and a moderate correlation between CI and temperature gradient ($r = 0.471$, $P = 0.000$). No correlations with MAP or VIS were observed. Correlation with height was not found in those measurements where dicrotic notch was detected.

Conclusions: Most of the cardiac output measurements registered by PRAM are within normal limits in this observational study involving hemodynamically stable children. If dicrotic notch is not detected, CI measured may be influenced by the size of the children. Further studies are necessary to validate this method.

137 – POSTER SESSION

NEONATAL CARDIAC EMERGENCIES IN AN INTENSIVE CARE UNIT

B.M. Vale, P. Mação, P.V. Silva, T. Dionísio, A. Dinis, F. Neves

Hospital Pediátrico Coimbra, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Background and aims: Neonatal cardiac emergencies represent an important group of patients in intensive care. Successful management depends upon prompt diagnosis and appropriate therapy. Our aim was to characterize newborns with neonatal cardiac emergencies.

Methods: Retrospective descriptive study of newborns with cardiac emergencies admitted to our PICU, from 2002 to 2011. Newborns with antenatal diagnosis of structural cardiopathy were excluded.

Newborns were divided according to the time of clinical presentation (before or after maternity discharge) and the variables analysed were: age, symptoms (cardiogenic shock, congestive heart failure (CHF), cyanosis and arrhythmias), diagnosis, therapeutic interventions and outcome.

Statistical treatment: SPSS17®.

Results: There were 76 admissions (62 % males). Perinatal risk factors were present in 12 and a positive family history in 5. The main symptom was cyanosis in 39, CHF in 15, shock in 12 and arrhythmia in 10. In 24 % of the cases, clinical presentation occurred after maternity discharge, corresponding to 9 aortic coarctation/interrupted aortic arch and 8 tachydysrhythmias, presenting symptom was poor feeding in most cases, mean of 13 days of age. Cyanotic cardiopathies manifested earlier (18 h vs. 8 days; $p < 0.05$). Overall, therapy with PGE was used in 76 %, percutaneous interventions in 28 % and early surgery in 63 %. There were 4 deaths. The average length of hospitalization in PICU was 9 days.

Conclusions: Cyanotic cardiopathies were the most prevalent (51 %) group, with an earlier clinical presentation. There was a high prevalence of ductus-dependent congenital cardiopathies. The early recognition and therapy determined the outcome with a low mortality.

138 – POSTER SESSION

POSTOPERATIVE COMPLICATIONS OF THE FONTAN SURGERY IN PATIENTS FROM A PRIVATE INSTITUTION FROM MEDELLIN: COLOMBIA

N. Vargas Grisales, **A.M. Vargas Gallego**, G. Castilla Agudelo, L.M. Martinez, M.D.L.Á. Rodríguez Gázquez, Biología de Sistemas

Medicine School, Universidad Pontificia Bolivariana, Medellin, Colombia

The Fontan surgery is a palliative intervention, performed in patients with univentricular heart.

Objective: Identify the most common postoperative complications of the Fontan surgery in patients from a private institution from Medellin.

Methodology: Descriptive clinical series. The population was patients undergoing the Fontan surgery. Information about sociodemographic and clinical variables was taken directly from the medical records. The research was approved by the Ethics Committee. We used SPSS[®] version 17.0 (SPSS Inc, Chicago, Illinois, USA) for processing and analysis of information. For statistical handling of data is used for descriptive statistics.

Results: 21 patients participated, the median age was 5 years (minimum 3, maximum 10), 66.7 % were male. 100 % of the children had a history of prior palliative surgery, the most common was the bidirectional Glenn. As for the most common complications were pleural effusion (52.4 %), myocardial dysfunction and wound infection (19 %).

Conclusion: The complications presented agree with those reported in the literature, it is notable that no patient reported subaortic stenosis and bleeding.

139 – POSTER SESSION

CONTINUOUS INTRAVENOUS HEPARIN INFUSION PREVENTS CATHETER-RELATED THROMBOEMBOLIC EVENTS IN YOUNG CHILDREN AFTER CARDIAC SURGERY

P. Zheng, M. Qi, X. Han, F. Chen

Intensive Care Unit, Wuhan Asia Hospital, Wuhan, China

Objectives: Internal jugular vein catheterization is standard-procedure in the cardiac surgery. However, it may cause complications including catheter-related infection, haemorrhage and catheter-related thrombosis. Above all, catheter-related thrombosis is more likely to happen to young children because of their undeveloped coagulation function and delicate vessels. We evaluated the effects of continuous intravenous heparin infusion (CIHI) on prevention of catheter-related thromboembolic events in young children after cardiac surgery.

Methods: 112 patients (average age: 2.2 ± 0.1 months and range 0–3 months) suffered with congenital heart disease were randomly assigned to two groups. Therapy group ($n = 58$) was treated with CIHI using initial dose at 5 U/kg/h followed by maintenance monitoring: adjust heparin to maintain APTT 55–60 s. Control group ($n = 54$) received continuous intravenous normal saline administration. Ultrasound examination of bilateral internal jugular vein was performed at 3, 7, 9 and 14 days after surgery. Morbidity and mortality of deep vein thrombosis (DVT) and adverse reaction including bleeding was assessed.

Results: Although no bleeding was observed in both groups, DVT occurred in three patients from control group (5.56 %) and one from CIHI group (1.72 %). Patients who developed DVT died due to

pulmonary embolism, indicating that morbidity and mortality of catheter-related DVT in CIHI group is significantly lower compared with control group. In addition, heparin administration elevated postoperative plural drainage volume compared with saline group without reaching the level of statistical significance.

Conclusions: CIHI was associated with lower morbidity and mortality of DVT, indicating that CIHI may be an effective therapy against DVT in young children after cardiac surgery.

140 – POSTER SESSION

PHOTOTHERAPY: RISK FACTOR FOR SUDDEN DEATH?

M. Zibolen¹, Z. Uhríkova¹, L. Chladekova², K. Javorka², M. Javorka², M. Kozar², K. Matasova¹

¹*Clinic of Neonatology*, ²*Department of Physiology, Jessenius Medical Faculty Comenius University, Martin, Slovak Republic*

Objectives: The functional changes in the cardiovascular system are common side effects of the phototherapy. Short-term heart rate variability (HRV) may be used for evaluation of cardiac regulation even in newborns. The main aim was to evaluate changes in HRV during phototherapy using nonlinear mathematical methods.

Methods: Twenty full-term newborns undergoing phototherapy were studied. In each enrolled baby three ECG recordings (before, during and after phototherapy, each with min. 3,000 RRs) were obtained. The complexity of time series was analysed using symbolic dynamics method (Porta et al. 2001). RR intervals were transformed into alphabet of 6 symbols. Normalized complexity index (NCI), normalized unpredictability index (NUP) and pattern classification were used for analysis.

Results: Symbolic dynamics analysis showed a reduction in NCI and NUP of HRV during phototherapy. From pattern classification analysis, the 0 V% index increased while the indices 2 LV% and 2 UV% decreased during the treatment procedure. The changes remained significant at least 20 min after phototherapy. The loss of complexity and unpredictability of the heart rate can indicate changes in cardiac regulation associated with pathological states described in adult patients at risk of sudden death (Voss et al., 1996).

Conclusion: The symbolic dynamics analysis found reduction of cardiac regulation during phototherapy. Both, the specificity of newborns' cardiovascular autonomic regulation and presence of exogenous stressor—phototherapy can predispose the newborns to an increased risk of sudden death.

Reference:

Porta A. et al. *Comp. Cardiol.* 2006;33:109–112.

Voss et al. *Cardiovasc. Res.* 1996;31:419–433.

Acknowledgement: Supported by VEGA 1/0223/12

Healthcare (141–216)

141 – POSTER SESSION

TIME TO REFLECT: REFLECTIVE PRACTICE GROUPS FOR CONSULTANTS AND REGISTRARS ON A NEONATAL AND PAEDIATRIC INTENSIVE CARE UNIT (N/PICU)

K. Abbas, C.M. Pierce

Neonatal & Paediatric Intensive Care Unit, Great Ormond St Hospital, London, UK

Background and aims: It is widely acknowledged that working on N/PICU has an emotional impact on staff. Reflective Practice (RP) groups provide space to explore and share feelings and experiences, manage stress, and facilitate the development of effective coping styles. These groups are not routinely held; it is therefore important to gain feedback on how, and if, these groups are helpful.

Methods:

- 25 RP groups were held with the N/PICU Registrars (weekly).
- 3 RP groups were held with the N/PICU Consultants (bimonthly).
- Groups were facilitated by the N/PICU Clinical Psychologist.
- Feedback was received from Registrars after 5 pilot sessions (n = 15) and then after the 22nd session (n = 12); feedback is currently being collated from the Consultants.

Results:

- 88 % of respondents reported that they felt ‘okay’ or ‘very comfortable’ discussing feelings and reactions with colleagues.
- On a scale of 1–10 (10 = very helpful), 82 % rated the groups as 7 or above.
- 62 % reported that they would have attended even if the groups were not compulsory.
- When asked what difference these groups have made, responses included:
 - Chance to reflect on, and learn, from clinical experiences (91 %)
 - Increased peer support and opportunity to share experiences (82 %)
 - Increased understanding of psychological ideas and approaches (73 %)

Conclusions: Doctors on N/PICU value the opportunity to regularly reflect on their practice with peers through a facilitated RP group. More research is needed to assess the impact on staff’s emotional well-being, sickness rates and clinical practice.

142 (Abstract withdrawn)

143 – POSTER SESSION

USE OF OXYGEN AND CPAP FOR DELIVERY ROOM NEONATAL RESUSCITATION; WHAT’S HAPPENING IN SAUDI ARABIA?

J. Alallah¹, Z. Al-Salam², S. Al-Olayan³

¹Department of Pediatrics, King Abdulaziz Medical City, Jeddah,

²Department of Pediatrics, Prince Sultan Military Medical City,

³Department of Pediatrics, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia

Current international resuscitation guidelines emphasis the importance of initial respiratory care including oxygen, CPAP and surfactant judiciously. Although international newborn resuscitation guidelines have been implemented more than 15 years in Saudi Arabia, there are no data on current respiratory practice for delivery room resuscitation of newborn infants in this region.

Objectives: To study current practices and available equipment for initial respiratory care for newborn resuscitation in the delivery room in Saudi Arabia.

Methods: An anonymous questionnaire was used to survey attendees of the annual neonatology meeting of the Saudi Neonatology Society in April 2012.

Result: Of the total of 150 questionnaire distributed, 92 (61 %) were returned completed. Respondents were mainly (90 %) from level III NICUs. (57.6 % Neonatologists; 35.9 % senior registrar or fellows and 6.5 % pediatrician). Blended oxygen is available in 92.4 %, and pulse oximeter is used during resuscitation by 83.7 %. For term babies 56.6 % started resuscitation with room air while 22.9 % still using 100 % O₂, while for premature babies 25.6 % of the responder uses 100 % while 21.8 % use RA. Use CPAP by 48.4 % and surfactant use by 62.2 % and routine intubation in 52.2 %.

Conclusion: Substantial variations exist in Use of oxygen, CPAP, routine intubation and surfactant replacement therapy for delivery room neonatal resuscitation practices in Saudi Arabia. We recommend Standardization of Respiratory care in the delivery room through national neonatal resuscitation program.

144 – POSTER SESSION

MEASURING THE EFFICIENCY OF VERBAL COMMUNICATION IN AN EXPANDING PAEDIATRIC INTENSIVE CARE UNIT

H. Banbury¹, H. Cooney¹, A. Plunkett²

¹Medical School, Birmingham University, ²Paediatric Intensive Care, Birmingham Children’s Hospital, Birmingham, UK

Objectives: Efficient verbal communication within clinical teams is a vital component of clinical care. Staff in our institution’s Paediatric Intensive Care Unit (PICU) rely on ‘line of sight’ to identify and communicate with team members. The inherent inefficiencies of this system have been exacerbated by recent expansion of our department (20–31 beds). Delays resulting from inefficient communication may impact on patient care. We aimed to evaluate staff-members’ perception of delays in communication and quantify the impact of these delays in terms of staffing hours.

Methods:

1. Electronic survey of PICU staff’s perceptions of communication delays.
2. Observational self-monitoring study of communication delays, performed by bedside nurses and receptionists.

Results: Survey results (89 responders):

1. 77 (87 %) “commonly encounter delays” in communication episodes
2. 67 (75 %) perceive these delays have a “negative impact on clinical care”.

Self-monitoring study:

1. 22 episodes of communication delay (>1 min to response) were captured during observation period of 89 nursing hours. Total delay time 5.3 h (5.9 % of nursing time).
2. 20 incoming phone calls were observed during observation period of 17 receptionist hours. These required total of 37 min (3.6 % of receptionist time) searching for a staff member to deal with the call. In 5 cases (25 %) the staff member could not be located.

Conclusion: Communication delays are evident in our PICU. These delays may impact negatively on patient care. Installation of innovative technology such as a wireless, hands-free communication system may significantly reduce these delays.

145 – POSTER SESSION

POST TRAUMATIC STRESS DISORDER AMONG MOTHERS OF A BRAZILIAN NEONATAL INTENSIVE CARE UNIT

K.N. Costa¹, J.A.L. de Jesus², R.M. Tristão², L.F. de Oliveira³, N.T. das Neves³

¹Area of Medicine for Child and Adolescent, University of Brasilia, Brasilia, ²Area of Medicine for Child and Adolescent, ³Faculty of Medicine, University of Brasilia, Brasilia, Brazil

Aims: Post Traumatic Stress Disorder (PTSD) requires the presence of a traumatic event that threatens the emotional or physical integrity. This study evaluated the incidence and factors contributing to PTSD in mothers of infants attending a neonatal intensive care unit (NICU) and compared to mothers of healthy infants of a well baby nursery (WBN) at the same hospital facility.

Methods: Prospective study was performed in 113 mothers, 48 of the control group (WBNg) and 27 of the NICU group (NICUg). We applied the Perinatal Posttraumatic Stress Disorder Questionnaire (PPQ) to all mothers by delivery time and 6–8 weeks after. Statistical analyses were performed using Chi square test, multiple Poisson regression with robust variance, and analysis of variance with repeated measures.

Results: By the first interview, suggestive scores of PTSD were present in 42.3 % of NICUg and 8.3 % of WBNg ($p < 0.01$). By the second interview, PTSD was present in 38.4 and 6.2 %, respectively, and NICUg showed a score 1.53 points higher than mothers of WBNg ($p = 0.04$). Moreover, NICUg had lower education level ($p < 0.05$) and prevalence of PTSD was higher in mothers of infants more ill and with higher gestational age.

Conclusions: PTSD had higher incidence at NICUg, though also present at the WBNg and both groups showed no significant symptoms improvement after 6–8 weeks time. It is important to investigate this disorder in all postpartum women in a way the proper treatment could be offered to them preventing suffer and negative impact at the infant's development.

146 – POSTER SESSION

TEENAGE PREGNANCY AND OTHER RISK-FACTORS ASSOCIATED WITH NEONATAL MORTALITY IN A BRAZILIAN MATERNITY

K.N. Costa¹, R.M. Tristão², J.A.L. de Jesus², M.V.M. de Oliveira³

¹Area of Medicine for Child and Adolescent, University of Brasilia, Brasilia, ²Area of Medicine for Child and Adolescent, ³Faculty of Medicine, University of Brasilia, Brasilia, Brazil

Introduction and aims: It remains controversial whether adolescent pregnancy is associated with adverse events such as premature delivery and neonatal mortality. The objective of this study was to evaluate the profile of newborns' death in a neonatal unit of a tertiary

hospital and its relation to maternal age and other covariates and associated factors.

Methods: Retrospective descriptive study conducted in the neonatal unit of a tertiary hospital evaluated all births and deaths of neonates in the Neonatal Intensive Care Unit (NICU), verifying the relationship among the occurrence of death and clinical and demographic variables. Statistical analysis was run using ANOVA, Two-way ANOVA, post hoc by Sidak, and Bivariate Correlation of Spearman two-tail.

Results: We analyzed data from 4,827 births (755 in teenage mother's group and 4,072 in adult mother's group) at the database of the Department of Neonatology, referring to attended population from 2000 to 2007. The mortality rate was 1.1 % (57 neonates). Neonates' death was related with lower: gestational age, Apgar scores and birth weight and was highly associated with teenager's pregnancy ($t = 2.5$, $p < 0.05$), health care-associated infections ($p = 0.003$) and hemorrhagic disorder ($p = 0.03$). Teenager mothers had babies with lower birth weights, lower Apgar score at 5 min, more vaginal delivery and fewer regular antenatal visits.

Conclusions: Teenagers' newborns had higher tendency to lower birth weight, lower score of Apgar in the fifth minute and higher mortality. Data suggests preventive awareness campaigns and intensive follow up of teenage pregnancy by health professionals.

147 – POSTER SESSION

BURNOUT IN PAEDIATRIC/NEONATAL INTENSIVE CARE STAFF: ASSOCIATION WITH STRESS, RESILIENCE AND COPING STRATEGIES

C. Dalia¹, J. Brierley², G. Colville³, L. Perkins-Porras¹, K. Abbas²

¹St George's Medical School, ²Great Ormond Street Hospital, ³St George's Hospital, London, UK

Background: Recent research has documented significant levels of burnout in doctors and nurses working in adult Intensive Care settings and demonstrated an inverse relation between resilience and burnout/stress.

Objectives:

- 1) To ascertain prevalence of symptoms of burnout in a mixed staff group working in a paediatric intensive care setting.
- 2) To examine associations between symptoms of burnout, demographic factors, resilience and stress.
- 3) To determine whether the use of particular coping strategies was associated with lower risk of burnout.

Design: Cross-sectional questionnaire study

Participants: Fifty-eight health professionals working on a Paediatric/Neonatal Intensive Care Unit.

Measures: Abbreviated Maslach Burnout Inventory (aMBI) which is made up of 3 subscales, Emotional Exhaustion, Depersonalisation and Personal Achievement, each scored 0 = never to 18 = everyday; Brief Resiliency Scale (BRS); Trauma Screening Questionnaire (TSQ); list of coping strategies.

Results: All staff admitted to symptoms of Emotional Exhaustion on some level, mean score = **8.0**; 22 experienced some Depersonalisation, mean score = 2.6 and scores for Personal Achievement ranged from 2 to 18, mean score = 12.5, although there was no association with gender, length of service, living alone, having children or profession (doctor/nurse). Burnout was associated positively with TSQ score ($p < 0.05$), and negatively with BRS score ($p < 0.01$) and some coping strategies, including meeting with a mentor ($p < 0.01$) and having hobbies ($p < 0.01$).

Conclusion: A significant number of paediatric intensive care staff reported symptoms of work-related burnout. More research is needed on the prevalence and management of psychological distress in this group.

148 – POSTER SESSION

DO CHANGING POPULATION DEMOGRAPHICS EXPLAIN AN INCREASE IN ADMISSIONS TO PAEDIATRIC INTENSIVE CARE IN ENGLAND AND WALES?

P.J. Davis¹, C.J. Stutchfield¹, E.S. Draper^{2,3}

¹Paediatric Intensive Care Unit, Bristol Royal Hospital for Children, Bristol, ²Health Sciences, University of Leicester, Leicester, ³Paediatric Intensive Care Audit Network (PICANet), Universities of Leeds & Leicester, Leeds & Leicester, UK

Objectives: Admissions to paediatric intensive care (PIC) appear to be increasing in England and Wales (E&W). We aimed to identify whether this increase was due to an increasing need for PIC or changing population demographics.

Methods: Anonymised data from the Paediatric Intensive Care Audit Network (PICANet) was analysed for all PIC admissions to NHS Trusts in E&W between 2004 and 2011 including sex, age, diagnostic group, mode of ventilation and deaths. This was compared with 2011 census data and live birth rates over the same period from the Office of National Statistics.

Results: The number of patients admitted to PIC in E&W increased by 27 % between 2004 and 2011. The most significant increase was in children under 5 years of age (34 %). Over the same period there was a 13.2 % increase in live births with a mean annual increase of 2 % over the past 10 years. The number of individual children with respiratory admission diagnoses has risen most (39 %) with increasing numbers receiving ventilatory support during the study period (42 %). Additionally more patients each year have multiple PIC admissions, particularly those with cardiac and respiratory diagnoses. The male preponderance of patients overall remained unchanged (M:F ratio 1:2). There was also a 10 % decrease in the number of deaths over the 8 years.

Conclusions: Demand for PIC beds in England and Wales is increasing with an expanding younger patient population, particularly those with respiratory diagnoses requiring ventilation, significantly affecting admission rates. Awareness of these demographic trends is necessary to optimise available PIC resources.

149 – POSTER SESSION

PILOT RANDOMIZED CONTROLLED TRIALS IN PEDIATRIC CRITICAL CARE: A SYSTEMATIC REVIEW

M. Duffett^{1,2}, K. Choong¹, C. Cupido¹, L. Hartling³, K. Menon⁴, L. Thabane², D.J. Cook², Evidence in Pediatric Intensive Care Collaborative (EPICC)

¹Pediatrics, ²Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, ON, ³Alberta Research Centre for Health Evidence, University of Alberta, Edmonton, AB, ⁴Pediatrics, University of Ottawa, Ottawa, ON, Canada

Objectives: There are substantial challenges to conducting randomized controlled trials (RCTs) in pediatric critical care. Pilot RCTs can

be used to evaluate the feasibility of, and inform the design and conduct of, larger RCTs. Our objective was to systematically identify and describe pilot RCTs in pediatric critical care.

Methods: We searched the Evidence in Pediatric Intensive Care database (epicc.mcmaster.ca) for published trials (1986 to July 1, 2012) that were described by the authors as pilot, feasibility, proof-of-concept, phase 2 or preliminary studies. We then used Web of Science[®] and the World Health Organization's Clinical Trials Search Portal to search for trials informed by these pilot trials.

Results: We identified 20 pilot RCTs out of a total of 225 RCTs. The number of children randomized ranged from 6 to 56; the median number was smaller than non-pilot RCTs (26 vs. 50, $p < 0.001$). Three trials (15 %) explicitly reported feasibility as an outcome and none reported criteria for success. Blinding was reported in 9 RCTs (45 %). We found 3 registered trials (2 listed as recruiting and 1 as terminated) in trial registries that were similar to 4 pilot trials. 17 pilot trials were indexed in Web of Science; these were cited a median number of 15 (IQR 4–30) times in total and 2.7 (IQR 0.9–6.9) times per year since publication.

Conclusions: Pilot trials are an underutilized research strategy in Pediatric Critical Care research. Published pilot trials uncommonly report explicit feasibility outcomes.

Funding: Canadian Institutes of Health Research.

150 – POSTER SESSION

CRITICAL ULTRASOUND, THE NEW ESSENTIAL SKILL IN PEDIATRIC/NEONATAL ICU

M. Elbarbary

Pediatric Cardiac Intensive Care, KACC, Riyadh, Saudi Arabia

With the recent introduction of a high-quality, reasonably priced, and completely portable neonatal ultrasound machines, a new paradigm shift also emerged in the philosophy of ultrasound imaging in PICU which is the philosophy of “critical ultrasound”. This is a shift from being organ based, systematic, comprehensive exam done by radiologists to a new concept of problem based, goal directed, focused multi-organ, time dependent, exam done by the treating neonatologist. The new paradigm is not trying to describe an organ pathology but rather involves “focused- simple yes/no” exams for the airway, lung, heart, abdominal or limbs that directed to answer specific clinical problem (like hypoxia-hypotension....etc.) and performed not only for diagnosis but also for monitoring the management.

The presentation will give the results of 4-years' experience of our center with regards to this new essential skill in PICU in obtaining hour-by-hour information to help the management of the critically ill pediatric cardiac patients, in addition to the multiple procedures that was guided by ultrasound such as vascular access, lumbar puncture or pleural tap. It will also shed light on its important application in the telemedicine filed.

151 – POSTER SESSION

DOING MORE WITH LESS; TOWARDS A LOW COST PICU

M. Elbarbary

Pediatric Cardiac Intensive Care, KACC, Riyadh, Saudi Arabia

In the past few decades, an exponential increase in the costs of PICU was observed across the globe. The high cost extends almost to all aspects of PICU including the infrastructure, medications, imaging, monitoring, machines, devices in addition to the staffing costs. There are many consequences and ramifications of this phenomenon particularly in limited resource countries. Among the important effects is the marked limitation of providing PICU care to many patients due to the high cost if there is an alternative low cost PICU, it would be feasible to provide PICU care a larger pool of patients. PICU drains great percentage of overall budget of any hospital. On a population based perspective, a state or country health care system can be severely affected with such high cost PICUs. The lecture will shed light on strategies for establishing low cost PICUs that can perform efficiently in managing critically ill patients. Through evidence based method, it will give several examples that clearly shown lack of benefits of utilization of high cost drugs, lab, ventilators, machines and other devices commonly used in PICU. It will explain strategies for managing patients outside PICU such as “critical care outreach” programs. The concept of Health technology Assessment (HTA) will be briefly explained particularly with regards of how it works in the context of different economic, societal, legal and cultural circumstances. The lecture has a clear message that we can DO MORE WITH LESS.

152 – POSTER SESSION

EPIDEMIOLOGY OF LOW BIRTH WEIGHT INFANTS (LBWI) AND AT NICU IN BENGHAZI JAMHOURYA HOSPITAL IN LIBYA AND THEIR OUTCOME

N. El-Houni¹, A. Mersal²

¹Benghazi, University-Libya, Benghazi, Libya, ²King Faisal Specialist Hospital & Research Center, Jeddah, Saudi Arabia

LBW Infants a major concern in the developing countries, they are associated with a high morbidity and mortality. It may lead to a considerable health problems in early infancy and later childhood a prospective study carried out to estimate the Epidemiology of LBW infants and their outcome.

Method: A prospective study from January 2005 through December 2005; pertinent data collected at birth and at the post discharge follow up clinic; infants had weekly visits in first month of life, twice a month then every 3 months.

Results: The number of deliveries 17,242; 3,756 (21 %) infants admitted to NICU, 707 (4 %) of deliveries and (18.8 %) of the admission are LBW. 39 (5.5 %) ELBW, 130 (18.4 %) VLBW, 538 (76 %).

75 (10.6 %) Infants died, the cause of death was sepsis and RDS. 49 (6.9 %) transferred to children hospital for further care. 573 Infants followed up in high risk clinic. We able to follow 128 (22 %).

The incidence rates of early complications respiratory distress syndrome (90 %), sepsis (72 %), hyperbilirubinemia required treatment (65 %) and IVH (4 %).

Later complication; Periventricular leukomalacia (PVL) 12/128 (9 %), Diplegic Cerebral palsy 7/128 (5 %), hypotonia 1/128 (07 %), hydrocephalus 1/128 (07 %) and 10/128 (7 %) had anemia required transfusion.

Eye examinations not done, hearing screen performed with otoacoustic emission (OAE) 5/128 (4 %) had hearing impairment.

Conclusion: The prevalence of LBW is 4 %, comparatively low in comparison to other developing countries. With our limited resources mortality rate is 10.6 %.

This data presented to the decision-making at Ministry of health to get support to NICU.

153 – POSTER SESSION

IRON DEFICIENCY ANEMIA IN CHILDREN ADMITTED TO ZAGAZIG UNIVERSITY HOSPITAL FOR CHILDREN

N.A. Elshafie Omran¹, N.A. Khalifa², S.M. Morsy¹, H.M. Ibrahim³

¹Pediatrics, ²Clinical Pathology, Faculty of Medicine, Zagazig University, ³Pediatrics, Ministry of Health, Zagazig, Egypt

There is a paucity of data on anemia in hospitalized children & infants. The present study was done to determine the frequency of iron deficiency anemia (IDA) among hospitalized children & the associated risk factors.

Five hundreds and four patients were admitted to Zagazig University Hospital for Children in the period from January 2010 to May 2011, out of which 302 (60 %) had anemia. Microcytic anemia was present in 200 patients (66 %) who were the subject of the present study. In addition to 100 control patients not having anemia.

All children underwent full history taking, thorough clinical examination & investigations that included CBC, serum iron, serum ferritin & total iron binding capacity (TIBC).

Results showed IDA was detected in 54 % of all anemic hospitalized children & in 81 % of all patients with microcytic anemia. There was a statistically significant decrease in RBCs count, serum ferritin & mean corpuscular hemoglobin in patients with IDA when compared to patients with other causes of microcytic anemia. Conversely TIBC & Red Cell distribution Width (RDW) were statistically significantly increased in IDA patients than in patients with other causes of microcytic anemia.

As regards hemoglobin concentration, serum iron & mean corpuscular volume there were no significant differences between IDA patients & those with other causes of anemia.

Among risk factors for IDA where rural residency, non educated mothers, low socioeconomic levels & poor dietetic history.

Conclusion: Iron status in hospitalized children should be investigated during their stay to identify & treat iron deficiency anemia among their management protocol.

154 – POSTER SESSION

INCREASED RISK OF NEC FOLLOWING RED CELL TRANSFUSION: A REVIEW OF LITERATURE

G. Erumbala¹, D. Abraham², S. Damodaran³, S.I. Nelliantavida Thazhe Kuniyil⁴

¹Paediatrics, Milton Keynes General Hospital NHS Foundation Trust, Oxford, ²Paediatrics, Birmingham Heartlands Hospital, Birmingham,

³Paediatrics, Peterborough City Hospital, Peterborough,

⁴Paediatrics, Manchester Royal Infirmary, Manchester, UK

Introduction: Several published reports have highlighted a possible association between packed red cell transfusions (PRBC) and NEC in premature neonates. Currently, there is a lack of firm recommendations or guidelines in this regard. We have examined the current published literature looking into this topic.

Clinical question: Does recent PRBC transfusion increase the risk of NEC among premature babies?

Source: Medline database, search criteria: “Transfusion, NEC”.

Results: 6 studies were identified. The published reports consists of retrospective studies and surveys. Except one, all of the papers reported a possible link between recent red cell transfusion and development of NEC. Notably, a recent large randomised multicentric randomised study has underlined this possible association. One study also noted that cessation of feeding during transfusion reduced the incidence of NEC.

155 – POSTER SESSION

THE USE OF ELECTRONIC PATIENT AND PARENT REPORTED OUTCOMES IN A FOLLOW-UP AFTER A PICU ADMISSION

L. Haverman¹, H. Knoester², M.A. Grootenhuis¹

¹Psychosocial Department, ²Pediatric Intensive Care Unit, Emma Children's Hospital/Academic Medical Center, Amsterdam, The Netherlands

Background: Pediatric intensive care unit (PICU) admission is a stressful event associated with posttraumatic stress disorder (PTSD), distress and a lowered Health Related Quality of Life (HRQOL) after discharge in patients and their parents. After unexpected PICU treatment, around 30 % of the patients and parents meet criteria for (subclinical) PTSD. Assessment of risk factors and psychosocial outcomes is necessary to facilitate prevention of PTSD and detection of persistent PTSD for early intervention.

Methods: Before an outpatient follow-up consultation, children (aged 8–18 years) and both father and mother (if applicable) of children aged 0–18 years completed web-based questionnaires about HRQOL, distress and PTSD (via <http://www.hetklikt.nu>). The answers on the questionnaires are converted into a so-called KLIK ePROfile. This ePROfile was provided to the pediatric psychologist and used during consultation.

Results: In the past 10 months, we have implemented the KLIK system in the follow-up care. During this period, 20 families were screened for psychological problems (response rate: 80 %). 19 mothers (76 %), 16 fathers (64 %) and 4 children (≥8 years, 100 %) completed the questionnaires. Of these mothers, 63 % reported a clinical score on the ‘Intrusion’ subscale, 5 % on the ‘avoidance’ subscale and 11 % on the ‘arousal’ subscale of the PTSD questionnaire (fathers respectively: 38, 13 and 0 %). Families were provided with information about their experienced problems (also available on <http://www.nahetziekenhuis.nl>) and intervention options were discussed.

Conclusions: We think that the KLIK ePROfile contributes to systematically monitoring and discussing problems during consultations in order to provide tailored interventions.

156 – POSTER SESSION

COMPUTERIZED PROGRESS NOTE IN PEDIATRIC CARDIAC ICU. DOES IT AFFECT OUTCOME?

M.S. Kabbani, A. Jijeh, J. Mckitterick, O. Hijazi, G. Shaath, S. Ismail, M. Elbarbary

Cardiac Science, King Abdulaziz Medical City, Riyadh, Saudi Arabia

Introduction: Computerized paperless progress note in pediatric ICU is challenging task. The aim of this study is to assess the impact of introducing paperless computerized progress note to high volume Pediatric cardiac ICU (PCICU). The study looks to the impacts of computerized progress note on work flow, documentation and outcome of PCICU.

Methods: Retrospective study was conducted from 1/1/2012 till 31/12/2012 in 12-beds PCICU of tertiary hospital. The hospital is JCI accredited institute. The study looked to the effects of introduction of computerized progress note on work flow, time to finish progress note, time to train new staff and outcome of PCICU pre and post implementation of computerized progress system.

Results: 450 admissions were documented utilizing computerized progress note during study period. The notes were documented by PCICU staff with 3 physician covering daytime working hours and 2 physician covering night duty and weekends. New staff required 2 weeks + 2 weeks to become familiar and learned the system. The system that is coded with IACS international coding system, successfully documented progress status of patients and maintained good work flow without compromise in quality or patient's care. Improvement in documentation was associated with improvement in outcome with more than 99 % post-surgical repair survival.

Conclusion: Computerized progress note that has interfaced with patient monitored biological data, ventilator setting and lab results were successfully implemented in high volume PCICU with improvement in quality of documentation, accuracy in data acquisition, and improvement in outcome.

157 – POSTER SESSION

PREDICTION OF LENGTH OF POSTOPERATIVE VENTILATION IN CDH SURVIVORS; PREOPERATIVE AND OPERATIVE VARIABLES

A. Khairi^{1,2}, A. Hassan Sherif^{2,3}, S. Elokda^{2,4}

¹Alexandria Faculty of Medicine, Alexandria, Egypt, ²Dallah Hospital, Riyadh, Saudi Arabia, ³Zagazig Faculty of Medicine, Zagazig, ⁴Ain Shams Faculty of Medicine, Cairo, Egypt

Background/purpose: The period taken for complete weaning from ventilation in cases of repaired congenital diaphragmatic hernia (CDH) varies greatly. We tried to relate the endo-tracheal tube removal time (ETTTRT) in these cases with the different variables; both preoperative and operative.

Materials and methods: This is a retrospective study of cases of CDH survivors managed by the authors over the period from January 2003 till February 2010. The preoperative variables included gestational age, gender, birth weight, Apgar score, the time of intubation, the ventilation strategy, the presence of a significant PDA in the ECHO study and the time-lapse till surgery. The operative variables (all by laparotomy approach) included the side of the hernia, the herniated contents, the presence of a sac, the insertion of a chest tube and the degree of abdominal wall stretch required. The successful weaning from ventilation and ETTTRT were classified into two groups; <7 days and >7 days postoperatively.

Results: During the study period, 26 cases were included (21 Males and 5 females). The ETTTRT ranged from 2 to 23 days (mean = 7.7 ± 7.15). Among the variables studied; the statistically significant ones (P value <0.05) were Apgar score at 1 min (preoperatively) and the need for “vigorous” abdominal wall stretch (operatively).

Conclusion: Apgar score of <8 at 1 min; preoperatively, and the need for “vigorous” abdominal wall stretch; operatively, were associated with delayed weaning from ventilation in CDH survivors. This could have a predictive value in the management of these cases.

158 – POSTER SESSION

IT'S ONLY A DATE! SHOULD IT MATTER? RISK ADJUSTED CONTROL CHARTS BY PICU DISCHARGE DATE

B. Lakin, P. Baines

Department of Paediatric Intensive Care, Royal Liverpool Children's NHS Foundation Trust, Liverpool, UK

Objectives: Early detection of excessive mortality is important. Risk adjusted Cumulative Sum Charts (CUSUM) and Sequential Probability Ratio Test (SPRT) charts are both commonly used. Conventionally, biophysical admission data (e.g. PIM2) is plotted by admission date. Other outcome measures are determined by discharge—we hypothesized that it would be equally valid to plot the admission data by discharge date and that there should be no significant observed difference.

Method: Our units' admission data (April 2010–January 2013) were used for risk adjusted CUSUM and SPRT. These data were then remodelled by discharge date.

Results: In both cases the distribution pattern of maximal values was different. Several other observations were made. The most interesting is SPRT—where the upper warning limit (cumulative log likelihood ratio = 3) was crossed twice and approached on a further two occasions when data was plotted by admission date. Conversely, if plotted by discharge date the same upper warning limit was never approached (maximum ratio 2.1). For CUSUM, when plotted by admission date, the maximum cumulative excess death was 6.8 whereas by discharge the maximum value was 5.4.

Conclusion: These very different results cannot be easily explained. Our run length would detect all admitted patients being discharged after considerable time. Multiplicity may be partly responsible—when multiple subjects are being monitored simultaneously. Using discharge date should not affect early detection as monitoring is not continuous—it is carried out at discrete time points. We suggest that further consideration is warranted.

159 – POSTER SESSION

OVER-TRIAGE AMONG PEDIATRIC PATIENTS AND THE AMENDMENTS

P.-J. Liao¹, Y.-C. Chang², C.-J. Ng², **K.-H. Hsu³**

¹Department of Health Care Administration, Oriental Institute of Technology, New Taipei City, ²Department of Emergency Medicine, Chang Gung Memorial Hospital Linkou, ³Laboratory for Epidemiology, Department of Health Care Management, Chang Gung University, Taoyuan, Taiwan R.O.C.

Background and aims: Although pediatric triage system, such as Ped-TTAS, was widely adopted in many countries. Over-triage among children with high reaction of vital signs was observed. This study aims to investigate the over-triage phenomena and to provide amendments.

Methods: This study is a retrospective follow-up design in which 42,859 pediatric patients admitted to emergency department of the largest medical center in Taiwan during Jan–Dec 2010 are recruited. The study variables include patient demographics, chief complaint, clinical characteristics, triage level, post-ER hospitalization, and administrative data. A logistic regression model is applied to demonstrate factors associated with over-triage and its effects on prognosis and medical consumptions.

Results: The study has demonstrated that higher urgent pediatric patients (acuity level 1&2) and moderate urgent pediatric patients (acuity level 3) have respectively odds ratios of hospitalization at 1.58 and 2.58, emergency room medical expenses (USD) at 13.3 and 37.3, post-ER hospitalization expenses (USD) at 81.4 and 313.3, total hospital stay medical expenses (USD) at 94.7 and 350.6 while comparing to lower urgent pediatric patients (acuity level 4&5). Further down-weighting modifications on the vital signs, such as respiratory rate, blood pressure, and pulse, have shown a better linear association between acuity levels and prognosis and medical consumptions.

Conclusions: Suggestions on the amendments of Ped-TTAS were placed to the vital signs modification. The findings affect the current practice of emergency care among pediatric patients. Further developments of clinical decision rules in such patient care will improve the efficiency and effectiveness of emergency and intensive care.

160 – POSTER SESSION

SEASONAL VARIATION IN DELIVERY RATE IN RURAL INDIA

R. Mahendru

Obstetrics and Gynecology, BPS GMC, Sonapat, India

Objective: To understand the delivery pattern during the calendar months in rural India.

Materials and methods: The study was carried in a retrospective manner by collecting month-wise delivery data for the past three calendar years from registration center in a rural area of Ambala District of Haryana Province (India). This included deliveries occurring after viable period of 28 weeks gestation conducted in

- a teaching Institute,
- government set-up hospital and
- domiciliary environment of that particular area.

Observations: During the study period, 43,191 deliveries were recorded with an average monthly rate of 1,199 births. Sinusoidal pattern was observed in the monthly distribution of deliveries peaking during August–October and decline in January and April–May. There was a statistically significant difference between the highest and lowest rates.

Conclusion: Results of this study may be beneficial in health system planning and in the interpretations of seasonal variations in other reproductive parameters.

161 – POSTER SESSION

PROMOTING INNOVATION: WHAT ISSUES ARE RAISED WHEN INVOLVING PARENTS AS SERVICE USERS IN ETHICALLY SENSITIVE RESEARCH STUDIES?

H. Nicholl, C. Comiskey

School of Nursing & Midwifery, Trinity College Dublin, Dublin, Ireland

Aim: The aim of this presentation is to present the challenges and solutions of service user engagement within the context on two case studies.

Based on their involvement in multiple qualitative and quantitative research studies, the presenters will explore practical, ethical and methodological issues that they have experienced during studies in child health care research involving small and large cohorts of parents.

Background: Nationally and internationally the importance of user involvement in health care research is emerging and having meaningful user contributions is becoming central to good research practice and clinical governance. The level of user involvement and contribution is also often the focus of interest of ethics committees and research funders. However, the interpretation and importance of user involvement can vary and the realities of user involvement can raise methodological and practical issues in a research study. In this presentation these challenges will be discussed as well as strategies that can promote active and meaningful involvement.

Findings: A brief overview of varying levels of service user engagement will be presented. Two case studies one in children with complex needs and one with parents who misuse drugs will be presented. Specific challenges will be highlighted and recommendations on how active and meaningful contributions were obtained will be reported.

Conclusions: Key issues in user involvement and how they may be resolved will be fully explored from the perspective of experienced researchers in health care and nursing research.

162 – POSTER SESSION

MEDICAL SPECIALISTS PREDICT PRENATALLY TYPE OF POSTNATAL SURGICAL CLOSURE OF AN OMPHALOCELE

N.C.J. Peters¹, M.E. Visser 't Hooft¹, N. Ursem¹, W.C.J. Hop², D. Tibboel³, R.M.H. Wijnen³, G.J. Bonsel¹, T.E. Cohen-Overbeek¹

¹Obstetrics and Prenatal Medicine, ²Biostatistics, ³Pediatric Surgery, Erasmus University Medical Center, Rotterdam, The Netherlands

Objectives: To evaluate variations in prenatal counselling of obstetric physicians (OP) and paediatric physicians (PP) in predicting probability of primary postnatal surgical closure of an omphalocele. To establish which prenatal information guides that judgment.

Methods: Cases with an isolated omphalocele or with minor additional anomalies and between 12 and 23 weeks of gestation were included. A standardized presentation form per case provided ultrasound images, defect diameter, cele content and 2 ratios: cele circumference/abdominal circumference and defect diameter/abdominal diameter. Ten OP and nine PP assessed the probability of primary closure quantitatively and qualitatively and stated which information was most important for their assessment. The specialists were blinded towards patients and postnatal outcome.

Results: Primary closure was observed in 13/21 cases, and predicted correctly by the majority of the specialists in 5/13 cases. The number of correct assessments per case ranged from 12 to 17/19. In the 8 cases not closed primarily, closure was predicted correctly in 7/8. The number correct assessments per case ranged from 11 to 16/19 specialists. Prediction failure did not differ significantly between specialties. Individual accuracy ranged from 2 to 13/21 cases. Qualitative terms mostly paralleled the quantitative terms, but appeared to be more positive overall. Most of the specialists (34 %) stated that the most important information was cele content.

Conclusions: Specialists did not differ in antenatal judgment on primary closure of an omphalocele; the majority of specialists assessed the probability of primary closure overall to be <60 %. Cele content was the key information guiding that judgment. Specialists tended to be too pessimistic, affecting prenatal counselling.

163 – POSTER SESSION

PAEDIATRIC INTENSIVE CARE TRAINING FOR NEONATOLOGISTS: A NEW COURSE

N. Pozzi¹, M.G. De Luca¹, L. Grappone¹, L. Tortorolo², A. Scoppa¹, P. Papoff³, L. Orfeo¹

¹Neonatal and Paediatric Intensive Care Unit, 'G. Rummo' Hospital, Benevento, ²Paediatric Intensive Care Unit, Catholic University School of Medicine, ³Department of Paediatrics PICU, Sapienza University, Rome, Italy

Critical cares for young children are usually provided in Paediatric Intensive Care Units (PICUs) by anaesthesiologists trained in adult anaesthesia residency programs. In Southern Italy, the shortage of PICU beds has led to an increased number of critically ill infants being admitted to Neonatal Intensive Care Units (NICUs). Whilst many aspects of neonatal care resemble those of paediatric critical care medicine (PCCM), several disorders are unique to each respective discipline. To meet the needs of neonatologists to learn basic notions of PCCM, we devised a two-day course with four main hands-on sessions. The first session aims to provide the basic and advanced ABC resuscitation skills of the critically ill child, the second teaches how to manage lung failure with invasive and non-invasive ventilation strategies, while the third provides guidelines for hemodynamic support of paediatric septic shock, including a practical session on the ultrasound-guided central venous catheterization and radial arterial cannulation techniques; finally, the last session includes high fidelity simulation scenarios to practice non-technical skills. All course teachers are neonatologists with PCCM field experience. At the end of the course, participants performed an anonymous evaluation of all aspects of the course. The students found the course to be well suited to their training needs and indicated a high level of satisfaction (73 % of trainers marked the highest score for the acquisition of new theoretical knowledge, and 86 % for procedural skills). They suggest that the course should be available to all neonatologists dealing with critically ill young infants.

164 – POSTER SESSION

EFFECT OF “WINTER SURGE” ON ELECTIVE CARDIAC SURGERIES

S. Swamy, N. Holt, S. Sebastian

Paediatric Intensive Care Unit, Birmingham Children's Hospital, Birmingham, UK

Background: In our centre, currently, we admit all children needing respiratory support to Paediatric Intensive Care Unit (PICU). During the winter season, the surge of bronchiolitis patients puts extra pressure on PICU bed availability.

Aims: To describe the type of respiratory support for bronchiolitis patients admitted to the PICU and their impact on elective cardiac surgeries.

Methods: In a 24-bedded multi disciplinary PICU, an audit of children <5 years with clinically suspected or confirmed bronchiolitis over the winter months was done prospectively. Data regarding cancelled elective cardiac surgeries were collected from our database.

Results: Over a 3 months period from November 2011, 45 patients were studied. Their median age was 47 days (range 9 days to 4 years), nearly two thirds being males. Mean duration of PICU stay was 4 days (range 1–32 days). Respiratory Syncytial Virus (RSV) was detected in 80 % of the patients. Sixteen (35 %) children required only bubble CPAP support. Rest (29) required invasive ventilation including mechanical ventilation, HFOV (8), inhaled nitric oxide (5) and ECMO (2). 34 % of these had proven secondary pulmonary bacterial co infection.

During the same period, 29 elective cardiac surgeries were cancelled due to non-availability of PICU beds. Of these, 9 (31 %) could have been avoided if these CPAP patients were treated outside the PICU area.

Conclusions: Many children requiring respiratory support for bronchiolitis need only CPAP support. Providing CPAP support outside PICU in an HDU area will free up PICU beds for elective surgical procedures.

165 – POSTER SESSION

ASSESSING COMPETENCE IN THE PAEDIATRIC INTENSIVE NURSING: AN EXPLORATORY STUDY

C. Tosin¹, D. Silvagni¹, P. Chinchio², R. Manessi¹, F. Carnevale³, P. Biban¹, A. Bonaldi¹

¹Pediatrics, Azienda Ospedaliera Universitaria Integrata Verona,

²University of Verona, Verona, Italy, ³McGill University, Montreal, QC, Canada

Background: Elements constituting nursing competence have been examined by many authors. No studies have investigated paediatric critical care settings to date.

Aim: To create a map of indicators related to nursing competence in our paediatric intensive care unit (PICU), identifying those specific for novice nurses as well as defining the related observable behaviours (OB).

Methods: We used the Nurse Competence Scale elaborated by Mere-toja (2002), Palese's (2005) study of competence in critical care, and Benner's (1984) research. 97 indicators were proposed for all expert nurses in our PICU at AOUI of Verona. Nurses evaluated the pertinence of each indicator, defining the level of competence to assign to the nurse. These were limited to three of Benner's original levels (novice, proficient, expert), as this smaller number of levels was considered operationally more feasible in the early stages of this Italian adaptation of Benner's work. For every indicator assigned to novice nurses we identified OB competence, by using a Focus-group method.

Results: All expert nurses of our PICU participated in this study. All 97 indicators were considered pertinent: 24 for novice nursing competence, 50 for proficient and 23 for expert. The Focus-group identified 96 OB for novice nurses.

Conclusion: We explored which indicators could reflect nursing competence in our PICU. We concluded that the framework of indicators, identified by the literature review and contextualized through Focus-groups, could be reliable and reproducible tools to objectively evaluate the competence of novice PICU nurses. Further studies will be needed to evaluate applicability and utility of this method in other contexts.

166 – POSTER SESSION

EFFICACY OF ZINC OXIDE OINTMENT COMPARED WITH ZINC OXIDE/TOCOFEROL FOR NAPKIN DERMATITIS TREATMENT IN INFANTS: RCT, TRIPLE BLIND STUDY

C. Tosin¹, M. Gaffuri¹, F. Zaglia¹, R. Manessi¹, S. Ceschi², C. Bruni³, P. Soffiatti⁴, L. Dell'Orletta¹, M. Lonzar¹, P. Biban¹, A. Bonaldi¹

¹Pediatric and Neonatal Intensive Care Unit, Department of Pediatrics, ²Pediatric Unit, Department of Pediatrics, ³Neonatal Unit, Department of Pediatrics, ⁴Azienda Ospedaliera Universitaria Integrata Verona, Verona, Italy

Background: Diaper dermatitis (DD) represents a classical irritative contact dermatitis. It's prevalence is estimated between 25 and 65 % of children with a peak around 6–12 months of life. Zinc oxide is generally recommended as the best first choice for DD. Pure topical vitamin E has an emollient effect on the skin and the absence of water also prevents bacterial proliferation, enhancing the barrier function of the skin. Besides Vitamin E has been promoted to help wound healing.

Aim: To evaluate the effectiveness of vitamin E and zinc oxide in neonates affected by DD. To compare the efficacy of two treatments for DD: zinc oxide ointment and zinc oxide and tocoferol, to evaluate the efficacy after 5 days of treatment in infants born at 34 weeks or more of gestation. To establish the rate of complete healing after 5 days of treatment.

Methods: A total of 182 infants will be recruited from the Pediatric Unit of Major City Hospital in Verona (Italy) and included in this controlled, randomized trial. They will be treated with topical ointment containing either Zinc Oxide 10 % (91) or Zinc Oxide and Vitamin E (91) sixfold daily for 5 days. The disease will be graded on Davis's et al. Score (0–5).

Results: One point decreasing rate score (Davis et al.) after 5 days treatment. Complete healing after 5 days treatment.

Conclusion: Results of this RCT will be published and the different efficacy of two study paste in DD treatment.

167 – POSTER SESSION

MEASUREMENTS OF BODY SEGMENTS IN CHILDREN IN THE FIRST YEAR OF LIFE

R.M. Tristão¹, V.L.V.L.A.V. de Bezerra¹, G.V. Pontes¹, L.A. Feitosa¹, E.F. Silva², F.R.B. de Araujo¹, K. Costa¹

¹Area of Medicine for Child and Adolescent, Faculty of Medicine, University of Brasilia, ²Department of Statistics, University of Brasilia, Brasilia, Brazil

Background and aim: Seven body segments measures are not routinely used in clinical and research contexts, but which can provide data about growth patterns. The aim was to obtain and verify whether there are differences in these measures between genders and correlate them with the traditional measures—weight, length and head circumference—during the first year of life.

Methods: Cross-sectional study in which measures were obtained from 250 infants, whose ages ranged from 11 days to 12 months, 58.8 % male and 41.2 % female. The measurements recorded were the segments skull's vertex-gluteus, popliteal crease-gluteus, popliteal crease-heel's plantar aspect, hallux's distal extremity-heel, middle

finger's distal extremity-midpoint of the wrist's anterior surface, ulnar styloid process-olecranon process and olecranon process-acromion.

Results: The measures of the seven body segments were established in this study. There were no statistically significant difference in measures between males and females. The head circumference measurement was the least correlated with the seven segments studied when compared with weight and length. Among the segments, the skull's vertex-gluteus showed the best statistical correlation with weight and length ($r = 0.894$ and $r = 0.832$, respectively).

Conclusions: The segment skull's vertex-gluteus showed to be a good collaborative measure for child's growth evaluation in their first year of life.

168 – POSTER SESSION

EMPATHY IN A NICU: IDENTIFYING STAFF PERCEPTIONS OF AND TRAINING IN SOCIAL-EMOTIONAL DEVELOPMENT OF INFANTS IN THEIR CARE

A. Twohig^{1,2,3}, F. McNicholas⁴, E.J. Molloy^{1,2}

¹Paediatrics, UCD, ²Clinical Research Unit, National Children's Research Centre, ³Medicine, ⁴Child Psychiatry, University College Dublin, Dublin, Ireland

Staff members of the NICU play a crucial role in supporting parents during the first weeks of the infant's life. The work of the Neonatal Intensive Care staff involves close interaction with parents and infant during a most vulnerable time. The formation of the bond between mother and infant is underway and through their interactions with parents and with infants this process may be facilitated and supported. Staff may also encounter emotionally distressing situations on a daily basis. This may lead to stress and secondary trauma. This complex interplay of factors relating to the developing attachment between infant and parent in the setting of the NICU has important implications for the infant, parents and for staff. Our objectives were to identify NICU staff attitudes to and perceptions of attachment and social-emotional development of infants admitted to a tertiary referral NICU at a teaching hospital, to enquire about previous education and training in this area and to explore staff perceptions of the emotional impact of the work on staff.

Methodology: The study is an observational study. A questionnaire was administered to staff of the NICU and results analysed using SurveyMonkey tm.

Results: The most frequent contact with parents was discussing the infant's medical condition. The least frequent contacts were psychological support, assessment of parent's emotional state and social support. Staff believed that discussing parent's emotional states was part of their role and these states affected infant development and infant-parent relationship, but staff had received little training in the area.

169 – POSTER SESSION

THE VISCERO ABDOMINAL DISPROPORTION RATIO PREDICTS TYPE OF OMPHALOCELE CLOSURE, A PILOT STUDY

M.E. Visser 't Hooft¹, N.C.J. Peters¹, N.T.C. Ursem¹, E.A.P. Steegers¹, R.M.H. Wijnen², D. Tibboel², G.J. Bonsel¹, T.E. Cohen-Overbeek¹

¹Obstetrics and Prenatal Medicine, ²Pediatric Surgery, Erasmus University Medical Center, Rotterdam, The Netherlands

Objective: To investigate the prognostic predictive value of pre-natal ultrasound measurements of omphaloceles in the second trimester of pregnancy for the expected type of postnatal surgical closure.

Methods: Retrospectively we collected data on 13 fetuses diagnosed with an omphalocele before 23 weeks gestational age, without major additional anomalies (period 2003–2009). We retrieved prenatal and postnatal data, and images of the axial plane of the abdomen at the level of the defect. Two potential prognostic ratios were calculated which reflect the viscerocranial disproportion: the defect diameter/abdominal diameter (DD/DA) ratio, and the omphalocele circumference/abdominal circumference (OC/AC) ratio. Prognostic outcome was primary closure. The sensitivity and specificity of these ratios, and the area under the ROC curve were calculated as measures of prognostic accuracy.

Results: Primary closure was performed in 8/13 cases. A cut-off value of 0.61 for the DD/DA-ratio successfully predicted type of closure in 10/13 cases; for the OC/AC-ratio a cut-off value of 0.82 successfully predicted outcome in 12/13 cases. In all cases without eviscerated liver tissue, the defect was primarily closed.

Conclusion: Particularly the OC/AC-ratio represents an accurate counseling tool to inform parents in case of an omphalocele detected in the second trimester of pregnancy.

170 – POSTER SESSION

NOVEL COST EFFECTIVE SIMULATION DEVICE FOR TRAINING OF MANAGEMENT OF PEDIATRIC EMERGENCIES

D. Vlajnic, R. Knies, S. Dannemann, J. Breuer

PICU, Zentrum für Kinderheilkunde/Universitätsklinikum Bonn, Bonn, Germany

Objective: In order to improve the management of pediatric emergencies we started a training program including high-fidelity simulation PALS training on a regular basis. Due to limited financial resources we developed a simulator which can be used on multiple sites and clinical settings, is transportable and affordable for other hospitals.

Methods: In cooperation with the University of applied Sciences Bonn Rhein-Sieg we developed a new simulation device. Beside heart rate and ECG we needed authentic simulation of blood pressure and oxygen saturation. In order to raise the level of authenticity we developed a simulation device which can be plugged into any clinical monitoring systems. All relevant vital parameters can be seen by the participants on "their monitors" and can be changed online by the instructors. Using this novel simulator we trained 217 participants in Pediatric Advanced Life Support.

Results: Confidence score before the courses for all skills was 3.3 ± 0.6 (scale 1–6). 34 % of all participants attended at least 5 or more CPA resuscitation. To most of the participants scenarios with our novel simulator were authentic (1.8 ± 0.3 , scale 1–6). After the training confidence score raised to 1.6 ± 0.4 (scale 1–6). Participants welcomed the novel training program as very useful and necessary (1.2 ± 0.3).

Conclusions: Our self constructed simulator shows no lack of authenticity in different simulation of pediatric emergencies. By using a system which is independent of the available monitoring system it is possible to improve acceptance and clinical performance.

171 – POSTER SESSION

LENGTH OF STAY AND NEED FOR RESPIRATORY SUPPORT ON A NEONATAL INTENSIVE CARE UNIT, A 2 YEAR EXPERIENCE

A. Walker¹, A.K. Ewer^{1,2}, S.V. Rasiah¹

¹Neonatal Unit, Birmingham Women's NHS Foundation Trust,

²University of Birmingham, Birmingham, UK

Objectives: To identify length of stay and need for respiratory support in preterm infants.

Methods: Data was extracted from the unit neonatal database over a 2 year period from April 2009 to March 2011. Information was included for inborn infants, born at <34 weeks, who were discharged from the neonatal unit and were without major congenital abnormalities.

Results: 291 infants were identified from 577 admissions. Babies born at <27 weeks gestation were discharged around the time of the expected date of delivery. Infants born at 27 weeks were home at 38 weeks corrected gestational age (CGA). After 28 weeks discharge was at around 36 weeks CGA. All infants under 27 weeks required intubation and ventilation. At 27 weeks 80 % required respiratory support; most of these required ventilation. The need for respiratory support fell with increasing gestational age at birth to 27 % at 33 weeks. By 33 weeks only 7.6 % of infants required intubation and ventilation. The length of respiratory support again fell with increasing gestational age, with infants born at 24, 25 and 26 weeks needing a mean of 60, 40 and 47 days respectively. This fell to 17 days at 27 weeks and 8 days at 28 weeks.

Conclusion: In infants born at <27 weeks the expected date of delivery seems to be a good estimate for the time of discharge; this then falls with increasing gestational age to 36 weeks. All babies under 27 weeks need ventilation; rates then fall steadily.

172 – POSTER SESSION

OPENPEDIATRICS™: DEVELOPMENT OF A PLATFORM FOR MULTIDISCIPLINARY KNOWLEDGE SHARING GLOBALLY

T. Wolbrink^{1,2}, J. Brierley³, N. Kissoon^{4,5}, J. Burns^{1,2}

¹Division of Critical Care Medicine, Department of Department of Anesthesia, Perioperative and Pain Management, Children's Hospital Boston, ²Department of Anesthesia, Harvard Medical School, Boston, MA, USA, ³Paediatric Intensive Care Unit and Neonatal Intensive Care Unit, Great Ormond Street Hospital for Children, London, UK, ⁴Division of Critical Care and the Child and Family Research Institute, British Columbia's Children's Hospital, ⁵Department of Pediatrics, University of British Columbia, Vancouver, BC, Canada

Background: The Internet as a vehicle of enabling widespread dissemination of medical knowledge is gaining acceptance. However, it is not yet fully embraced despite the existence of technologies for massively open online courses and collaboration and knowledge sharing within and across countries. Indeed, experts have proposed that information technology be used as a major tool to reform post-graduate medical education globally. We describe the development of

an open-access, peer-reviewed platform for knowledge sharing in critical care medicine.

Methods: A needs assessment survey was conducted of members of the World Federation of Pediatric Intensive and Critical Care Societies. This informed the development of curricular content for OPENPediatrics™ with local and international experts, beta platform development, and a multi-center international beta release over 24 months in collaboration with IBM®.

Results: The needs assessment highlighted that respiratory care including mechanical ventilation, protocols, case-based simulation, and videos were the desired primary topics and means for learning. The site has four broad areas: video-based guided learning pathways, device simulators, information on demand, and social networking. The beta release commenced on September 13, 2012 with World Sepsis Day. We currently have 69 hospitals in 38 countries with 267 registered users sharing knowledge on OPENPediatrics™.

Conclusion: We have created a web-based platform to connect the global community of practice in pediatric critical care medicine. Current challenges include involvement of busy clinicians and adaptation of an unfamiliar technology. Further enhancements based on user feedback will be crucial to the sustainability of this novel platform.

173 – POSTER SESSION

THE RELIABILITY OF TELEMEDICINE IN ASSESSING RESPIRATORY VARIABLES DURING PATIENT ASSESSMENT IN A PEDIATRIC INTENSIVE CARE UNIT (PICU)

P. Yager, M. Clark, N. Noviski

Pediatric Critical Care Medicine, Massachusetts General Hospital for Children, Boston, MA, USA

Objectives: Telemedicine has become popular as a means to support clinical care, yet few studies have measured the reliability of the physical assessment obtained via telemedicine. In a previous study including 55 patients, we found there was low agreement for respiratory variables (kappa −0.02 to 0.34). In our current study, we aimed to further investigate the reliability of telemedicine in assessing respiratory variables in critically ill pediatric patients.

Methods: Study providers included pediatric intensivists and pediatric critical care fellows. Phase I: Two providers were randomly assigned to perform a patient examination in-person or via telemedicine. Assessments were completed consecutively. Phase II: Two providers were randomly assigned to perform an examination in-person or via telemedicine. Assessments were done simultaneously. Phase III: One provider completed the patient examination via telemedicine and immediately after, the same provider completed the patient examination in person.

Results: Regarding pulmonary assessment, we found good agreement among respiratory variables when the assessments were done simultaneously (Phase II) as opposed to consecutively (Phase I). We found 100 % agreement when the same provider conducted the patient examination via telemedicine and subsequently in person (Phase III).

Conclusions: Telemedicine is a powerful tool to aid in assessment of critically ill patients. It can be used to reliably identify normal and abnormal findings on the circulatory, neurologic and pulmonary examinations. One needs to be aware of certain limitations of telemedicine and strategies to overcome them for its optimal use.

174 – POSTER SESSION

STUDY OF ORAL MICROBIAL FLORA IN INSTITUTIONALIZED MENTALLY RETARDED PEDIATRICS OF SARI -2011

M. Ahanjan, A. Akhavan, F. Abedian, A.M. Mirabi, M.R. Hagshenas

Microbiology, Mazandaran University of Medical Sciences, Sari, Iran

Introduction and objectives: Mental retardation (MR) is a generalized disorder appearing before adulthood, characterized by significantly impaired cognitive function and deficits in two or more adaptive behaviors. The prevalence and severity of dental caries' gingivitis and periodontitis is high in patients with mental retardation. This shift to a diseased state may lead to the experience of a high mortality from septicemia' sepsis' pneumonia and endocarditis. Our purpose is study of oral and gingival microbial flora in institutionalized mentally retarded patients of Sari and to estimate D % (percentage with untreated decayed teeth) and DMFT % (percentage of population affected with dental caries).

Materials and methods: This study was descriptive cross-sectional type in which Plaque samples were collected from the mouth and gingival of 138 institutionalized mentally retarded patients of Sari to culture in specific media to identify the microorganisms. In this study anaerobic bacteria were not isolated because the instrument was not available in the laboratory. The information has been analyzed by χ^2 T test methods by SPSS 17 software.

Results: The isolated microorganisms were: pneumococ(37/7 %)_streptococcisp(18/8 %)_ (16/7 %)_staphylococcisp(1/4 %)_niseriasp (45/6 %)_salmonella(8/7 %)_proteus(3/6 %)_difitroid(4/2 %)_pseudomonas(0/7 %). The percentage of resistant strains was found to be highest with penicillin(67/9 %) and lowest with vancomycin(11 %).

Conclusion: D % between all the patients were (66/66 %). Bacterial flora in mentally retarded patients were significant normal persons, so with improve in the mouth health care, we can decrease these undesirable changes.

175 – POSTER SESSION

RETROSPECTIVE ANALYSIS OF MEDICINE RELATED CRITICAL INCIDENT REPORTS IN PAEDIATRIC INTENSIVE CARE UNIT

A. Ameer¹, A. Taberner-Stokes², S. Dhillon¹, R. Booth², M. Peters², M. Ghaleb¹

¹Department of Pharmacy, University of Hertfordshire, Hertfordshire,

²Paediatric Intensive Care Unit, Great Ormond Street Hospital, London, UK

Background and aims: Medication errors are frequently reported in paediatric intensive care unit (PICU). Aim is to characterise medicine related incidents in PICU.

Methods: Critical incident reports from 1st January 2007 to 30th September 2012 were collected from London based PICU for analysis.

Results: There was 1686 critical incident documented. Medicine related reports accounted for 35 % of all incidents. Breakdown of medicine related reports shows medication administration errors

(30 %, n = 176), medicine given correctly but prescription written contained an error (24 %, n = 141), prescribing errors (17 %, n = 95), CD balance discrepancies or storage (11 %, n = 64), TPN (10 %, n = 59) and pharmacy-related incidents (8 %, n = 48). Number of reports is lowest during weekend days and holiday periods. Graph illustrates the nature of incidents for administration errors, prescribing errors and prescription administered containing an error. Antimicrobials are associated with the highest number of medication errors. Major harm is in 12 incidents and moderate harm in 39 incidents. Incidence for administration errors, prescribing errors and both prescribing and administration errors from 2007 to 2011 is 2.4, 1.2 and 2.3 per 100 admissions respectively, prevalence of 3.7, 1.8 and 3.4 per 1000 bed days respectively.

Nature of medicines related reports

Conclusions: Considerable number of incidents are occurring due to medication use in PICU, predominantly, medication administration errors. Root cause analysis is required to establish causes of errors.

176 – POSTER SESSION

UTILISATION OF LIGHTS AND SIRENS TO EXPEDITE TRANSFER OF CRITICALLY ILL CHILDREN

N. Athiraman¹, S. Hancock², C. Harrison², J. Oldfield², C. Harness², C. Howard²

¹Neonatal Unit, Doncaster Royal Infirmary, Doncaster, ²Embrace Transport Service, Sheffield Children's Hospital NHS Trust, Barnsley, UK

Objectives: Utilisation of ambulance lights and sirens (L&S) to expedite transfer of patients by road has an association with serious injury and death. Important questions include reason for use of L&S, time saved and adverse event rate.

Methods: Prospective data was collected on the utilisation of L&S and adverse events for all transfers from October 2011 to January 2012. A structured proforma was completed with additional information on patient stability provided by the clinical team. Actual time of each transfer using L&S was compared to previously recorded back transfers between the same hospitals during a similar time of day.

Results: L&S were used for all or part of the journey for 63 (10.5 %) of 660 transfers completed during the study period. Thirty three (52 %) of the expedited journeys were paediatric and 30 (48 %) were neonatal. Reasons for use of L&S are described (table 1). Forty eight (76 %) of expedited transfers were quicker than matched back

transfers. The adverse event rate was 2 (3 %) but there were no documented accidents, injuries or mortality.

Table 1 Reasons for use of lights and sirens (n = 63)

Patient related	36	Traffic related	23	Combined	4
Time critical	20	Standing traffic	10		
Unstable patient	11	Congestion	13		
Deteriorated on route	5				

Conclusion: Embrace use L&S for a minority of their transfer activity. We have demonstrated a time saving for the expedited journeys but it is unclear if this is clinically significant. The adverse event rate is low but the risk should still be assessed as potentially high.

177 – POSTER SESSION

SOME OF THE FREQUENCY CHARACTERISTICS OF VENOUS THROMBOSIS IN CHILDREN WITH MALIGNANCIES

I. Begun

Belarusian Research Center for Pediatric Oncology, Hematology and Immunology, Minsk, Belarus

Aims: To analyze the frequency of thrombotic complications in children with malignancies during treatment of the underlying disease.

Methods: An retrospective analysis cases of venous thrombosis in children and adolescents with malignancies was made. All patients received treatment in our centre from 2002 to 2011. In protocols of ultrasound and medical histories found 74 patients with first diagnosed venous thrombosis aged 0.7–21 years for both sexes (median 12 years). The data were processed from patients who had ultrasound symptoms the presence of thrombotic masses in lumen of superficial and deep venous.

Results: When analyzing the frequency characteristics was revealed that venous thrombosis by ultrasound diagnosed an average in 2.6 % of patients (0.7–5.7 %) per year from such who first time during of year were receiving treatment. A comparative analysis of similar data for 2002/06 and 2007/11 showed an increase in the frequency diagnoses of thrombotic complications (Chi-square 9.28; $p = 0.002$) for patients receiving treated in these periods. The average annual growth rate of detection this pathology for ten-year period was 14 %. Such situation in the last time may be linked with the growth attention of clinicians to identify thrombotic complications, by increasing in the number catheterizations of central and peripheral veins and improving the quality of primary diagnosis of thrombosis.

Conclusions: During last 10 years was established the rising incidence of diagnosis of venous thrombosis in children with malignancies, which is consistent with global trends. Ultrasonography is informative method of diagnosis of this pathology in pediatric cancer patients.

178 – POSTER SESSION

NEONATOLOGIST PLACE IN THE PRENATAL DIAGNOSIS OF HEREDITARY DISEASES IN A NEONATAL INTENSIVE CARE UNIT

S. Blibech^{1,2}, M. Chibani³, N. Kasdallah⁴, H. Ben Salem⁴, R. Rachdi³, M. Douagi⁴

¹Neonatal Intensive Care Unit, University of Medicine of Tunisia,

²Military Hospital of Tunisia, ³Obstetrics and Gynaecology,

⁴Neonatal Intensive Care Unit, Military Hospital of Tunisia, Tunis, Tunisia

Background and aims: Prenatal diagnosis (PND) of hereditary diseases (HD) after genetic counseling is feasible by the neonatologist. We report our experience in the unit of PND for 9 families.

Methods: Study over a period of 14 years (1998–2012) for cases of HD PND. Practical arrangements is established for each HD by the neonatologist.

Results: Nine families with HD benefited from DPN. It was a case of propionic acidemia, a case of arginosuccinic aciduria, a case of deficiency in sulfite oxidase and xanthine, a family of GM1 gangliosidosis (Landing disease), a case of mucopolysaccharidosis type III (Sanfilippo), a case of Canavan disease, a case of association of Crigler Najjar and Gilbert, a case of tuberous sclerosis and a case of cystic fibrosis. PND was performed 14 times. This was done by amniocentesis in 13 cases. PND biochemical, enzymatic or molecular has been practiced in France (Paris—Lyon) in 7 cases, in one case in Holland (Canavan) and Tunis in one case (Cystic Fibrosis). 7 families had financial supported by the Directorate General of Military Health.

Conclusions: The PND is the only preventive way in genetic diseases with bad prognosis. Some technical financial and ethical difficulties are lifting and invite to launch a national multidisciplinary debate.

179 – POSTER SESSION

OUTBREAK OF HEPATIC LESIONS ASSOCIATED WITH THE USE OF AN INTRAVASCULAR NEEDLELESS POSITIVE PRESSURE VALVE ON UMBILICAL VENOUS CATHETER

B. Boeuf¹, P. Geneste¹, M. Szymanowski¹, L. Gilain², V. Ponsonaille¹, A. Mulliez³, J.M. Garcier²

¹Neonatal Intensive Care Unit, CHU Estaing, Clermont-Ferrand,

²Pediatric Radiology, CHU Estaing, ³Biostatistics, Clinical Research and Innovation, Centre Hospitalier Universitaire, Clermont Ferrand, France

During routine ultrasound scan (US) monitoring after umbilical vein (UV) catheterism we observed an unusual type of hyperechoic hepatic lesion, in temporal association with the introduction of a positive pressure connector valve (PPV)

Objective: To determine risk factors for such hepatic injury.

Design: Retrospective case control study over a 24 months period.

Patients: Medical records of all newborn who underwent abdominal US in our units during the study period were reviewed. Data collected

included demographics, characteristics of umbilical catheterism, adjunction of a PPV, prothrombotic factors, drugs infused on UVC, catheter related sepsis. Risk factors for hepatic injury were determined by logistic regression.

Measurements and main results: Hepatic injury was considered when sonography revealed patchy appearance of the liver with diffuse hyperechoic and heterogeneously echogenic intraparenchymal lesions. Among the 299 newborns with hepatic ultrasound examination included in this study, 219 had an UVC whom 105 were capped with PPV. Hepatic injuries were identified 24 patients, all with UVC associated with 4 left portal vein thrombosis and 3 portal air micro embolism. Following multivariate analysis, significant risk factors for hepatic injury were PPV (odds ratio 12.9, 95 % confidence interval 2.7–61.2) and malposition of the catheter during catheterisation (odds ratio 8.1, 95 % confidence interval 2.7–24.4). Hepatic injuries were always asymptomatic.

Conclusion: We observed a significant association between a displacement mechanical positive pressure valve needleless connector and a new type of hepatic injury probably via air micro embolism phenomenon. Further study is needed to determine whether such devices are safe in neonatal practice.

180 – POSTER SESSION

A SIMULATION ANALYSIS OF ROAD ACTIVITY DATA TO PREDICT HELICOPTER USAGE BY A NEONATAL AND PAEDIATRIC TRANSPORT TEAM

I. Braithwaite¹, S. Hancock¹, D. Clegg², M. Tupor²

¹Embrace, Sheffield Childrens Hospital, ²Department of Engineering and Mathematics, Sheffield Hallam University, Sheffield, UK

Objectives: Embrace, the Yorkshire and Humber Infant and Children's Transport Service, performed 2,236 transfers in the year 2011/12. Embrace is collaborating with aeromedical providers to enable access to air transport for their patients. Process improvement tools and techniques have been shown to improve operational efficiency and effectiveness in health services. But these techniques are unable to fully explain the inter relationship between fluctuating demand and resource availability that can be modelled in a simulation study.

Methods: Journey timings from the transport database were analysed. Transports with a travel time >90 min were reviewed to assess suitability for transfer by helicopter. The daily activity of the transport service was overlaid with local emergency medical helicopter availability in a simulation study to further understand utilisation. A scenario was also considered where a dedicated helicopter was utilised and other restrictions were lifted.

Results: Database analysis showed the potential for Embrace to transfer patients by helicopter was around 50 occasions per year. After reviewing the cases, this was reduced to 38 occasions per year. The simulation study demonstrated 47 opportunities for Embrace to transfer patients by helicopter. However for 29 of these transports a helicopter could not be accessed. If a dedicated aircraft was available 112 transfers could have been by helicopter, 9 would have been eligible for air transport but were transferred by road due to service limitations.

Conclusions: This information is useful for developing Embrace aeromedical services. The analysis may be relevant to other transport services with similar regional coverage.

181 – POSTER SESSION

SAFETY OF CONTRAST ENEMAS IN VERY LOW BIRTH WEIGHT NEONATES

T. Brick¹, T. Watson², K. Cross³, P. Lister¹

¹Paediatric and Neonatal Intensive Care Units, ²Department of Radiology, ³Department of General Surgery, Great Ormond Street Hospital, London, UK

Background and aims: Neonatal contrast enemas are performed in the diagnosis of neonatal intestinal obstruction. Little has been reported on the safety of this technique, in particular in preterm very low birth weight neonates.

Methods: We undertook a retrospective case series in a neonatal surgical unit with 700 admissions per year. Clinical information from the patients' medical records and the NICU clinical information system was reviewed for infants <1.5 kg who underwent a contrast enema within the past 5 years.

Results: 25 contrast enemas were performed in 24 infants with a mean weight of 0.96 kg, a mean gestation at birth of 27 weeks + 2 days and a mean postnatal age at study of 17 days. 11/25 procedures were judged by radiologist to have been diagnostic, of which 8 were reported as normal and 3 pathological. 14 studies were non-diagnostic, of which 8 were inadequate, and in 6 the study was adequate but non-diagnostic. 3 serious complications were attributable to the procedure: 1 study was abandoned because the patient became too unstable, 1 resulted in caecal perforation, 1 died of sepsis and multiorgan failure within 6 h. In all 3 cases the infants weighed 700 g or less at time of study.

Conclusions: Neonatal contrast enemas are frequently non-diagnostic. They are, not infrequently, associated with serious complications. These observations should be validated with a larger, multi-centre review in order to stratify risk and better inform clinical decision-making.

182 – POSTER SESSION

HIGHER READMISSION RATE AFTER PAEDIATRIC INTENSIVE CARE UNIT DISCHARGE DURING NON-OFFICE HOURS

L. de Kroon, N. Gal, R. Blokpoel, M. Kneyber

Beatrix Children's Hospital, University Medical Center Groningen, Groningen, The Netherlands

Background and aims: Readmission after paediatric intensive care unit (PICU) discharge is an important problem. It may be associated with an increased mortality, morbidity and length of stay (LOS). It is therefore imperative to identify risk factors for readmission following PICU discharge. We tested the hypothesis that children discharged during non-office hours (i.e. 5 pm to 8 am the following day) were at higher risk of readmission than children who are discharged during office hours (8 am to 5 pm).

Methods: We retrospectively retrieved all demographical and clinical data from children admitted between 2006 and 2012 to our PICU. Patients were labelled readmission if they were readmitted to our PICU within 48 h of discharge. Data are presented as mean $\pm$ standard deviation or percentage of total. Statistical analysis was done using the Mann–

Whitney test for continuous data and Chi square test for dichotomous variables. P values <0.05 were accepted as statistically significant.

Results: A total number of N = 3,368 children were studied, of whom N = 30.4 (%) were readmitted. Baseline demographical data was not different between children who were readmitted or not. Children who were readmitted were more often discharged during non-office hours (13.4 vs 9.2 %, $p = 0.04$). The mean length of PICU stay in the readmission group was significantly longer (7.7 ± 12.383 vs 5.6 ± 14.104 days, $p \leq 0.001$).

Conclusion: Our study showed that PICU readmission occurred more often in children who were discharged during non-office hours. PICU readmission was associated with prolonged length of stay.

183 – POSTER SESSION

THE EFFECTS OF NOISE REDUCTION BY EARMUFFS ON THE PHYSIOLOGIC AND BEHAVIORAL RESPONSES IN VERY LOW BIRTHWEIGHT PRETERM INFANTS

R. Duran, N. Aladağ Çiftidemir, Ü. Vatansever, U. Berberoğlu, F. Durankuş, N. Süt, B. Acunaş

Trakya University, Edirne, Turkey

Preterm infants are exposed to loud noises during their stay in the neonatal intensive care unit which can lead to physiologic and behavioral alterations and even hearing loss. The use of earmuffs can reduce sound level and these changes. To evaluate the effectiveness of the earmuffs in preterm infants solely cared for in closed incubators, a comparative prospective study comprising 20 clinically stable preterm infants weighing <1,500 g was conducted. Preterm infants acted as their own controls whereby they were observed without earmuffs (Group 1) for 2 days and with earmuffs (Group 2) on consecutive 2 days. The preterm infants' physiologic responses and Anderson Behavioral State Scoring System (ABSS) scores were assessed over 30 s every 2 h for 8 h during daytime for 4 days. Out of 20 preterm infants, 6 were male and 14 female with a mean birth weight of $1,220 \pm 209$ g, gestational age of 29.9 ± 2.1 weeks. The total number of measurements was 320. The mean ABSS scores of Group 1 and 2 were 3.07 ± 1.1 and 1.34 ± 0.3 , respectively. Statistically significant difference was noted between the means of ABSS scores ($p < 0.001$). Preterm infants with earmuffs (87.5 %) were more frequently observed in a quiet sleep state of ABSS compared with those without earmuffs (29.4 %). In conclusion, noise reduction in preterm infants by earmuffs may be helpful by improving sleep efficiency and increasing time of quiet sleep.

184 – POSTER SESSION

INTRODUCTION AND VALIDATION OF THE RADBOUD PAEDIATRIC EARLY WARNING SCORE: FIRST RESULTS AND IMPLICATIONS OF USAGE IN THE NETHERLANDS

J. Fuijkschot, B. Vernhout, J. Lemson, J.M. Draaisma, J.L. Loeffen

Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Objectives: Timely recognition of seriously ill children is important to prevent complications and death. Recognition is complicated

because of ranging age-related vital norm parameters and warrants sufficient knowledge amongst healthcare professionals. Though paediatric literature provides data of early changes in vitals, only few fully operational and clinically validated warning systems exist. To prove the value of such a system in the European setting, we developed the Radboud Paediatric Early Warning Score (PEWS) and studied its effect upon patients' safety and healthcare quality.

Methods: The Radboud PEWS was constructed from international literature. It added up to a card set consisting of 8 parameters in 5 different age categories (Fig. 1).

Clear instructions are given towards professionals what actions need to be taken at different scores. We validated the Radboud PEWS by studying baseline scores, chosen cut-off points and effects upon knowledge and self-efficacy amongst professionals.

Results: We analysed 118 admittances on the paediatric oncology ward providing 1,115 separate scores. In 91 (77 %) admittances all the scores were ≤ 4 (baseline score). A PEWS ≥ 8 was scored 56 times in 15/118 admittances (13 %). The corresponding clinical condition was ascertained retrospectively as 'critically-ill' in 40/56 (71 %) scores. ICU involvement was only seen in patients with PEWS ≥ 8 .

Professionals embraced the PEWS praising its simplicity and effectiveness. Effects upon knowledge improvement and self-efficacy are currently studied.

Conclusions: The Radboud PEWS is the first fully operational scoring system in the Netherlands providing sufficient sensibility to promptly identify critically ill patients.

185 – POSTER SESSION

A COMPARATIVE DIFFERENT ASPECTS QUALITY OF LIFE IN HEALTH ADOLESCENTS WITH HEMOPHILIA ADOLESCENTS REFERRED TO SEYED AL-SHOHADA HOSPITAL IN ISFAHAN

M. Golchin¹, Z. Hemati²

¹*School of Nursing and Midwifery- Pediatrics Group, Isfahan University of Medical Sciences, Esfahan,* ²*School of Nursing and Midwifery, Shahrekord University of Medical Sciences and Health Services, Shahrekord, Iran*

Background and objectives: Now a days many Emphases on the quality of life. The complex nature of hemophilia negative effects on the patient's body and spiritual Affect quality of life these patients. The aim of this study was to compare the different dimensions of quality of life of healthy adolescents with hemophilia were teenagers.

Materials and methods: Observational study—an analysis of case—control between two groups sampling was simple random sampling, samples were 64 teenagers with similar demographic characteristics like age, sex, socioeconomic situation, neighborhood that allocated in two groups. Data collection was the through questionnaire that completed in two steps by researcher. The data were analyzed using spss15 software and statistic tests paired *t* test, two independent samples, Chi square, and Spearman and Pearson correlation coefficients.

Results: Scores of physical, psychological and environmental quality of life and quality of life of the average total score in the control group (both measured at the time) was significantly different from each other ($p > 0/001$) and the average score quality of life community in the first two measurements ($p = 0/27$) Second measure ($p = 0/53$) was not significantly different from each other.

Conclusions: Regarding to poor quality of life in teens with hemophilia in compare with healthy teens, Measures to improve the quality of life in all its aspects seem to be essential.

Keywords: Quality of Life, Hemophilia, Adolescent

186 – POSTER SESSION

NATIONAL SURVEY ON MANAGEMENT OF NEONATES BORN TO MOTHERS WITH POLYHYDRAMNIOS TO EXCLUDE OESOPHAGEAL ATRESIA IN THE UNITED KINGDOM

H. Gowda, Y. Tan, P. Satodia

Neonatal Intensive Care Unit, University Hospital of Coventry and Warwickshire, Coventry, UK

Background and aims: It is common practice in many neonatal units across the United Kingdom (UK) to insert a nasogastric tube (NG) at birth to exclude oesophageal atresia to infants born to mothers with polyhydramnios. There has been limited evidence for this practice. We performed a national survey to find out practices across neonatal units in the UK.

Methods: It is a structured questionnaire survey across neonatal units in the UK from November 2012 to January 2013. This questionnaire was sent to all the British Association of Perinatal Medicine members. The same questionnaire was conducted via telephone to the remaining units. All the responses were analysed.

Results: We received 50 responses from Neonatal units across the UK. 40 % were level 3 units and 60 % were level 2 units.

24 % (12) have written unit guidelines.

52 % (26) of the units routinely check for oesophageal atresia to all babies born to mothers with polyhydramnios, while 16 % (8) use a risk-based approach.

54 % (27) pass NG or orogastric tube, 50 % (25) aspirate tube and check for acidity on gastric contents.

44 % (22) check the NG tube position on X-ray if pH paper does not turn acidic.

Conclusion: The practice of passing an NG tube in neonates born to mothers with polyhydramnios varies from hospital to hospital across the UK due to lack of evidence.

Risk based approach for neonates who are symptomatic are more useful than in asymptomatic neonates.

Larger studies looking into the incidence of oesophageal atresia in neonates born to mothers with polyhydramnios are required to standardise this practice.

187 – POSTER SESSION

MEASUREMENT OF PARENT SATISFACTION IN FRENCH-SPEAKING PICUS: A NEED FOR TRANSLATION AND CULTURAL ADAPTATION OF THE EMPATHIC QUESTIONNAIRE

C. Grandjean^{1,2}, J.M. Latour³, J. Cotting⁴, M.-C. Maitre⁴, S. Leteurtre⁵, A.-S. Ramelet^{1,6}

¹Institute of Higher Education and Nursing Research, Lausanne University, CHUV, ²Pediatric Intensive Care Unit, DMCP, Centre des Formations, DSO, CHUV, Lausanne, Switzerland, ³Erasmus MC, Sophia Children's Hospital, Rotterdam, The Netherlands, ⁴Pediatric

Intensive Care Unit, DMCP, CHUV, Lausanne, Switzerland, ⁵Pediatric Intensive Care Unit, Jeanne de Flandre Hospital, CHRU, Lille, France, ⁶HESAV, University of Applied Sciences Western Switzerland, Lausanne, Switzerland

Background and aims: Family-centred care is an expected standard in PICU and parent reported outcomes are rarely measured. The Dutch validated EMPATHIC questionnaire provides accurate measures of parental perceptions of family-centred care in PICU. A French version would provide an important resource for quality control and benchmarking with other PICUs. The study aimed to translate and to assess the French cultural adaptation of the EMPATHIC questionnaire.

Methods: In September 2012, following approval from the developer, translation and cultural adaptation were performed using a structured method (Wild et al. 2005). This included forward-backward translation and reconciliation by an official translator, harmonization assessed by the research team, and cognitive debriefing with the target users' population. In this last step, a convenience sample of parents with PICU experience assessed the comprehensibility and cultural relevance of the 65-item French EMPATHIC questionnaire. The PICUs in Lausanne, Switzerland and Lille, France participated.

Results: Seventeen parents, including 13 French native and 4 French as second language speakers, tested the cognitive equivalence and cultural relevance of the French EMPATHIC questionnaire. The mean agreement for comprehensibility of all 65 items reached 90.2 %. Three items fell below the cut-off 80 % agreement and were revised for inclusion in the final French version.

Conclusions: The translation and the cultural adaptation permitted to highlight a few cultural differences that did not interfere with the main construct of the EMPATHIC questionnaire. Reliability and validity testing with a new sample of parents is needed to strengthen the psychometric properties of the French EMPATHIC questionnaire.

188 – POSTER SESSION

THE EVALUATION OF POSSIBLE CHANGES AFTER THE APPLICATION OF KANGAROO MOTHER CARE IN THE HOSPITAL AND AT HOME

M. Hematyar^{1,2,3}, N. Pourzadi^{3,4}, N. Pourzadi³, M. Zare⁵, M. Pourzadi⁶

¹Departments of Nursing and Midwifery, ²Nursing & Midwifery, Islamic Azad University, Tehran Medical Branch, ³Chemistry University, Shahid Beheshti University, ⁴Shahid Beheshti University, Chemistry Bulding, ⁵IAU, Islamic Azad University, Tehran Medical Branch, ⁶Khatamolanbia Hospital, Tehran, Iran

The aim was to evaluate possible changes in temperature, heart & breath rate, breastfeeding, sleeping rate, and attachment of mother and infant A randomized controlled trial was performed in which 60 LBW neonates with weight ≤ 2 kg. Subjects were matched by sex, gestational age, mother's delivery type, Apgar score, mother's education, age, occupations. The subjects were randomized into three equal groups, one intervention group (KMC-20) received KMC in hospital, the other (KMC-20) received KMC at home. The control group (CMC-20) received conventional care. KMC groups received kmc for 6 h per day in 6 consecutive days and control group received standard care. The results showed breathing rate, Heart rate, temperature and Sleeping time in study groups had significant differences ($p < 0.001$) and the mean of the study groups were more than control group. Also the result showed nutrition rate in study groups had

significant statistical differences after applying KMC ($p < 0.001$) and in relation to mother and infant attachment, comparing these three groups showed significant differences ($p < 0.05$) and the Levene Statistic test showed that the variance of three groups are equal ($F(2,57) = 1.67$, $p > 0.05$), and an ANOVA test showed there are significant differences between three groups. KMC at home results are significantly increased in neonates when they are given KMC at home. The present study has important implications in the care of LBW in developing countries, where expensive facilities for conventional care may not be available and where a neonate is kept in the hospital just because he or she is a LBW.

189 – POSTER SESSION

THE TRIGGER TOOL IS A VALUABLE ADDITION TO ADVERSE EVENT MONITORING IN PICU PRACTICE

M.D. Jong¹, A.V.D. Bos², C.V.D. Starre², M.V. Dijk²

¹IC Kinderen, ²Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Background and aims: The pediatric intensive care unit (28-beds, level 3 IC unit with 1,400 admissions annually) in the Erasmus MC-Sophia Children's Hospital Rotterdam runs a Patient Safety Management System since 2004. It includes incident reporting, adverse event detection, team training and risk management. To justify our activities we needed to quantify the effects on patient outcome in terms of occurrence of adverse events. Adverse events (AE's) are reported voluntarily in two ways; complication registration by physicians and digital incident reporting mainly by nurses. We assume that there is underreporting of AE's.

Methods: AE's can be detected and monitored with the trigger tool methodology. A trigger is an occurrence, prompt or flag found on review of a medical record that 'triggers' further investigation into the possibility of an AE. In our PICU we used the PICU trigger tool from the Institute of Healthcare Improvement and some items from their NICU trigger tool. Consensus was reached about definitions, how to identify a trigger and how to determine the occurrence of an AE. We applied the trigger tool on medical records, the hospital electronic database and the unit data management system.

Results: Application of the trigger tool on a random sample of 25 % of all patients discharged in 2011 yielded 249 AE's in 106 patients (32.5 %). In 2012 we considered all discharged patients in the first 6 months. We identified 456 AE's in 216 patients (23.6 %).

Conclusions: We detected far more AE's with the trigger tool than reported by physicians using complication registration only.

190 – POSTER SESSION

NATIONWIDE SURVEY OF DIFFICULT AIRWAY TROLLEYS IN PAEDIATRIC INTENSIVE CARE

A. Khan¹, T. Radia², M. Lane³

¹Anaesthesia, Great Ormond St Hospital, ²Paediatrics, Evelina London Children's Hospital, ³Anaesthesia, Royal Brompton Hospital, London, UK

Introduction: There is limited data regarding standard contents of a paediatric difficult airway trolley (DAT) and no specific paediatric

difficult airway algorithm exists to guide development [1, 2]. The report, Major Complications of Airway Management in the UK, has recommended the immediate availability of a DAT in intensive care units. We surveyed current practice in UK Paediatric Intensive Care Units (PICU) and high-dependency units (HDU) regarding availability of a DAT to highlight the need.

Methods: We identified 31 PICU and HDUs. A telephone survey was conducted and questions identified the presence of a DAT, its contents, location and on-going management. Data was analysed using Excel.

Results: We achieved a 100 % response rate. 42 % (13 units) had a paediatric DAT. 58 % (18 units) did not. Standard airway equipment was similar. Additional visualisation aids were the Glidescope and Airtraq. 3 units had a fiberoptic bronchoscope. 23 % of units had Quicktrach sets and 46 % cricothyrotomy needle kits.

Discussion: Unanticipated difficult airway in the paediatric population is uncommon and this may be why less than half of the PICU (42 %) have a DAT.

We agree with the recommendation that a dedicated paediatric DAT in PICU is essential for the provision of high quality care [2].

References:

1. Henderson JJ et al. Difficult Airway Society guidelines for the management of the unanticipated difficult intubation. *Anaesthesia* 2004;59: 12):1242–1247
2. Major Complications of Airway Management in the United Kingdom. The 4th National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. March 2011.

191 – POSTER SESSION

VOLUNTARY TOXOPLASMOSIS SCREENING IN PREGNANCY UNDERESTIMATES ACTIVE INFECTION IN DEPENDENCY OF SOCIOECONOMIC FACTORS: POPULATION-BASED SURVEY OF NEONATES IN POMERANIA (SNIP)

A. Lange¹, R. Thyrian², J. Göbel³, F. Schalthorn⁴, W. Hoffmann², M. Zygmunt³, C. Fusch⁵, H.N. Lode⁶, J.P. Haas⁷, M. Heckmann⁴

¹Neonatology and Intensive Care, ²Institute of Community Medicine, Div. of Health Care Epidemiology and Community Health, ³Dept. of Gynaecology and Obstetrics, ⁴Departments of Pediatrics and Neonatology & Paediatric Intensive Care Medicine, University of Greifswald, Greifswald, Germany, ⁵Department of Pediatrics, Division of Neonatology, McMaster University, Hamilton, ON, Canada, ⁶Department of Pediatrics, University of Greifswald, Greifswald, ⁷German Center for Rheumatology in Children and Adolescents, Garmisch-Partenkirchen, Germany

Background and purpose: 40 % of all initial infections with *Toxoplasma gondii* during pregnancy develop into congenital toxoplasmosis, which is associated with the risk of severe damage to the CNS, frequent premature deliveries, and stillbirths. In Germany, toxoplasmosis immunity screenings are not covered by the state health insurance as a general preventive care service, in contrast to screening for rubella immunity. Therefore, we analyzed the impact of socioeconomic factors on the efficiency of private toxoplasmosis screening during pregnancy in a population-based study.

Materials and methods: Toxoplasmosis and rubella screening data were collected from 5,736 mothers during the period from May 2002 to June 2008 within the population-based Survey of Neonates in Pomerania (SNiP).

Results: At the first screening, 34.2 % of expecting mothers were immune to toxoplasmosis, 75.2 % had immunity against rubella after

active immunization. Negative immunity for toxoplasmosis was found in 39.7 % and in 7.7 % for rubella (missing information: toxoplasmosis: 25.8 %; rubella 17.2 %). Less than 10 % ($n = 282$) of the women without immunity participated in a second toxoplasmosis screening. An active toxoplasmosis infection was found in 0.3 % ($n = 17$) women during pregnancy. There were no infections with the rubella virus. Pregnant women with a higher socioeconomic status participated in screenings considerably more frequently.

Conclusion: Our population-based sample demonstrated a substantial risk of toxoplasmosis infection during pregnancy in contrast to the rubella risk. Furthermore, lower socioeconomic status adversely affects the rate of toxoplasmosis screening. This data support the need for toxoplasmosis screening for pregnant women as a general health care benefit covered by insurance.

192 – POSTER SESSION

LYCOPENE SUPPLEMENTATION DURING PREGNANCY HAS BENEFICIAL EFFECTS: ALBEIT A FEW!

R. Mahendru

Obstetrics and Gynecology, BPS GMC, Sonapat, India

Objective: To evaluate the benefits of lycopene supplementation in prevention of pre-eclampsia and the perinatal outcome in women at high risk of developing pre-eclampsia.

Materials and methods: A pilot study comprising 107 pregnant women (13–28 gestational weeks) with factors considered high risk for pre-eclampsia were considered and randomly allocated into two groups: I ($n = 55$) and II ($n = 52$), with or without lycopene supplementation, respectively. Lycopene in a dose of 4 mg once daily starting from the date of entry was given to the antenatal subjects of the study group (Group-I) and took the drug regularly until delivery. Women of Group-II were not provided with lycopene. Main observation measures: development of preeclampsia and its severity, period of gestation at delivery, mode of delivery, fetal weight and perinatal outcome as regards to admission to neonatal intensive care unit and neonatal death.

Observations: There were no significant differences in development of preeclampsia but severity was more in the group-II. Significant adverse finding noticed, having no mention in the literature earlier, was: one case of eclampsia. Women in the lycopene supplementation group had not only significantly lesser incidence of growth restricted babies but also significantly healthier babies and had a better perinatal outcome compared to women in non-supplemented group.

Conclusion: Supplementation of Lycopene although does not decrease the incidence of preeclampsia in high risk women but may help in reducing its severity and there is reduced incidence of intra-uterine growth restriction with better perinatal outcome.

193 – POSTER SESSION

SURVEILLANCE OF HEALTHCARE-ASSOCIATED INFECTIONS IN A FRENCH NEONATAL AND PAEDIATRIC INTENSIVE CARE UNIT

F. Martin¹, C.G.D.S. Brémaud-Csizmadia¹, A.D. Hauteclouque², S. Ayraud-Thévenot³, M. Albouy-Llaty²

¹Neonatal and Paediatric Intensive Care, ²Medical Evaluation Unit and Healthcare-Associated Risks Management, ³Infection Prevention Team, University Hospital of Poitiers, Poitiers, France

Objectives: Healthcare-associated infections (HAI) are a major and potentially preventable cause of morbidity and mortality, especially in the acute care setting.

The main objective of this study is the implementation of a device-associated infections surveillance system, including central line-, urinary tract catheter- and endotracheal tube-associated infections, in a French neonatal and paediatric intensive care unit.

Methods: All children consecutively admitted to our unit, from July to December 2011, for more than 48 h, were prospectively included. The data were separately analyzed for the neonatal (1–28 days old) and the paediatric population (>28 days old). All above mentioned devices were registered. The definitions used for HAI were those elaborated by the Center for Diseases Control. All data were treated anonymously. A linear regression analysis was performed to point out the main risk factors of HAI.

Results: We assessed 303 consecutive admissions. Of them, 181 children were included in the surveillance: 129 neonates (median weight: 1,730 g; median gestational age: 32 weeks), wearing 199 central lines, 116 endotracheal tubes and 26 urinary tract catheters. Seventeen central line-associated bloodstream infections and 5 endotracheal tube associated infections were found. Fifty two children (median age: 3 months) having had 31 central lines, 23 endotracheal tubes and 14 urinary tract catheters were also enrolled.

Conclusions: The implementation of a HAI surveillance system is feasible. An additional surveillance period is planned to allow the analysis of the device-associated infections incidence rates. This surveillance system will help us to improve our healthcare practices.

194 - POSTER SESSION

HEALTH CARE COST SAVINGS USING HIGH FLOW NASAL CANNULA THERAPY IN THE PAEDIATRIC WARD

S. Mayfield^{1,2}, F. Bogossian², A. Schibler¹

¹Paediatric Intensive Care Unit, Mater Children's Hospital, ²School of Nursing and Midwifery, The University of Queensland, Brisbane, QLD, Australia

Objectives: To assess the safety and fiscal implications of using High Flow Nasal Cannula (HFNC) therapy in a paediatric ward (PW) for treating infants with bronchiolitis.

Methods: 61 infants aged ≤ 12 months with bronchiolitis and oxygen requirement were enrolled in the emergency department (ED) and transferred to the PW on HFNC. Comparison group of 33 patients retrospectively identified, but managed with standard sub nasal oxygen therapy.

Results: Admission demographics and heart rate (HR), respiratory rate (RR) and physiological score (CEWT) were similar in both groups. Patients requiring PICU admission showed no change of HR, RR and CEWT after 1 h on HFNC compared to a significant decrease in the patients remaining on PW ($p < 0.02$). Patients receiving HFNC were 4 times less likely to need PICU admission than the comparison group (OR 4.086, $p = 0.043$). There were no serious adverse events or intubations. Median length of stay of both groups was 92 h. Current costs for a combined PICU/PW admission are AU\$ 15,517/pp, compared to AU\$ 4,992/pp on PW alone. Predicted annual cost saving for a 19 bed mixed medical/surgical PICU with 1,300 admissions/year is AU\$ 1.2 Mio.

Conclusions: HFNC treatment on the PW for bronchiolitis is safe. Non-responders requiring PICU admission can be identified by no

reduction in HR, RR and CEWT within the first hour of HFNC treatment. The early use of HFNC in ED may lead to a significant decrease in the admission of infants with bronchiolitis to the PICU and hence represent significant health care cost savings.

195 – POSTER SESSION

A CLINICAL PRACTICE REVIEW OF COAGULATION SCREENING AND FRESH FROZEN PLASMA TRANSFUSIONS IN PRETERM INFANTS LESS THAN 29 WEEKS

S. Nagar, M. Luig

NICU, Westmead Hospital, Sydney, NSW, Australia

Background and objectives: There is paucity of data on the subject of coagulation screening as well as FFP transfusions in preterm infants. This study aimed to analyze clinical practices in an Australian tertiary NICU.

Methods: Retrospective data for 109 preterm infants admitted over a period of 2 years (2010–2012) was collected for perinatal and neonatal variables affecting coagulation system, test results which included sequential PT, aPTT and INR, fibrinogen, platelet count etc. The timing of these tests, clinical bleeding episodes and use of FFP was also noted. The study cohort was divided in two groups (i.e., 23–26 weeks and 27–28 weeks). The thresholds used for transfusion and improvement in coagulation indices after FFP transfusion was studied.

Results: 89 infants (81.6 %) infants in this series had the first coagulation screen performed within the first 5 days after birth and most of the tests (58 %) were done within the first 6 h of life. A coagulation screen was done for 50 (96 %) infants in the 23–26 week group and 68 % infants of the 27–28 week. All infants who received FFP had a coagulation screen prior to transfusion. Comparison of pre-transfusion indices for infants who received FFP with those who didn't, resulted in highly statistically significant difference. 17 infants had clinical bleeding and deranged indices were not indicators of minor bleeding. Longer aPTT was associated with antepartum haemorrhage. The threshold of transfusion appeared to be INR of 1.5–1.6.

Conclusions: The practice of screening and transfusion needs consensus based guidelines based on more research.

196 – POSTER SESSION

ADHERENCE TO HOSPITAL PRESCRIBING GUIDELINES IN A TERTIARY PAEDIATRIC INTENSIVE CARE UNIT IN ENGLAND: AN AUDIT

R. O'Neill¹, N. Shetty², A. Darbyshire²

¹University of Liverpool, ²Paediatric Intensive Care Unit, Alder Hey Children's Hospital, Liverpool, UK

Introduction: Prescribing errors are a major problem in the health-care environment with paediatrics presenting challenges from off-label and weight based prescribing. In the Paediatric Intensive Care Unit (PICU) additional factors such as the severity of illness and the

involvement of multiple specialist teams may predispose to greater numbers of errors.

Aims: The aims of this audit were to assess the level of adherence to hospital prescribing guidelines in the PICU, identifying the areas of greatest and least adherence, and trying to identify possible patient factors that may predispose to a higher incidence of non-adherence.

Methodology: A prospective, observational audit was carried out in the PICU in Alder Hey Children's Hospital with bedside data collection, using a template based on hospital guidelines.

Results: 988 prescriptions were reviewed during the study period comprising a mean of 20 prescriptions per patient with a mean of 24 drug administrations per patient over a 24 h period. The overall adherence in the five individual prescription sections was 91.62 %. No correlation was noted between adherence and patient factors such as Paediatric Multiple Organ Deficiency Score. The critical incident rate was 5.06 per 1,000 prescriptions; none of these caused permanent harm because of early detection.

Conclusions: This audit helped to raise awareness of key areas that are to be targeted as part of an action plan to improve adherence. The detailed data collected in the various prescription sections showed a high adherence rate reflecting the competency of the staff prescribing within the very challenging PICU environment.

197 – POSTER SESSION

SNAPPE-II AND RISK OF NEONATAL MORBIDITIES IN VERY LOW BIRTH WEIGHT PRETERM INFANTS

B. Ozcan¹, S. Kavurt¹, O. Aydemir¹, Z. Gencturk², A.Y. Bas¹, N. Demirel¹

¹Department of Neonatology, Etlik Zubeyde Hanım Women's Health Teaching and Research, ²Department of Biostatistics, Ankara University School of Medicine, Ankara, Turkey

Aim: Illness severity scores were described to estimate mortality and morbidity risks based on data obtained shortly after birth. Aim of this study was to evaluate Score for Neonatal Acute Physiology-Perinatal Extension (SNAPPE-II) as a predictor of neonatal morbidities such as bronchopulmonary dysplasia (BPD), retinopathy of prematurity (ROP), intraventricular hemorrhage (IVH).

Methods: A prospective cohort study was conducted including 278 infants with gestational age (GA) ≤ 32 weeks and/or birth weight (BW) $< 1,500$ g. SNAPPE-II based on data collected in first day of life and risk factors for ROP requiring laser photocoagulation, BPD and IVH ($\geq$ grade 3) were studied in univariate analysis and significant variables were further evaluated in logistic regression. Receiver-operating characteristics (ROC) curve analysis was performed for SNAPPE-II and GA, and areas under the curve were compared.

Result: Mean GA and BW of the cohort were 29.2 weeks (± 2.15) and 1.323 g (± 331.4), respectively. SNAPPE-II was significantly higher among patients with BPD, ROP and IVH ($p < 0.001$, $p < 0.001$, $p = 0.002$, respectively). After logistic regression SNAPPE-II was independent risk factor for BPD (OR = 1.04, $p = 0.005$), ROP (OR = 1.05 $p = 0.034$) and IVH (OR = 1.04, $p = 0.022$). The best discriminative cutoff value of SNAPPE II for BPD was 14.5 (sensitivity 92.7 %, specificity 68.3 %), for ROP was 23.5 (sensitivity 80 %, specificity 79 %), for IVH was 13.5 (sensitivity 100 %, specificity 57.5 %). GA alone had a similar discriminative power to SNAPPE II.

Conclusion: High SNAPPE-II at admission is an independent risk factor for BPD, ROP and IVH. SNAPPE-II is not better than GA for predicting these neonatal morbidities.

198 – POSTER SESSION

QUALITY OF CARE PERCEIVED BY PARENTS OF CHILDREN ADMITTED TO A CARDIAC INTENSIVE CARE UNIT (CICU)

F. Petrangeli¹, A. Polito¹, D. Selvaggio¹, F.G. Iodice¹, L. Luciani¹, L. Zucaro², P. Cogo¹, S. Timpani¹

¹Department of Pediatric Cardiology and Cardiac Surgery, ²Pastoral Care Unit, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

Background and aims: A child's admission to the CICU requires a sudden re-adaptation of the entire family to a new situation, full of risks and uncertainties. The purpose of our study was to identify parents' needs, and their perceptions, and expectations regarding the pediatric intensive care services.

Methods: A 14-item self report questionnaire was given by the bedside nurse to all parents upon admission to the CICU from September to December 2012. A modified version of the Critical Care Family Needs Inventory was utilized. Questionnaires' items were analyzed according to nationality, length of CICU stay, age of the child and number of CICU admissions, expressed as dichotomous variables. Differences were assessed by Chi square test and $p < 0.05$ was considered as statistically significant.

Results: A total of 120 questionnaires were given to the parents and forty (33 %) were available for the analysis. Twenty-four were answered by mothers (60 %) and 31 were Italian (77.5 %). There were significant differences between the Italian and immigrant parents about satisfaction of medical care and CICU facilities (waiting room). Parents of children >1 year of age, parents whose child was admitted for >7 days, and parents whose child was admitted >1 time to CICU scored the hospital personnel care and medical communication significantly less compared with the respective other group.

Conclusions: 'Dissatisfaction' was highest among families of Italian origin, and in older children, with longer or multiple admissions, suggesting that communication and care should be modulated and centered on family and child needs.

199 – POSTER SESSION

HOW CAN WE IMPROVE THE SATISFACTION OF PARENTS OF CRITICALLY ILL CHILDREN?

F. Petrangeli¹, A. Polito¹, D. Selvaggio¹, F.G. Iodice¹, A. Rossi², L. Luciani¹, P. Cogo¹, S. Timpani¹, G. Carta³

¹Department of Pediatric Cardiology and Cardiac Surgery,

²Department of Psychology, ³Nursing Direction, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

Background and aims: Hospitalization due to a critical illness is a stressful situation and there is a growing interest in parents satisfaction as indicator of quality of care. It is essential that both physicians and nurses attempt to identify and meet the needs of parents of

critically ill children. The purpose of this study was to identify the impact of the implementation of a continuity of physician care in the CICU and the evaluation of this role on the parents' perception of the quality of care given.

Methods: This is an ongoing study, started in September 2012, that will be completed at the end of April 2013. A modified version of the "Critical Care Family Needs Inventory" questionnaires will be prospectively collected to assess the parent's satisfaction of the quality of care before and after the implementation of a continuity physician, introduced in our CICU at the 1st of January 2013. This attending physician is in charge of the communications with all the parents.

Results: The study will report on the effect of the implementation of the continuity of medical care in a CICU. Data are not available yet for the second part of the study, as the continuity of care has been implemented only at the beginning of this month.

Conclusions: New policies, such as continuity of medical and nursing care, will most likely improve the degree of satisfaction of parents and help the family to learn from the PICU experience and facilitate adaptation to a stressful and difficult situation.

200 (Abstract withdrawn)

201 – POSTER SESSION

BLOOD TRANSFUSIONS IN VERY PREMATURE NEONATES, BORN AT 23 TO 28 WEEKS GESTATION

T. Pillay^{1,2}, R.A. Lowdon¹, P. Nightingale³, E. Rizal¹

¹Neonatal Unit, Royal Wolverhampton Hospitals Trust, Wolverhampton, ²SSBC Newborn Network, West Midlands,

³University of Birmingham, Department of Statistics, Birmingham, UK

Objectives: We studied the pattern of blood transfusions administered to very preterm neonates, in an attempt to rationalise transfusion practices on our NNU.

Methods: 96 consecutive admissions to our Level 3 NICU, born at 23–28 weeks gestation, were retrospectively evaluated between 12/3/2010 and 11/3/2012. Data on timing and frequency of blood transfusions against gestational age, in survivors, were analysed using Kendall's tau-b correlation coefficient.

Results: 369 transfusions were administered to 80 (83.3 %) neonates. All-cause mortality was 23/96; 7 died without receiving a blood transfusion. 9 survivors (26–28 weeks) did not require transfusions; the remaining 64 required a median of 4 transfusions each. 86 neonates were ventilated in the first 24 h, with the remaining 10 receiving CPAP/BiPAP support. Birth haemoglobin increased with increasing birth gestation ($p = 0.001$; 12.6 g/dl in 23⁺⁰–23⁺⁵ weeks and 15.7 g/dl in 27⁺⁰–27⁺⁵ weeks survivors). Median day of first transfusion was sooner in those born earlier (2 days in 23⁺⁰–24⁺⁵ weeks vs 8 days in 27⁺⁰–27⁺⁵ weeks; $p < 0.001$). Neonates born at earlier gestation required more frequent transfusions in the first 2 weeks of life ($p < 0.001$; 3 and 1.5 in the first and second week of life in 23⁺⁰–23⁺⁵ weeks). Intervals between multiple transfusions were shorter in those born earlier ($p < 0.01$).

Conclusion: The lower the gestational age of the NICU survivor, the sooner, more frequent, and quicker succession of blood transfusion was needed. This data has helped formulate a single donor multi-pack blood transfusion programme for our high risk NICU residents, and enlightens our parent counselling.

202 – POSTER SESSION

EVALUATION OF ACACIA SENEGAL GUM EFFECT ON PREVENTION AND TREATMENT OF PERISTOMAL SKIN DISORDERS IN CHILDREN

A. Pirnia Naeini¹, M. Ghazi Thalkhoncheh², A. Zargham Brogeny³

¹Pediatric Surgery, Esfahan University, Esfahan, ²Emergency, Isfahan University, ³Nursing, Nursing University, Isfahan, Iran

Background: Intestinal stomas are produced when a section of gastrointestinal tract is opened on to the skin surface to drain the stoma effluents. Most surgically formed stomas are colostomies, ileostomies, and urostomies. However, there are some The commonest postsurgical problem for ostomy patients is peristomal skin damage.

Aim: To evaluate the effect of Acacia senegal gum in treatment/management of the ostomy complications of the peristomal skin.

Methods: Clinical observation methods with especial assessment tools (DET and get photograph) were used. DET (ostomy skin tools) was used for the evaluation of treatment and software (Auto CAD2010) to calculate the wound size in order to understand the effectiveness of Acacia senegal gum in treatment of wounds. 10 patients were observed for 8 months (5-under effect of Acacia senegal gum, 5-under effect of zinc oxide ointment). In this study, examined Effects of Acacia senegal gum in prevention and treatment of children peristomal skin disorders as compared to zinc oxide.

Results: The peristomal complications were positively influenced by the use of the Acacia senegal gum with in period of 8 days. The total DET score in all domain effectively reduce from 7.60 (3.05) on day 0 to 3.00 (2.34) on days 8. The size of discolouration skin area in mm² on 0 day was 1,433.5 (1,037.83) mm² that decreased to 654.3 (446.78) mm² on 8th day.

Conclusion: In this study, it was found that Acacia senegal gum is useful remedy in the peristomal complications and may act as a good barrier to treatment of complications.

203 – POSTER SESSION

THE RACEVA PROTOCOL IN THE PEDIATRIC PATIENT: A RATIONAL CHOICE OF THE SAFEST APPROACH FOR CENTRAL VENOUS CATHETERIZATION

M. Pittiruti¹, D.G. Biasucci², G. Conti²

¹Department of Surgery, ²Emergency Department Pediatric Intensive Care Unit, 'A. Gemelli' Teaching Hospital Catholic University of The Sacred Heart, Milan, Italy

Background: Ultrasound (US) guided central venous cannulation is becoming common in the pediatric intensive care unit. Since many veins can be cannulated by US (internal jugular vein—IJV, external jugular—EJV, brachio-cephalic vein—BCV, subclavian vein—SV, axillary vein—AV), we propose a protocol for a standardized evaluation of all possible veins, the RaCeVA (Rapid Central Vein Assessment), already used in adult patients in our institution.

Methods: The US evaluation starts at mid-neck (visualization of IJV in short axis). The probe is moved to the anterior mediastinum (visualization of BCV). Moving the probe laterally above the clavicle, SV and EJV are visualized. Finally, we scan the infraclavicular area (visualization of AV and cephalic vein in short and in long axis).

Then, the safest vein is chosen, taking into consideration for each vein seven criteria: caliber, depth, collapse during breathing, compression by arteries, proximity to the pleura, possible pathological abnormalities.

Results: We performed 183 central venous catheterization in 165 patients (15 aged < 1 month, 70 aged 1–12 months, 80 aged 1–6 years). After RaCeVA, in 167 cases we chose BCV, in 10 cases IJV, in 3 cases SV and in 2 cases EJV (in its deep tract, close to the junction with the SV). All insertions were successful, with no puncture-related complications. In 85 % of cases, the vein was punctured at first pass of the needle.

Conclusion: The RACeVA gives the operator the possibility of choosing the safest venous access and performing a 100 % success insertion.

204 – POSTER SESSION

HELP PARENTS IN FRONTING DIFFICULTIES TO CARE THEIR NEWBORN WITH AND WITHOUT LIFE THREATENING CONDITIONS: PROJECT OF TELEPHONE HELP LINE

A. Ragni, A. Portanova

NICU, Bambin Gesù Children Hospital, Rome, Italy

Background: The number of newborn with congenital abnormalities that survive their life threatening condition and remaining dependent on the hospital after discharge is increasing. In fact general paediatricians have limited knowledge of these rare conditions and parents may feel it difficult to rely on them after discharge. Furthermore even for parents with uneventful pregnancies, and especially for strangers, daily care of the neonate can be perceived stressful due to the lack of a familial environment.

Aims: Our telephone counselling aims at supplying with extra support both parents of neonates with congenital abnormalities and parents of healthy newborns.

Methods:

Dedicated telephone helpline

Campaign directed to parents of neonates hospitalised in our Hospital Specific link on the Hospital web page and activation of an e-mail inbox

Expert team of nurses with specific knowledge of medical and psychological problems.

Conclusions: The telephone helpline promotes wellness after discharge by strengthening parents and reducing the stress burden of parents of neonates discharged after congenital abnormalities correction. Telephone counselling can furthermore reduce re-hospitalisations as well as after hour consultations and accesses to the emergency department.

205 – POSTER SESSION

MOTHERS' KNOWLEDGE AND PERFORMANCE ABOUT APPLICATION OF SWADDLING

M. Sirousi¹, B. Zarei²

¹Midwifery, Zahedan University of Medical Sciences, Iranshahr,

²Public Health, Saravan Health Development Center, Saravan, Iran

Swaddling is a traditional practice of wrapping infants in swaddling clothes so that movement of the legs and foot are tightly restricted. Despite of these advantages, if swaddling use inappropriately, would result in Dislocation of Hip. In this research we assess the Mothers' knowledge and performance about application of swaddling.

Methods: This is a descriptive-analytical research. Data gathered through a researcher- administered questionnaire and interview by professional midwife. The validity of questionnaire confirmed through experts (Pediatricians, Faculty members in nursing and midwifery, orthopedist) and its reliability after distributed in a sample of 30 mothers gained 91 % through Cronach's alpha. Data analyzed by expert through SPSS version 16.00.

Results: Finding showed that the majority of mothers (65 %) have not knowledge about benefits and pitfall of swaddling. 86 % of them knew that it was good for calming babies, sleeping and warming. 16 % of them knew that swaddling may lead in dislocation of hip. Educated mothers and housekeepers swaddled their babies less than others. Educated mothers told in the interview that they did not receive information about swaddling much from media and doctors (65%).

Conclusions: With regards of weak results about knowledge and performance of mothers on swaddling and its consequences such as adult emotional health and dislocation of hip, promotion of mothers' knowledge suggested through health workshop and practical teaching sessions by professional and governmental official is necessary.

206 – POSTER SESSION

STEP BY STEP IMPLEMENTATION OF THE ROMANIAN REGISTRY FOR RESPIRATORY DISTRESS SYNDROME

S.M. Stoicescu¹, M. Stamatin², C. Ilie³, G. Zaharie⁴, M. Cucerea⁵, V. Filip⁶, M.L. Ognean⁷, G. Olariu⁸, L. Blaga⁹, A.S. Craciun¹⁰, E. Coleta¹¹, S. Iftimie¹²

¹Neonatology Dpt., Institute for Mother and Child Care, Polizu Maternity Hospital, University of Medicine and Pharmacy Carol Davila, Bucharest, ²Neonatology Dpt., Cuza-Voda Maternity, University of Medicine and Pharmacy Gr. T. Popa, Iasi, ³Neonatology Dpt., Bega Maternity, University of Medicine and Pharmacy, Timisoara, ⁴Neonatology Dpt., Obstetric and Gynecology Clinical Hospital 1, University of Medicine and Pharmacy, Cluj Napoca, ⁵Neonatology Dpt., Clinical County Emergency Hospital, University of Medicine and Pharmacy, Tg. Mures, ⁶Neonatology Dpt., Clinical County Emergency Hospital, Faculty of Medicine, Oradea, ⁷Neonatology Dpt., Clinical County Emergency Hospital, Faculty of Medicine, Sibiu, ⁸Neonatology Dpt., Dr. D. Popescu Maternity Hospital, Timisoara, ⁹Neonatology Dpt., D. Stanca Obstetric and Gynecology Clinical Hospital, University of Medicine and Pharmacy, Cluj-Napoca, ¹⁰Neonatology Dpt., Cantacuzino Maternity, Bucharest, ¹¹Neonatology Dpt., Clinical County Emergency Hospital, University of Medicine and Pharmacy, Craiova, ¹²Neonatology Dpt., County Hospital, Piatra Neamt, Romania

Respiratory distress syndrome (RDS) is the most frequent pathology in preterm infants and the short and long term outcome of this condition is often influenced by its' severity and management.

Aim: Implementation of a national database for respiratory distress syndrome in preterm infants ≤ 32 weeks gestation.

Materials and methods: An on-line national database was started in 2010 in order to collect, on voluntary basis, data regarding the management of the respiratory distress syndrome in preterm infants ≤ 32 weeks gestation. A review of the steps taken in order to implement, extend and develop this database was done after 2 years.

Results: In 2010 the database comprised 673 preterm infants, born in 9 maternity hospitals and covered 14.28 % from all the births in Romania. In 2011, the database increased to 1309 preterm infants admitted in 15 neonatal units (13 level III and regional and 2 level II maternities), covering 23.41 % of the births at national level. Also, in 2011, the database was enlarged to collect, above epidemiological data and information regarding birth management and respiratory care, data about nutrition and infections. Also, 38 presentations and papers were done or published using the collected data.

Conclusion: The national Registry for RDS offered a great opportunity to improve the quality of care, collect important epidemiological data, promote the new national guidelines, encourage the implementation of protocols according to each unit level, disseminate information and stimulate research based on the collected data.

207 – POSTER SESSION

NEONATAL MORTALITY AND MORBIDITY AMONG EXTREMELY-LOW-BIRTH-WEIGHT NEONATES ADMITTED TO THREE ROMANIAN NEONATAL CARE CENTERS

L.M. Suciu¹, M. Cucerea¹, B. Szabo², L. Puscasiu², E.F. Bell³

¹Neonatology, ²Obstetrics and Gynaecology, University of Medicine and Pharmacy Tirgu Mures, Tirgu Mures, Romania, ³Pediatrics, Carver College of Medicine, University of Iowa, Iowa, IA, USA

Background and aims: Birth before 28 weeks of gestation is associated with a high mortality and morbidity. The purpose of this study was to examine characteristics associated with in-hospital mortality and morbidity among extremely-low-birth-weight neonates admitted to three tertiary care centers in Romania.

Methods: The study was conducted in three Romanian hospitals with Level III Neonatal Intensive Care Units. We studied singleton live births at the established Romanian limit of viability (i.e., 25–28 weeks gestational age) born between January 2007 and December 2010 (n = 227). Infants born in non-Level III facilities transferred to these three centers were included in our study (n = 39). Descriptive and multivariate statistical analyses were used to describe the population and examine outcomes and risk factors.

Results: During the study period, 62 neonates (27.3 %) were delivered at 25 weeks, 56 (24.7 %) at 26 weeks, 56 (24.7 %) at 27 weeks, and 53 (23.3 %) at 28 weeks. Overall in-hospital mortality was 65 % (from 85 % at 25 weeks, 60 % at 26 weeks, 55 % at 27 weeks to 35 % at 28 weeks). The rates of key complications were necrotizing enterocolitis 8.8 %, bronchopulmonary dysplasia 12.5 %, and retinopathy of prematurity (stage 3 or higher) 26.2 %.

Conclusions: During 2007 to 2010, in-hospital survival of infants admitted to three Neonatal Intensive Care Units in Romania was 35 % and ranged from 14 % at 25 weeks to 64 % at 28 weeks.

208 – POSTER SESSION

ASSESSMENT OF EXPOSURE OF EGYPTIAN INFANTS TO AFLATOXIN M1 THROUGH BREAST MILK

R. Tomerak¹, H. Hamdi², U. Khalafallah², M. El Shazly¹

¹Pediatrics, ²Cairo University, Cairo, Egypt

Background: Mothers are exposed to many toxins that can reach their infants through breast milk. One of these toxins is aflatoxins, produced by *Aspergillus* fungus which colonizes grains, especially in tropical regions. Aflatoxins are highly toxic, mutagenic, teratogenic, and carcinogenic. One of these is aflatoxin B1 that is excreted in breast milk as aflatoxin M1 (AFM1).

Aim of work: Assessment of exposure of Egyptian infants to aflatoxin M1 through breast milk.

Methods: This cross-sectional study included 150 mother-infant dyads. All the infants were exclusively breastfed. Infant weights' standard deviation scores were documented at birth and at 6 months. At 6 months, before starting weaning, AFM1 was measured in breast milk and liver enzymes; alanine aminotransferase (ALT) and aspartate aminotransferase were assessed for all mothers and infants.

Results: Ninety-eight mothers (65.3 %) had AFM1-positive breast milk samples (AFM1 > 0.05 mg/l according to the European Community and Codex Alimentarius). AFM1 levels ranged between 0.2 and 19.0 mg/l (mean: 7.1 ± 5.0 mg/l). In cases considered negative, AFM1 levels ranged between 0.01 and 0.05 mg/l (mean: 0.04 ± 0.01 mg/l). Infants of AFM1-positive mothers had lower weight standard deviation scores at birth and at 6 months ($P = 0.04$ and 0.0001). ALT and aspartate aminotransferase of mothers and ALT of infants were significantly higher in dyads having AFM1-positive breast milk ($P = 0.0001$, 0.0001 , and 0.03 , respectively).

Conclusion: Aflatoxins represent a real threat in Egypt. The higher liver enzymes in AFM1-positive cases might represent an alarm toward future development of hepatocellular carcinoma.

209 – POSTER SESSION

INCIDENCE OF RESIDUAL IMPAIRMENT AND MORTALITY POST PICU ADMISSION IN A TERTIARY, PEDIATRIC INTENSIVE CARE UNIT

D. Tzira, P. Bonus, A. Patsoura, A. Prezerakou, A. Vintila, G. Sideri, V. Papaevangelou, J. Papadatos

PICU, 'P&A. Kyriakoy' Athens Childrens Hospital, Athens, Greece

Aims: The main objective of this study was to examine the incidence and risk factors associated with aggravated general statement, residual impairment and death post PICU hospitalization.

Methods: Retrospective study between 1/1/2011–25/02/2012 in a PICU located in a tertiary pediatric hospital. Patients younger than 2 years, with underlying oncological disease and those who died within the first 12 h after admission were excluded.

Results: Overall, from a total number of 315 admissions, 58 patients were included. The median age was 7 years old. A significant proportion of our cohort needed rehabilitation post PICU discharge, eighteen patients (31 %), while two children (3, 4 %) died.[i2] Factors associated with aggravated general statement, residual disease

and death included: head injury (34.5 %), delayed PICU admission-for clinical admissions over 24 h (41 %), for posttraumatic admissions over 3 h (19 %), pediatric risk of mortality (PRISM) score at the first 24 h of the admission > 8 (38 %), underlying neurological disease (17.2 %), duration of mechanical ventilation > 7 days (12 %), use of vasoactive drugs at the admission (5.17 %), hospital-acquired infection (17 %) correlated with prolonged hospitalization > 10 days (17 %).

Conclusions: Although there has been significant improvement in the provided care by PICU, still survival as well as post discharge impairment and quality of life depend on the critical care support provided before admission in PICU. Secondary, severity of illness, estimated by PRISM score is the key factor for the prognosis of the critical ill children.

210 – POSTER SESSION

IMPROVING WRITTEN WORK IN NEONATAL AND PAEDIATRIC INTENSIVE CARE

E. Updale¹, J. Brierley²

¹Associate Fellow, Royal Literary Fund UK, ²Paediatric and Neonatal Intensive Care, Great Ormond St Hospital, London, UK

Objectives: Staff in PICU and NICU are required to undertake a wide variety of written tasks, yet few have received formal writing training since leaving school. Complex cases can involve correspondence with parents and professionals unfamiliar with the jargon and practices of ICU. Poor communication can be dangerous, and when things go wrong, written records may be crucial to the outcome of legal cases.

Methods: In Late 2012, in collaboration with the Royal Literary Fund, Great Ormond Street Hospital ICU began a brief pilot project to see whether staff would welcome the opportunity to receive one-to-one advice from a professional writer. Medical, nursing, and administrative staff at all levels took advantage of the scheme. Topics ranged from everyday written work, and the challenges faced by those for whom English is not their first language, to the refinement of articles for learned journals.

Results: Close examination of how and why familiar writing tasks were performed brought suggestions for changes and developments in custom and practice. Unexpected areas for attention, such as potential pitfalls in email correspondence, were highlighted and addressed.

Conclusion: Our presentation will describe how the project was conducted, outline the response of individual members of staff to the scheme, and attempt to assess its impact on the written output of the unit. We will explore the potential for future developments, and for implementing similar schemes elsewhere, with a view to enhancing the professional skills of individuals and reducing the reputational and legal risks for institutions in which they work.

211 – POSTER SESSION

WHICH PATIENTS ARE AT RISK TO SUFFER FROM ADVERSE EVENTS IN PICU? A PROSPECTIVE COHORT STUDY

E. Veldhoen, E. Schouten, J. Eising, A. van Vught, C. Bollen

University Medical Center Utrecht, Utrecht, The Netherlands

Background and aim: Adverse events are of major interest, not only because of their impact on patients but also because they provide a measure of quality of health care and opportunity for improvement. This study aimed to identify, at admission, patients at increased risk to experience one or more adverse events in PICU.

Methods: All adverse events were registered prospectively during a 13 month period in a 14-bedded PICU. Univariate and multivariable logistic regression analysis was conducted, to identify at admission patients who will suffer from one or more adverse events.

Results: During the study period the PICU had 658 admissions, with a total of 4,380 patient days. The overall adverse event rate was 0.45 per admission and 68 per 1,000 patient days. Independent positive predictors were PRISM 2 score (truncated above 10) and TISS score (truncated above 25) at admission, significant past medical history and invasive ventilation at admission. Increasing age was a positive predictor above the age of seven and a negative predictor below seven years. Independent negative predictors were transport by PICU retrieval team and immediate postoperative admissions.

Conclusion: We identified in our PICU which patients are at risk to experience adverse events. This will hopefully facilitate targeted interventions to prevent adverse events.

212 – POSTER SESSION

SAFETY VS. EFFICIENCY: READMISSION AFTER OUT OF HOURS (OOH) PICU DISCHARGE

A. Wagh, G. Sefton, E. Scott, P. Baines

PICU, Alder Hey Children's Hospital NHS Trust, Liverpool, UK

Background and aims: Readmissions within 48 h of PICU discharge are a measure of quality of intensive care service. With ever increasing bed pressure, concerns have been raised that OOH PICU discharge is becoming more frequent. We aim to study effect of OOH discharge on readmissions (rate/morbidity/mortality).

Methods: A single centre (PICU, Alder Hey Children's NHS Trust) retrospective review of prospectively collected database over 10 years (January 2003–December 2012). The PICU is a 22 bed cardiac and general unit with around 1,100 admissions per year. OOH were defined as hours between 17:00 and 08:00 hours, weekends, and bank holidays.

Results: Of the total 9,471 PICU episodes eligible, 330 were admitted with in 48 h (3.36 %). 4,910 (50 %) were discharged OOH and 4,890 office hours. The 48 h readmission rate did not differ between the groups (3.1 vs 3.6 %). However, readmission PICU mortality rate was significantly higher with OOH discharge as compared to office hours discharge (7.86 vs 1.31 %, P value 0.006). PIM2, ventilation days and PICU length of stay for the readmission episodes were not different between the two groups.

Conclusions: Readmission rate at our institution is comparable to the published data. There is no difference in 48 h PICU readmission rate between discharge during office hours or OOH time. However, with out of hours discharge there is significantly increased readmission mortality.

References:

1. Elliott M (2006) *Aust Crit Care* 19(3):96–8, 100–4
2. Kramer A (2013) *Crit Care Med* 41(1):24–33

3. Odetola F (2007) *Pediatr Crit Care Med* 8(4):343–7 (CEU quiz 357)

4. Namachivayam P (2010) *Pediatr Crit Care Med* 11(5):549–55

213 – POSTER SESSION

ROLE OF ALBUMIN DIALYSIS WITH THE MOLECULAR ADSORBENT RECIRCULATING SYSTEM (MARS) IN PAEDIATRIC INTENSIVE CARE—A SINGLE CENTRE EXPERIENCE

K. Wojtalczyk¹, M. Migdal¹, K. Witulska¹, S. Prokurat², P. Kalicinski³

¹Anaesthesiology and Intensive Care, Children's Memorial Health Institute, Warsaw, ²Nephrology, ³Surgery and Transplantation, Children's Memorial Health Institute, Warszawa, Poland

Objectives: Aim of the study was to assess usefulness of extracorporeal liver support-albumin dialysis with the molecular adsorbent recirculating system (MARS) for treatment of paediatric patients with acute or acute-on-chronic liver failure.

Methods: Study was conducted in tertiary pediatric hospital (national reference centre for paediatric liver transplantations). Retrospective search on medical records of all MARS procedures performed since July 2001 until December 2010 in intensive care unit patients have been performed. All patients treated with at least 1 procedure of MARS, were included into analysis.

Results: During 10 years period MARS procedures were used for treatment of 68 patients (37 girls, 31 boys). Age of patients varied from 13 months to 23 years (mean age 10.7 years). Among patients treated with MARS procedures most frequent diagnosis were: acute intoxication (drugs/mushrooms)—19 children and Wilson disease—10 children. During analyzed period 188 MARS procedures were performed, in 48 patients more than one. Mean number of procedures per patient was 2.8 with highest number 9 procedures in one patient. Among all 68 patients treated with MARS 47 children survived (69 %): successful liver transplantation was performed in 26 children, in 21 patients liver functions and clinical status improved significantly without further need for liver transplantation.

Conclusions: Results of our study have shown that MARS albumin liver dialysis is effective tool for treatment of paediatric patients with acute liver failure or decompensated chronic liver disease bridging those patients to liver transplantation. The MARS treatment can contribute also to liver regeneration.

214 – POSTER SESSION

INCREASE OF CHILDREN WITH COMORBIDITIES IN ITALIAN PICU ADMISSIONS

A. Wolfler¹, P. Santuz², F. Savron³, J. Gualino⁴, M. Marano⁵, I. Salvo¹, on behalf of TIPNet Italian PICU Network

¹Anesthesia and Intensive Care, Children's Hospital Vittore Buzzi, Milan, ²Neonatal and Paediatric Intensive Care, Azienda Ospedaliera Universitaria Integrata, Verona, ³Anesthesia and

Intensive Care, Children's Hospital Burlo Garofalo, Trieste,
⁴*Anesthesia and Intensive Care, Children's Hospital Sant'Antonio e*
⁵*Biagio e, Alessandria, Anesthesia and Intensive Care, Bambino Gesù*
Children Hospital, Roma, Italy

Background: Pediatric critical care medicine have been significantly improved in the last decades with a reduction of morbidity and mortality. At the same time, the incidence of children with comorbidities increased: children with severe congenital or acquired diseases have a longer survival rate and represent an increasing percentage of patients admitted in PICU. Aim of this study is to evaluate incidence and describe chronic children admitted in Italian PICUs along 2 years.

Methods: All children admitted in 13 Italian PICUs in 2011 and 2012 were enrolled in the study. Beyond anagraphic and descriptive data children were divided in previously healthy or chronic if a comorbidity affected the patient on admission. Comorbidity was defined as the presence of a disease lasting at least for 6 months conditioning repetitive hospital admissions and/or a limitation in everyday life.

Results: Overall, 4,045 children were enrolled in the study which accounted for 4,578 number of PICU admissions. There was an increment of comorbid children from 41.8 % to 44.8 mainly affected by neurologic disease and it was observed in almost all the units and in all age categories. Length of stay and mortality was significantly higher in chronic than in healthy children. Readmission rate for chronic ranged between 8 and 13 %.

Conclusion: Children with comorbidities represent an increasing part of PICU admissions. They account for almost 65 % of PICU days. Social-economics relapse and cost-effectiveness analysis should be considered in order to be able to afford for all the needs in the future.

215 – POSTER SESSION

THE RELIABILITY AND VALIDITY OF TURKISH VERSION OF WHAT BEING THE PARENT OF A BABY IS LIKE SCALE

D. Yildiz, Y. Sanisoğlu

Gulhane Military Medical Academy, School of Nursing, Ankara, Turkey

The transition to motherhood is a major developmental life event. This study is planned for quantification of validity and confidence of “What Being the Parent of a Baby is Like (WPL)” scale in Turkish primipara mothers who have healthy, full-term infants. Study is composed by the 81 mothers. The scale was created by Karen Pridham, administrated to the mothers at the end of 1st week, 1st month and 3rd month. A questionnaire of socio-demographic aspects of mothers and “What Being the Parent of a Baby is Like” scale were used for the collection of the data.

Cronbach alpha coefficients which were collected from subscale are ranged between 10.13 and 82.07. Cronbach's alpha coefficients for administration of at 1 week, 1 month, and 3 months postpartum were at 0.87 on Evaluation, 0.68 on Centrality, and 0.75 on Life Change. The smallest data is assessed from the “Centrality of a Baby in the Parents Life” subscale and the highest data is assessed from the “Evaluation of Parents” subscale. All the subscale except the “Centrality of a Baby in the Parents Life” are appreciated that they have validity and reliability. Also it is accepted that these subscale can be used for the same aims in two publics. The scale can be used for evaluation of a mother's that has a new baby after

laboring, at the same time it can be used as a guide for compliance for motherhood.

216 (Abstract withdrawn)

Infection, Systemic Inflammation and Sepsis (217–289)

217 – POSTER SESSION

EVALUATION OF PROCALCITONIN AS A MARKER OF NEONATAL SEPSIS

A. Ahmed, A. Baki, T. Begum, N. Nahar

Department of Paediatrics and Neonatology, BIRDEM General Hospital, Dhaka, Bangladesh

Objective: Serum procalcitonin has been reported as a marker in the inflammatory response to the infection. The aim of the study was to assess the role of procalcitonin (PCT) level as a marker in the early diagnosis of neonatal sepsis.

Methods: This prospective study was conducted at Neonatal Intensive care unit of BIRDEM Hospital, Dhaka from July to December 2012. Procalcitonin level was measured in 70 neonates who were clinically suspected as sepsis. Leukocyte count, serum CRP, and blood culture were also performed.

Results: The results of blood culture showed that 46 (65.7 %) of samples were positive. Among them, 18 (39.1 %) had bacterial growth and 28 (60.8 %) fungal. The most frequent bacteria isolates were *Klebsiella* (38.8 %) and *Acinetobacter* (22.2 %). Leucopenia was found in both groups. Fifty-two percent had raised CRP in culture positive and 33.3 % in culture negative cases, the differences were statistically significant ($p < 0.05$). Regarding procalcitonin (PCT), 76.1 % in culture positive and 79.2 % in culture negative cases were positive, the differences were not significant and when PCT $> 5,000$ pg/ml, the differences were statistically significant in culture positive and culture negative cases ($p < 0.05$). Nine cases died, of them all had PCT > 500 pg/ml. Four of them had culture positive and had PCT $> 5,000$ pg/ml.

Conclusion: PCT increase in neonates with suspected sepsis, but significantly increase in culture positive cases and mortality was seen with high PCT level in culture positive cases. It could be a sensitive marker in early diagnosis of sepsis in neonates.

218 – POSTER SESSION

HUMAN METAPNEUMOVIRUS IN JORDAN: PREVALENCE AND CLINICAL SYMPTOMS IN HOSPITALIZED PEDIATRIC PATIENTS AND MOLECULAR VIRUS CHARACTERIZATION

A. Alshurman^{1,2}, L.M. Qaisy¹, M.M. Meqdam², A. Alkhateeb¹, A. Al-Shorman¹, H.O. Al-Rousan¹, M.S. Al-Mogbel²

¹*Princess Rahma Hospital MOH, ²Jordan University of Science and Technology, Irbid, Jordan*

Respiratory viral infections account for significant morbidity and mortality especially in young children worldwide. Human metapneumovirus (hMPV) causes illnesses ranging from mild respiratory

problems to bronchiolitis and severe pneumonia. From January to December 2007, 220 nasopharyngeal aspirates were collected from children younger ≤ 13 years old hospitalized with lower respiratory tract infection to detect hMPV by reverse transcription-polymerase chain reaction and to clone and sequence the hMPV-positive samples. Human metapneumovirus was detected in 28 (12.7 %) specimens with a median age of 7 months (range 1.3–24 months). Human metapneumovirus type A and type B were detected in 26 (93 %) and 8 (28.6 %) of specimens, respectively. Coinfection with hMPV type A and type B was detected in 6 (21.4 %) specimens positive for hMPV. The major clinical diagnosis of hMPV-positive patients was bronchiolitis (75 %).

Human metapneumovirus and hMPV type B were found to be significantly associated with bronchiolitis ($P = 0.03$ and 0.01 , respectively). Human metapneumovirus and hMPV type A were found to be significantly associated with pneumonia ($P = 0.004$ and 0.002 , respectively). The main symptoms in patients infected with hMPV were cough (92.9 %), fever (82.1 %), and wheezing (78.6 %), with a significant association of hMPV type A with fever ($P = 0.018$).

219 – POSTER SESSION

SEVERE SEPSIS IN IMMUNODEPRESSED CHILDREN IN AN INTENSIVE CARE UNIT

M. Amado, M. Costa, J. Rios, L. Boto, C. Camilo, F. Abecasis, M. Vieira

Hospital de Santa Maria, Centro Hospitalar Lisboa Norte, Lisbon, Portugal

Background: Immunodepressed patients have a higher risk of sepsis, which is related with high morbidity and mortality. Yet, early institution of antibiotic therapy and quick transfer to an intensive care unit has increased survival rate.

Aims: Characterize the immunodepressed patients with severe sepsis admitted to the Pediatric Intensive Care Unit of the Centro Hospitalar de Lisboa Norte.

Methods: Retrospective and descriptive study of the medical records of children admitted with severe sepsis from January 1st 2009 till December 31st 2012.

Results: A total of 57 children with severe sepsis were admitted, 25 were immunodepressed (18 with malignancies, 7 with primary immunodeficiency, 10 had previously received a bone marrow transplant), 16 were in bone marrow aplasia. Median age was 9 years (10 months–17 years) and 56 % were male. Average PRISM was 15. The causative agent was isolated in 12 patients (48 %), mostly bacteria isolated from blood. All patients needed fluid bolus and 21 needed vasoactive and/or inotropic drugs. Nine patients underwent hydrocortisone therapy. Twenty children had two or more organ-failure. Twelve children were ventilated (average 7 days), seven non-invasively and four needed renal replacement therapy. Six patients needed parenteral nutrition. The median length of PICU stay was 7 days (3–41 days). Mortality rate was 28 %.

Comments: Immunodepressed patients, when compared to immunocompetent ones, have more severe forms of sepsis, with higher rates of multi-organ failure and mortality. Despite the clinical severity, the survival rate sustains the significant therapeutic investment in these patients.

220 – POSTER SESSION

GENDER MORTALITY DIFFERENCES OF INFANTS ON PICU

K. Amer¹, R. Basu Roy², R. Parslow³, T. McShane³, S. Nadel²

¹Kings College London, ²Imperial College NHS Trust, ³PICANET, London, UK

Background: Developed countries exhibit higher rates of PICU admission and case fatalities in male infants compared to females (Scott Watson et al., *Am J Respir Crit Care Med*, 2003). Contrastingly, in addition to the disease-specific protection vaccination offers, observational studies and randomised trials in developing countries have indicated possible non-specific effects of such vaccines, particularly in females (Aaby et al., *PIDJ*, 2007). Specifically, the diphtheria-tetanus-pertussis (DTP) vaccine has been associated with increased morbidity in females (Agergaard et al., *Vaccine*, 2011).

Aims: To understand whether this phenomenon is pertinent in the developed world, we hypothesised that non-specific vaccine effects would be demonstrated by differences in gender mortality and admission to PICU in infants with life-threatening infection.

Method: UK PICANET admissions data between January 2005 and January 2012 yielded 48,763 males and females <1 year of age. Mortality between genders was risk adjusted using the paediatric index of mortality 2 (PIM2). Statistical analysis was conducted using the Pearson's Chi squared model to achieve probability values.

Results: Crude and adjusted mortality was increased in females under 12-months-old in comparison to males. The risk adjusted OR is 1.18 (1.08–1.29; $p < 0.001$) using PIM2. This appears strongest in children with a respiratory diagnosis, where the OR is 1.48 (1.2–1.82; $p < 0.001$).

Conclusion: Primary analysis suggests clear gender differences in mortality. These differences relate to respiratory, as apposed to other infectious diagnoses. Further analysis of the data, focusing on immunization status is warranted.

221 – POSTER SESSION

RAPID REMOVAL OF MYOGLOBIN WITH THE HCO 1100 FILTER IN 5 CHILDREN WITH RHABDOMYOLYSIS

O. Amon, E. Heimberg, I. Gerbig, M. Kumpf, H. Billing, C. Fink

University Children's Hospital Tuebingen, Tuebingen, Germany

The High CuT Off (HCO) 1100 Dialysis filter for elimination of light chains in multiple myeloma is able to remove plasma components up to 45 kDa. Myoglobin (Molecular weight 17.8 kDa) may lead to rhabdomyolysis-associated renal failure.

We have treated five children with rhabdomyolysis with the HCO filter. Cause of rhabdomyolysis were trauma, infection and multiorgan failure ($n = 1$ each) and severe limb ischemia ($n = 2$). The four boys and one girl were 2–15 years old with a body weight of 11–60 kg. Mean initial myoglobin value was 43.227 (range 1.876–102.300) $\mu\text{g/L}$. The patients were treated for 12 h with the HCO filter, followed by conventional CVVH. At the end of the 12-h HCO treatment period the myoglobin values had decreased to a mean of 12.250 (range

396–42,000) $\mu\text{g/L}$. Additional 2 HCO treatments for 12 h each were performed in two and an additional one HCO treatment was performed in one patient—each treatment followed by 12 h of conventional CVVH. After this second or third HCO treatment course the myoglobin values had dropped to 927, 983 and 1,483 $\mu\text{g/L}$. During the 12 h-periods of conventional CVVH the myoglobin values did not decrease. Four children survived, one child died from multiorgan failure. Dialysis treatment could be discontinued in the survivors within a mean of 6 days after HCO treatment (range 1–14 days).

In our experience HCO filter treatment is superior to all other treatments used to remove myoglobin in childhood rhabdomyolysis. Human albumin substitution is necessary.

222 – POSTER SESSION

PAEDIATRIC TB IN HIV ERA IN SUB-SAHARAN AFRICAN PERSPECTIVE

M. Anwar

Department of Paediatrics, Stanger Hospital, Stanger, South Africa

TB is the number one cause of death in children with HIV in sub-Saharan Africa. In the last three decade TB cases rates have increased dramatically in countries with high HIV prevalence. In South Africa alone 16 % of children accounts for all TB cases of which 25–60 % are HIV co-infected. Actual TB rates are much higher and have been under-reported in public health system.

Problems in detection and difficulties in diagnosis in children pose some challenges. The most widely used method of TB testing, the sputum smear, and show false negative in 87 % of the cases. Overlapping lung diseases (pneumonia, bronchiectasis) in HIV-positive children often lead to diagnostic error or delayed diagnosis of TB resulting in high infant mortality rate. This challenge is further compounded by the Multi Drug Resistant (MDR) strain of the disease. In 2010, The World Health Organization (WHO) endorsed PCR assay based diagnostic tools for TB such as Gene Xpert and MDR/RIP for children. These are more reliable diagnostic tools which results obtained within hours.

In Paediatric patients evolution showed Gene Xpert detected twice as many cases (75.9 %) as smear (38 %). Unfortunately these are still not widely available owing to high cost.

Research, funding and trained personnel is needed for improving the diagnosis and treatment of smear-negative TB in children. Collaboration is required between public and private sectors battle this pandemic disease. TB is a multisystem disease and is correlated to HIV. If the HIV can be controlled, TB will controlled.

223 – POSTER SESSION

ASYMMETRIC DIMETHYLARGININE AND L-ARGININE LEVELS IN NEONATAL SEPSIS AND SEPTIC SHOCK

O. Aydemir, B. Ozcan, H. Yucel, A.Y. Bas, N. Demirel

Department of Neonatology, Etlik Zübeyde Hanim Women's Health Teaching and Research Hospital, Ankara, Turkey

Aim: Nitric oxide (NO) formed in endothelium by the enzyme NO synthase (NOS) from L-arginine, is an important mediator for pathogen elimination. Being a potent vasodilator NO is also implicated in

pathogenesis of hypotension and decreased organ perfusion in sepsis. Asymmetric dimethylarginine (ADMA) is an endogenous NOS inhibitor shown to contribute to regulation of vascular tone. We aimed to investigate ADMA and L-arginine levels in neonatal sepsis and their relation to disease severity.

Methods: A prospective controlled study was conducted including 31 neonates with sepsis and 20 healthy controls. Serum ADMA and L-arginine levels were measured within 24 h of sepsis diagnosis. Clinical and laboratory data including clinical risk index for babies (CRIB) score, presence of septic shock, severe sepsis, multi organ dysfunction syndrome (MODS) and death were recorded. Presence of severe sepsis, MODS or death was defined as poor outcome.

Results: L-arginine and ADMA levels were significantly higher in neonates with sepsis compared to controls ($p = 0.029$ and $p = 0.001$, respectively). Neonates with septic shock ($n = 9$) had higher L-arginine ($p = 0.012$) and ADMA ($p = 0.026$) levels. L-arginine and ADMA levels were similar among patients with clinical, gram positive and gram negative sepsis. Patients with poor ($n = 6$) and good outcome ($n = 25$) had similar L-arginine and ADMA levels. ADMA levels were correlated with CRIB score ($p = 0.320$, $p = 0.025$).

Conclusion: L-arginine and ADMA levels are increased in neonatal sepsis and even higher levels are observed in infants with septic shock. Further studies with larger sample size are needed to investigate their relation to organ failure and prognosis.

224 – POSTER SESSION

IN-LINE FILTRATION MINIMIZES ORGAN DYSFUNCTION: NEW ASPECTS FROM A PROSPECTIVE, RANDOMIZED, CONTROLLED TRIAL

M. Boehne, T. Jack, H. Köditz, K. Seidemann, F. Schmidt, M. Abura, H. Bertram, M. Sasse

Department of Pediatric Cardiology and Intensive Care Medicine, Hannover Medical School, Hannover, Germany

Background: Infused particles induce thrombogenesis, impair microcirculation and modulate immune response. We have previously shown in critically ill children, that particle-retentive in-line filtration reduced the overall complication rate of severe events, length of stay and duration of mechanical ventilation. We now evaluated the influence of in-line filtration on different organ function and thereby elucidated the potential underlying pathophysiological effects of particle infusion.

Methods: In this single-centre, prospective, randomized controlled trial 807 critically ill children were assigned to either control ($n = 406$) or filter group ($n = 401$), the latter receiving in-line filtration for complete infusion therapy. Both groups were compared regarding the differences of incidence rates and its 95 % confidence interval (CI) of different organ dysfunction as defined by the International Pediatric Sepsis Consensus Conference 2005.

Results: The incidence rates of respiratory (-5.06 %; 95 % CI, -9.52 to -0.59 %), renal (-3.87 %; 95 % CI, -7.58 to -0.15 %) and hematologic (-3.89 %; 95 % CI, -7.26 to -0.51 %) dysfunction were decreased in the filter group. No difference was demonstrated for the occurrence rates of cardiovascular, hepatic, or neurologic dysfunction between both groups.

Conclusions: In-line filtration has beneficial effects on the preservation of hematologic, renal and respiratory function in critically ill patients. The presented clinical data further support our hypothesis regarding potential harmful effects of particles. In critically ill patients infused particles may lead to further deterioration of the

microcirculation, induce a systemic hypercoagulability and inflammation with consecutive negative effects on organ function.

225 – POSTER SESSION

STAPHYLOCOCCAL AND STREPTOCOCCAL TOXIC SHOCK SYNDROME IN CHILDREN: CLINICAL CHARACTERISTICS, TOXINIC PROFILE AND VB T CELL SIGNATURES

P.-A. Bolze¹, C. Jamen², O. Dauwalder³, G. Lina^{3,4}, F. Vandenesh^{3,4}, Y. Gillet², E. Javouhey^{2,4}

¹Obstetrics and Gynaecology, Hôpital Femme Mère Enfant,

²Pediatric Critical Care Unit, Hôpital Femme Mère Enfant,

³Bacteriology Laboratory, Centre de Biologie et de Pathologie Est, Hospices Civils de Lyon, Lyon-Bron, ⁴University Claude Bernard Lyon 1, University of Lyon, Lyon, France

Objective: To compare characteristics and prognosis factors associated with Toxic Shock Syndrome (TSS) in children and analyze toxinic profile and Vβ T cell signatures in order to identify early diagnostic criteria of TSS.

Methods: A monocenter retrospective evaluation of bioclinical data and treatment outcomes was performed including 30 children with a definite or a probable case of Staphylococcal (n = 15) or Streptococcal TSS (n = 15), according to CDC criteria.

Results: The most frequent origins of Streptococcal and Staphylococcal TSS were lower respiratory tract and genital tract, respectively. Streptococcal TSS cases showed higher severity score (PIM2), higher organ dysfunction score (Pelod), more ventilatory support requirement, longer duration of intubation, and a trend of increased mortality when compared to Staphylococcal TSS cases. The absence of antitoxin therapy was associated with mortality. Non-menstrual Staphylococcal TSS cases were associated with more neurological disorders while menstrual Staphylococcal TSS presented more digestive disorders. We identified a significant precocious decrease and a later increase in T cell Vβ 2 signature of Staphylococcal TSS patients specifically associated with the presence of TSST-1. The level of activation of Vβ 2 repertoire and the number of organ failures were linked by a linear correlation in these latter patients.

Conclusions: This study helps to better define the circumstances of diagnosis and the clinical profiles of Staphylococcal and Streptococcal TSS. Diagnosis of TSS could then be evoked earlier and antibiotic treatment adapted faster. Further studies should evaluate the impact of precocious administration of specific treatment like intravenous immunoglobulins.

226 – POSTER SESSION

IN PICU PATIENTS WITH SUSPECTED INFECTION, FEVER IS NOT ASSOCIATED WITH DECREASED MORTALITY

T. Brick¹, M. Peters^{1,2}, P.-M. Fortune³, H. Winmill⁴, K. Morris⁴, R. Agbeko⁵, T. Dominguez⁶, A. Deep⁷

¹PICU/NICU, Great Ormond St Hospital,

²UCL Institute of Child Health, London,

³Paediatric Intensive Care Unit, Royal Manchester Children's Hospital, Manchester,

⁴Paediatric Intensive Care Unit, Birmingham Children's Hospital, Birmingham,

⁵Paediatric Intensive Care Unit, Great North Children's Hospital, Newcastle Upon Tyne,

⁶Cardiac Intensive Care Unit, Great Ormond St Hospital,

⁷Paediatric Intensive Care Unit, King's College Hospital, London, UK

Animal studies demonstrate that fever in infected animals is associated with decreased mortality. Fever in adult ICU patients with infection is also associated with a lower mortality. It is not known whether this is the case in critically ill children. We hypothesize that children in PICU with suspected infection who are febrile have a decreased mortality.

Prospectively collected data from unselected admissions to five UK PICUs were pooled. Data was obtained for 471 patients, ages 0–16. Data described patient demographics, maximum temperature in 1st 24 h of ICU stay, clinically suspected infection and survival before discharge from ICU.

Patients with suspected infection had a higher maximum temperature within the 1st 24 h of ICU stay compared with patients where infection was not suspected (Mean Temperature 38.1 vs 37.6 °C p < 0.001). The odds of death for patients with suspected infection who had temperatures ≥37.8 vs <37.8 °C was 0.35 (95 % CI 0.1–1.1). The odds of death for patients without suspected infection who were pyrexial (≥37.8 vs <37.8 °C) was 1.4 (95 % CI 0.61–3.42). This study did not demonstrate an association between decreased mortality and pyrexia in PICU patients with suspected infection. Variability in methods of temperature measurement, subjective assessment of suspected infection and the use of antipyretics and therapeutic cooling introduce noise into the sample. Further prospective work is needed, with standardized temperature measurement, greater patient numbers, consistency in assessment of infection, longer follow up and adjustment for illness severity.

227 – POSTER SESSION

PROCALCITONIN (PCT), C REACTIVE PROTEIN (CRP) AND LACTATE IN PREDICTING MORTALITY, SEPTIC SHOCK AND THE STRATIFICATION OF SEPSIS

R. Bustos Betanzo¹, C. Fuentes Saez², O. Padilla Perez³

¹PICU, Hospital Guillermo Grant Benavente, ²Department of Pediatrics, University of Concepcion, Concepcion, ³Department of Public Health, Catholic University, Santiago, Chile

Objectives: The use of biomarkers could be a tool for diagnosis, prognosis and stratifying children with sepsis. To analyze the value of PCT, CRP and lactate in predicting mortality, septic shock and the stratification of patients according to severity of sepsis.

Methods: Prospective study in 81 patients. Plasma levels of PCT, CRP and lactate were measured at admission in the PICU. Patients were categorized into systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis and septic shock.

Results: Concentrations of PCT (ng/ml) increased significantly according to the severity of sepsis: 0.36 (0–1.2) for SIRS, 1.96 (0.4–3.5) for sepsis, 7.5 (3.9–11.1) in severe sepsis and 58.9 (35.1–82.7) in septic shock (p < 0.001). Compared to CRP and lactate, the area under the ROC curve revealed a good discriminative power of PCT to predict septic shock and mortality, 0.91 (95 % CI 0.83–0.97) and 0.80 (95 % CI 0.69–0.88), respectively. Logistic

regression confirmed that the PCT is only relevant in predicting mortality OR 11(95 %CI 2.4–51) ($p = 0.02$).

Conclusions: In contrast to CRP and lactate, the determination of PCT in PICU admission is a good predictor of mortality and septic shock and can stratify patients according to severity of sepsis.

228 – POSTER SESSION

CRIMEAN CONGO HEMORRHAGIC FEVER IN IRANIAN CHILDREN, A CLINICAL AND PARA CLINICAL APPROACH

S. Chinikar, N. Shah-Hosseini, S. Khakifirouz, T. Jalali, B. Moghassemi

Arboviruses and Viral Hemorrhagic Fevers Laboratory (National Ref. Lab), Pasteur Institute of Iran, Tehran, Iran

Introduction: Crimean-Congo hemorrhagic fever (CCHF) is a tick-borne zoonotic disease caused by a single-stranded RNA virus belongs to the *Nairovirus* genus from Bunyaviridae family. CCHFV is transmitted by tick bite or by direct contact with blood or tissues of infected livestock or nosocomially.

Method: To diagnose CCHF in Iranian children, 529 sera samples were gathered from probable patients under 18 years old (aged 1–18) from different provinces of Iran during 2000–2012, molecular (RT-PCR) and serological (IgM, IgG) tests were applied.

Results: Among 529 suspected cases for CCHF, 23 % (126 cases) were IgM and/or RT-PCR positive and 19 cases were died. Among positive cases, boys with 67 % (85 cases) were the dominant gender. Fever with 96 % (123 cases), haemorrhagic with 35 % (45 cases) and myalgia with 23 % (30 cases) were dominant clinical findings. The laboratory experiments also showed thrombocytopenia in 96 % (123) of cases and leucopenia in 18 % (23) of cases.

Conclusion: Interestingly, the majority of confirmed cases were boy, which seems due to boys implication in high risk professions related to infected livestock such as slaughtering in rural areas. Concerning clinical approach, data demonstrated that fever, haemorrhage and myalgia were ranked among the most common clinical symptoms in children patients, respectively. In addition, thrombocytopenia was seen in the majority of patients.

229 – POSTER SESSION

SERIAL CRP IN RELATION TO HEMATOLOGICAL PARAMETER & MICROBIOLOGICAL PARAMETER FOR EARLY DIAGNOSIS OF NEONATAL SEPTICEMIA IN DEVELOPING COUNTRIES

C.B. Chowdhury

Neonatology, Chittagong Medical College, Chittagong, Bangladesh

The present study includes:

1. role of CRP, haematological parameter & blood culture in early diagnosis of neonatal sepsis
2. significance of serial CRP in diagnosis of neonatal sepsis
3. prognostic value of CRP in neonatal sepsis.

This is a prospective study done in neonatal unit, CMCH. The study was carried out from January 2008 to January 2011. Sample size was 300. 150 neonates with suspected sepsis as cases and 150 healthy babies as control were enrolled in this study. Of 150 cases of suspected neonatal sepsis total 80.7 % had raised CRP. In initial sample 70.39 % were CRP positive and in 2nd sample additional 9.31 % case were CRP positive. In control group 91 % were CRP negative. CRP was positive in 100 % of culture proven sepsis. Sensitivity of CRP was 80.67 % and specificity of CRP was 76.44 %. Leucocytosis was observed in 7 % of cases and leucopenia was found in 11 % of case. Sensitivity of leucocyte count was 18 % and specificity was 20.68 %. Thrombocytopenia was found in 28 % of case group. Out of 150 cases only 15.33 % yielded growth of organisms in blood culture. In culture positive cases, 87 % were found gram negative and 13 % were gm. positive. Sensitivity of blood culture was 15.33 % and specificity was 100 % CRP is the most sensitive method for early diagnosis of neonatal sepsis and found to be 100 % in culture proven sepsis and 80.7 % in suspected sepsis. Therefore, serial CRP can be taken as alternative method for diagnosis of neonatal sepsis specially in developing countries.

230 – POSTER SESSION

TIMING OF DEATH OF PAEDIATRIC SEPSIS CASES REFERRED FOR INTENSIVE CARE OVER A 7-YEAR PERIOD: IMPLICATIONS FOR INTERVENTIONAL STUDIES

M. Cvetkovic¹, D. Lutman¹, P. Ramnarayan², M.J. Peters¹

¹Great Ormond St Hospital, ²St Mary's Hospital, London, UK

Early deaths in paediatric severe sepsis will limit the impact of novel therapies that can only be provided on the paediatric intensive care unit (PICU) and the relevance of randomised trials employing standard consent procedures. We hypothesised that the majority of deaths in children with severe sepsis occur very early (within 24 h of referral to intensive care).

Methods: Consecutive referrals to the Children's Acute Transport Service (CATS), London, UK between 1 January 2005 and 31 December 2011 were reviewed. Cases aged 0–15 years with a working diagnosis of 'sepsis', 'severe sepsis', 'meningococcal sepsis' or 'septic shock' were studied. Age, sex, PIM-2 score, infectious organism, severity of sepsis, distance to PICU, times of referral and death, and survival status to 1 year were recorded.

Results: Out of 13,409 referrals made to CATS, 703 (5.3 %, 95 %CI) met inclusion criteria. Survival data were not available for 81 patients. 133 (21 %, 95 % CI 17–23 %) died in the first year after referral. Of these, 68/133 (54 %, 95 % CI 46–63 %) children died in the first 24 h after referral.

The survival curve for the whole cohort is presented showing survival in the first month by hour. The Majority of deaths occur within the first 48 h.

Fig. 1 Kaplan–Meier survival curve

Discussion: This large observational study demonstrates that the majority of deaths in paediatric sepsis occur very early in the clinical course. This has important implications for clinical trial and service developments. There is also significant late mortality >28 days.

231 – POSTER SESSION

PERSISTENTLY POSITIVE BLOOD CULTURE: SEARCH FOR ETIOLOGY

K. Demova, F. Bauer

Clinic of Neonatology, Faculty Hospital, Nove Zamky, Slovak Republic

Background and aim: Persistently positive blood culture, persistent thrombocytopenia in the investigation of neonates leads us to search for the etiology and should alert to the possibility of serious diagnosis.

Case report: We report an infant born at 28 w.g. by cesarean section due to maternal bleeding. Birth weight 1,100 g, Apgar score 8/8. ANS prophylaxis was not done, without PPROM.

On day of life 7 sepsis was developed. Empiric ATB was started (vancomycin, gentamycin). CONS was isolated from blood culture repeatedly despite of appropriate ATB therapy. Central line was not present. The CSF was negative; the child was without focal infections. Chest radiograph and the cranial ultrasound were normal.

The echocardiography examination in structurally normal heart demonstrated tricuspid valve endocarditis with right ventricular partial inflow obstruction, vegetation on the tricuspid valve and moderate tricuspid valve regurgitation. Cardiac murmur was present.

We changed the empiric therapy to targeted (teicoplanin, gentamycin).

Hospitalization was complicated by an episode of pulmonary embolism with signs of respiratory failure and required mechanical ventilation.

We treated the baby with antibiotics for 6 weeks.

Conclusion: In the investigation of neonates with persistently positive blood culture and persistent thrombocytopenia despite of absence of CVC or CHD echocardiography should be valuable tool.

232 – POSTER SESSION

MATRIX METALLOPROTEINASE-2 AND METALLOPROTEINASE-9 IN VARIOUS CLINICAL SPECTRUM OF CHILDHOOD DENGUE VIRAL INFECTION AND ITS RELATIONSHIP WITH ACUTE PHASE HEMATOCRITE

D.L.H. Dzulfikar¹, A. Sukadi¹, H. Garna¹, M.N. Shahib²

¹Department of Child Health, Faculty of Medicine, Universitas Padjadjaran/Hasan Sadikin General Hospital, ²Department of Biochemistry, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

Dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) are caused by increasing in vascular permeability which leads to plasma leakage into extravascular compartment. Previous research in vitro and in vivo showed overproduction of MMP-2 and MMP-9 causing leakage in vascular endothelial. This has not been proved in human, therefore it needs to be tested the relation between serum MMP-2 and MMP-9 in various clinical spectrum of dengue and acute phase hematocrite. This was an analytical observational study, a cross sectional design, involved 1 month–14 years old admitted to Hasan Sadikin Hospital with diagnosis dengue fever (DF), DHF, or DSS from February 2010 to December 2012. There were 80 children included, 26 with DF, 29 with DHF, and 25 with DSS. The result showed a significant serum MMP-2 level in acute and convalescence phase at all spectrum of dengue ($p < 0.005$), and in groups there were significant differences between DHF ($p = 0.020$) and DSS ($p < 0.001$). Serum MMP-9 level also showed a significant differences in acute and convalescence phase at all spectrum of dengue ($p < 0.001$). In groups, there were also significant differences in each group DF, DHF, and DSS ($p < 0.001$). However, MMP-2 and MMP-9 level in convalescence phase were higher than in the acute phase. Linier regression analysis showed a significant relationship between serum MMP-2 and MMP-9 and hematocrite in acute phase.

Conclusion: Serum MMP-2 level was higher than MMP-9.

233 – POSTER SESSION

HEAT SHOCK PROTEIN 70 EXPRESSING STRESS IN SEPSIS: UNBRIDGEABLE GAP BETWEEN ANIMAL AND HUMAN STUDIES

M. Fytrolaki¹, E. Briassouli², G. Briassoulis¹

¹University of Heraklion, Heraklion, ²University of Athens, Athens, Greece

Background: Heat shock protein 70 (Hsp70) exhibits a protective role by facilitating immunological responses during times of increased risk of pathogenic challenge and/or tissue damage.

Purpose: To ascertain Hsp70 protective effect differences between animal and human studies in sepsis.

Data sources: Electronic literature search of PubMed (1994–2012).

Study selection: Title and abstract review followed by full-text review.

Data extraction: Two authors independently abstracted data on studies type, induction methods used, Hsp70 measurements, association with biomarkers, apoptosis, organ damage, inflammation, and clinical protective effect.

Data synthesis: Forty-one in vivo (56.1 %), in vitro (17.1 %) or combined (26.8 %) animal and 14 in vivo (2) or in vitro (12) human Hsp70 studies ($p < 0.0001$) were enrolled in analysis. Of the 14 human studies, 50 % showed a protective Hsp70 effect compared to 95.8 % protection shown in septic animal studies ($p < 0.0001$). Only human studies reported Hsp70-associated mortality (21.4 %) infection (7.1 %), or reported results (14.3 %) non-protective ($p < 0.001$). In animal models, any Hsp70 induction method tried (heat shock, glutamine, exogenous or gene Hsp70) increased intracellular Hsp70 (100 %), compared to 57.1 % of human studies ($p < 0.02$), reduced pro-inflammatory cytokines (28/29), organ damage (27/27), clinical deterioration (19/20), and enhanced survival (18/18).

Conclusion: Animal studies show Hsp70 protective effect in sepsis. Human studies are inconclusive, showing either protection (in vitro) or a possible relation to mortality and infections (in vivo). This might be due to the fact that using ever-more-purified target cell populations in animal models, a lot of clinical information regarding the net response that occurs in sepsis is missed.

234 – POSTER SESSION

VALUE OF ROUTINE CENTRAL LINE TIP CULTURING IN NEONATAL INTENSIVE CARE UNIT: A RETROSPECTIVE MICROBIOLOGICAL STUDY

H. Gowda, B. Jenkins, A. Coe

Neonatal Intensive Care Unit, University Hospital of Coventry and Warwickshire, Coventry, UK

Background and aims: Central catheters such as umbilical venous catheters (UVC), umbilical arterial catheters (UAC) and percutaneous long lines (LL) are routinely inserted in Neonatal Intensive Care Units (NICU). These catheters may become colonised or act as foci for sepsis. At removal it is a common practice in many NICUs to send tips routinely for bacterial culture and sensitivity.

We examined the bacteriology associated with catheter tips after removal.

Methods: Retrospective observational study in UK tertiary NICU of all indwelling catheters removed from April 2012 to Sept 2012. All UVC, UAC and LL tips sent for culture during the 6-month period were analysed.

Results: 137 tips were sent during study period of which 10 % (14) had positive growth:

Catheter tips positive and negative culture

Catheter/line type	Tip culture positive	Tip culture negative
UAC	4 (10 %)	37 (90 %)
UVC	1 (2 %)	42 (98 %)
Unspecified umbilical line	2 (20 %)	8 (80 %)
Percutaneous long line	7 (12 %)	50 (88 %)
Total	14 (10 %)	137 (90 %)

8, scanty growth of skin flora; 5, CONS; 1, *Enterobacter*

Of the six true positive cases, five babies were well, so no action was taken. In the 6th antibiotics started previously for suspected line infection continued.

Conclusions: The positive culture rate (excluding skin contamination) in all type of catheter/line tips was 4 %.

Sending line tips for culture in unwell babies, or when line infection is suspected, is more useful than sending routinely in well babies.

235 – POSTER SESSION

OBSERVATIONAL STUDY OF ROUTINE ENDOTRACHEAL TIP CULTURING IN NEONATAL INTENSIVE CARE UNIT

H. Gowda, B. Jenkins, A. Coe

Neonatal Intensive Care Unit, University Hospital of Coventry and Warwickshire, Coventry, UK

Background and aims: Endotracheal (ET) tubes are routinely used for intubation in Neonatal Intensive Care Units (NICU). These tubes may become colonised or act as foci for respiratory infection/sepsis. At removal it is a common practice in many NICUs to send tips routinely for culture and sensitivity.

We examined the bacteriology associated with ET tube tips after removal.

Methods: Retrospective observational study in UK tertiary NICU of all ET tube tips from April 2012 to Sept 2012. All ET tube tips sent for culture during the 6 month period were analysed.

Results: 110 ET tube tips were sent during study period. 28 (25 %) had a positive culture.

There were multiple tips from same patient, which grew the same bacterial growth because of colonisation.

ET tip culture in each patient

Patient	A	B	C	D	E	F
Number of ET tips sent	6	4	3	2	2	2
Bacterial growth	<i>Enterobacter</i>	Coagulase negative <i>Staphylococcus</i> (CONS)	CONS + <i>E. coli</i>	<i>Enterobacter</i>	CONS + <i>Acetobacter</i>	CONS + <i>Enterobacter</i>

In rest of the nine patients only a single tip was sent which grew respiratory commensals and CONS.

None of the positive cultures led to antibiotic prescription.

Type of bacterial growth

Type of bacterial growth	CONS	<i>Enterobacter</i>	<i>E. coli</i>	<i>Enterococcus</i>	Group B <i>Streptococcus</i>	<i>Staph. aureus</i>	<i>H. influenzae</i>	<i>Acetobacter</i>	<i>Candida</i>
Number ET tips	10	7	7	1	1	1	1	1	1

30 bacterial growth from 28 tips

Conclusions: Most of the positive ET-tube tips were due to colonisation. None of them warranted antibiotic prescription. Sending routine ET-tube tips for culture is not beneficial. Endotracheal secretions for culture may be more useful if there is clinical concern of respiratory infection in ventilated neonates.

236 – POSTER SESSION

DOES UTILIZATION OF NYSTATIN PROPHYLAXIS CAUSE INCREASED FREQUENCY OF INFECTIONS BY RESISTANT *CANDIDA* SUBSPECIES IN VERY LOW BIRTH WEIGHT INFANTS?

N. Guzoglu¹, M.Y. Oncel¹, S.S. Oguz¹, Z. Eras¹, U. Dilmen^{1,2}

¹Zekai Tahir Burak Maternity Teaching Hospital, ²Yildirim Beyazit University, Ankara, Turkey

Background: Oral nystatin prophylaxis was routinely administered for very low birth weight infants in our NICU.

Objective: This study aimed that compare the antifungal resistance and the change of fungal ecology in the case of IFI between the pre-prophylaxis and the prophylaxis periods.

Methods: We retrospectively evaluated all the invasive fungal infections (IFI) determined in VLBW infants in our NICU. Infants infected with *Candida* spp. and antifungal resistance were identified and the incidence rates of infection by these *Candida* spp. were calculated. A comparison was made of the prophylaxis period with the pre-prophylaxis period.

Results: The rate of IFI per year was 0.5 % in the pre-prophylaxis period and 0.2 % in prophylaxis period ($p = 0.01$). Although the incidence of IFI-related *C. albicans* during the prophylaxis period was lower than that of pre-prophylaxis period (70.6–58.8 %), *C. albicans* was the leading pathogen in the two groups. There were no significant differences in the infants in pre-prophylaxis group compared to prophylaxis group with regard to susceptibility to fluconazole, itraconazole, variconazole, and amphotericin ($p > 0.05$).

Conclusion: In our study, we observed that nystatin was effective for prophylaxis, and that it decreased the incidence of IFI without causing resistance in *Candida* spp. or alteration of fungal ecology in VLBW infant admitted to the NICU.

237 – POSTER SESSION

MORBIDITY AND MORTALITY IN A PICU: THE STREPTOCOCCI

K.L.E. Hon, K.L. Cheung

The Chinese University of Hong Kong, Hong Kong, Hong Kong S.A.R.

Aim: We investigated morbidity/mortality associated with streptococcal infection and PICU admission.

Methods: Retrospective study between 2002 and 2012 of every child with a laboratory isolation of Streptococcus was included.

Results: There were a 29 PICU patients with streptococcal isolations including *Streptococcus pyogenes* (Group A streptococcus, GAS, $n = 5$), *Streptococcus agalactiae* (Group B streptococcus, GBS, $n = 5$), *Streptococcus pneumoniae* (SP, $n = 16$), *Streptococcus bovis* ($n = 1$), *Streptococcus intermedius* ($n = 1$) and alpha-hemolytic streptococcus ($n = 1$). Comparing GAS, GBS and SP, the pulmonary system (pneumonia, pleural effusion) was more likely affected by GAS or SP ($p = 0.033$), whereas GBS more often caused meningitis (0.008). All GAS and GBS and the majority of SP (86 %) were sensitive to penicillin (minimum inhibitory concentrations 0.06–2.0 µg/ml). All SP specimens were sensitive to cefotaxime and vancomycin. These infections were associated with high PICU mortality of 40, 20, 13 %, respectively. Among the SP, the majority (70 %) were healthy children younger than 5 years (median 2.1 years), whereas children older than 5 years (median 10.1 years) had significant higher prevalence of premorbid conditions such as malignancy, mental retardation/cerebral palsy (MRCP) ± seizure disorders, chromosomal or genetic disorders ($p = 0.003$). Serotypes were obtained in some of these specimens which included 19A, 19F, 6B, 3 and 6C. There were two SP deaths with multi-organ system failure and hemolytic uremic syndrome.

Conclusions: Severe streptococcal infections are associated with a significant morbidity and mortality despite treatment with systemic antibiotics and ICU support. The expanded coverage of newer polyvalent pneumococcal vaccines might have prevented pneumococcal infections by serotypes 19A, 19F, 6B and 3.

238 – POSTER SESSION

AN AUDIT OF VENTILATOR ASSOCIATED PNEUMONIA (VAP) IN A CHILDREN'S INTENSIVE CARE UNIT

J. Howes, S. Mittal, M. Duthie, P. Barry, A. Vora

Department of Children's Intensive Care, University Hospitals of Leicester, Leicester, UK

Objectives: VAP is a significant cause of morbidity and mortality, increasing duration of hospital stay and resource utilisation. Centre for Disease Prevention and Control (CDC) guidance highlights the gold standard of Broncho-alveolar lavage (BAL) in diagnosing VAP, followed by antibiotic duration of 5–7 days treatment. Prevention measures of hand hygiene, semi-recumbent bed position, daily sedation interruption, gastro prophylaxis, verification of NG tube position and regular antiseptic mouthcare are recommended. The audit aims were to identify the incidence of VAP in our unit and assess whether CDC management recommendations were adhered to.

Methods: We performed a retrospective audit over two consecutive winters (October to February 2010/11 and 2011/12,) identifying patients in whom samples for BAL and Endotracheal aspirate (ETA) had been taken, reviewing case notes to identify clinical, radiological and laboratory criteria for VAP and assessing whether CDC recommendations were followed.

Results: 402 patients were admitted to CICU during these periods. 77/77 (100 %) were nursed at 30–45° and 75/77 (97 %) were turned regularly. NG tube placement was verified in 72/77 (93 %) and 39/77 (51 %) received gastroprophylaxis. Daily sedation interruption occurred in 24/77 (31 %). None received antiseptic mouthcare (0 %). VAP incidence was 7 % (28/402). Antibiotics were given for a mean of 6.32 days (range 3–12 days).

Table 1

Management Criteria	Number of patients in which achieved (n = 77)	%
Nursed at 30–45°	77	100
Patient turning	75	97
Verification of NGT position	72	93
Gastro prophylaxis	39	51
Daily sedation interruption	24	31
Mouth care with oral antiseptic	0	0

Conclusions: VAP has an incidence of 7 % in our hospital. We have since changed our mouthcare policy in line with CDC recommendations and are formulating a VAP guideline, reiterating the importance of admission and repeat BAL with clinical change. Repeat auditing is planned.

239 – POSTER SESSION

CASE SERIES OF PAEDIATRIC INTENSIVE CARE PATIENTS WITH RHABDOMYOLYSIS: A UNIT'S EXPERIENCE

A. Hussey, K. Sykes, J. Pappachan, I. Macintosh

PICU, University Hospital Southampton, Southampton, UK

Objectives: Acute renal failure (ARF) occurs in 42–50 % [1] of paediatric cases with rhabdomyolysis. Hyperhydration, diuresis, urinary alkalinisation, and haemofiltration (CVVH) are common strategies with limited supporting paediatric data or guidance.

Methods: Retrospective data collected on patients diagnosed with rhabdomyolysis on Southampton PICU, UK from 1st January 2012 to 31st December 2012.

Results: Six patients were diagnosed with rhabdomyolysis:

- 5 month old—PVL *Staphylococcus aureus* septic shock.
- 4 year old—Femoral artery embolus.
- 16 year old—Traumatic subdural haematoma who developed polymorphic VT secondary to propofol syndrome.
- 14 year old—Malignant hyperthermia with a 30 min VT/asystolic arrest and placed on venoarterial ECMO.
- 10 year old—Malignant neuroleptic syndrome.
- 3 month old—Toxic shock from necrotising fasciitis with a 32 min asystolic arrest.

Conclusions: We only investigate high-risk patients and those with macroscopically suspected myoglobinuria. It is likely we fail to diagnose many cases.

Morbidity and mortality will be multifactorial and predominantly diagnosis-dependent. Two patients rapidly died due to conditions that caused widespread rhabdomyolysis and intractable ARF despite maximal treatment.

All survivors received urinary alkalinisation (never adequately achieved in any patient), diuresis and hyperhydration; and some responded to this treatment. Two patients needed CVVH to treat ongoing rhabdomyolysis and ARF with good effect.

We suggest that rhabdomyolysis is under-recognised and that CVVH should be considered earlier in the management.

References:

1. (2006) Pediatrics 118(5):2119–25.
Acute pediatric rhabdomyolysis: causes and rates of renal failure
Mannix R et al.

240 – POSTER SESSION

BLOOD CULTURE ISOLATES IN A TROPICAL NEWBORN UNIT: A 5 YEAR REVIEW

E. Isaac, I. Jalo, Y. Alkali, M. Lano, G. Yohanna, B. Idris, A. Popoola, G. Galadima, N. Nicodemus, J. Aiphayo, A. Umar, K. Ebisike, A. Ajani, R. Aliu, O. Wariri, V. Burak, H. Bakari, L. Adebisi, A. Kudi, S. Umar, M. Charanchi

Federal Medical Centre Gombe, Gombe, Nigeria

Background/aims: Despite advances in perinatal care, Neonatal sepsis is a significant cause of morbidity and mortality in the tropics. It accounts for 30–70 % of neonatal mortality.

Delay in diagnosis and treatment results in poor outcome; surveillance identifies common pathogens thus guiding empiric therapy.

This review describes pathogens in neonatal sepsis in our facility.

Methods: A retrospective review of blood culture reports from January 2008–December 2012 of newborns admitted into the SCBU of the Federal Medical Centre Gombe was conducted. Information regarding age, sex and isolates were analysed. The average yearly admission is 650 neonates.

Results: 2,114 blood cultures were analysed and these constituted 40 % (2,114/5,276) of all childhood blood cultures. Male neonates constituted 53 % (1,118/2,114) and females 47 % (996/2,114).

13.3 % (282/2,114) of newborn cultures were positive. There were more isolates in males 52 % (148/282) than females 48 % (135/282). 51 % (143/282) of pathogens were isolated during the wet season and 49 % (139/282) in the dry season.

Gram Negative pathogens constituted 52 % (147/282) of newborn isolates; 35 % (101/282) were Gram Positive. Contaminants constituted 12 % (34/282) of the isolates.

Leading pathogens were *Klebsiella*, *staphylococcus aureus* and *Escherichia coli*. *Klebsiella* was the most common isolate 37 % (104/282). *Klebsiella* sepsis was more in males 54 % (56/104) than females 46 % (48/104). *Staphylococcus aureus* constituted 19.1 % (54/282) with females 57 % (31/54) predominating and males 43 % (33/54). 9.6 % (27/282) of isolates were *Escherichia coli* with males and females constituting 59 % (16/27) and 41 % (11/27), respectively.

Other pathogens included *Pseudomonas* 2.1 % (6/282); *Alcaligenes faecalis* 1.8 % (5/282); *Yersinia* 1.42 % (4/282); *Candida* 0.35 % (1/282).

Conclusion: Gram negative pathogens are the predominant aetiological agents in neonatal sepsis in our centre.

241 – POSTER SESSION

SENSITIVITY OF TORCH SCREEN VS URINE FOR CMV IN DIAGNOSING INTRAUTERINE INFECTION IN MIDWESTERN REGION

A. Ismail, A.M. Murphy, S. Qadri, C. Sreenan

Paediatrics, Mid Western Regional Hospital University of Limerick, Limerick, Ireland

Introduction: The TORCH screening is a blood tests that is used to check for several different infections in a newborn. TORCH stands for **toxoplasmosis, rubella**, cytomegalovirus, herpes simplex, and HIV. A diagnosis of congenital CMV infection can be made by seeing the virus in an infant's urine. Congenital CMV cannot be diagnosed if the infant is tested more than one week after birth. The yield and costs of TORCH screen may not be justifiable.

Aim: The aim of the study is to determine the number of congenital infections detected in Midwestern region with the current use of the TORCH screen Vs urine for CMV.

Methods: A review of all TORCH screen results and urine for CMV results were undertaken in a 10 year period from January 2002 to December 2012 by serology laboratory results with subsequent review of relevant medical charts. Canvassing the neonatologist about the babies admitted under their care.

Results: During this period there where 54,231 live births out of which 2,964 babies were born below tenth centile out of that 419 with symmetrical IUGR for which TORCH screen was sent and only five are positive that is 1.1 % of the total blood test and in comparison to that only 77 urine test was sent for CMV and 17 are positive that is 20 % of the total test.

Conclusion: The yield and costs of TORCH screen may not be justifiable but CMV diagnosis can only be made if the virus is detected in infants urine during the first week of life.

242 – POSTER SESSION

ANTIMICROBIAL POLICY IN NEONATAL SEPSIS: EXPERIENCE OF A REGIONAL LEVEL THREE NEONATAL INTENSIVE CARE UNIT

S. Jayachandran¹, S. Shankar¹, V. Laza-Stanca²

¹Neonatal Intensive Care Unit, ²Department of Microbiology,
University Hospital of North Staffordshire, Stoke-on-Trent, UK

Background: Prompt treatment of neonatal sepsis is paramount; however, inappropriate antibiotic usage could be harmful. Our first-line antibiotics are benzylpenicillin + gentamicin for 'early onset sepsis' (EOS) and flucloxacillin + gentamicin for 'late onset sepsis' (LOS).

Aim: To identify

1. Bacterial spectrum causing neonatal sepsis and their antibiotic susceptibilities
2. Appropriateness of local antimicrobial policy for sepsis
3. Whether blood culture's time to positivity can guide antibiotic duration.

Methods: Retrospective cohort study involving all positive bacterial blood cultures between July 2010 and June 2012. Demographics, clinical features and microbiological reports were analysed. Time to positivity's significance calculated using 'Receiver operating characteristics' (ROC)

Results: 99 episodes of positive blood cultures from 67 neonates included (median gestation age 27 + 4 weeks, median birth weight 1,045 g). EOS and LOS accounted for 14 and 86 %, respectively. Common EOS pathogens (*E. coli*/GBS) were susceptible to benzylpenicillin + gentamicin combination. CONS were commonest LOS pathogen (69 %). All CONS isolated were susceptible to vancomycin, only 3 % susceptible to flucloxacillin/gentamicin. Five deaths were reported, two relating to CONS sepsis.

As assessed by ROC, 36 h cut-off value has high specificity (98.5 %) and very low sensitivity (8.5 %) for significantly positive blood cultures.

Bacteria isolated and antibiotic susceptibilities

Organism	%	Antibiotic susceptibility (% of bacterial growth)
Coagulase negative staphylococci species (CONS)	69	Vancomycin (100 %) flucloxacillin (3 %)
<i>Escherichia coli</i> (<i>E. coli</i>)	8	Cefotaxime (100 %) gentamicin (88 %)
Group B <i>Streptococci</i> (GBS)	5	Penicillin (100 %)
<i>Klebsiella pneumonia</i>	3	Cefotaxime/gentamicin (100 %)
<i>Serratia marcescens</i>	2	Gentamicin/meropenem (100 %)
<i>Streptococci agalactiae</i>	2	Penicillin (100 %)
<i>Staphylococcus aureus</i>	1	Flucloxacillin (100 %)
<i>Streptococci pneumonia</i>	1	Penicillin (100 %)
<i>Streptococci mitis/oralis</i>	1	Penicillin (100 %)
<i>Propionibacterium</i> species	1	Penicillin (100 %)
<i>Corynebacterium</i> species	1	Vancomycin (100 %)
<i>Enterococcus faecalis</i>	1	Vancomycin (100 %)
<i>Klebsiella oxytoca</i>	1	Cefotaxime (100 %)

Conclusion: Existing EOS antibiotic policy was appropriate; policy for LOS needs revision to provide appropriate cover for CONS sepsis. Cut-off value of 36 h can be safely used to support decision to stop antibiotics.

243 – POSTER SESSION

HEMOFILTRATION DOES NOT DECREASE THE MAGNITUDE OF SIRS DURING ECMO IN NEWBORNS

B. Kapitein¹, K. Cransberg², E. Wildschut¹, D. Hamman-Wenzlau³,
J. Hazelzet¹, D. Tibboel¹

¹Pediatric Intensive Care, ²Pediatric Nephrology, Erasmus MC-Sophia Children's Hospital, Rotterdam, ³Sanquin, Amsterdam, The Netherlands

Background and aim: Extracorporeal membrane oxygenation (ECMO) elicits a systemic inflammatory response syndrome (SIRS). Our aim was to compare mediators of SIRS (complement activation markers (C3b/c), human neutrophil elastase- α 1AT (HNE- α 1AT) and plasminogen-activator inhibitor-I (PAI-I) with or without hemofiltration in newborns on ECMO.

Methods: In this prospective study, newborns on ECMO were randomised to the treatment group (hemofiltration during ECMO) or the control group. Clinical data were collected from the Patient Data Management System. Blood samples were collected at t = 0 (before cannulation) and at 1, 3, 6, 12 and 48 h after cannulation. ELISA was performed to measure levels of IL-6, C3b/c, HNE- α 1AT and PAI-I.

Results: A total of 17 children (HF n = 11 and control n = 6) were included. Mortality was equal in both groups.

Both the IL-6 and HNE- α 1AT response showed a comparable pattern in both groups with an initial increase followed by a decrease to baseline levels after 12–24 h. The C3b/c and PAI-I response did differ between both groups, with lower C3b/c levels at t = 3 and t = 6 (both ns). The levels of PAI-I were consistently lower in the HF group. This difference lasted throughout the 48 h measured with a significant difference at 48 h (P < 0.05).

Conclusion: Hemofiltration incorporated in the ECMO system does not influence SIRS as reflected in IL-6 levels or HNE- α 1AT. However, hemofiltration did result in lower PAI-1 levels and possibly influences the fibrinolysis by persisted decreased levels of PAI-1.

Reference

1. Blijdorp K, Cransberg K, Wildschut ED et al (2009) Critical Care 13(R48):1–7.

244 – POSTER SESSION

PRETERM PREMATURE RUPTURE OF MEMBRANES: OPTIMAL GESTATIONAL AGE FOR DELIVERY AND INCIDENCE OF NEONATAL INFECTION

N. Kolici¹, E. Tushe¹, A. Bimbashi², E. Prifti³

¹UHO 'Koco Gliozheni', ²UHO 'Koco Gliozheni' Obstetric Department, ³UHO 'Koco Gliozheni' Pathologies of Pregnancies Department, Tirana, Albania

Background: The optimal management of pregnancies complicated by PPRM remains undefined and is area of great controversy in obstetrics. There are two options for managing PPRM: expectant management (EM) or early planned birth (Induction of labour = IL). Our protocol include EM of PPRM, prophylactic antibiotics, tocolytic, and corticosteroids in PPRM <34 weeks GA. GA >34 weeks management is still in discussion.

Objective: To determinate infections neonatal incidence related time of gestational age to delivery.

Materials and methods: Prospective study during 2009–2012. All pregnancies complicated to PPRM >18 h had screening for sepsis and we sign obstetrical management of PPRM. All pregnancies in our study was hospitalised and all womens had standardized treatment. Neonate was monitored for clinical and laboratory index of infection.

Results: From January 2009–December 2012, 1.66 of pregnancies result complicated to PPRM >18 h. Incidence of neonatal infection was 17.64 %. Infection was cause of death in 23.3 % of neonates aged <35 weeks and the prematurity is still the most important cause of deaths in this group. We found 8.7 % infection in EM group vs 6.09 % to the IL group, but not significant difference.

Discussion: Decision for an expectant management related to early planned birth is un balance to different factors that include GA, well-being of mother and fetus. EM is justified in GA <34 weeks related to high rate of morbidity/mortality in this GA. IL for GA >34 weeks can reduce infection risk.

245 – POSTER SESSION

CLINICAL DATA OF INFANTS WITH BRONCHIOLITIS WHO ARE ADMITTED TO TWO PICUS

C. Koutsaftiki¹, A. Tsialla¹, G. Sideri², A. Bampanelou², I. Papadatos², L. Sianidou¹

¹PICU, Penteli Children's Hospital, Palaia Penteli, ²PICU, "P. & A. Kyriakou" Children's Hospital, Athens, Greece

Background: RSV bronchiolitis is a major cause of PICU admissions in infancy

Objective: Evaluation of the clinical data from infants admitted to the PICU due to bronchiolitis.

Patients-methods: Retrospective survey of bronchiolitis patients admitted to two PICUs, which are being analyzed for risk factors (prematurity, CLD, congenital heart disease, chronic oxygen dependence) and need for mechanical ventilation.

Results: 120 infants with bronchiolitis were recorded during 2007–2012. 70 % were ≥ 36 weeks gestational age (GA), 20 % 32–35 weeks and 11 % ≤ 32 weeks. Mean age on admission was the 77 days (44 % ≤ 30 days old). Males: females ratio = 75:45. 76 % were admitted between January and March. RSV infection was found in 77 % infants. Risk factors had 13 % of the infants. Palivizumab was administered in 7 infants (6 %). Intubation–mechanical ventilation was needed in 32 infants (27 %), 26 of which had RSV (81 %) and 4 had received palivizumab. 12 infants of the 32 had GA ≤ 35 weeks (37 %) and 6 had CLD (19 %). 4 deaths (3.3 %) were recorded, all RSV cases, with risk factors.

Conclusions:

1. RSV bronchiolitis remains a serious infection which can lead to PICU admission.
2. Palivizumab is not administered according to the indications, maybe due to financial reasons.
3. Most of the infants admitted or mechanically ventilated were not premature, without remarkable medical history, hence with no indications for palivizumab prophylaxis.
4. Death occurs to infants with serious medical history.

246 – POSTER SESSION

NEISSERIA MENINGITIDIS AS INFECTIOUS CAUSE OF ACUTE EPIGLOTTITIS IN A TODDLER: CASE REPORT

C. Koutsaftiki¹, M. Vasilopoulou¹, A. Tsialla¹, D. Theophilatou¹, A. Voyatzi², L. Sianidou¹

¹PICU, ²Department of Clinical Microbiology and Immunology, Penteli Children's Hospital, Palaia Penteli, Greece

Background: Acute epiglottitis occurs rarely in pediatrics, since the systematic vaccination against Haemophilus influenza type b. Surprisingly, the last decades, other pathogens such as Neisseria meningitidis, are reported to cause acute epiglottitis in children but in adults as well.

Case report: A 4.5 years old male, previously healthy toddler, from Russia, was on summer vacations in Greece. He experienced sudden onset of intense sore throat and the following day, high fever (40 °C) and respiratory distress emerged. Primary diagnose was bacterial pharyngotonsillitis, thus azithromycin was initiated, but as his condition worsened, he was treated for laryngitis with oxygen, nebulized adrenalin and iv dexamethasone. Ten hours later, the boy's condition was critical, with emerging respiratory failure. A lateral neck roentgenogram confirmed the diagnose of epiglottitis, showing diffuse soft tissue cervical and epiglottic swelling (thumb sign). He was intubated in the operating room, he was given iv ceftriaxone and he was transferred to the PICU. Initial laboratory findings were WBC = $12 \times 10^9/L$ (51 % polymorphonuclears, 26 % bands), PLT = $188 \times 10^9/L$ and CRP = 11 mg/dl. Cultures from blood, sputum (via endotracheal tube), pharyngeal smear, after the onset of antibiotics were negative. PCR from sputum (via endotracheal tube) and blood sample, revealed presence of N. meningitidis (non A, B, C, Y, W135), but not H. influenza. The child hadn't been immunized against both organisms, since they are not included in Russia's obligatory vaccination program.

Conclusion: N. meningitidis has been reported to cause epiglottitis since 1995. Though few cases are reported globally, surveillance is needed for better awareness of the disease.

247 – POSTER SESSION

HIGH TIDAL VOLUME MECHANICAL VENTILATION DURING SEPSIS CAUSES KIDNEY APOPTOSIS AND IMPAIRS KIDNEY FUNCTION WITH MINIMAL LUNG INJURY

J.W. Kuiper¹, J. Groeneveld², F.B. Plotz³

¹Erasmus MC-Sophia Children's Hospital, ²Erasmus MC, Rotterdam, ³Tergooziekenhuizen, Hilversum, The Netherlands

Objectives: During sepsis, mechanical ventilation (MV) is thought to contribute to the development of acute kidney injury (AKI) and renal apoptosis may be involved.

Methods: Sepsis was induced in 36, male Sprague–Dawley rats by cecal ligation and perforation (CLP). Six rats served as healthy controls. Animals were randomly assigned to three groups: 1) low tidal volume (V_T) 6 ml/kg, and positive end-expiratory pressure (PEEP) 5 cm H₂O (LV_T), 2) high V_T 15 ml/kg and PEEP 3 cm H₂O (HV_T), and 3) non-ventilated controls. Rats were ventilated for 4 h. Macrophage inflammatory protein-2 (MIP-2), interleukin (IL)-6, tumor necrosis factor- α and the endothelial markers intercellular adhesion molecule-1 and active plasminogen activator inhibitor-1 (PAI-1) were measured in plasma. Renal function was measured and lung and kidney injury were assessed by microscopy. Apoptosis was quantified using TUNEL staining.

Results: An increase in renal medullary apoptotic index (51.7 ± 10.5 vs. 26.4 ± 5.6 %, $p = 0.01$) and concurrent 40 % decrease in glomerular filtration rate was observed in the HV_T group as compared to the LV_T and the non-ventilated sepsis groups, in the absence of hypotension ($p = 0.01$). This was associated with minimal lung injury. Renal medullary apoptosis best correlated with increased active PAI-1 (correlation coefficient 0.46, $p = 0.03$).

Conclusions: During sepsis induced by CLP, lung injurious MV has profound effects on kidney apoptosis and impairs kidney function, with only minimal lung injury. The data suggest that inhibition of intrarenal fibrinolysis may be involved.

248 – POSTER SESSION

NEONATAL URINARY TRACT INFECTION AND ASSOCIATED BACTEREMIA

E.R. Lekic, L. Dragas, D. Dakic, R. Rudanovic, B. Vujovic

Institut of Children Disease, Centar of Neonatology, University Clinical Center of Montenegro, Podgorica, Montenegro

Objectives: Urinary tract infection (UTI) in newborns frequently is associated with bacteremia and may result in long-term complications. The purpose in this retrospective study was to identify the bacterial microorganisms caused UTI associated with systemic infection in the newborns hospitalized in the Center of Neonatology during the period of 2002, 2003 and 2004.

Method: We used clinical, microbiological, laboratory and radiology methods.

Results: 2,086 infants were treated at the Center of Neonatology during the period of 2002–2004. Term (NT) were 1391, and pre-term (NPT) were 682. In 528 NT were proven infections: omphalitis 44.9 %, sepsis and/or meningitis 10.9 %, pneumonia 18.5 %, cutaneous infections 8.7 %, conjunctivitis 5.5 %, otitis media 3.8 %, mastitis 1.7 %, diarrhea 0.2 %, UTI 5.5 %. In 98 NPT were proven infections: omphalitis 36.7 %, sepsis and/or meningitis 30.6 %, pneumonia 15.3 %, cutaneous infections 12.2 %, conjunctivitis 2.0 %, diarrhea 2.0 %, UTI 1 %, UTI was observed in 28 newborn. Overall rate in all hospitalised infants was 1.3, and 4.6 % of all proven infections. Of the total UTI, 96.5 % occurs in NT, usually in period of 2–4 weeks of life ($\chi^2 = 18.721$; $p < 0.01$). The most common cause UTI is *Escherichia coli* (*E. coli*), and it is proven in 19 children, or 67.8 %, followed by *Enterococcus* in 7 children, or 25 %, *Pseudomonas* and *Enterobacter* in 1 newborn, or 3.5 %. In 3 NT *E. coli* was isolated in blood and urine culture, and in 2 NT was associated with meningitis.

Conclusions: *E. coli* is dominant pathogen and in 3 NT associated with sepsis and in 2 NT with meningitis.

249 – POSTER SESSION

AUTONOMIC DYSFUNCTION AND DISEASE SEVERITY IN INFANTS WITH RSV INFECTION

C. Liebrand¹, I. Aho¹, M. Kox², J. van der Hoeven³, C. Neeleman¹

¹Pediatric Intensive Care Unit, ²Research Unit Intensive Care,

³Intensive Care Unit, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: Apnea is frequently observed early in RSV infection when symptoms are confined to the upper airways, suggesting inflammatory response induced autonomic dysfunction.

Objective: The aim of the study is to assess autonomic dysfunction as indexed by Heart Rate Variability (HRV) in acute RSV infection and its correlation with disease severity and inflammatory profiles.

Methods: Prospective study in infants with moderate and severe RSV infection admitted to an university hospital. Controls were age matched infants without signs of infection. Autonomic function was assessed via HRV, monitoring low frequency (LF) and high frequency (HF) indices. In addition levels of serum SAA-1 (HK333), serum amyloid P (HK331), Pentraxin 3 (HK347), properdin (HK334) and C-reactive protein (HK358) were determined by ELISA.

Results: In 15 severely affected patients, 6 moderately affected patients and 72 healthy controls a total of 207 recordings were analyzed. Total HRV, LF and LF/HF ratios were significantly lower in severely affected RSV patients versus moderately affected patients ($p < 0.00045$, $p < 0.002$ and $p < 0.0025$, respectively) and severely affected patients and controls ($p < 0.0002$, $p < 0.0002$ and $p < 0.0001$, respectively). Also CRP, properdin and SAA were significantly correlated with disease severity. PTX3 levels were correlated with need for supplemental oxygen.

Conclusion: RSV infection in infants is associated with inflammatory response induced autonomic dysfunction of central origin. This may be correlated with an increased risk for serious apnea or ALTE, for which prolonged cardio respiratory monitoring is indicated.

250 – POSTER SESSION

MICROBIOLOGICAL PROFILE OF BURN-WOUND SEPSIS IN CHILDREN

B. Lipový, M. Hanslianová, H. Řihová, I. Suchánek

University Hospital Brno, Brno, Czech Republic

Introduction: Infectious complications are a major cause of morbidity and mortality in burn patients. In the last century was the most common infectious complication located within the burned area. The incidence of infectious complications in the burned area, thanks to early necrectomy methods and subsequent autotransplantation resulting defect significantly reduced. Nevertheless, it is still significant complications for our patients.

Materials and methods: The study included a total of 97 children with thermal trauma hospitalized in ICU in 2006–2009. These patients were monitored regularly microbiological situation not only in the burned areas. Microbiological surveillance in burned areas was performed using swabs and smears.

Results: The average age of the group was 2.72, with an average range of burnt areas was 16.25 % TBSA (total body surface area). The overall average length of hospital stay was 19.10 days. We have a total of 1,157 bacterial strains isolated. The most frequently isolated bacteria were coagulase negat. staphylococci (40.02 %), *Bacillus* sp. (10.46 %), *Acinetobacter baumannii* (10.46 %) and *Escherichia coli* (9.77 %).

Conclusion: In the study, we have identified the main microbiological agents of burn-wound sepsis.

251 – POSTER SESSION

CHANGING SPECTRE IN CAUSAL MICROORGANISMS IN PEDIATRIC SEPSIS: A SINGLE CENTRE RETROSPECTIVE STUDY

S. Maebe¹, J. Willems², P. Vande Voorde², A. De Jaeger²

¹University Hospital Ghent, ²Pediatric Intensive Care Unit, University Hospital Ghent, Gent, Belgium

Background and aims: Sepsis is a leading reason for admission on pediatric intensive care units worldwide and a leading cause of morbidity and mortality in the pediatric population. We aim to objectify our hypothesis that there is a shift in causal organisms from *N. meningitidis* towards Group A *Streptococcus* (GAS).

Methods: We reviewed our database for the previous 4 years and selected those patients with community-acquired sepsis due to *Neisseria meningitidis* and to Group A *Streptococcus* (GAS), since these two organisms cause the most significant morbidity in our patients with sepsis. Clinical data were collected and are presented.

Results: 27 patients were identified. Most children were previously in good health. In 15 patients, *N. meningitidis* was isolated, in 12 GAS. Mortality in our cohort was fully contributable to the subgroup with GAS infection. Children with Meningococcal disease had more chance to have a relatively uneventful course (6/15 vs 2/12). There appears to be a shift towards more frequent isolation of GAS compared with *N. meningitidis* over the years, though numbers are too small to be statistically significant. Remarkably, GAS-infection in our

cohort only occurred as a surinfection during the course of acute infection with varicella zoster virus (VZV).

Conclusion: A genuine increase of community-acquired sepsis caused by GAS compared to *N. meningitidis* needs to be confirmed in a multi-centre analysis. Our findings may add fuel to the debate whether to vaccinate our children against VZV or not.

252 – POSTER SESSION

CLINICAL UTILITY OF EARLY FERRITIN MEASUREMENT IN HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS

B. Maji¹, S. Basu²

¹Paediatrics, ²Clinical Biochemistry, Institute of Child Health, Kolkata, India

Aim: Ferritin of >500 ng/ml, an established diagnostic marker of Hemophagocytic Lymphohistiocytosis (HLH), was studied for its clinical utility in a cohort of hospitalized children. Ferritin above 10,000 ng/ml was evaluated for prognostic significance in HLH.

Methods: A diagnostic study of ferritin and correlates (Jun–Dec 2012) of HLH in children (mean age: 4 years 9 months, males: 55.9 %) admitted in a pediatric teaching hospital. Ferritin (method: electrochemiluminescence) estimated for the first time following admission was considered.

Results: 34 children diagnosed with HLH (29, infection associated; 5, macrophage activation syndrome), had median ferritin of 4254 ng/ml (range 898–61,155) for the first measurement, which was performed as early as day 1 of admission in most (67.6 %) patients. Hypertriglyceridemia (>265 mg/dl) occurred in 52.9 %, hemoglobin <9 g/dl in 44.1 %, and platelet <100,000 in 9.2 %. Twelve patients died, of which 6 (50 %) had first measurement levels >10,000 ng/ml. Among survivors, four patients (11.8 %) had levels >10,000 ng/ml. The median ferritin (8,461 ng/ml) of non-survivors was not significantly different from those of survivors (median ferritin 3,728 ng/ml, *p* = 0.207). From receiver operator characteristic (ROC) curve analysis, a first measurement ferritin value of >10,000 ng/ml had an average positive predictive value of 72 % for mortality.

Conclusions: Early ferritin estimation of above 10,000 ng/ml following admission is clearly diagnostic, but not predictive of a negative outcome in HLH; probably due to prompt and effective management of the disease process in its early stages with well proven treatment modalities.

253 – POSTER SESSION

MICROALBUMINURIA: A RELIABLE PROGNOSTIC MARKER IN THE CRITICALLY ILL CHILD

B. Maji¹, S. Basu²

¹Paediatrics, ²Clinical Biochemistry, Institute of Child Health, Kolkata, India

Introduction and objectives: Microalbuminuria [albumin creatinine ratio (ACR) >30 mg/g] increases in acute inflammatory conditions as a result of glomerular endothelial dysfunction. The study evaluated its prognostic potential in the critically ill child.

Methods: Prospective observational study (Aug–Dec 2012) of random urine ACR (mg/g) estimated on day 1 and day 3 of pediatric intensive care unit admission, of a tertiary care hospital. Demographic, laboratory data, vasopressor use, mechanical ventilation, length of stay, outcome and PELOD scores were recorded.

Results: Of 92 children, 40 children (median age 4.5 years, 68 % male) recruited. Day 1 ACR (median 70.8 mg/g) significantly correlated with day 3 total leukocyte count ($P = 0.016$), and both day 1 and day 3 ACR correlated with PELOD scores [median 8] ($P = 0.002$ and $p = 0.003$, respectively) and duration of mechanical ventilation ($p = 0.003$ and $p = 0.001$, respectively). Both median day 1 ACR, and day 3 ACR were significantly different between survivors ($n = 29$) and non-survivors ($n = 11$) ($p = 0.0001$ and $p < 0.0001$, respectively). ROC curve analysis for mortality prediction revealed the highest area under curve (AuC) of 0.963 for ACR3, followed by 0.928 for ACR1 and 0.867 for PELOD scoring ($p > 0.05$, non-significant for AuC comparisons). A cut-off value of day 3 ACR of 102.4 mg/g had a positive predictive value of 95.8 % for negative outcome.

Conclusions: Microalbuminuria is an early inflammatory marker that correlates with organ dysfunction. Significant levels reliably predict negative outcome early into intensive care admission, as accurately as PELOD scores, which can help counsel patients, plan treatment and triage, and allocate resources judiciously.

254 – POSTER SESSION

NEUTROPHIL CD15S IS A POTENTIALLY USEFUL BIOMARKER OF SERIOUS BACTERIAL INFECTION

J. Markic¹, A. Jeroncic², D. Polancec³, N. Bosnjak⁴, A. Markotic⁵, J. Mestrovic¹, V. Cikes Culic⁵

¹Department of Pediatrics, Pediatric Intensive Care Unit, University Hospital of Split, ²Department for Research in Biomedicine and Health, University of Split, Medical School, Split, ³Galapagos Research Center Ltd., Zagreb, ⁴Department of Medical Laboratory Diagnostics, University Hospital of Split, ⁵Department of Medical Chemistry and Biochemistry, University of Split, Medical School, Split, Croatia

Background and aims: Early recognition of serious bacterial infections (SBI) is essential for better treatment outcomes. Flow cytometry analysis of neutrophil surface molecules is increasingly investigated as a tool for diagnosis. The aim of this prospective observational study was to compare the diagnostic performance of various biomarkers in detection of SBI.

Methods: The infants under 6 months of age presenting with fever without apparent source to the emergency department who were hospitalized with suspicion of having SBI were enrolled, 69 into the training and 36 in the validation set. Based on the final diagnosis they were classified into SBI or viral infection group. Input measures were white blood cells count, absolute neutrophil count (ANC), C-reactive protein (CRP), procalcitonin (PCT), neutrophil CD11b, CD15s and CD64 expression level, percentage (%CD15s⁺) and the absolute count (AC-CD15s⁺) of CD15s⁺ neutrophils.

Results: In the infants with SBI, %CD15s⁺ was 10.5 times more likely to be higher than the cut-off value. ANC, CRP, PCT, CD64, and AC-CD15s⁺ were also found as useful biomarkers for differentiation between bacterial and viral infection. The-best-fit multivariate logistic regression model included CRP, PCT, and

%CD15s⁺ as significant predictors of SBI. The model's sensitivity (87 %), specificity (83 %), positive (5.11) and negative (0.16) likelihood ratios indicated high model's accuracy. After model's validation its accuracy maintained high: 86 % sensitivity and 93 % specificity, while positive and negative likelihood ratios were 12.86 and 0.15, respectively.

Conclusions: The study shows evidence that the neutrophil CD15s expression is potentially a valuable biomarker for detection of SBI.

255 – POSTER SESSION

PLEX ID ROLE IN THE DIAGNOSIS OF ACUTE BACTERIAL MENINGITIS WITH *HAEMOPHILUS INFLUENZAE* IN CHILDREN

M.M. Merisescu^{1,2}, M. Luminos^{1,2}, G. Jugulete^{1,2}, D. Florea¹, A. Streinu-Cercel^{1,2}

¹Pediatric, Institute of Infectious Diseases 'Prof. Dr. Matei Bals', ²Infectious Diseases, University of Medicine and Pharmacy 'Carol Davila', Bucharest, Romania

Introduction: *Haemophilus influenzae* infection takes the most varied forms, with different locations in the entire body such as: ear infections, sinusitis, conjunctivitis, epiglottitis, pneumonia, meningitis, sepsis. This paper aims to explore the role of molecular diagnosis in the clinical course of acute purulent meningitis cases with *Haemophilus influenzae* in children.

Materials and methods: We have conducted a 16 months study from September 2011 to December 2012 on children admitted in the ICU of The National Institute of Infectious Diseases for severe forms of bacterial meningitis with *Haemophilus Influenzae*. Positive diagnosis of meningitis was established with classic methods like: clinical and laboratory criteria (CSF cultures), as well as Plex-id detection. We have studied the correlation of data obtained by classical methods versus molecular method results and the clinical and biological evolution of the patients under treatment.

Results: *Haemophilus influenzae* was identified as the cause for 5 cases (19.2 %) out of all 26 cases of acute purulent meningitis that were admitted in our clinic. The results obtained by Plex Id were positive every time we suspected *Haemophilus influenzae*. Although, two patients required orotracheal intubation and mechanical ventilation for a short period of time, the evolution was favorable in all cases. No deaths were registered.

Conclusions: *Haemophilus influenzae* meningitis represents one of the most severe bacterial meningitis. It can lead to death and it can have a high frequency of neurological complications. The *Haemophilus influenzae* type B vaccine is the only efficient method to limit the incidence of severe cases of meningitis.

256 – POSTER SESSION

COHORT OF PICU ADMISSIONS OF CHILDREN WITH *PNEUMOCOCCAL* MENINGITIS

S. Mohapatra, A. Doulah, K. Sethi

PICU, Leeds Teaching Hospital NHS Trust, Leeds, UK

Background and aims: Pneumococcal meningitis remains associated with high mortality/morbidity in paediatric population, especially in children admitted to PICU. Various conjugate vaccines introduced have resulted in alteration in the serotype causing invasive pneumococcal disease without significantly altering the prognosis.

Study design: Retrospective observational study by reviewing case notes to study the demography, presentation, complications and outcome.

Methods: Setting: PICU, Leeds General Infirmary, Leeds, UK.

Participants: 15 children admitted to PICU with pneumococcal meningitis between April 2006–March 2012. Diagnosis made by identifying organism by culture/PCR from CSF for children with symptoms of meningitis with organism identified on blood culture.

Results: Risk factors identified—mother of a neonate tested positive for pneumococcus on vaginal swab and later developed pneumonia. One child had trisomy 21.

Incidence and mortality is highest between 0 and 24 months. 93 % presented with low GCS. 60 % presented with seizures but nearly all developed seizures sometime during their stay.

Most deaths occurred within 72 h of admission. Neurological complications were commonest. Among others 3 had renal failure of which 2 were diagnosed to have HUS, 3 developed hepatic failure. *S. pneumoniae* was isolated from blood/CSF cultures in 12. PCR in blood/CSF helped confirm the organism in the rest. Children with renal complications tested positive for Coomb's. Organism was penicillin sensitive. 13 had abnormal findings on CT head.

Children presenting with leucopenia, needing inotropic support with Adrenaline or nor-adrenaline and developing hepatic failure were more likely to die.

Conclusions: Despite introduction of new vaccines outcome in such cases continues to remain poor.

257 – POSTER SESSION

INDICATIONS AND COMPLICATIONS OF PERIPHERALLY INSERTED CENTRAL CATHETERS IN A CHILDREN'S HOSPITAL

Q. Mok¹, R. Pal¹, H. Lumgair¹, D. Roebuck², R. Gilbert³

¹Pediatric Intensive Care Unit,

²Interventional Radiology Department, Great Ormond Street Hospital for Children,

³MRC Centre of Epidemiology and Child Health, UCL Institute of Child Health, London, UK

Background and aims: Peripherally inserted central catheters (PICCs) are increasingly used in children who require long-term intravenous therapy or repeated blood tests. These are inserted by interventional radiologists (IR) in our hospital for various groups of patients, for different indications. The aims of this study are to audit usage, determine complication rate and the association with specific patient groups.

Method: This is a retrospective audit of PICCs inserted by IR. Short term percutaneous central lines inserted by other teams, and surgically inserted lines were excluded. Data were collected from 108 children who had PICCs in 2011–2012. Data sources included the hospital intranet-based Clinical Document Database, medical notes, microbiology results, and post-procedure X-rays.

Results: PICCs were inserted in all age groups from neonates to adolescents and from broad clinical disciplines: cardio-respiratory (n = 19), cystic fibrosis (37), gastro-enterology (6), endocrine-metabolic (5), haemato-oncology (5), neurology (15), transplant (2) and

others (19). Median duration of the lines was 2 weeks (interquartile range 14–33 days).

Indications included long-term antibiotics in 69 (64 %), infusions of drugs 8 (7 %), chemotherapy 2 (2 %), parenteral nutrition 11 (10 %), difficult access 12 (11 %) and blood sampling 6 (6 %).

Complications were uncommon, 8 (7 %) cases of infection and 3 (3 %) blocked lines. These were too infrequent to be significantly associated with any disease group or usage pattern.

Conclusion: PICCs were most commonly used for long-term antibiotic therapy. There was a 10 % complication rate, mainly due to infection and blockage. There was no obvious association between complications and underlying disease or line usage.

258 – POSTER SESSION

PERFORMING A LUMBAR PUNCTURE IN NEONATES: DO WE KNOW THE IDEAL POSITION?

M. Mora Matilla¹, P. Alonso Quintela¹, S. Rodríguez Blanco², I. Oulego Erroz³, S. Lapeña López de Armentia¹, M.T. Palau Benavides², F. Fernández Calvo²

¹Pediatrics, ²Neonatal Intensive Care, ³Pediatric Intensive Care, Complejo Asistencial Universitario de León, León, Spain

Background and aims: Positioning of newborns for lumbar puncture (LP) is not standardized. This study aims to establish the optimal position and needle penetration angle for conducting LP with less disturbance in oxygen saturation and heart rate.

Methods: We performed an ultrasound evaluation and monitoring of heart rate (HR), oxygen saturation (OS) in 6 different positions [sitting (s1), sitting with flexed hips (s2), sitting with flexed hips and neck (s3), lying (l1), lying with flexed hips (l2) and lying with flexed hips and neck (l3)]. Interspinous distance (ID), subarachnoid space width (SSW) as well as the optimum needle entry angle (NEA) in each position were measured.

Results: 109 newborns were enrolled (49 boys). Patient's weight and gestational age were 2.539 ± 882 g and 36 ± 3 weeks, respectively. Sitting and flexion of the hips and/or neck increased ID with s2 achieving the highest value [$p < 0.01$ vs. all positions except s3 ($p = 1.0$)]. Sitting and flexion also increased SSW with s3 bringing up the widest space [$p < 0.05$ vs. all positions except s1 and s2 ($p = 0.099$ and $p = 0.897$)]. Baseline HR and OS were 142 ± 20 bpm and 97 ± 2 %. Neck flexion was associated with significant lower saturation (l3: 91 ± 7 and s3: 90 ± 6). With slight differences among them, all positions increased HR compared to baseline. A NEA around 65° – 70° is optimal without significant differences between positions.

Measurements in the different positions

	Baseline	L1	L2	L3	S1	S2	S3
ID (mm)	–	9.98 ± 1.2	11.1 ± 1.4	11.2 ± 1.5	11 ± 1.6	11.6 ± 1.4	11.5 ± 1.5
SSW (mm)	–	1.8 ± 0.8	2.5 ± 1	2.8 ± 1	2.7 ± 1	2.9 ± 0.9	3.1 ± 1.1
α	–	69.7 ± 4.7	67.5 ± 4.8	67.4 ± 4.4	67.9 ± 4.2	66.2 ± 3.9	66.5 ± 3.9
HR	142 ± 20	153 ± 24	153 ± 25	157 ± 24	162 ± 24	163 ± 24	164 ± 23
HR >200 (n)	0	1	2	2	2	4	9
O2 Sat.	97 ± 2	97 ± 3	95 ± 4	91 ± 7	95 ± 3	92 ± 6	90 ± 6
Sat <85 % (n)	0	0	2	17	1	11	17

Conclusions: s2 seems to be the most suitable position for LP. Neck flexion does not improve anatomical view and may cause more physiological disturbance. NEA is independent from patient's positioning.

259 – POSTER SESSION

MEDITERRANEAN SPOTTED FEVER (MSF) IN CHILDREN IN ORAN, ALGERIA

N. Mouffok

Medicine, Chuoran, Oran, Algeria

We report prospective study conducted on MSF in children. Our cases were confirmed to be caused by *R. conorii* using immunofluorescence methods completed by Western blot and cross-absorption. Cases were encountered in the summer. Two children presented with two eschars. This is quite unusual in MSF. However, particular climate, including higher temperature, reported in Oran in recent years, may have led to an increased proclivity of ticks to bite. Although 62.5 % of the children, were hospitalised, only two (with seizures). Cases were particularly severe in adults; 49 % of 167 patients diagnosed with MSF were hospitalised with a severe form. Cases of MSF seem to be milder in children than in adults. In adults, the eschar is most often observed on the trunk and legs. Herein, the eschar is frequently localised on the cephalic area. When they initially sought medical care, children were prescribed drugs that were ineffective to treat rickettsiosis. It should be remembered that doxycycline remains the treatment of choice for all patients. The risk of dental staining by doxycycline is negligible when a single (short course of therapy). Chloramphenicol continues to be used as the empirical parenteral treatment of severe cases if presence vomiting and lack of intravenous doxycycline. Josamycin can be used in children, but newer macrolides are also of interest, particularly azithromycin. MSF seems to be still misdiagnosed in children as other eruptive febrile diseases. The consequences of this include delays in appropriate therapy and a risk of a severe form and even a fatal outcome.

260 – POSTER SESSION

THE ASSOCIATION OF A CERVICAL LENGTH OF <25 MM IN HIGH-RISK PREGNANCIES ON NEONATAL MORBIDITY-MORTALITY IN PRETERM INFANTS

M.Y. Oncel¹, S. Arayici¹, S. Celen², G. Kadioglu Simsek¹, A. Oskovi², N. Uras¹, S.S. Oguz³, O. Erdevi³, N. Danisman², U. Dilmen¹

¹Neonatology, ²Perinatology, Zekai Tahir Burak Maternity Teaching Hospital, ³Neonatology, Ankara University School of Medicine, Ankara, Turkey

Background and aims: To evaluate and compare the effects of a short cervix (<25 mm) on neonatal morbidity and mortality as opposed to a normal cervical length (≥25 mm). The predictive value of a short cervix on neonatal outcome is also investigated.

Methods: Preterm infants who were admitted to the neonatal intensive care unit and whose mothers had undergone a pre-delivery evaluation for cervical length (CL) and cervical cultures were included in the study. Infants were stratified into two groups based on CL measurements (Group 1, CL <25 mm; Group 2, CL ≥25 mm).

Results: A total of 203 infants were included in the final analysis. Group 1 consisted of 105 neonates while Group 2 had 98 newborns. Cervical culture positivity rate was 46.7 % (n = 49) in Group 1

compared to 19.4 % (n = 19) in Group 2 (p = 0.0001). Frequencies of early onset neonatal sepsis (EOS) in Group 1 and Group 2 were 31.5 % and 18.4 %, respectively (p = 0.032), whereas respective frequencies of proven sepsis in the two groups were 18.1 and 8.2 % (p = 0.037). A CL <25 mm was found to increase the risk of cervical culture positivity, EOS and proven EOS by odds ratios of 3.63, 2.03 and 2.48, respectively.

Conclusions: This is the first clinical study to demonstrate a significant link between CL and each of cervical culture positivity, EOS and neonatal morbidity and mortality. Preterm infants born to high-risk mothers with short CL should be monitored closely for the risk of EOS.

261 – POSTER SESSION

IMPACT OF CHANGE IN ANTIBIOTIC PRACTICE ON THE PREVALENCE OF COLONISATION AND BLOOD STREAM INFECTION WITH HOSPITAL ACQUIRED ORGANISMS

B. Palanisami¹, H. Ibrahim¹, B. Yoxall¹, T. Neal²

¹Neonatology, Liverpool Women's Hospital NHS Foundation Trust, ²Microbiology, Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK

Background: Preterm and sick babies nursed in NICU are highly susceptible to colonisation and infection with microorganisms. Rationalising antibiotic use can reduce colonisation and infection with hospital acquired organisms (HAO). Based on the local research, policy of stopping antibiotics in true culture negative infection was changed from 48 to 36 h and antibiotic regimen was tailored to local culture results over the last decade.

Aims: To measure the rate of colonisation & infection with HAO on routine swabs before and after the introduction of the new policies.

Methods: Retrospective collection of data before (1997) and after (2010) the change. Swab results and blood culture data for all babies during the periods were retrieved from the microbiology database. Colonisation and infection rates were compared. The following organisms were classified as HAO: *Pseudomonas aeruginosa*, *Serratia marcescens*, *Acinetobacter*, *Stenotrophomonas*, *Staphylococcus aureus* (both MSSA and MRSA) and gentamicin resistant *E. coli*.

Results: There were 797 admissions in 1997 and 1197 in 2010. The rates of colonisation and blood stream infections with HAO are given in Figs. 1 and 2, respectively

Fig. 1 Colonisation rate

Fig. 2 Blood stream infection with HAO

Conclusion: There was a change in the pattern of colonisation with an overall reduction in blood stream infection rate with HAO.

262 – POSTER SESSION

HOSPITALIZATION OF CHILDREN WITH INFLUENZA (H1N1) VIRUS IN THE CLINICAL HOSPITAL IN STIP, MACEDONIA

G.I. Panova¹, B.D. Panova², N.B. Panov²

¹UGD-Stip, Faculty of Medical Sciences-Stip, ²UGD-Stip, FMN-Stip, Kocani, FYROM-The Former Yugoslav Republic of Macedonia

Background: The disease burden of seasonal influenza in the pediatric population is generally attributed to a combination of immunologic naivety, prolonged virus shedding, and enhanced transmission opportunity in child-care and educational institutions.

Aim: To describe the clinical characteristics of children hospitalized with 2009 influenza A H1N1 infection in General Hospital of Stip.

Methods: We reviewed the medical reports of 11 children with pandemic H1N1 Influenza A hospitalized to the pediatric clinic of General Hospital of Stip. Between March to December 2012.

Material: All patients were laboratory-confirmed with 2012 influenza A (H1N1). The most frequent clinical presentations were influenza-like illness and wheezing exacerbation. Predisposing underlying illnesses were detected in three of the patients who have viral-induced asthma. Pneumonia diagnosed in three of all patients of whom two had a history of viral-induced asthma and the third was infant. More than two-thirds received treatment of antiviral or antibacterial or combination of antiviral and antibacterial. The median length of stay in hospital was 2.6 days. None of the children died or need admission in intensive care unit.

Conclusions: Despite the fact that 2012 outbreak of Influenza H1N1 did not cause serious disease or complications in pediatric population of Macedonia, the clinicians should maintain a high suspicion in children with febrile respiratory illness and promptly treat those with underlying risk factors.

263 – POSTER SESSION

REDUCTION OF CATHETER-ASSOCIATED BLOODSTREAM INFECTION IN NEONATES

J. Parra¹, F. Cneude¹, S. Ducki², C. Marey¹, M.R. Mallaret², T. Debillon¹

¹Neonatology, ²Hygiene Unit, CHU Grenoble, Grenoble, France

Introduction: Catheter-associated bloodstream infections (CA-BSI) are the most common nosocomial infections in neonatal intensive care units. A multifaceted intervention was gradually implemented: it included the implementation of a database, practice guidelines for the insertion and maintenance of central lines, a handwashing campaign, the promotion of breast-feeding and a collaboration with a hygiene unit. The aim of this study is to evaluate the impact of this strategy on the reduction of CA-BSI.

Methods: Clinical data were collected prospectively. The study population included all neonates with peripherally inserted central catheters from January 1, 2008, to December 31, 2011. At the time of study, criteria for CA-BSI included a positive blood culture and clinical/or biological signs.

Results: Overall 653 infants (mean age 30 weeks, mean birth weight 1,571 g) and 741 catheters were included in the study. During this period, gestational age, birth weight and catheterization duration were similar. The incidence of CA-BSI decreased gradually and significantly between 2008 and 2011 (from 19.1 to 6.25 % and from 13.8 to 4.4 per 1,000 catheters days). Per year the decrease was on average 4.8 % (95 % CI: 0–9.5 %).

Conclusion: This study demonstrates a correlation between the multifaceted intervention and the reduction of CA-BSI. Infection rates can be reduced by the application of strict protocols and by the education of physicians and nurses. The database is important to keep a permanent control on the incidence rate.

264 – POSTER SESSION

EFFECTIVENESS OF CONTINUOUS VENO-VENOUS HEMOFILTRATION IN THE MANAGEMENT OF HAND- FOOT-MOUTH DISEASE-RELATED FULMINANT CARDIOPULMONARY FAILURE

P.H. Phan, H.V. Dau, T.T. Phung, T.A. Ta, T.V. Nguyen, T.V. Pham, N.T. Liem

The National Hospital of Pediatrics, Hanoi, Vietnam

Background and aims: The aim of this study was to evaluate the therapeutic effect of continuous veno-venous hemofiltration (CVVH) in the management of fulminant cardiopulmonary failure as complications of hand-foot-mouth disease (HFMD).

Methods: We conducted a historically controlled study of 20 children with HFMD induced cardiopulmonary failure who were admitted to the National Hospital of Pediatrics, Hanoi, Vietnam. Eight patients with conventional treatments (from 10/09/2011 to 10/10/2011) were in the control group, and the intervention group consisted of 12 patients (from 11/10/2011 to 10/01/2012) who were treated with CVVH (Prisma machine, Gambro, Germany) with AN

69 hemofilter membrane. The median duration of CVVH was 48 h. Hemodynamic parameters were hourly recorded during the intervention. Cytokines were measured by enzyme-linked immunosorbent assay. All survivors were assessed for neurodevelopment at 1 year of follow-up by physical examination and Denver Developmental Screening Test.

Results: There were no differences in baseline characteristics between two groups. The mortality rate was significantly lower in the CVVH group (16.7 vs 87.5 %, $p = 0.003$). Hemodynamic parameters and body temperature improved quickly 6 h after CVVH commenced. Ejection fraction of left ventricles improved after 48–72 h post-CVVH. A decreased serum IL-8 level was seen after 24 h of CVVH. At 1 year of follow-up, eight out of ten survivors in CVVH group had normal neurodevelopment, one infant required ventilation support, and another infant has mild upper limb weakness.

Conclusion: Children with HFMD-related cardiopulmonary failure treated with CVVH had better outcomes than those who received only conventional therapy.

265 – POSTER SESSION

TO STUDY PROCALCITONIN KINETICS IN PEDIATRIC PATIENTS WITH OPEN HEART SURGERY AND ITS SIGNIFICANCE TO DISCRIMINATE BETWEEN SEPSIS AND SYSTEMIC INFLAMMATORY SYNDROME (SIRS)

A. Rastogi

Pediatric Cardiac Critical Care, Fortis Escorts Heart Institute, New Delhi, India

Objective: To evaluate procalcitonin kinetics as marker of inflammation severity and its specificity in discriminating between sepsis and systemic inflammatory response syndrome after pediatric open heart surgery.

Design: Prospective, observational, clinical study in 17 bedded tertiary pediatric intensive care unit.

Materials and methods: PCT kinetics was evaluated at 1.3 and 7th day in thirty pediatric patients undergoing open heart surgery with cardiopulmonary bypass (CPB) (SIRS model: group 1, $n = 15$) and patients with clinical sepsis (SIRS + sepsis, group 2, $n = 15$). Post-operative data included fever, requirement and duration of inotropic support, duration of mechanical ventilation, length of ICU and hospital stays along with laboratory parameters.

Results:

- In Group 1, PCT median concentration was 0.24 ng/ml (reference value < 2.0 ng/ml). Average PCT concentration was 0.47 ng/ml at 24 h; 0.33 ng/ml at 72 h and then decreased to 0.12 ng/ml at 7th postoperative day. All patients had favourable outcome.
- In Group 2, average PCT was 1.02 ng/ml at 24 h which increased to 4.15 ng/ml at 72 h. It decreased in 12/15 patients who progressed favourably (average 0.61 ng/ml). 6/15 patients had culture positive septicemia. 2/3 patients with persistent elevated PCT at 7th postoperative day expired.

Conclusion:

- PCT kinetics is able to differentiate between SIRS and postoperative infection (sepsis) during postoperative follow-up period.
- PCT concentration varied with the evolution of sepsis.

266 – POSTER SESSION

INFLAMMATORY CYTOKINE COMPLEX PANELS IN CHILDREN WITH SEPSIS—A PILOT STUDY

L. Rautiainen¹, P. Tretjakovs², I. Grope^{3,4}, J. Pavare^{3,4}, D. Gardovska^{3,4}

¹*Emergency Department, Children's University Hospital,*

²*Department of Human Physiology and Biochemistry,* ³*Department of Pediatrics, Riga Stradins University,* ⁴*Children's University Hospital, Riga, Latvia*

Background and aims: Sepsis is one of the leading causes of death in children; being 7.8 % among hospitalized healthy children, and 12.8 % in children with concurrent illnesses. The most important factor of improving survival in sepsis is early diagnostics. The aim was to reveal diagnostic possibilities of inflammatory cytokines in children with sepsis.

Materials and methods: In this prospective study (1.10.2010–1.10.2011) we included patients with SIRS and sepsis, based on the International Consensus Conference (2002) criteria. Levels of CRP, procalcitonin, IL-6, and experimental cytokine panels were measured (Luminex-200, Millipore) at inclusion, after 24 h, and at discharge.

Results: In total, 24 patients were included. On inclusion the median level of CRP was 150.25 mg/l, median procalcitonin level—3.06 pg/ml, and median IL-6—101.35 pg/ml. Statistically significant differences between the inclusion and compared levels after 24 h were detected in granulocyte colony-stimulating factor (G-CSF) ($p = 0.006$) and soluble vascular cell adhesion molecules (sVCAM-1) ($p = 0.05$). Differences between the inclusion and discharge were seen in TNF α ($p = 0.05$), IFN γ ($p = 0.05$), IL-10 ($p = 0.003$), G-CSF ($p = 0.003$), IFN inducible protein-10 (IP-10) ($p = 0.004$), monocyte chemoattractant protein-1 (MCP-1) ($p = 0.028$), macrophage migration inhibitory factor (MIF) ($p = 0.034$), plasminogen activator inhibitor (PAI-1 total) ($p = 0.01$), sVCAM-1 ($p = 0.006$).

Conclusions: TNF α , IFN γ , IL-10, G-CSF, IP-10, MCP-1, MIF, PAI-1, sVCAM-1 could be used for early diagnostic of sepsis. G-CSF and sVCAM-1 needs to be investigated as markers of therapeutic efficacy in children with sepsis.

Study was funded by as a part of VPP BIOMEDICINE state research program.

267 – POSTER SESSION

EPIDEMIOLOGICAL ASPECTS OF LYMPHOCYTIC MENINGITIS IN THE PEDIATRIC WARD AT THE UNIVERSITY HOSPITAL OF BATNA

N. Righi¹, S. Brahmi², H. Zerguine¹, F. Hanfougue³, L. Hambaba⁴, S. Tebbal¹

¹*CHU for Batna,* ²*Batna, CHU for Batna,* ³*Department of Biochimie Batna,* ⁴*Laboratory of Biochemistry of Bioactive Molecules, Batna, Algeria*

Lymphocytic meningitis of the child with the CHU of Batna Authors.

Introduction: Acute lymphocytic meningitis are most frequent in the child, generally of viral etiology, the enteroviruses prevail. Their evolution is generally benign with cure without after-effects.

Objective: To evaluate the frequency of lymphocytic meningitides at the department of paediatrics to study their profile epidemiologic, clinical, biological and evolutionary.

Materials and methods: Retrospective study made on the files of the children hospitalized for a lymphocytic meningitis at the department of paediatrics of the CHU of Batna during one 3 years period (1/1/2009 at the 31/12/2011).

Results: We colligé 191 cases of lymphocytic meningitis with a hospital incidence of 1.98 lymphocytic meningitis accounts for 55.5 % of the whole of meningitides of the child. The 28 day old older child to 10 years is most concerned by far of which 53.9 % of the cases are older children <5 years. The boys are touched by lymphocytic meningitis in our series (67.5 %) with a sex-ratio of 2.08A high incidence of the new cases during the summer period (in connection with the frequency of viral meningitises)The child touched by lymphocytic meningitis presented a pleocytose of 10–500 elements/mm³ in 71.7 % of the cases, a normal albuminorrachie in 66.7 % of the cases, a normal glycorrachie in 91.2 % of the cases.CRP is positive in 41.5 %, a VS accelerated at 65 %.

Conclusion: This study confirmed the frequency of lymphocytic meningitis in pediatriy. Preponderance of the viral cause what corresponds to the literature.

268 – POSTER SESSION

MEASURES TO REDUCE ANTIBIOTIC LOAD ON THE NEONATAL INTENSIVE CARE UNIT: A COMPLETED RE-AUDIT CYCLE

S. Sampath¹, R. Fallon¹, C. Ghinescu¹, A. Hamud¹, S. Kandasamy¹, T. Neal², H. Ibrahim¹

¹Department of Neonatology, Liverpool Women's NHS Foundation Trust, ²Department of Microbiology, Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK

Background: Neonatal intensive care is a clinical environment with heavy use of antibiotics. Traditionally antibiotics have been continued for a minimum of 48 h until blood culture (BC) is negative in clinically well babies. Local audit in 1997/98 had shown that the negative predictive value of BC was 99.7 % at 36 h. Another local audit in 1997/98 had shown that a manual system of verifying blood cultures leads to unnecessary overuse of antibiotics.

Two interventions were introduced since year 2000 in a stepwise fashion.

1. Direct computer link to the microbiology lab for live reporting of positive BC (Tpath).
2. BC negative at 36 h were considered true negative in the absence of other laboratory or clinical features.

Aim: To assess the impact on the number of antibiotic doses used since the stepwise introduction of these interventions.

Methodology: Retrospective review of random 120 blood culture negative episodes (BCNE) from the year 2010 and 350 BCNE from 2 years 1997–1998. From these two time periods, the rate of antibiotic use was ascertained and extrapolated to the total number of true BCNEs.

Results: An estimated reduction of 1,837 (39.1 %) antibiotic doses in year 2010 compared to 1998 was achieved. This translated to an estimated cost saving of £2392 and an estimated 612 nursing hours saved per year.

Conclusion: We have demonstrated a 39.1 % reduction in antibiotic usage on our neonatal unit over last few years by concerted effect of T-path and change in antibiotic policy.

269 – POSTER SESSION

ACUTE LIVER FAILURE (ALF) DUE TO COXACKIE VIRUS INFECTION IN NEWBORNS: CASE SERIES

I. Savarese¹, C. Auriti¹, A. Pietravalle¹, J. Rechichi¹, M.H. Lombardi¹, M.D. Caione², C. Russo², F. Diomedi Camassei³, F. Callea³, S. Fiore⁴, A. Dotta¹

¹NICU, ²Microbiology Unit, ³Department of Pathology, Bambin Gesù Children Hospital, Rome, ⁴Laboratory of Virology, Istituto Superiore di Sanità, Roma, Italy

Background: Enterovirus infection is common in the neonatal period with a characteristic seasonal pattern (June–October) and variable clinical presentation ranging in severity from benign febrile illness to severe forms including meningoencephalitis, myocarditis and ALF. The identification of risk factors for severe disease (prematurity, maternal symptomatic infection at the time of delivery, early onset and viral serotype) is crucial for appropriate management.

Case series: We describe three cases of late preterm newborns, occurred between June 2012 and January 2013, with onset in the first week of life with coagulopathy, ALF and mothers febrile before delivery.

The first and the third patient died at 27 and 13 days of life, respectively, despite prompt aggressive supportive care and massive transfusion therapy. The second one, after a critical initial phase and liver biopsy, improved and was removed from the transplant list. In the first two cases Coxsackie B viral genome (serotype B3 and B4, respectively) was detected on blood, cerebrospinal fluid and bone marrow. In the last one an Enterovirus was also identified (serotyping in progress at the moment). Neonatal hemochromatosis, initially suspected in the first case because of intra and extra hepatic siderosis, was not confirmed on histological examination.

Discussion: Enterovirus can lead to severe ALF and death in newborns and must be always considered in the differential diagnosis of neonatal ALF. We underline the importance of early recognition of risk factors in pregnant women and of clinical manifestations in newborn infants.

270 – POSTER SESSION

HEME OXYGENASE-1 DEFICIENCY IMPAIRS ADAPTIVE IMMUNITY IN THE INTESTINES OF YOUNG MICE VIA CHANGES IN T-REGULATORY CELLS

S. Schulz¹, K.M. Chisholm², F. Kalish¹, H. Zhao¹, Y. Yang³, R.J. Wong¹, D.K. Stevenson¹

¹Pediatrics, ²Pathology, ³Genetics, Stanford University, Palo Alto, CA, USA

Background: Heme oxygenase-1 (HO-1) controls heme degradation, and the products of this process confer anti-inflammatory and immunomodulatory effects. Recently, we demonstrated that HO-1 deficiency promotes NEC-like intestinal injury in mice. A decreased

ratio of T-regulatory (Treg) to T-effector (CD4, CD8, Teff) cells in necrotizing enterocolitis (NEC) has been reported.

Aim: To study whether a deficiency in HO-1 affects neonatal adaptive immunity by modulating T cell populations.

Methods: 7–10 day-old HO-1 heterozygous (HO-1^{+/-}) and wild-type (Wt) mice were given vehicle (Con) or 5 mg LPS/kg IP. To induce NEC-like injury, 7 day-old Wt pups were fed 200 µL formula/4 h orally for 30 h. On D1.5 and 7, pups were exposed to 5 % O₂. For flow cytometry analyses, intestinal lamina propria (ILP) cells were stained with CD45, CD3, CD8, CD4, CD25, and FOXP3 antibodies.

Results: Preliminary studies show a similar number of FOXP3^{hi}-expressing CD4⁺CD25⁺ Tregs in Con HO-1^{+/-} (88 ± 3 %) and Wt pups (93 ± 1 %). 12 h after LPS, FOXP3^{hi} expression decreased to 79 ± 0.1 % and 85 ± 3 % in CD4⁺CD25⁺ T cells of HO-1^{+/-} and Wt pups, respectively. The Treg/Teff ratio in HO-1^{+/-} pups was 11 ± 6 % (Treg/CD4) and 22 ± 2 % (Treg/CD8) lower than in Wt pups 12 h post-LPS treatment, decreasing further in HO-1^{+/-} pups after 24 h [39 ± 7.5 % (Treg/CD4), 35 ± 14 % (Treg/CD8)]. After NEC induction in Wt pups, FOXP3^{hi} expression in CD4⁺CD25⁺ T cells decreased by 30–40 %.

Conclusion: FOXP3^{hi}CD4⁺CD25⁺ Tregs and the Treg/Teff ratio in the ILP are compromised in HO-1^{+/-} pups after LPS treatment. If the reduction of Tregs in Wt pups after NEC induction is more severe in HO-1^{+/-} mice will be further studied.

271 – POSTER SESSION

THE SIGNIFICANCE OF GENETIC POLYMORPHISMS OF GLUTATHIONE S-TRANSFERASE FAMILY IN THE DEVELOPMENT OF PNEUMONIA IN PREMATURE BORN BABIES

E.Y. Shunko¹, N.G. Gorovenko², O.M. Kovalova³, Z. Rossokha², J. Goncharova³

¹Neonatology, National Medical Academy of Postgraduate Education, ²National Medical Academy of Post-Graduate Education named after P.L. Shupik, Kiev, ³Ukrainian Medical Dental Academy, Poltava, Ukraine

Background and aims: To investigate associations between polymorphism of *GSTM1*, *GSTT1*, *GSTP1* genes and the development of pneumonia in premature born babies during their treatment in neonatal intensive care units.

Methods: We investigated associations between polymorphisms of *GSTM1*, *GSTT1* and *GSTP1* genes and the development of pneumonia amongst 120 premature newborns at <36 weeks gestation (median birthweight 1,475 g, range 700–2,480 g; gestation 30.8 weeks, range 27–36; 68 male). In these children we measured the rate of use of oxygen support, CPAP, and mechanical ventilation.

Differences between groups were determined by parametric (independent *t* test) or non-parametric techniques (Mann–Whitney U test) depending on their distribution. Analysis was performed using SPSS.

Results: The AG and GG *GSTP1* genotypes were associated with the development of pneumonia in premature newborns. In premature born babies with genotype GG gene *GSTR1* the duration of mechanical ventilation was significantly greater than in newborns with AG or AA genotypes (Me = 8.0 and 4.4, 3.5 days). Babies with a combination of non-functional alleles of the *GSTM1* gene and the A313G single

nucleotide change of *GSTP1* gene required the use of oxygen support significantly more than babies with functional genotypes (51.5 and 4.8 %, *p* < 0.01).

Conclusions: These data to support a role of polymorphism of *GSTP1* in the development of pneumonia in premature newborns.

272 – POSTER SESSION

MATRIC METALLOPROTEINASE-2 LEVEL AS A MARKER OF ENDOTHELIAL LEAKAGE IN DENGUE SHOCK AFTER RESUSCITATION WITH HYPEROSMOLAR SODIUM LACTATE SOLUTION

D.H. Somasetia^{1,2}, D. Setiabudi^{1,2}, B.A. Azhali², P. Idjradinata^{1,2}

¹Pediatrics, Universitas Padjadjaran, ²Pediatrics, Hasan Sadikin Hospital, Bandung, Indonesia

Objectives: Hyperosmolar sodium lactate (HSL) solution can be used for small volume resuscitation. Endothelial leakage in dengue shock syndrome (DSS) is caused by the increased of adhesion molecules and matric metalloproteinases (MMP) activity. The purpose of this study was to compare the MMP-2 plasma level after fluid resuscitation with HSL or Ringer's lactate (RL) in DSS as a marker of endothelial leakage.

Methods: Single blind randomized clinical trial was done to compare HSL and RL in DSS. Data were collected on January–June 2010 and were analyzed between June and December 2010. Group I (23 subjects) received HSL and group II (22 subjects) received RL. Serial blood sampling were obtained for MMP-2 plasma level measurement on admission, 6, 12, 24, and 48 h after fluid resuscitation. The capillary refill time (CRT) <2 s was used as a clinical marker of shock recovery.

Results: No decrease in MMP-2 plasma level until 48 h after resuscitation, Mann–Whitney test showed no significant difference between two groups (*p* > 0.05). This study showed that neither HSL nor RL did not decreased the MMP-2 plasma level within 48 h after fluid resuscitation, but CRT <2 s as a clinical marker of shock recovery were reached faster within 30 min in group I, Fisher Exact test showed significant difference between two groups (*p* < 0.05).

Conclusions: The MMP-2 plasma level can not be used as marker of endothelial leakage, CRT <2 s can be used as clinical marker of shock recovery and HSL can recover shock faster in DSS.

273 – POSTER SESSION

CLINICAL COURSE OF BRONCHIOLITIS PATIENTS ADMITTED TO PICU—A SINGLE CENTRE EXPERIENCE

S. Swamy¹, N. Holt², S. Sebastian²

¹Paediatric Intensive Care Unit, ²PICU, Birmingham Children's Hospital, Birmingham, UK

Background: Children with bronchiolitis account for considerable workload in Paediatric Intensive Care Unit (PICU) during winter months.

Aim: To describe the clinical course and outcome of children with suspected or confirmed bronchiolitis admitted to PICU.

Methods: Prospective data on demographics, respiratory support and outcome were collected on all children aged <5 years admitted to a 24 bedded multi disciplinary PICU with bronchiolitis

Results: Over a 3 months period from November 2011, 45 eligible patients were studied. Their median age was 47 days (range: 9 days–4 years), nearly two-thirds being males. Mean length of PICU stay was 4 days (range 1–32 days). Respiratory syncytial virus (RSV) was detected in 80 % of the children. Risk factors/co morbidities identified include young age <2 months (55 %), prematurity (33 %), congenital heart disease (11 %), chronic lung disease (6 %) and Down syndrome (6 %). No co-morbidities were identifiable in 18 (40 %) children. Sixteen (35 %) children required CPAP support only. Rest (29) required invasive ventilation including High frequency oscillatory ventilation (HFOV) (8), inhaled nitric oxide (5) and ECMO (2). 34 % of these children had proven secondary pulmonary bacterial co infection. Survival to PICU discharge was 93 %. All three children who died (crude mortality rate of 6.6 %) had significant co-morbidities namely complex heart disease with heart failure, prolonged cardiac arrest and multi organ dysfunction.

Conclusion: While most children with bronchiolitis admitted to PICU have an uneventful PICU course, those with co morbidities have more protracted course and increased risk of mortality.

274 – POSTER SESSION

ECHOCARDIOGRAM DONE EARLY IN NEONATAL SEPSIS: WHAT DOES IT ADD?

R. Tomerak, A.A. El-Badawy, G. Hussein, N.R.M. Kamel, A.R.A. Razak

Cairo University, Cairo, Egypt

Background: One of the major organs affected in neonatal sepsis is the heart. Echocardiogram provides real-time information on the cardiovascular performance rather than dependence on the clinical signs alone, which might lead to misjudgment.

Aim of the work: To assess left ventricular (LV) functions in septic neonates early after admission using transthoracic color Doppler Echocardiography.

Patients and methods: Echocardiography was done to 30 septic and 30 nonseptic newborns who were divided among 4 groups (septic full-term, 14; septic preterm, 16; nonseptic full-term, 21; and nonseptic preterm, 9). Comparisons were made among the 4 groups using analysis of variance and post hoc test regarding the systolic function (using ejection fraction and fractional shortening), the diastolic function (using the early atrial peak/atrial peak flow velocity ratio), and the global LV function (using myocardial performance index).

Results: The E-wave and the early peak flow velocity/atrial peak flow velocity ratio were significantly lower in the septic neonates, whether full-term or premature, compared to their corresponding age groups in the nonseptic newborns, suggesting LV diastolic dysfunction (P G 0.001 and P G 0.014, respectively). No difference was found in the diastolic function between the full-term and the preterm neonates whether lying within the septic group or in the nonseptic group. Myocardial performance index was significantly higher in the septic neonates who died than in the survivors (P G 0.001).

Conclusion: Neonatal sepsis is associated with LV diastolic dysfunction.

275 – POSTER SESSION

TRACHEAL COLONIZATION IN PRETERM INFANTS SUPPORTED WITH NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE

R. Tomerak, H.A.M. Badawy, A.A. El-Kholy, A.S. Hamed

Pediatrics, Cairo University, Cairo, Egypt

Background: The aim of this study was to examine endotracheal bacteriological status in premature infants who are supported by nasal continuous positive airway pressure (CPAP) without any history of tracheal intubation.

Methods: In this prospective study, we enrolled 60 premature infants with respiratory distress; of these, 30 were supported by CPAP without tracheal intubation, and 30 were intubated and mechanically ventilated. Infants were enrolled at a postnatal age of <24 h. Endotracheal (ET) cultures were taken at 24 h and at the 5th day of life.

Results: ET cultures taken on the 1st day of life showed colonization in 7/30 (23 %) in the CPAP group versus 19/30 (63 %) in the mechanically ventilated group (P = 0.002). Tracheal cultures on day 5 were positive in 5/30 (17 %) and 11/30 (37 %), respectively (P = 0.093). *Klebsiella* spp. represented the most frequently isolated organism in both groups. A positive tracheal culture at 5 days was associated with a longer duration of respiratory support in the CPAP group (P = 0.05) but not in the ventilation group. Endotracheal culture at 5 days was associated with mortality in the ventilation group (8/11 vs 5/19, P = 0.02), but not in the CPAP group (1/5 vs 2/25, P = 0.45). Early endotracheal cultures did not relate with mortality in either of the groups.

Conclusion: The trachea of premature infants supported with CPAP is at risk for bacterial colonization. Predisposing factors, mechanisms and clinical implications of these novel findings need to be studied.

276 – POSTER SESSION

BACTERAEemia DUE TO MULTIDRUG-RESISTANT GRAM-NEGATIVE BACILLI IN THE NEONATAL INTENSIVE CARE UNIT PATIENTS: RISK FACTORS, ANTIBIOTIC TREATMENT AND OUTCOMES

M.H. Tsai¹, S.-M. Chu², J.-F. Hsu², Y.-C. Huang²

¹*Chang Gung Memorial Hospital Yunlin, Yunlin*, ²*Chang Gung Memorial Hospital Linkou, Linkou, Taiwan R.O.C.*

Background and aims: To assess the risk factors, antibiotic therapy and outcomes of multidrug-resistant Gram-negative bacilli (MDRGNB) bacteraemia in the neonatal intensive care unit (NICU) patients.

Methods: Episodes of MDRGNB bacteraemia were compared with a susceptible control group in an 8-year cohort study.

Results: Of 1106 bacteraemias, 393 (35.5 %) were caused by a Gram-negative bacilli (GNB). Seventy (18.6 %) were caused by a MDR strain. The most frequent mechanism of resistance was extended-spectrum β -lactamase (ESBL) production (67.1 %), mainly by *Klebsiella pneumoniae* (59.6 %). Previous antibiotic exposure to 3rd generation cephalosporin [odds ratio (OR) 5.97; 95 % confidence interval (CI) 2.37–15.08, P < 0.001] and carbapenem (OR 3.60; 95 %

CI 1.26–10.29, $P = 0.017$) and underlying renal disease (OR 7.08; 95 % CI 1.74–28.83, $P = 0.006$) were identified as independent risk factors for MDRGNB acquisition. Patients with MDRGNB bacteraemia more likely received inadequate initial antibiotic therapy (72.9 versus 7.8 %, $P < 0.001$), had a higher rate of infectious complication (21.4 versus 10.5 %; $P = 0.011$), and a higher overall case-fatality rate (28.6 versus 10.5 %; $P < 0.001$). Independent risk factors for overall mortality were presence of infectious complications after bacteremia (OR 3.16; 95 % CI 1.41–7.08, $P = 0.005$) and underlying secondary pulmonary hypertension with/without cor pulmonale (OR 6.19; 95 % CI 1.88–20.31, $P = 0.003$).

Conclusions: MDRGNB accounted for 18.6 % of all neonatal GNB bacteremia, especially in those with previous broad-spectrum antibiotic therapy and underlying renal disease. The most frequent mechanism of resistance was ESBL production. Neonates with MDRGNB more frequently received inadequate empiric antibiotic therapy and presented poorer outcomes with a higher overall case-fatality rate.

277 – POSTER SESSION

HOW ACCURATE ARE BELL'S STAGING CRITERIA FOR NECROTIZING ENTEROCOLITIS IN NEONATES?

N.T.N. Tu¹, N.T. Liem², N.V. Linh², K.T.K. Dung¹

¹Neonatal Department, ²Department of Pediatric Surgery, Vietnam National Hospital of Pediatrics, Ha Noi, Vietnam

Background and aims: For many years, Bell's Staging Criteria are considered the standard instrument to diagnose necrotizing enterocolitis (NEC). But nowadays, Bell's criteria appear inaccurate because of various presentations of NEC. In this research, we used laparoscopy in newborns with diagnosis of NEC to evaluate the accuracy of Bell's Staging Criteria.

Methods: All newborns with diagnosis of NEC from stage IIA of Bell's Staging Criteria underwent laparoscopy on the neonatal intensive care unit.

Results: 33 newborns were tolerated well at laparoscopy. Median gestations age at birth was 35.2 weeks (range 26–40). Median weight at time of laparoscopy was 2,303 g (range 1,100–3,400). Additional diseases were septicemia, hyaline membrane, patent ductus arteriosus, pneumonia, septicemia. According to Bell's criteria, there were 20 patients classified to be in stage IIA, 7 patients in stage IIB, 2 patients in stage IIIA and 4 patients in stage IIIB. In laparoscopy results, NEC was excluded in 16 patients because of normal intestinal appearance or other diseases and confirmed in 17 patients. In confirmed NEC group, histologic findings were edema, hemorrhage, pneumatosis of the submucosa.

Conclusions: Bell's Staging Criteria for NEC are no longer reliable. We should use laparoscopy to confirm the diagnosis of NEC.

References:

1. Corona Bellostas C et al (2011) Role of laparoscopy in premature infants with suspicion of necrotizing enterocolitis. *Cir Pediatr* 24(3):151–152
2. Pierro A, Hall N, Ade-Ajayi A et al (2004) Laparoscopy assists surgical decision making in infants with necrotizing enterocolitis. *J Pediatr Surg* 39(6):902–906.

278 – POSTER SESSION

BORDERZONE INFARCTION IN MENINGOCOCCAL SEPTIC SHOCK IN A 1 YEAR OLD BOY

H. van der Heijden, C. Neeleman

Paediatric Intensive Care Unit, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Objectives: Cerebral lesions in meningococcal septic shock (MSS) patients without meningitis are rare and survivors generally show good neurological outcome. Here we describe a MSS patient with multiple borderzone infarcts on cerebral MRI.

Methods: A 1 year old boy presented on the emergency department with a fulminant septic shock with petechiae and purpura. There were no symptoms of meningitis.

Results: The patient was intubated and treated with fluid resuscitation, inotropes, steroids and antibiotics. His hemodynamics stabilized within hours. Blood cultures showed *Neisseria meningitidis* type B. On day seven, the patient developed subfebrile temperature and irritability. In addition CRP increased combined with extreme leukocytosis ($94.6 \times 10^9/l$). MRI was performed to investigate the presence of cerebral empyema. The MRI revealed multiple hyperintensities, focal and bilaterally, located in the white matter of both hemispheres (Fig. 1). Cerebral fluid was without abnormalities. A control MRI showed some reversibility of the lesions. At follow up after 4 weeks, no gross neurological impairments were observed.

Conclusions: This is to our best knowledge the first report of borderzone infarction in a child with meningococcal septic shock. This, probably underreported finding, underscores the importance of multidisciplinary follow up of MSS patients.

Fig. 1 Borderzone infarction

279 – POSTER SESSION

PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY OF *ACINETOBACTER BAUMANII* IN A PEDIATRIC INTENSIVE CARE UNIT IN GREECE

M. Vasilopoulou¹, A. Papatheodoropoulou¹, A. Makri², C. Koutsaftiki¹, Z. Sarri¹, A. Vogiatzi², L. Sianidou¹

¹Pediatric Intensive Care Unit, ²Microbiologic Department, Penteli Children's Hospital, Athina, Greece

Background: *Acinetobacter baumannii* (AB) is an important nosocomial pathogen with increasing drug resistance.

Aims: To determine the prevalence of AB colonization/infection, to assess the AB susceptibility/resistance patterns and to document the presence of multiresistant AB (MRAB) in a single pediatric intensive care unit (PICU) of a tertiary hospital over the last decade (January 2003–December 2012).

Methods: A retrospective study, reviewing the medical records of 784 patients (aged between 15 days–17 years). All patients had specimens collected from urine, blood, bronchial secretions, pharyngeal smear and gastric secretions at PICU admission and every 48 h thereafter. Multiresistance was defined as resistance to three or more of the following five drug classes: antipseudomonal cephalosporins (ceftazidime, cefepime), antipseudomonal carbapenems (imipenem, meropenem), ampicillin + sulbactam, quinolones and aminoglycosides.

Results: AB was isolated from 43 specimens collected from 32 patients. The overall prevalence of AB colonization/infection was 4 % (32/784). The most common sites of isolation were respiratory tract system (67.5 %), gastrointestinal tract system (11.5 %) and blood (7 %). 18.8 % (6/32) of the patients had AB cultured from multiple sites. MRAB was identified in 6/32 (18.8 %) patients. The most effective antibiotic category against AB was carbapenems (90.6 %) whereas the maximum resistance was noticed against quinolones (43.8 %). Antibioresistance towards ampicillin-sulbactam was 21.9 %, antipseudomonal cephalosporins 21.9 % and aminoglycosides 18.8 %.

Conclusions:

1. Prevalence of MRAB in PICU patients still remains remarkably lower compared to that in adult ICUs.
2. High resistance against quinolones is alarming in PICU patients. The use of effective infection control measures could limit the development and spread of antimicrobial resistance.

280 – POSTER SESSION

LATE ONSET SEPSIS (LOS) IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS—CLINICAL AND METABOLIC ASSOCIATIONS

C. Vasudevan¹, D. Kriel², N. Orsi³, M. Cummings³, J. Puntis², M. Levene¹

¹Academic Unit of Paediatrics, University of Leeds, ²Department of Paediatric Gastroenterology and Nutrition, Leeds Teaching Hospitals NHS Trust, ³Department of Pathology and Tumor Biology, Leeds Institute of Molecular Medicine, Leeds, UK

Objectives: To study the association of risk factors including raised serum triglycerides (>2.3 mmol/L) with the incidence of LOS in VLBW (<1,500 g) infants.

Methods: Retrospective analysis of case records of VLBW infants over a period of a year, who received parenteral nutrition and had serum triglyceride levels measured. Clinical, epidemiological and laboratory parameters (birth weight, gestation, inflammatory markers and blood culture, serum triglycerides) were obtained and analysed for their association with incidence of LOS.

Results: 274 VLBW infants who were admitted to the unit during the study period received PN. 133 infants had serum triglycerides estimated while on PN (mean gestational age—27 weeks, mean birth weight 1,029 g). 64 infants (48 %) of the infants had raised serum triglyceride levels and 69 (51 %) had at least one episode of LOS during their hospital stay. On uni-variate analysis, lower gestational age, longer duration of parenteral nutrition and raised serum triglycerides were significantly associated with incidence of LOS. The duration of parenteral nutrition and lower gestational age remained significant on multivariate logistic regression analysis. Birth weight and gender did not appear to be significantly associated with an increased incidence of LOS.

Conclusion: Lower gestational age and longer duration of parenteral nutrition were significantly associated with increased incidence of LOS in VLBW infants. A significant proportion of parenterally fed infants had high serum triglycerides and their association with LOS needs further evaluation.

281 – POSTER SESSION

PROCALCITONIN AS A MARKER OF SEPSIS AFTER PAEDIATRIC SURGERY

A. Ventura, A. Dias, T. Dionisio, A. Dinis, C. Pinto, L. Carvalho, F. Neves

PICU, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Introduction and aims: In critically ill patients, sepsis can be difficult to distinguish from other situations with SIRS, like extensive surgical interventions. Procalcitonin is considered a useful marker of severe bacterial infection and sepsis in these situations. The aims were to assess the profile of procalcitonin and C-reactive protein (CRP) in the postoperative period of children admitted to PICU, and to compare them as markers of systemic bacterial infection.

Methods: Serial measurements of procalcitonin and CRP were performed at different time periods after surgery (0, 6–12, 24–30, 48–54, 72–78 and 120–126 h) in children older than 3 days of life with a central line. Surgical contamination classification and sepsis/SIRS were defined according to CDC and International Paediatric Sepsis Consensus Conference criteria. Children were divided in 2 groups: with and without infection; procalcitonin and CRP were compared.

Results: 34 children (median age 12.6 years) who underwent orthopaedic surgery (17), general surgery (10) and neurosurgery (7) were included. Most surgeries were classified as clean (25). 16 had SIRS and 4 had sepsis criteria. Regarding the group without infection (30), procalcitonin reached a plateau at 12–24 h (median 0.41 ng/mL) and the CRP achieved a peak at 48–54 h (median 8.2 mg/dL). Procalcitonin median values in children with infection were higher ($p < 0.05$) than those without infection: 6–12 h (52.8 vs 0.4 ng/mL), 24–30 h (24.6 vs 0.28 ng/mL) and 48–54 h (32 vs 0.2 ng/mL). No differences were found regarding CRP.

Conclusions: Procalcitonin can be an important marker in sepsis diagnosis after surgery and may be useful to optimize the antibiotic management.

282 – POSTER SESSION

CHARACTERISTICS AND OUTCOME OF NEONATES WITH A HEALTHCARE-ASSOCIATED BLOODSTREAM INFECTION IN A NICU OVER A 10-YEAR PERIOD (2002–2011)

E.H. Verstraete¹, G. Claeys², I. Leroux-Roels², D. Vogelaers³, P. Vanhaesebrouck⁴, S. Blot¹

¹Internal Medicine, Ghent University, ²Laboratory of Clinical Biology, ³Internal Medicine, ⁴Neonatal Medicine, Ghent University Hospital, Ghent, Belgium

Objectives: Healthcare-associated bloodstream infection (HABSI) is the most frequent infectious complication in NICU's. Very low birth weight (BW) ($\leq 1,500$ g) and very low gestational age (GA) (≤ 31 weeks) are major risk factors. Our objective is to describe the characteristics of neonates with HABSI and to look for changes in their risk profile and outcome over a 10-year period.

Methods: A historical cohort study of neonates with possible or definite HABSI, based on a prospective NICU audit system and a hospital-wide surveillance for HABSI. Three periods are considered: 2002–2005, 2006–2008, 2009–2011. Only the 1st episode of HABSI is included. Severity of illness is assessed with the Clinical Risk Index for Babies (CRIB) score.

Results: A total of 337 neonates developed HABSI in 5,432 admissions (6.2 %). Data are reported in Table 1. A nearly significant decrease in in-hospital mortality is observed while less neonates had a high-risk-CRIB-score. Logistic regression analysis adjusting for risk factors for death confirmed that survival improved over time (cf. Table 2).

Conclusion: In-hospital mortality in patients with HABSI decreased with time. A CRIB-score lower than five and admission in a more recent period of time, was protective for mortality.

Table 1 Characteristics and outcome of neonates with HABSI

Variable	2002–2005 (n = 129)	2006–2008 (n = 108)	2009–2011 (n = 100)	P value
1. Ga, weeks	33 (29–37)	32 (29–37)	34 (28–38)	0.252
GA ≤ 31 weeks	41 %	43 %	39 %	0.803
2. BW, g	1,820 (1,210–2,845)	1,743 (1,148–2,688)	1,798 (1,052–3,118)	0.828
BW $\leq 1,500$ g	39 %	42 %	44 %	0.723
3. Gender, male	63 %	51 %	56 %	0.180
4. CRIB ≥ 5	30 %	18 %	16 %	0.031
5. Length of stay, days	42 (22–65)	32 (17–71)	49 (22–91)	0.111
6. Days before infection	11 (7–19)	8 (3–18)	10 (13–17)	0.192
7. Mortality	15 %	9 %	5 %	0.050

Table 2 Independent risk factors for mortality

Variable	OR (95 % CI)	P value
GA ≤ 31 weeks	0.31 (0.09–1.07)	0.063
BW $\leq 1,500$ g	2.85 (0.92–8.86)	0.071
CRIB ≥ 5	2.79 (1.08–7.19)	0.034
Period of admission		
2002–2005 (reference)	–	–
2006–2008	0.66 (0.28–1.57)	0.350
2009–2011	0.32 (0.11–0.94)	0.038

283 – POSTER SESSION

INVASIVE CANDIDIASIS IN PEDIATRIC INTENSIVE CARE UNITS (PICUS) IN GREECE: A NATION-WIDE STUDY

L. Vogiatzi¹, S. Ilia², G. Sideri³, E. Vangelakoudi⁴, M. Vasilopoulou⁵, M. Sdougka¹, G. Briassoulis², J. Papadatos³, P. Kalabalikis⁴, L. Sianidou⁵, E. Roilides⁶

¹PICU, Hippokration Hospital Thessaloniki, Thessaloniki, ²PICU, University Hospital of Heraklion, University of Crete School of Medicine, Heraklion, ³PICU, Aglaia Kyriakou Children's Hospital, Athens, Greece, ⁴PICU, Aghia Sophia Children's Hospital, Athens, Gibraltar, ⁵PICU, Pendeli Children's Hospital, Athens, ⁶3rd Department of Pediatrics, Aristotle University School of Medicine, Thessaloniki, Greece

Purpose: To record the practices for the prevention and management of invasive candidiasis in each PICU, and to investigate the epidemiology and outcome of candidiasis nationwide.

Methods: Multicenter national study among PICUs. A questionnaire referring to local practices of prevention and management of candidemia was filled in and a retrospective study of candidiasis episodes that occurred during 5 years (2005–2009) was conducted in all seven PICUs in the country.

Results: Clinical practices were similar among PICUs although case-mix was somewhat different. 22 episodes of candidemia were nationally recorded between 2005 and 2009 with a median incidence 6.4 cases/1000 admissions. Median age was 8.2 (0.3–16.6) years. The median duration of PICU stay prior to the candidemia episode was 18.5 (4–615) days. *Candida albicans* was isolated in 45.4 % of episodes followed by *Candida parapsilosis* (22.7 %). Six patients had been previously exposed to antifungal agents and five of them developed candidemia due to non-albicans spp. Common findings were presence of central venous and urinary catheters, mechanical ventilation and administration of antibiotics with anti-aerobic activity in most patients with candidemia. Total parenteral nutrition was administered to 5 (22.7 %) patients. Most of the patients had a chronic underlying disease, 5 were oncology patients and 16/22 patients presenting with candidemia were colonized with *Candida* spp. Lipid formulations of amphotericin B were the predominant therapeutic choice (54.5 %). Thirty-day mortality was 18.2 %.

Conclusions: The national epidemiology and management of candidemia in PICU is reported contributing to the improvement of candidiasis management in PICU.

284 – POSTER SESSION

THE EFFECT OF TIMING OF CAESAREAN SECTION ANTIBIOTICS IN THE INCIDENCE OF SEPSIS IN THE FIRST 3 MONTHS OF LIFE

E. Wilson, E. Vamvakiti, S. Devarajah

Paediatrics, Worthing Hospital, Worthing, UK

Background: In July 2012 Western Sussex Hospitals Trust changed the timing of prophylactic antibiotics for LSCS (Lower Segment Caesarean Section) from post to pre-incision as per recent NICE guidance.

Objective: To review the effect on the incidence of sepsis in infants depending on the timing of maternal antibiotics.

Methods: Retrospective collection of data 3 months before and after the change in policy.

Inclusion Criteria: All infants up to 3 months of age delivered at Worthing Hospital by LSCS and treated for sepsis.

Exclusion Criteria: Gestational age <35 weeks. Transfer to tertiary neonatal services on the 1st day of life. Immediate LSCS.

Prolonged rupture of membranes and maternal pyrexia as these altered the timing and choice of antibiotics.

Results: A total of 27 infants met the criteria, 14 pre and 13 post change in local policy.

Out of the 14 infants (post-skin incision antibiotics): nine had 48–72 h of antibiotics for presumed sepsis until a negative blood culture result was available. Five completed 5–7 days of antibiotics for probable sepsis, all had negative blood cultures.

Out of the 13 infants (pre-skin incision antibiotics): 8 had 48–72 h of antibiotics for presumed sepsis until a negative blood culture was available. Five completed 5–7 days of antibiotics for probable sepsis, all had negative blood cultures.

Conclusion: The study showed that the timing of antibiotics for LSCS did not affect the incidence of sepsis.

285 – POSTER SESSION

A CASE OF TYPE F INFANTILE BOTULISM IN ITALY

A. Wolfler¹, A. Mandelli¹, E. Rota¹, I. Fiocchi², D. Lonati³, E. Zoia¹, I. Salvo¹

¹Anesthesia and Intensive Care, ²Pediatric Neurology, Children's Hospital Vittore Buzzi, Milan, ³Poison Center and National Toxicology Information Centre, Maugeri Foundation, Pavia, Italy

Infantile botulism is a rare cause of paralysis in infants. The vast majority of cases of infant botulism are caused by botulinum toxin types A and B and only few cases of type F neurotoxin has been identified in infant botulism and reported. We report a severe case of infant botulism caused by botulinum toxin types B and F in a 5 months old baby.

Case report: NP, female, 6.2 kg of body weight. She presented in the ED of a regional hospital with a 2-days story of constipation, poor feeding, and lethargy, poor respiratory effort and hypotonia since 12 h. Due to child deterioration, intubation and ventilation were required and she was transferred in our PICU. Botulism was clinically suspected and confirmed by EMG and by the presence in stool sample of toxin B and F producing *Clostridium botulinum* on PCR. Because of the lack of efficacy of botulism immunoglobulin (BabyBig) for type F toxin, we administered supportive therapy and tried to eradicate the

clostridium strains from the intestine through bowel irrigation. Repeated PCR tests on faecal samples were made until negative results were obtained. Ventilation was shifted in NAVA to monitorize diaphragmatic activity. She was extubated uneventfully on day 13, transferred in neuro-rehabilitation on day 24 in good condition.

Conclusion: Botulinum toxin type F infection seems to be less severe than other types toxin. NAVA system might help for weaning purpose to determine diaphragmatic strength and recovery. Supportive therapy should include removal of enteric reservoir of infection.

286 – POSTER SESSION

BACTERIAL PATHOGENES CAUSING SEPTICEMIA IN INFANTS PATIENTS AND ANTIBIOTICS RESISTANCE PATTERN IN HAMEDAN, WEST OF IRAN

R. Yousefimashouf¹, H. Hashemi², M. Molaei²

¹Department of Microbiology, ²Hamadan University of Medical Sciences, Hamadan, Iran

Background and aims: Resistance pattern of different bacteria and pathogen frequency may vary significantly from country to country and also in different hospitals within a country. Thus, regional surveillance programs are essential to guide empirical therapy and infection control measures. The aim of present study was the evaluation of bacterial pathogens that causes septicemia and their antimicrobial sensitivity, at Educational hospitals, Hamedan, Iran.

Methods: This descriptive cross-sectional study comprised 746 blood cultures, which were taken from infant patients in Hamadan hospitals during 2 years. Positive blood cultures, the etiology of septicemia, antimicrobial sensitivity and resistance of strains to antibiotics were entered the questionnaires. Data were statistically analyzed, using SPSS 13.

Results: From 746 blood cultures evaluated, 93 cases (12.5 %) were positive and 51.6 % of positive blood cultures were due to gram negative bacteria. The most common causes of septicemia included: *Staphylococcus epidermidis* 37.6 %, *E. coli* 25.8 % and *Staphylococcus aureus* 8.6 %, respectively. Gram negative bacteria were resistance to common antibiotics: cloxacillin 100 %, tetracycline 84.6 %, cephalotin 69 %, ampicillin 66.7 %, nalidixic acid 62.5 %, cephalexin 61.5 %, amoxicillin 61.5 %, and TMP-sulfamethoxazole 53.1 %; while resistance was lower in gram positive organisms: cloxacillin 66.7 %, penicillin 75 %, nafazoline 75 %, amikacin 50 %, doxycycline 50 %, TMP-sulfamethoxazole 41.7 %, and gentamicin 40 %.

Conclusion: The present study showed that gram negative organisms, in particular, *E. coli* are the most common causes of sepsis in this region. It also indicated that gram negative strains causing septicemia showed most common resistance to current antibiotics, so that more than 50 % resistance was observed in most of these organisms.

287 – POSTER SESSION

A STUDY ON PATHOGENIC BACTERIA CAUSING DIARRHEA IN CHILDREN AND DETECTION OF ANTIBIOTICS RESISTANCE PATTERNS IN HAMADAN, IRAN

R. Yousefimashouf¹, F. Eghbalian², M. Koshki²

¹Department of Microbiology, ²Hamadan University of Medical Sciences, Hamadan, Iran

Background and aim: Bacterial diarrhea is very common in particular in developing countries and is still one of the most causes of mortalities in children. The aim of present study was to identify the most common of bacterial agents causing acute bacterial diarrhea in children under 14 years old and detection of their resistance to antibiotics

Methods: During 2 years, 610 samples obtained from children under 14 years old with gastroenteritis were investigated for bacterial cultures, frequency of age, serogrouping of isolates and antibiogram patterns. Polyvalent (I, II, III, IV) and monovalent antisera were used for serogrouping of *E. coli* (EPEC). Antibiogram tests were also performed by gel-diffusion method of Kirby–Bauer. The data were gathered through a questionnaire and analysed using spss software.

Results: Out of 610 tested samples, 155 cases (25.4 %) had positive culture for intestinal pathogenic bacilli. The most common isolate was; *Escherichia coli* (EPEC) with 105 cases (67.8 %) and the lowest isolate was *Shigella* with 18 cases (11.6 %). The most common serogroup of *E. coli* was 0128 (26.6 %) and the lowest serogroup was 0119 (5.7 %). The most common serogroups of *Salmonella* were *S. typhi* (34.4 %) and *S. typhimurium*. The most common serogroup of *Shigella* was *S. sonnei* (55.6 %). The most effective antibiotics against bacteria were ceftriaxone, nitrofurantoin, imipenem, amikacin and gentamycin.

Conclusions: The present study showed that *Escherichia coli* (EPEC) and *Salmonella species* are predominant causes of bacterial diarrhea in children under 14 years old in this region. Most species showed high resistance to routine antibiotics such as ampicillin, trimethoprim and chloramphenicol.

288 – POSTER SESSION

THE RISK OF SERIOUS NOSOCOMIAL INFECTION BY *STAPHYLOCOCCUS AUREUS* AND THE RELATION WITH IMPROPER HANDWASHING IN HOSPITALS

S.M. Youssef

Infection Control, Org PF Teaching Hospitals, Institutes, Alexandria, Egypt

Objectives: A study was done at Damanhour Teaching Hospital (1,300 Bed) to evaluate hand wash practice among medical staff using staph. Aureus presence or absence as a serious measure for infection control.

Patients and methods: 56 of hospital physicians and nurses from Haemodialysis unit and from haematemesis unit were subject to a questionnaire about hand washing and Infection control also tests for the presence of *Staphylococcus aureus* in their hand flora swabs culture directly after hand washing before and after patients contact.

Conclusion & recommendation: The study showed knowledge about the mode of viral B & C hepatitis transmission between physicians 70 % while nurses 21 %. The percentage of vaccinated staff against HBV infection was very bad 36 % of physicians & 47 % nurses. Usage of gloves & masks and goggles during contract with patients was very low, this was explained by pressure of work Bad system of medical waste disposal (needles. Syringes & Scaples ...) was discovered in the questionnaire.

There was a very high rate of positive staphylococcus Aureus hands swabs cultures from hands of physicians & nurses (50 % in haemodialysis unit & 75 % in Haematemesis unit. Which have alarm about the high risk of severe nosocomial infections development in the future.

Educational programs along with training courses on infection control and proper hand washing already have been started in the hospital by the author.

289 – POSTER SESSION

PANCREATIC STONE PROTEIN: NOVEL BIOMARKER IN PAEDIATRIC SEPSIS?

J. Žurek, M. Fedora

Department of Anesthesia and Intensive Care, School of Medicine, Masaryk University, Brno, Czech Republic

Objective: Pancreatic stone protein (PSP)/regenerating protein 1-alpha (reg) is associated with inflammation, infection, and other disease-related stimuli. The aim of this study was to determine levels of PSP/reg in paediatric patients with SIRS or septic state, comparing these levels with a healthy population. The second goal was to compare levels of PSP/reg within individual septic conditions, impact of levels of this protein on mortality.

Methods: Children aged 0–19 years with systemic inflammatory response syndrome or septic states were studied. The degree of severity was evaluated according PELOD Score. Blood tests to determine levels of PSP/reg were taken throughout the patient meets the criteria of systemic inflammatory response syndrome or sepsis. Control group to determine the serum levels of PSP/reg has been taken from patients undergoing elective surgery.

Results: PSP/reg levels in patients with SIRS or any septic condition were higher than in the control group during the 5-days. PSP/reg cut-off for the third day—D3 was cut-off 283.8 ng/ml, AUC 0.608, *p* value 0.008; for the fifth day - D5 cut-off was 399.6 ng/ml, AUC 0.593, *p* value <0.016. PSP/reg levels in patients with PELOD score >12 were higher than in patients with PELOD score <12, *p* value 0.007. Patients who died had significantly higher levels of PSP/reg, *p* value 0.002.

Conclusion: We conclude that PSP/reg is up-regulated in paediatric sepsis, and the levels are related to the severity of inflammation and may predict mortality.

Long term Outcome (290–317)

290 – POSTER SESSION

OUTCOMES FOR PEDIATRIC SEVERE TRAUMATIC BRAIN INJURY AT A TERTIARY PEDIATRIC INTENSIVE CARE UNIT

N. Aşlıoğlu, F. Turna, Ş.M. Pakso

Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey

Severe head trauma is a significant cause of mortality and morbidity in childhood. The aim of this retrospective study was to put forward the outcomes of patients with severe traumatic brain injury and the factors effective on these outcomes. A total of 61 with severe brain injury were included in the study. Endotracheal intubation and mechanical ventilation were applied to 45 (73.8 %) patients, 21 (34.4 %) patients underwent cranial surgery, 51

(83.6 %) patients had hyperglycemia and 36 (59 %) patients had cerebral edema on admission. Mortality was found to be 23 %. According to the Glasgow Outcome Scale (GOS); 20 (42.5 %) patients had good outcomes and 27 (57.5 %) patients had bad outcomes at the time of hospital discharge. At the 6th month, 37 (78.7 %) patients had good outcomes and 10 (21.3 %) patients had bad outcomes. Positive inotropic support need, Pediatric Risk of Mortality (PRISM) Score, Trauma Scores—Injury Severity Score (TRISS), Injury Severity Score (ISS), Revised Trauma Score (RTS), Abbreviated Injury Scale (AIS), level of blood glucose, mechanical ventilation need and base deficit at the time of admission were found to be related to mortality. Level of blood glucose, PRISM, TRISS, ISS, RTS, base deficit on admission, durations of intensive care unit and hospital stay were found to be effective on the outcomes on hospital discharge and at the 6th month. As a conclusion, morbidity and mortality rates in the children with severe head trauma are high, neurological recovery continue in the follow-up of the surviving patients.

291 – POSTER SESSION

PREDICTIVE VALIDITY AT PRIMARY SCHOOL OF THE ITALIAN PARENTAL QUESTIONNAIRE FOR PRESCHOOL DEVELOPMENTAL EVALUATION AT AGE 4 (QS4-G)

F. Bevilacqua¹, P. Giannantonio², M.F. Coletti¹, A. Ragonese³, L. Ravà¹, V. Di Ciommo¹, M.C. Caselli⁴, P. Pasqualetti², A.M. Dall'Oglio⁵

¹Bambino Gesù Children's Hospital, IRCCS, ²AFAR, ³Università Rome, ⁴CNR, ⁵Unit of Clinical Psychology, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

Background and aims: In a previous study we validated the QS4-G designed to evaluate the neuropsychological and behavioural developmental status of four-year-old children and to identify children in need of further evaluation. The validation of the QS4-G was conducted on a sample of preterm and at-term children (263 as a whole) and was focused on reliability, internal consistency, concurrent validity and discriminant validity. We present here the accuracy of the QS4-G in predicting cognitive, neuropsychological, and academic performance at school age 4/6 years later.

Methods: Fifty-one children were consecutively recruited from September 2007 to December 2008 at Bambino Gesù Children's Hospital in Rome and in a primary school. They were selected from the original sample and were representative of it. The sample was assessed with standardized test in cognitive, neuropsychological, and academic performances. According to the results obtained in the QS4-G, the sample was divided into two groups: at-risk and not-at-risk. Crosstabs were used to assess if the at-risk and the not-at-risk group presented difficulties as to cognitive, neuropsychological and academic performances 4–6 years later.

Results: Children in the at-risk group, 4–6 years later, presented difficulties in neuropsychological abilities (0.000) and academic performances (0.035); 43.7 % of them improved their cognitive abilities. Not-at-risk group presented adequate cognitive (0.000) and neuropsychological (0.000) performances; almost half of them developed difficulties in academic performances.

Conclusions: QS4-G has a good predictive validity as to neuropsychological abilities. Clinicians should follow up carefully children identified as at-risk by the questionnaire.

292 – POSTER SESSION

THERAPEUTIC EFFECT OF INSULIN IN REDUCTION OF CRITICAL ILLNESS POLYNEUROPATHY AND MYOPATHY IN PEDIATRIC INTENSIVE CARE UNIT

N. Bilan

Pediatric, Tabriz University of Medical Sciences, Tabriz, Iran

Objective: Hyperglycemia can occur in the patients affected by any kind of critical illnesses. It has been recently shown that treatment of hyperglycemia with insulin administration significantly reduces the prevalence of critical illness polyneuropathy and myopathy and on the other hand reduces the demand for long-term mechanical ventilation in the patients admitted in ICU for more than 1 week. The aim of this study was to determine the therapeutic effect of Insulin in reduction of the incidence of critical illness polyneuropathy and myopathy in pediatric intensive care unit.

Materials and methods: In this study we recruited 30 patients admitted in the PICU of Tabriz Pediatric Hospital and evaluated incidence of CIPNM following hyperglycemia in these patients. The patients were categorized into two groups. In the case group blood sugar was controlled in the range of 140–180 mg/dl by administration of insulin (in the form of drips and in the account of 0.05 U per each kilogram of body weight in hour) and in the control group placebo was used, and then the incidence of CIPNM, duration of PICU and duration of mechanical ventilation were compared between two groups.

Results: In this study the incidence of CIPNM and duration of PICU stay and duration of mechanical ventilation were significantly reduced in the patients treated with Insulin compared to the control group.

Conclusion: This study shows that controlling of blood sugar results in reduction of incidence of critical illness polyneuropathy and myopathy.

293 – POSTER SESSION

EARLY NEURODEVELOPMENT IN VERY LOW BIRTH WEIGHT AND/OR VERY PREMATURE NEWBORNS WITH INTRAVENTRICULAR HEMORRHAGE

F. Correia¹, L. Branco¹, S. Rodrigues², A. Freitas²

¹Pediatric Department, ²Neonatology Department, Centro Hospitalar do Alto Ave, Guimarães, Portugal

Background and aims: Intraventricular hemorrhage (IVH) is an important cause of brain injury in premature infants. This study aimed to assess early development in very low birth weight and/or very premature infants who had IVH in the neonatal period and to compare their neurodevelopment with their IVH grade.

Methods: A retrospective review of medical records was performed for all newborns treated in a neonatal intensive care unit, between 2003 and 2009, who weighted <1,500 g and/or who were born before the 32th gestational week. Only the infants with IVH were enrolled in this study.

Results: Among the 63 infants, 54 % were female, the median gestational age was 28 weeks and mean birth weight 1,074 ± 335 g. The IVH was bilateral in 71 % of the patients. Mild IVH was more prevalent than severe (Grade 1: 42 %, 2: 19 %, 3: 18 % and 4: 21 %).

Patients with IVH grade 4, when compared with patients with IVH grade 1, had higher mortality rate (69 versus 3.7 %), higher prevalence of periventricular leukomalacia (100 versus 9 %), posthemorrhagic hydrocephalus prevalence (50 versus 4.5 %), cerebral palsy (50 % versus 4.5 %) and cognitive disfunction.

Conclusions: Although our study has a small sample, the long-term outcome of infants who survive with IVH worsens with increasing severity of IVH. Severe (grade 4) IVH is related to higher mortality rate, higher prevalence of periventricular leukomalacia and posthemorrhagic hydrocephalus and lower scores in neurodevelopment outcome. Many factors which are independent from the grade of the IVH seem to influence the neurodevelopment outcome.

294 – POSTER SESSION

RHABDOMYOLYSIS AND SECONDARY KIDNEY INJURY IN CRITICALLY ILL PATIENTS

O. Dursun, H. Tekguc, A. Yalcinkaya

Pediatric Intensive Care, Akdeniz University Hospital, Antalya, Turkey

Introduction: In this study we presented etiological factors, clinical course and prognosis of rhabdomyolysis in nontraumatic critically ill children who are admitted to Akdeniz University PICU.

Method: Total 219 patients laboratory data were screened retrospectively who are admitted to PICU in 2011 using with electronic records and who has 5 folds acute increased serum Creatin Kinase levels enrolled the study. Demographic data, laboratory values, organ failures, and prognosis of these patients were recorded.

Results: Rhabdomyolysis established at eleven patients (5 %). In most of the patient, asphyxia and perfusion abnormalities were the reason of rhabdomyolysis. Average length of stay in PICU was 10 days (range 2–34 days) and average length of mechanical ventilation was 8 days (1–34 days). Eight of them had known chronic illness on the admission of PICU. None of them developed serious hypocalcaemia or hyperkalemia. Eight of the 11 (72 %) patient had acute renal injury according to RIFLE criteria and hemodialysis used three of them. Six of the 11 (54 %) patient died. Three of the patient died had physical findings of acute congestive heart failure.

Discussion: According to this retrospective analysis; rhabdomyolysis mostly associated with perfusion disabilities at the nontraumatic critically ill child who needs PICU admission. Length of PICU admission and mechanical ventilation is not different from general population at present study. When acute renal injury and acute congestive heart failure accompany the rhabdomyolysis, they increase the mortality. Presence of the congestive heart failure was the factor that limited to use standard treatment options like urine alkalization, hydration and mannitol.

295 – POSTER SESSION

THE EVIDENCE BASED “DECISION ANALYSIS” IN NICU/ PICU

M. Elbarbary

Pediatric Cardiac Intensive Care, KACC, Riyadh, Saudi Arabia

Decisions in critical care setting frequently can be difficult and involve several tradeoffs and multiple risk–benefit ratios. In the face of this dilemma, the currently most commonly used methods to take a decision in these circumstances are depending on the personal knowledge or experience, nihilism, defer to other experts, defer to patients, dogmatism or just blindly follow a policy. These methods are not scientifically sound. They are not only lacking objectivity but more importantly lacking evidence supporting it. It may also minimize patient/family adequate involvement. This situation is frequently encountered in making decisions of management of critically ill children and neonates. In the recent era of evidence based medicine, full arrays of decision support aids were developed. Among which an important method, unfortunately infrequently used, the evidence based *decision analysis* (DA). In this presentation, we will explain this important tool for decision aids and how it can help in making difficult decisions by utilizing the best available scientific evidence (to elicit probability factors) together with incorporating the patient/family own preferences and values (to elicit disutility factors). This scientifically validated method is assure maximum objectivity by expressed numerical values of disutility and probability and re-computing it in a back-propagation manner. The presentation will also explain the various models that can be utilized to achieve a proper patient/family shared medical decision making.

296 – POSTER SESSION

TWO YEAR NEURODEVELOPMENTAL OUTCOME FOLLOWING NEONATAL REPAIR OF CONGENITAL DIAPHRAGMATIC HERNIA

J.K. Gunn^{1,2,3}, S. Greaves⁴, E.A. Hutchinson¹, L. Kelly⁴, R.W. Hunt^{1,2,3}

¹Neonatal Medicine, Royal Children's Hospital, ²Neonatal Research Group, Murdoch Childrens Research Institute, ³Department of Paediatrics, The University of Melbourne, ⁴Occupational Therapy, Royal Children's Hospital, Melbourne, VIC, Australia

Background and aims: The neurodevelopmental trajectory of children with congenital diaphragmatic hernia (CDH) is largely unknown. We undertook evaluation of 2-year neurodevelopmental outcome in neonates undergoing CDH repair.

Methods: 26 neonates (15 male) underwent repair of CDH (6 right-sided) from 2009 to 2010. Pre-operative cranial ultrasound and post-operative MRI was routinely performed. Five (19 %) died and one interstate patient was not offered follow up. Four children were lost to follow-up and 16 two-year-olds were assessed using the Bayley Scales of Infant Development, 3rd edition.

Results: At 2.2 ± 0.3 years of age 16 children were assessed. Mean birth weight was 2.6 ± 0.8 kg and gestational age was 37.8 ± 2.6 weeks. Median age at surgery was 4 (IQR 3–6) days and ventilation time was 10 (8–14) days. Inhaled nitric oxide was administered to 7 infants, PGE1 infusion in 11 infants and sildenafil in 3. No infants had received ECMO. Pre-operative cranial ultrasound occurred in 15, 2 of whom had grade 1 IVH. Post-operative MRI brain occurred in 12 at 35 days (24–52), 5 with abnormalities identified. Mean cognitive, language and motor composite scores were 99 ± 17, 98 ± 25 and 96 ± 19, respectively. Three (19 %) children had severe developmental delay, one of whom was unable to be assessed at all. All three had abnormal post-operative MRI scans.

Conclusions: Neurodevelopment at 2 years in survivors of CDH is not different from test norms. Post-operative MRI may identify infants at higher risk of subsequent impairment.

297 – POSTER SESSION

TWO YEAR NEURODEVELOPMENTAL OUTCOME FOLLOWING NEONATAL REPAIR OF OESOPHAGEAL ATRESIA

J. Gunn^{1,2,3}, S. Greaves⁴, E.A. Hutchinson¹, L. Kelly⁴, R.W. Hunt^{1,2,3}

¹Neonatal Medicine, Royal Children's Hospital, ²Neonatal Research Group, Murdoch Childrens Research Institute, ³Department of Paediatrics, The University of Melbourne, ⁴Occupational Therapy, Royal Children's Hospital, Melbourne, VIC, Australia

Background and aims: The neurodevelopmental trajectory of children with oesophageal atresia (OA) is largely unknown. We undertook evaluation of two-year neurodevelopmental outcome in neonates undergoing OA repair.

Methods: 50 neonates (28 male) underwent repair of OA (1 long-gap) from 2009 to 2010. Pre-operative cranial ultrasound was routinely performed. Three (6 %) died and six interstate patients were not offered follow-up. Ten children were lost to follow-up and five are awaiting assessment. Twenty-six two-year-olds were assessed using the Bayley Scales of Infant Development, 3rd edition.

Results: At 2.3 ± 0.2 years of age 26 children were assessed. Mean birth weight was 2.8 ± 0.9 kg and gestational age was 37.9 ± 2.7 weeks. Median age at surgery was 1 (IQR 0–2) day and hospital length of stay (LOS) was 26 (14–37) days. Pre-operative cranial ultrasound occurred in 24, all of which were normal. At least one post-operative cranial ultrasound occurred in all patients and no significant abnormalities were identified. Mean cognitive, language and motor composite scores were 100 ± 10 , 99 ± 14 and 98 ± 12 , respectively. Six (23 %) had developmental delay, most commonly motor delay. Two each had cognitive and/or language delay. One child was unable to be assessed due to profound deafness and CHARGE Syndrome. Children with delays were smaller and more premature at birth and had longer LOS than those with normal developmental scores.

Conclusions: Neurodevelopment at 2 years in survivors of OA is not different from test norms. Intrinsic patient factors are likely important contributors to developmental outcome.

298 – POSTER SESSION

SURVEY THE EFFECT OF ORAL DIAZEPAM IN PREVENTION OF FEBRILE SEIZURE

M. Hemmati

Kermanshah Medical Science, Kermanshah, Iran

Introduction: One of the most common causes of seizure in childhood is febrile convulsion (FC). Diazepam or midazolam oral recommended for FC prevention, but the effectiveness of prophylactic

treatment with medication remains controversial. Prophylactic use of oral anticonvulsant drugs is thus a questionable practice. We designed this article to survey the effect of diazepam in prevention of seizure in FC.

Methods and materials: We conducted this study upon 186 child 6-60 mo in Imam Reza hospital in Kermanshah from 1,386 and followed those 24 months. Patients studied in three groups: group A: if had fever received oral diazepam 1 mg/kg/day, group B received oral diazepam 0.4–0.6 mg/kg/day, group C: when had fever did not received diazepam, then recurrence rate of seizure and demographic data were documented and analyzed.

Results:

Group A (n = 76),

Group B (n = 77),

Group C (n = 33).

Recurrence rate of febrile seizure were in (group A: 23.7 %, group B: 23.4 %, group C: 24.2 %). There was no statistically significant difference between 3 groups (p value = 0.930). Recurrent rate of seizure in patients with positive family history of febrile convulsion were more common.

Conclusion: Results of this study showed use of oral diazepam in begin of fever couldn't decrease the recurrent rate of seizure in febrile convulsion.

299 – POSTER SESSION

PEDIATRIC ICU MORTALITY: COMMUNICABLE OR NON-COMMUNICABLE DISEASES

K.L.E. Hon^{1,2}, K.L. Cheung^{1,2}, W. Wong^{1,2}

¹Paediatrics, The Chinese University of Hong Kong, ²Paediatrics, Prince of Wales Hospital, Hong Kong, Hong Kong S.A.R.

Objectives: We investigated the pattern of mortality at a PICU and explored if any unusual pathogens are associated with these deaths.

Methods: Demographic data of all PICU deaths were analyzed.

Results: There were 81 deaths (males 59 %; infants 25 %) over the 10-year period between 2002 and 2012. The mean annual mortality rate of PICU admissions was 5.7 %. Septicemia with common gram positive (commonest coagulase negative staphylococcus), gram negative (commonest pseudomonas) and fungal (commonest candida species) pathogens were present in 12 (15 %), 13 (16 %) and 5 (6 %) of these patients, respectively. Viruses (commonest CMV) were isolated in 20 patients (25 %). 91 % of these patients were ventilated, 73 % required inotropes, 91 % received broad spectrum antibiotic coverage, 31 % received systemic corticosteroids, 52 % blood transfusion and 38 % anticonvulsants. 36 patients (44 %) had a DNAR (Do-Not-Attempt-Resuscitation order) prior to their death at the PICU. Oncological diagnoses (n = 24) were predominant diagnoses. In the trauma category (n = 9), patients were more likely to present with cardiac arrest preceding ICU admission, and to have brain death subsequently. Trauma deaths typically affected healthy boys and not involving any pathogens. There was no gunshot or asthma death. Postmortem examination was performed in 30 % deaths.

Conclusions: Death in the PICU is a heterogeneous event that involves infants and children of both genders. These patients may have a premorbid condition but healthy children are not spared.

Infections are important associations only in non-traumatic PICU mortality. Nearly half of the patients did not receive active resuscitation against medical futility in honor of caregivers' wishes.

300 (Abstract withdrawn)

301 – POSTER SESSION

DAILY ESTIMATION OF THE PELOD-2 SCORE IN CRITICALLY ILL CHILDREN

S. Leteurtre^{1,2}, A. Duhamel^{2,3}, J. Salleron^{2,3}, B. Grandbastien^{2,4}, J. Lacroix⁵, F. Leclerc^{1,2}, on behalf of the Groupe Francophone de Réanimation et d'Urgences Pédiatriques (GFRUP)

¹Pediatric Intensive Care Unit, Jeanne de Flandre University Hospital, ²EA 2694, UDSL, Univ Lille Nord de France, ³Department of Biostatistics, CHU Lille, ⁴Department of Epidemiology and Public Health, Calmette University Hospital, Lille, France, ⁵Pediatric Intensive Care Unit, Sainte-Justine Hospital, Université de Montréal, Montréal, QC, Canada

The Pediatric Organ Dysfunction (PELOD)-2 score has been recently developed and validated, and allows assessment of the severity of cases of MODS in PICU with a continuous scale. The objective of the study was to validate the daily PELOD-2 score using the set of 7 days proposed with the previous version of this score.

Methods: We conducted a prospective multicenter cohort study. All consecutive children admitted in nine multidisciplinary hospitals in France and Belgium (June 2006–October 2007) were included. We collected data on variables considered for the PELOD-2 score during PICU stay up to seven time-points: days 1, 2, 5, 8, 12, 16 and 18. The outcome was vital status at PICU discharge. We used areas under receiver operating characteristic curve (AUC) to evaluate discrimination.

Results: The median number of admissions per PICU during the study period was 442 (IQR: 132–581). We enrolled 3671 consecutive patients (median age: 15.5 months; IQR: 2.2–70.7). Mortality rate was 6.0 % (222 deaths).

PELOD-2 score

Days	PELOD-2 score, median (Q1–Q3) survivors	PELOD-2 score, median (Q1–Q3) non survivors	Discrimination AUC (CI 95 %)
Day 1	4 (2–6)	11 (7–18)	0.88 (0.85–0.90)
Day 2	3 (2–5)	8 (5–15)	0.82 (0.77–0.87)
Day 5	3 (2–5)	7 (5–10)	0.80 (0.75–0.85)
Day 8	3 (2–5)	7 (5–9)	0.79 (0.72–0.85)
Day 12	3 (2–5)	6 (5–8)	0.75 (0.67–0.83)
Day 16	3 (2–5)	6 (4–8)	0.78 (0.69–0.87)
Day 18	3 (2–5)	6 (5–8)	0.80 (0.72–0.88)

Conclusion: Discrimination of the daily PELOD-2 scores was good or moderate.

302 – POSTER SESSION

INTELLIGENCE AND EDUCATIONAL OUTCOME AT 8 YEARS AFTER NEONATAL ECMO: A NATIONWIDE MULTICENTER STUDY

M.J. Madderom¹, J. Reuser², S.J. Gischler¹, D. Tibboel¹, A.F.J. van Heijst², H. Ijsselstijn¹, on behalf of the Dutch ECMO Follow-up Team

¹Intensive Care and Department of Pediatric Surgery, Erasmus Medical Center-Sophia Children's Hospital, Rotterdam, ²Department of Neonatology, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background and aims: This nationwide multicenter study reports neurodevelopmental outcome of children treated with neonatal extra-corporeal membrane oxygenation (ECMO) by evaluating intelligence, type of education, concentration and eye-hand coordination at 8 years of age.

Methods: A follow-up study was conducted in 135 8-year-olds who received neonatal ECMO between 1996 and 2001. The children underwent a structural psychological assessment for intelligence (Revised Amsterdam Intelligence Test), concentration (Bourdon-Vos) and eye-hand coordination (Developmental Test of Visual-Motor Integration).

Results: Intelligence ($n = 125$) did not differ from reference norm with a mean (SD) IQ of 99.9 (17.7); 91 % attended regular education. Significantly more children needed extra support (39 %) at regular education compared with reference norms. The children had significantly slower working speed ($\chi^2 = 132.36$, $p < 0.001$) and were significantly less accurate ($\chi^2 = 12.90$, $p < 0.001$) on the Bourdon-Vos ($n = 123$) compared to reference norms. Eye-hand coordination was within normal range with a [mean (SD)] score 97.6 (14.3); $n = 126$. Children with congenital diaphragmatic hernia scored lowest for eye-hand coordination but within normal range [91.0 (16.4); $n = 28$].

Conclusions: Eight-year-old children, treated with neonatal ECMO, experience average intelligence with subtle problems in the area of concentration and behavior, with increased need for extra support at regular education. Decreasing mortality and increasing morbidity necessitates long-term follow-up of these children to detect early signs of subtle learning deficits and to provide adequate interventions at early age.

303 – POSTER SESSION

LOWER GROWTH VELOCITY IS A SIGNIFICANT PREDICTOR FOR NEURODEVELOPMENT OUTCOMES AT 3-YEARS OLD IN EXTREMELY LOW BIRTH WEIGHT INFANTS

H. Maruyama¹, N. Yonemoto², Y. Kono³, S. Kusuda⁴, M. Fujimura⁵, Neonatal Research Network of Japan

¹Pediatrics, Kochi Health Sciences Center, Kochi, ²Epidemiology and Biostatistics, National Center of Neurology and Psychiatry Translational Medical Center, Kodaira, ³Pediatrics, Jichi Medical University, Shimono, ⁴Neonatology, Tokyo Women's Medical University, Shinjuku, ⁵Neonatology, Osaka Medical Center and Research Institute for Maternal and Child Health, Izumi, Japan

Objective: The aim of this study was to assess whether growth velocity (GV) predicts to the neurodevelopmental outcomes in extremely low birth weight (ELBW) infants.

Methods: Study subjects were the infants with BW 501–1000 g of Neonatal Research Network of Japan database 2003–2007. The GV scores during hospital admission were calculated by the exponential model. We assessed prediction of the GV to death or neurodevelopmental impairment (NDI) at 36–42 months' chronological age using multivariate logistic regression analysis.

Results: In the 1,708 infants, median of the GV was 10.5 (interquartile, 9.2–11.9, min–max, 2.7–44.4). GV score <9 was significantly related to death or NDI of the infants. Adjusted odds ratio (AOR) of the infants with GV score 8 was 1.62 (95 % confidence intervals (95 %CI), 1.07–2.43, p value = 0.022) using infants GV score 10 as a reference. The AORs (95 %CI) of infants with GV score 7, 6, 5, 4, and 3 were 2.74 (1.68–4.48), 4.85 (2.55–9.43), 4.49 (1.39–16.04), 7.21 (1.86–35.56) and 15.61 (3.59–109.03). However, the prediction of high GV scores (>10) were unclear.

Conclusions: The low GV scores were significant predictors for death or NDI of the ELBW infants.

304 – POSTER SESSION

SHORT AND LONG-TERM EVOLUTION OF THE CHILDREN INFECTED BY THE HIV IN ALGERIA

N. Mouffok

Medicine, CHU, Oran, Algeria

The HIV/infection emerged in paediatric in Oran from 1995; it remains underestimated and diagnosis remains late.

Objectives: Study forecast with short and long term of the HIV children, describe various therapeutic; study clinical and biological outcome and insertion in the normal life.

Methodology: 187 children; 119 alive and followed from 1995 till 2012, the others died and/or lost sight. Of the follow-up; every 3 months with clinical and biological data.

Results: 76 % were <5 years old at diagnosis (1 month 10 years), sex ratio: 1.4 and vertical transmission 94 %, breast-feeding was noted in 83 %. Diarrhea (61 %), lung infections (46 %), the tuberculosis (26 %), the low development (42 %), lymph nodes (61 %), *Molluscum contagiosum* (34 %), oral candidosis (63 %), bad teeth (43 %), fever (23 %), pneumonia lymphoïde (22 %), parotiditis (16 %), otitis (51 %), neurological signs (9.1 %), were the most suggestive signs. The HAART was established at 52 % of the children, (22 %) died and (15 %) have were lost sight.

Conclusion: Transmission of the virus is vertical in almost all of the cases. The infected children become symptomatic in a mean age of 23 months. Lymph-nodes, respiratory and digestive signs were the most frequent signs. Parotiditis, Pneumonia, *Molluscum contagiosum* and the tooth decays were signs which characterized these children. In front of child's chronic symptomatology, don't limit to classical diseases (allergy; coeliac). 22 % of them died. The forecast of these children was clearly improved thanks to HAART.

305 – POSTER SESSION

OUTCOME OF BABIES BORN TO EPILEPTIC MOTHERS ON ANTICONVULSANT MEDICATIONS

A. Pahuja, C. Ramesh

Paediatrics, Watford General Hospital, Watford, UK

Background: There is enormous evidence showing association between maternal epilepsy, use of antiepileptic medication during pregnancy and foetal malformation, demise and developmental delay in children later in life. So far there are no special arrangements to follow up these children until concerns are raised by school authorities in various aspects of development.

The objective of the survey was to ascertain the developmental outcome of children born to mothers on anti epileptic drug (AED) during pregnancy and also to observe the trend of s AED prescribed during pregnancy at Watford general hospital.

We performed the development assessment of children born to epileptic mothers between 2008 and 2010 in our county.

Development assessment was performed over telephonic consultation using Stages and Ages module for development assessment: easy to use and can be used by parents at home.

Results:

- There is strong association of increased risk of delayed neurodevelopment in children exposed to either NaV or CBZ monotherapy
- Lamotrigine-less incidence of development delay
- AED exposed children had smaller head circumference and Increased risk of febrile convulsions.

Recommendations:

- It would be ideal to have a regular follow up and development assessment of all babies born to mothers with epilepsy or on AED and to have a local policy for this.
- Involve parents in regular assessment of child's development by using stages and ages development assessment tool and perform detailed assessment if needed (Cost effectiveness).
- Promote the use of newer antiepileptic medication with fewer adverse effects

306 – POSTER SESSION

VITAMIN D STATUS IS LOWER IN CRITICALLY ILL CHILDREN THAN IN HEALTHY CHILDREN

C. Rey¹, D. Sánchez-Arango², A. Medina³, J. López-Herce⁴, A. Concha³, P. Martínez-Cambor⁵, Z. Pallavicini³

¹*Pediatrics, Hospital Universitario Central de Asturias, University of Oviedo, Oviedo,* ²*Pediatrics, Hospital de Laredo, Laredo,* ³*Pediatrics, Hospital Universitario Central de Asturias, Oviedo,* ⁴*Pediatrics, Instituto de Investigación Sanitaria Gregorio Marañón, Hospital Gregorio Marañón, Madrid,* ⁵*Oficina de Investigación Biosanitaria, University of Oviedo, Oviedo, Spain*

Objective: To assess if 25 hydroxyvitamin D or 25(OH)vitD deficiency has a high prevalence in critically ill compared with healthy children, and if it would be associated with increased risk of mortality.

Methods: Prospective observational study comparing 25(OH)vitD levels in 156 patients after PICU admission with 25(OH)vitD levels of 289 healthy children. 25(OH)vitD levels were also compared between PICU patients with PRISM III or PIM 2>p75 (Group A; n = 33) vs. the rest (Group B; n = 123).

Results: Median (p25–p75) 25(OH)vitD level was 26.0 ng/mL (19.2–35.8) in PICU patients vs. 30.5 ng/mL (23.2–38.6) in healthy children (p = 0.007). The prevalence of 25(OH)vitD <20 ng/mL was 29.5 % (95 % CI 22.0–37.0) vs. 15.6 % (95 % CI 12.2–20.0) (p = 0.01). PICU patients had an odds ratio (OR) for

hypovitaminosis D of 2.26 (CI 95 % 1.41–3.61). 25(OH)vitD levels were 25.40 ng/mL (CI 95 % 15.5–36.0) in group A vs. 26.6 ng/mL (CI 95 % 19.3–35.5) in group B ($p = 0.800$). 25(OH)vitD levels <20 ng/mL, age, underlying disease and year season were associated with three or more number or organ failure (OR 5.33, CI 1.15–24.59).

Conclusions: Hypovitaminosis D incidence was higher in PICU patients than in healthy children. Hypovitaminosis D was associated with three or more number of organ failures, but not with higher risk of mortality.

Supported in part by a grant of “Fundación Ernesto Sánchez Villares”.

307 – POSTER SESSION

NEONATAL APSTINENTIAL SYNDROME

R. Rudanovic, L. Dragas, M. Rudanovic, L. Globarevic

Children's Hospital, Podgorica, Montenegro

Introduction and aim: Addictive illnesses represent a very difficult social and medical problem having the characteristic of epidemic in some countries. Introduction of therapy with methadone in treatment of heroin addicts, the fertility has been restored to women. Addiction of mothers to drugs is very much related to the greater prenatal morbidity and mortality.

Problems combined with the usage of heroin during pregnancy are miscarriage in the first trimester, preterm delivery, infections of mothers and unborn babies and neonatal apstintential syndrome (NAS). Surgical and neonatal complications are less frequent with women who were treated with substitution therapy methadone. Less complications were noted with mothers and babies who were treated with small doses of Methadone (<60 mg daily) than with high doses (80–150 mg daily) Strength of NAS directly depends on the dose of methadone.

Method: Perspective observation of the newborns whose mothers were taking drugs. Period of observation 4 years.

Results: 14 newborns were observed who were exposed to drugs during pregnancy. 6 mothers were on Methadone therapy, 2 on heroin, benzodiazapinim, cocaine and marihuana. 10 were combining different kinds of drugs. Out of total of 14 newborns 8 newborns had clinical signs of NAS. For evaluation of signs of NAS and therapy of Finnegan score was used.

Conclusion: Receptors of relevant ages should be used in treatment of NAS. Hospitalization of patient should be applied for at least 5 days. Duration of treatments depends on the kind of drug which mothers used and clinical development of the newborn.

308 – POSTER SESSION

THE NEUROLOGICAL OUTCOME OF THE EXTREMELY AND VERY LOW BIRTH WEIGHT INFANTS WHO UNDERWENT GENERAL ANESTHESIA DURING EARLY CHILDHOOD

Y. Sakurai¹, K. Tazawa², M. Tanaka², K. Terui², T. Suzuki², K. Koyama², Y. Asano¹, M. Tamura¹

¹Pediatrics, ²Anesthesia, Saitama Medical Center, Saitama Medical University, Kawagoe, Japan

Background: There has been growing concern that general anesthesia during early childhood might affect the neurological outcome. This clinical research investigated the effect of general anesthesia during early childhood on the long term neurological outcome of the extremely and very low birth weight infants.

Subject and method: The subjects are 176 extremely and very low birth weight infants who have been followed up neurologically. The exclusion criteria are neonatal asphyxia (Apgar <7), cerebral hemorrhage, sepsis, anomaly syndrome, chromosomal abnormality, post-cardiac surgery, and post-brain/spinal surgery. The subjects are divided into the control group and the anesthesia group who underwent general anesthesia during early childhood. The neurological outcome was evaluated at 3 years old with Kyoto scale psychological development and at 6 years old with WISC-III. T test and Spearman's rank correlation coefficient were applied for the statistical analysis.

Result: One hundred sixty cases were the control group and sixteen cases were the anesthesia group. There is no significant difference in the scores of both Kyoto scale psychological development and WISC-III between the two groups. There is no significant co-relation between the scores of Kyoto scale psychological development and the total amount of sevoflurane, total amount of nitrous oxide and total anesthesia duration in the anesthesia group. There is also no significant co-relation with WISC-III.

Discussion: The general anesthesia with sevoflurane during 2–3 h in early childhood might not affect the neurological outcome at 3 and 6 years old in the extremely and very low birth weight infants.

309 – POSTER SESSION

ANALYSIS OF RISK FACTORS ASSOCIATED WITH RETINOPATHY OF PREMATURITY IN PRETERM NEONATES AND OUTCOMES IN A TERTIARY CARE NICU, INDIA

V. Shukla¹, S. Patel¹, N. Dongre², P. Joshi¹, V. Joshi¹

¹NICU, ²Ophthalmology, Kokilaben Hospital, Mumbai, India

Introduction: Retinopathy of prematurity (ROP) is a leading cause of visual impairment and blindness in premature babies. Yearly 3.5 million premature babies are born in India (global 25 %) but due to lack of national ROP screening program, the incidence and specific risk factors are unknown.

Methods: All babies <35 weeks, and between 35 and 37 weeks with risk factors were studied. Data collection of profile variables and ophthalmic check was done prospectively for 3 years.

Results: Out of 87 babies, the incidence of ROP, according to severity was: Stage 1-ROP-26 %, pre-threshold-ROP-20 % and threshold-ROP-15 %.

The association of birth weight (<1,500 g), gestational age (<35 weeks), ventilation duration, RDS requiring surfactant, Culture positive sepsis, shock requiring inotropes, duration of supplemental oxygen therapy, saturation fluctuations, apnea and blood transfusions with ROP were statistically significant(all P values <0.05).

Incidence of severe ROP (prethreshold, threshold) was 2 times higher in outborn, compared to inborn babies (P value <0.001).

The incidence of threshold ROP in neonates whose mothers received antenatal steroids was significantly less (P value <0.001).

The requirements of multiple sittings of laser therapy was higher (84.62 %) when the babies were treated in threshold stage vs. 26.67 % when babies were treated in pre-threshold stage (P value = 0.002).

Conclusion: The incidence of ROP was very high in outborn babies. Evidence based protocolised care is associated with significantly reduced ROP rates. Early Laser photocoagulation in pre-threshold stage was an effective treatment of ROP with no short term complications and reduced need for multiple laser sittings.

310 – POSTER SESSION

³HE MRI IN YOUNG ADULTS WITH CONGENITAL DIAPHRAGMATIC HERNIA: ALVEOLAR SIZE DIFFERENCES BETWEEN THE IPSI- AND CONTRALATERAL LUNG

M. Spoel¹, H. Marshall², H. IJsselstijn¹, J. Parra-Robles², P. Wielopolski², E. van der Wiel³, A. Swift², S. Rajaram², D. Tibboel¹, H.A. Tiddens^{3,4}, J.M. Wild²

¹Intensive Care and Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands, ²Academic Radiology, University of Sheffield, Sheffield, UK, ³Pediatrics-Respiratory Medicine and Allergology, ⁴Radiology, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

Background: An important component of congenital diaphragmatic hernia (CDH) is abnormal lung development. It is not clear to what extent compensatory lung growth in childhood compensates the hypoplasia.

Aims: To measure alveolar dimensions using hyperpolarised ³He MRI (Sheffield) in a cohort of Dutch adult CDH patients.

Methods: In nine patients with left-sided CDH (born 1975–1993), treated in Rotterdam, lung volumes and K_{COc} were measured. ³He MRI was used to image regional ventilation and to compute apparent diffusion coefficient (ADC) for the ipsilateral and contralateral lung.

Results: Patients were ventilated neonatally for a median (range) of 7 (1–141) days. One patient was treated with extracorporeal membrane oxygenation (ECMO). Mean (SD) SDS FEV₁ –1.47 (0.96), SDS TLC_{pleth} –0.21 (1.16), RV%TLC_{pleth} 25.3 (4.48), SDS K_{COc} –0.55 (0.79). ³He MRI showed ventilation abnormalities in six patients, ranging from a single ventilation defect on ipsilateral side (3 patients) to multiple ventilation defects in both lungs (ECMO-patient, image). Eight patients had elevated ADC values, suggesting abnormal alveolar dimensions, in the ipsilateral lung.

Conclusions: Long-term follow up of CDH patients showed persistent functional and microstructural changes of the ipsilateral lung, especially after ECMO. These morphological changes are represented by mild lung function abnormalities. ³He-MRI is useful to provide valuable information on long-term lung morphology, opening new ways of evaluating contemporary patients such as former ECMO patients.

Fig. 1 ³He MRI image

311 – POSTER SESSION

UNUSUAL NUMBER OF CYSTIC FIBROSIS CASES PRESENTING WITH INUTERO MECONIUM ILEAL: PERFORATION IN A YEAR

K. Sujay Manoharan¹, S.A. Ahmed², J. Egyepong²

¹Department of Paediatrics, Luton & Dunstable University Hospital,

²Neonatal Intensive Care Unit, Luton and Dunstable Hospital NHS Trust, Luton, UK

Background/introduction: Incidence of meconium ileal perforation in literature ~1:30,000 live birth. Early diagnosis of CF improves long term management.

Methods:

- Retrospective review of Inutero perforations
- From Jan 2011 to Dec 2011
- Single tertiary neonatal unit.

Results:

- Birth rate ~5,500/per year (2011)
- Four cases of meconium ileal perforation identified
- Two cases had antenatal diagnosis of which one had CF
- Two cases had postnatal diagnosis of which one had CF.

Case 1—had antenatal diagnosis of inutero perforation. Laparotomy-ileal perforation. Investigations confirmed CF.

Case 1- Antenatal Ultrasound

Case 1-Antenatal ultrasound

Case 2-presented on day 2 of life with bilious aspirates. X ray showed pneumoperitoneum. Laparotomy-ileal perforation with calcification suggestive of inutero perforation. No mutations for CF.

Case 2- Postnatal X ray

Postnatal X ray

Case 3—massive abdominal distention at birth with X ray findings of calcified meconium pseudocyst on D1 of life suggestive of inutero perforation. Laparotomy-ileal perforation. Investigations confirmed CF.

Case 4—Consanguineous asian parents with antenatal diagnosis of inutero perforation. Laparotomy-ileal perforation. No mutations for CF.

Conclusion:

- It is important to investigate for CF in inutero ileal perforation which has implication in longterm management.
- Unusual increase in a year of meconium ileal perforations.

312 – POSTER SESSION

OUTCOMES OF KIDNEY TRANSPLANTS IN SMALL CHILDREN (<15 KG) WITH AN ADULT DONOR: A REPORT OF 8 CASES

H. Tekguc¹, E. Comak², A. Dinckan³, S. Akman², O. Dursun¹

¹Pediatric Intensive Care, ²Pediatric Nephrology, ³Organ Transplantation Institute, Akdeniz University Hospital, Antalya, Turkey

Background: Due to size disadvantage and tendency to fluid overload, intensive care follow-up of kidney transplantation in small children is a complex task for any pediatric intensivist.

Cases: During 2012 in our hospital, 8 of total 232 patients undergoing kidney transplantation were <15 kg with 6 adult and 2 elder child donor. All of these patients were transferred to pediatric intensive care after operation. Central venous pressure (CVP) over 6–8 mmHg and invasive systolic blood pressure over 100 mmHg is targeted for every patient. Besides 30 cc/h D₅W infusion, hourly urine output is added to the total fluid as D₅–0.45 % sodium chloride. When hypotension or low CVP was detected, 20 cc/kg normal saline bolus was performed. Persistent blood glucose over 250 mg/dl was treated by insulin infusion. Most frequent side effect of our treatment was hyperglycemia.

Demographic data, primary Dx., donor, HLA match

Sex	Age (months)	Weight (kg)	Primary Dx	Donor	HLA Match	ICU stay (day)	Intensive care complications
Male	45	13	Steroidresistant nephrotic syndrome	Deceased	2/6	2	Hypertension
Female	31	8	Urological	Deceased	1/6	3	–
Female	17	8	Congenital nephrotic syndrome	Mother	3/6	2	Hyperglycemia
Male	51	11	Urological	Deceased	1/6	2	Hyperglycemia
Male	16	8	Urological	Father	3/6	2	Hyperglycemia
Female	47	15	Steroid resistant nephrotic syndrome	Grandmother	2/6	1	Hyperglycemia
Male	23	11	Drug induced renal failure	Deceased	1/6	4	Fever
Male	44	12	Urological	Mother	4/6	2	–

Discussion: To sustain new kidney's perfusion, even in a small child, high fluid turnover and blood pressure which is suitable for an adult, has to be targeted.

313 – POSTER SESSION

A NATIONWIDE LONGITUDINAL EVALUATION OF MOTOR PERFORMANCE AFTER NEONATAL EXTRACORPOREAL MEMBRANE OXYGENATION

M.H.M. van der Cammen-van Zijp^{1,2}, A.J.W.M. Janssen³, L.C.C. Toussaint², M.M.A. Raets⁴, D. Tibboel¹, S.J. Giscler¹, A.F.J. van Heijst⁵, H. Ijsselstijn¹

¹Intensive Care and Department of Pediatric Surgery, ²Rehabilitation Medicine and Physical Therapy, Erasmus MC-Sophia Children's Hospital, Rotterdam, ³Rehabilitation and Pediatric Physical Therapy, Radboud University Nijmegen Medical Centre, Nijmegen, ⁴Neonatology, Erasmus MC-Sophia Children's Hospital, Rotterdam, ⁵Neonatology, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Objectives: Following neonatal Extracorporeal Membrane Oxygenation (ECMO) 5-year-old survivors are at risk for motor-problems. Data on motor performance at older age are scarce. We evaluated long-term motor performance, its changes over time, and its association with clinical characteristics.

Methods: Longitudinal, prospective, nationwide follow-up study in 254 children who received neonatal ECMO between 1996 and 2006. Assessment at 5 and 8 years (Nijmegen) and 5, 8 and 12 years (Rotterdam). The Movement-Assessment-Battery for Children (M-ABC) was used (reference norms: 85 % normal, 10 % borderline, 5 % motor-problem).

Results: Primary diagnoses: meconium aspiration syndrome (MAS): n = 137; congenital diaphragmatic hernia (CDH): n = 49; other diagnoses: n = 68. Twelve percent of children had abnormal cranial ultrasound during ECMO.

*p < 0.01 Chi Square in comparison with norm values at all ages ANOVA resulted in mean (SE) percentile score of 38 (2), 44 (2) and 27 (4), respectively; with significantly lower scores at 12 years than at 5 and 8 (p = 0.002 and <0.001). Time on ECMO (p = 0.02), chronic lung disease (p = 0.001) and abnormal cranial ultrasound (p = 0.007) were of significant negative influence.

M-ABC

M-ABC total score, n (%) [*]	percentile 5 years, n = 243	8 years, n = 171	12 years, n = 42
≥P16 normal	179 (73.7)	128 (74.8)	17 (40.5)
P6–P15 borderline	31 (12.8)	21 (12.3)	7 (16.6)
≤P5 motor problem	33 (13.6)	22 (12.9)	18 (42.9)

Conclusions: Motor-problems in children treated with neonatal ECMO persist throughout childhood. Further studies with more children assessed at 12 years and older are needed to place our results of deterioration into perspective.

314 – POSTER SESSION

VLBW-INFANTS IN ADULTHOOD RESULTS OF A REGIONAL REPRESENTATIVE STUDY

N. Veelken¹, G. Ondang²

¹*Pediatrics, Asklepios Clinic Nord Hamburg, Hamburg,* ²*Internal Medicine, Städtisches Krankenhaus Krefeld, Krefeld, Germany*

The participants of this study represent all VLBW-infants born within a 3-years period in Hamburg/Germany enrolled in a longitudinal program. At the age of 20–22 years a detailed questionnaire was sent to the former VLBW-infants. Those with cerebral palsy were excluded. We still reached 135 of the former 329 infants (41 %). The participants were representative in terms of neurological outcome at the age of 6 years. 58 additional participants of the former control group could be evaluated in the same manner.

Former preterm participants showed significant lower values compared with control participants concerning body length, weight and head circumference. BMI was significantly reduced only in female participants. Significant more preterm participants underwent surgical procedures. Refractive errors were more frequent in preterm participants. Only two still suffered from epilepsy. Recurrent pain episodes were, however, found more frequently in the control participants.

75 % of the preterm participants were living still together with their parents. Preterm participants more often had to repeat a school year and reached a lower level of education, pronounced in male, AGA-, very preterm (GA <31 weeks) participants and those with neurological abnormalities other than CP at 6 years of age.

Regarding health situation of former not disabled VLBW-infants our results should be considered in the aspect of transition. A major percentage of those with later low educational level could be recognized already in childhood.

315 – POSTER SESSION

QUANTITATIVE ASSESSMENT OF VISUAL INFORMATION PROCESSING IN VERY PRETERM INFANTS

M. Vonk¹, J. Dudink², J.J.M. Pel¹, I.K.M. Reiss², J. van der Steen¹

¹*Department of Neuroscience, Erasmus MC,* ²*Neonatology Intensive Care Unit, Sophia Children's Hospital, Rotterdam, The Netherlands*

Infants born very preterm (<32 weeks gestational age) are at risk of development problems including motor, cognitive, and visual impairments. We developed a quantitative test, using remote eye-tracking, to assess higher-order visual functions in young infants. The aim of our study was to investigate visual development in very preterm infants compared to controls at 12 and 24 months of age.

Methods: We included 17 very preterm infants without any brain injury on repeated ultrasound and MRI scans (low-risk very preterms). Visual processing was assessed in terms of oculomotor reaction time to make an eye movement towards a stimulus displayed in the quadrants of a monitor with an integrated remote eye-tracker system. At the age of 1, all 17 infants underwent the visual assessment and 11 children repeated the test at the age of 2.

Results: Preliminary data show a difference in reaction times at 1 year of age in the very preterms compared to controls. Reaction

times in very preterms at 2 years of age [221 (20.5) ms, mean(SD)] were shorter than at 1 year of age [299 (66.7) ms, $p < .05$]. No difference was found between very preterms [221 (20.5) ms] and 12 controls at 2 years of age [230 (32.9) ms, $p > .05$].

Conclusion: These results suggest that, at the age of 2, no difference in visual processing is present between low-risk very preterms and controls. In the future we will also assess visual information processing in high-risk very preterms, and we will correlate the visual assessment to the degree and location of neonatal brain damage.

316 – (Abstract withdrawn)

317 – POSTER SESSION

USE OF ECHOCARDIOGRAM IN THE ASSESSMENT OF BABIES WITH CHRONIC LUNG DISEASE

P.K. Yajamanyam, S.V. Rasiah

Neonatology, Birmingham Women's Hospital NHS Foundation Trust, Birmingham, UK

Aims: To review the echocardiogram findings in babies born at <32 weeks gestation and diagnosed with chronic lung disease (CLD), defined as oxygen dependency at 36 weeks corrected gestational age (CGA).

Methods: We reviewed all the echocardiograms performed on our neonatal unit in 2011 and 2012 to identify babies born at <32 weeks gestation who had an echocardiogram for assessment of CLD.

Results: In 2011 and 2012 a total of 52 echocardiograms were done in babies born at <32 weeks gestation as part of assessment of CLD. Median gestational age was 25 weeks (range 23–30), median birth weight was 785 g (range 500–1,688 g).

Two babies were found to have significant pulmonary hypertension (PH) requiring multidisciplinary management and subsequently died due to respiratory failure secondary to PH. Five babies needed referral to paediatric cardiology services for congenital heart defects. Five babies had persistent ductus arteriosus (PDA) which was felt to be haemodynamically significant at that age. Five babies had evidence of hypertrophy of ventricular myocardium. Four babies had evidence of moderate tricuspid regurgitation which prompted further follow-up.

Conclusions: Our retrospective review found that echocardiogram is a very useful tool for the assessment of babies with CLD. The incidence of significant pulmonary hypertension in our cohort of babies is around 4 % which is much less than previously quoted in other studies.

40 % of the babies in this cohort had other significant findings on echocardiograms performed at 36 weeks CGA that prompted change in management.

Metabolism, Endocrinology and Nutrition (318–353)

318 – POSTER SESSION

EVALUATION OF SOME INFLAMMATORY CYTOKINES IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

E.R. Abdel Hameed¹, A.A. Abdel Shaheed¹, K.A. Mahdy²

¹*Child Health Department,* ²*Medical Biochemistry Department, National Research Center, Cairo, Egypt*

Objectives: Recent evidence favors primary role of cellular autoimmunity and its humoral mediators in pathogenesis and following type 1 diabetes mellitus (IDDM). The present study is carried out to investigate serum concentration of tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6) and soluble interleukin-2 receptor (sIL-2R) in children with (IDDM). Potential role of glycemic control, body mass index and disease duration were evaluated.

Designs and methods: Thirty-five children with IDDM and 30 age and six matched non diabetic healthy subjects were recruited for this study from the outpatient clinic of diabetes of National Institute of Diabetes and Endocrinology.

Results: Circulating level at TNF- α , IL-6 and sIL-2R were elevated in children with type 1 DM (39.91 ± 17.46 , 14.89 ± 10.69 and 779.0 ± 467.06 pg/ml, respectively). Compared with non diabetic controls (5.67 ± 1.88 , 6.23 ± 2.78 and 254.33 ± 173.6 pg/ml, respectively). These differences were statistically highly significant (<0.0001). Glycemic control, Insulin dose and disease duration were not significant predictors of cytokines concentration in children with IDDM. A significant negative correlation was obtained between TNF- α with age, weight and BMI and sIL-2R in diabetic patients. However there was a significant positive correlation between IL-6 with weight and BMI in those children.

Conclusion: Circulating levels of inflammatory cytokines were elevated in patients with IDDM suggesting activation of the inflammatory immune response. There levels were not affected by glucose level, insulin dose or duration of the disease.

319 – POSTER SESSION

LYMPHOCYTE RESPIRATION IN CHILDREN WITH TRISOMY 21

E. Aburawi¹, A.-K. Souid²

¹Paediatrics, United Arab Emirates University, ²Paediatrics, United Arab Emirates University, College of Medicine and Health Sciences, Al-Ain, United Arab Emirates

Background and aims: This study measured lymphocyte mitochondrial O_2 consumption (cellular respiration) in children with trisomy 21.

Methods: Peripheral blood mononuclear cells were isolated from whole blood of trisomy 21 and control children to measure cellular respiration rate. $[O_2]$ was determined as a function of time from the phosphorescence decay rates ($1/\tau$) of Pd (II)-meso-tetra-(4-sulfonatophenyl)-tetraenzoporphyrin. In sealed vials containing lymphocytes and glucose as a respiratory substrate, $[O_2]$ declined linearly with time, confirming the zero-order kinetics of O_2 conversion to H_2O by cytochrome oxidase. The rate of respiration (k , in $\mu M O_2 \text{ min}^{-1}$), thus, was the negative of the slope of $[O_2]$ vs. time. Cyanide inhibited O_2 consumption, confirming that oxidation occurred in the mitochondrial respiratory chain.

Results: The mean ($\pm$ SD) value of k (in $\mu M O_2$ per min per 107 cells) was 1.36 ± 0.79 (coefficient of variation, $Cv = 58\%$; median = 1.17; range = 0.60–3.12; $-2 \text{ SD} = 0.61$). For children with trisomy 21 (age = 7.2 ± 4.6 years, $n = 26$), the values of k were 0.82 ± 0.62 ($Cv = 76\%$; median = 0.60; range = 0.20–2.80), $p < 0.001$. Fourteen of 26 (54%) children with trisomy 21 had k values of 0.20–0.60 (i.e., $<-2 \text{ SD}$). The values of k positively correlated with body-mass index (BMI, $R > 0.302$), serum creatinine ($R > 0.507$), blood urea nitrogen (BUN, $R > 0.535$) and albumin ($R > 0.446$).

Conclusion: Children with trisomy 21 have reduced lymphocyte bioenergetics. The clinical importance of this finding requires further studies.

320 – POSTER SESSION

PREVALENCE OF VITAMIN D DEFICIENCY AMONG POSTPARTUM WOMEN AND THEIR NEWBORNS: A CROSS-SECTIONAL STUDY IN KARACHI, PAKISTAN

T. Ali¹, J. Khan²

¹Pediatrics, Liaquat National Hospital and Medical College Karachi, Karachi, Pakistan, ²Pediatrics, Al-Rahba Hospital, Abu Dhabi, United Arab Emirates

Background: Vitamin D deficiency during pregnancy has been linked with number of serious short and long term health problems in offspring, therefore adequate maternal vitamin D levels are pivotal for neonatal calcium hemostasis. The objective of this study is to evaluate vitamin D deficiency among post-partum women and their newborns.

Method: 360 pregnant women were enrolled from Liaquat National Hospital. Serum levels of 25-hydroxyvitamin D3 were assayed in maternal and cord blood samples collected at the time of delivery.

Results: The prevalence of vitamin D deficiency in maternal and cord blood was 69.6 and 58.2 %, respectively. There was significant correlation between maternal and cord blood serum concentration of Vitamin D₃. In mothers who were deficient in Vitamin D₃, cord blood Vitamin D₃ levels were lower than those from normal mothers. ($P = .001$). A significant direct correlation was also found between parda/veil observers mothers and levels of Vitamin D₃ ($P < 0.002$).

Conclusion: Keeping in view the high prevalence of vitamin D deficiency, considerations should be made for its supplementation in antenatal period to prevent hypovitaminosis in both mother and baby.

321 – POSTER SESSION

COMPARISON BETWEEN SOME CONTENTS OF HUMAN MILK AND SOME ARTIFICIAL FORMULAS USING LIBS

J. Alsharnoubi, Z. Abdelsalam

Cairo University, Cairo, Egypt

This study was done to use laser induced breakdown spectroscopy (LIBS) as diagnostic tool for identification and determination of many minerals as Mg, Ca, Na and Fe in milk samples and also to compare between different milk formulas to find the nearest in its composition to the mother's milk among most commonly used milk formulas at Egypt. Sixty milk samples were collected from nursing mothers (in first 6 months) and divided into two groups above and below 30 years old mothers. The two groups were analyzed by LIBS then compared with artificial milk in relation to Mg, Ca, Na and Fe. Mothers milk has higher intensity than the artificial formulas in Mg, Ca, Na and Fe. S26 formulas was the nearest to the mother's milk in the intensity level for Mg, Ca, Na and Fe. LIBS is a quick and simple non invasive method for identification of many minerals as Mg, Ca, Na and Fe in milk samples. Mother's milk is the optimum for babies needs and S26 formula is the nearest to it.

322 – POSTER SESSION

CHILD/ADOLESCENT ABDOMINAL PAIN RELATED FUNCTIONAL GASTROINTESTINAL DISORDERS IN SAKARYA-TURKEY

T.M. Alvr¹, N. Cinar², S. Oncel³, M. Toptaş⁴, D. Köse²

¹Kocaeli University Faculty of Medicine Department of Family Medicine, Kocaeli, ²Sakarya University School of Health Sciences, Sakarya, ³Kocaeli University Faculty of Medicine Department of Pediatrics, Kocaeli, ⁴Family Physician, Bingöl Merkez 15 No'lu Karşıyaka ASM, Bingöl, Turkey

Objectives: To explore abdominal pain related functional gastrointestinal disorders (FGIDs) prevalence which satisfy Rome III criteria and their effect on health care utilization and schooling among secondary school students.

Design: Cross-sectional study.

Setting: Randomly selected secondary schools in the Sakarya province center of Turkey.

Participants and patients: Secondary school students of 2011–2012 educational year.

Intervention: None

Main outcome measure(s): Prevalence of abdominal pain related FGIDs among secondary school students who live in the center of Sakarya providence. Numbers of physician visit and absent days due to abdominal pain were recorded.

Results: The ages of 759 students ranged from 12 to 15 years. During the previous educational year 1,624 physician visits were made by 619 students and 809 of the visits of 276 students were due to gastrointestinal complaints. A total of 59 children (7.8 %) satisfied the Rome III criteria for various abdominal pain related FGIDs; functional abdominal pain syndrome (n = 29; 3.8 %), abdominal migraine (n = 25; 3.3 %), functional dyspepsia (n = 18; 2.4 %), irritable bowel syndrome (n = 14; 1.8 %), functional abdominal pain (n = 7; 0.9 %). School absent days and physician visits by these students were 72, 108; 54, 54; 63, 75; 23, 35; 24, 28, respectively.

Conclusion: Abdominal pain related FGIDs and their effects have been studied for the first time in Sakarya-Turkey and 7.8 % prevalence is in concordance with the general medical literature. Numbers of absent days from the school and physician visits implies a serious burden.

323 – POSTER SESSION

POSTOPERATIVE INTENSIVE CARE AFTER PANCREATECTOMY IN CONGENITAL HYPERINSULINISM

H. Bahlmann, A. Weidner, M. Heckmann

Neonatology and Pediatric Intensive Care, Ernst-Moritz-Arndt-Universität, Greifswald, Germany

Background: Congenital hyperinsulinism (CHI) is a heterogeneous disease with recurrent hypoglycemia because of inappropriate insulin secretion.

Patients resistant to conservative treatment may achieve benefit from a pancreatectomy.

Objective: To characterize aspects of postoperative intensive care after pancreatectomy in CHI.

Patients and methods: 25 patients (11 girls; median age 10 months, range 7 weeks–10 years) with CHI were included in a retrospective chart review. 12 underwent laparoscopic and 13 open approach pancreatectomy. 18 patients showed a genetic pre-disposition for focal HI and 7 for the diffuse form. Postoperative glucose infusions were adjusted to permissive hyperglycemia (up to 14 mmol/l). CHI medications were not supported. Drainage fluids, urine production, the amount of intravenous glucose and concentrations of plasma lipase were recorded.

Results: Intensive care stay was between 2 and 62 days (median 6). Three patients were on ventilatory support for 3 days (one after CPR). Postoperative need for glucose did not exceed 4.5 mg/kg/min. Thereafter, glucose administration was increased due to hypoglycemia and showed individual latency (2–5 days). Plasma lipase levels differed from 30 µkatal/l to 1.73 (median 6.8). Drainage fluid was neglectable, except in 1 case. Arterial hypotension requiring dopamine and norepinephrine was noted in 2 patients. Renal function was normal in all patients. The routine pain management with metamizole and piritramid was sufficient. Tolerance of oral feeds was delayed in all patients.

Conclusion: Postoperative intensive care after pancreatectomy in CHI was uncomplicated in most of the cases. The main focus should be on glucose control.

324 – POSTER SESSION

AWARENESS, PRACTICES AND BENEFITS OF BREAST FEEDING IN ISRA UNIVERSITY HOSPITAL, PAKISTAN

A. Baig

Isra Medical University, Hyderabad, Pakistan

Objectives: Several studies regarding Breastfeeding have been done in Pakistan and around the world. We have also done such a study in Isra University Hospital. Breast feeding is perfectly suited to nourish infants. It is truly said that what is good for babies is good for mother. Our objectives were to determine knowledge about optimum breast feeding practices, benefits of breast feeding and pre-lacteal feeds, to evaluate the awareness of breast feeding through demographic parameters and to determine the causes of failure of breast feeding among mothers.

Methods: Questionnaire based hospital survey was conducted among 150 mothers, based on objectives which depended on certain variables: demographic variables like age, education, socio economic status, occupation, address. It also had questions about duration of marriage, number of kids. Study design was Cross Sectional Study and was done using SPSS.

Results: Breast feeding was initiated by 89.33 % (134) of mothers. 10.67 % (16) of mothers, who failed to breastfeed their babies, had mainly the reason of milk not being produced (50 %). Later we specifically asked the breastfeeding mothers certain questions. It was revealed that they were breast feeding their babies because breast milk is the best/balanced diet. 84 % recommended breastfeeding for today's mothers.

Conclusions: According to our study Illiterate females and house wives were breast feeding more. Economically deprived mothers tended to breastfeed their babies for longer period as compared to economically well-off or educated mothers. We came to the conclusion that awareness programs regarding correct breastfeeding practices be conducted.

325 – POSTER SESSION

OFF LABEL USE OF POWER INJECTABLE DOUBLE LUMEN PICCS FOR APHERESIS AND HEMODIAFILTRATION IN NEONATES AND CHILDREN

D.G. Biasucci¹, M. Pittiruti², S. Pulitanò¹, A. Mancino¹, M. Piastra¹, G. Conti¹

¹Emergency Department, ²Department of Surgery, 'A. Gemelli' Teaching Hospital Catholic University of The Sacred Heart, Milan, Italy

Background: Apheresis (AP) and hemodiafiltration (HDF) in critically ill pediatric patients often require a double lumen central catheter. New methodologies (ultrasound guided venipuncture) and new materials (power injectable polyurethanes) allow us the safe placement of high flow, low caliber double lumen catheters which have a good performance for AP and HDF.

Methods: We reviewed our experience with 5Fr double lumen power injectable central catheters (ProPICC, Medcomp) inserted in our pediatric intensive care unit during the last 20 months and utilized for AP or HDF.

Results: ProPICCs were inserted by ultrasound guidance in the brachio-cephalic vein (3 cases: 1, 6 and 11 year old) or in the femoral vein (1 case: 20 days old). All catheters were inserted without complications and tunneled to the infraclavicular area (if inserted in the brachio-cephalic) or to the thigh. The average dwell time of the devices was 54 ± 31 days. All PICCs were easily used for AP (one patient, 6 year old, graft vs host disease) or HDF (three patients, renal failure). There were no episodes of flow occlusion or of persistent difficulty in performing the procedures. The protocols of our institution consist in 4–6 ml/kg/min of blood flow rate and 10–20 ml/kg/h of infused fluid rate for HDF, and 1 ml/kg/min for AP. We reported no catheter-related bacteremia and no catheter-related thrombosis.

Conclusions: We suggest that double lumen power injectable PICCs can be used as multi-purpose central line, even for AP and HDF in neonates and in small children.

326 – POSTER SESSION

UNPREDICTABLE COMBINATION OF METABOLIC AND FEEDING PATTERNS IN MALNOURISHED CRITICALLY ILL CHILDREN: THE MALNUTRITION ENERGY ASSESSMENT QUESTION

G. Briassoulis¹, T. Tavladaki¹, A.M. Spanaki¹, D.-M. Fitrolaki¹, S. Ilia¹, E. Briassoulis²

¹University Hospital of Crete, Heraklion, ²1st Department of Internal-Medicine-Propaedeutic, University of Athens, Athens, Greece

Purpose: Measurement of resting energy expenditure (REE) by indirect calorimetry has long been the gold standard, but prediction energy expenditure (PEE) equations can serve as a simple alternative. Correct assessment of REE in malnourished critically ill children is important to achieve optimal nutritional status.

Methods: 44-paired measurements were performed in 32 well-nourished and 12 malnourished critically ill children. REE was obtained using 30-min indirect calorimetry by E-COVX. Estimated PEE and predicted basal metabolic rate (PBMR) were calculated using the ordinary Harris-Benedict, Schofield-HW (WHO), Seashore, Fleisch, Caldwell-Kennedy, Henrys, the PICU specialized White and Meyer's equations.

Results: All patients survived. The mean differences between the non-malnourished and malnourished groups of patients were non-significant for the REE (178 ± 119 kcal/day) and the White's (-80 ± 133 kcal/day) or Meyer's PEE (-171 ± 101 kcal/day). In the malnourished group REE differed from all PEE ($p < 0.04$) and energy intake ($p < 0.02$). In the non-malnourished group Schofield equation was shown to overestimate REE compared to the two PICU oriented PEE ($p < 0.0001$) whereas energy intake also differed from PEE ($p < 0.02$). Although energy intake in the malnourished group was higher ($p < 0.02$), REE was lower ($p < 0.002$), demonstrating a contrasting combination of hypo-metabolism (79.8 ± 24 vs. 89.4 ± 34) and over-feeding (145 ± 68 vs. 81.6 ± 32 , $p < 0.006$).

Conclusion: Our data illustrates the wide variability and poor agreement between REE and PEE in malnourished children. The combination of hypo-metabolism and overfeeding among malnourished critically ill patients renders even the use of the most specialized PEE estimation highly erroneous.

327 – POSTER SESSION

BREASTFEEDING MULTIPLES: WHAT ARE THE OPINIONS OF EXPECTANT MOTHERS?

N. Cinar¹, T.M. Alvur², D. Köse¹, Ö. Doğu³, S. Altinkaynak¹

¹Sakarya University School of Health Sciences, ²Kocaeli University Faculty of Medicine Department of Family Medicine, ³Sakarya Health and Training Hospital, Sakarya, Turkey

Background and aim: Breast milk is considered the optimal nutrition for all newborn infants. The thought of breastfeeding multiples fills most of the mother with apprehension but adequate quantity and quality of milk production has been documented even for high multiples. This study is conducted to determine the expecting mothers' opinions about breastfeeding their multiples to be born.

Method: Women pregnant with multiples who are in their 2nd or 3rd trimester were informed about the study and after their consent the filled in a questionnaire inquiring about breastfeeding. The study was conducted in Sakarya-Turkey in 2012 between May and November.

Results: The mean age of the pregnant women was 29.94 ± 5.2 (min 18, max 38) years and 77 (1 %; $n = 27$) of them were primary school graduates. 42.9 % ($n = 15$) of them had at least one elder child. 42.9 % ($n = 15$) of mother's had no notion of breast milk sufficiency for multiples. Nevertheless 94.3 % ($n = 33$) of the expectant women declared intention to breastfeeding their multiples and 5%. 7 ($n = 2$) claimed formula preference.

Conclusion: The women expecting multiple babies should be encouraged and be assured regarding the breast milk sufficiency for their babies.

328 – POSTER SESSION

KNOWLEDGE OF MOTHERS HAVING MULTIPLE BABIES ABOUT BREAST MILK STORING AND LATER USE

N. Cinar¹, D. Köse¹, C. Dede²

¹Sakarya University School of Health Sciences, ²Sakarya University, Vocational School of Health Sciences, Sakarya, Turkey

Aim: This study carried out to determine the knowledge of mothers having multiple babies about storing and later using breast milk.

Method: This study was performed with the participation of 27 volunteer mothers having multiple babies that 0–12 months. The study was conducted in Sakarya-Turkey in 2012 between November and December.

Results: The mean age of the mothers was 30.04 ± 5.4 (min 19, max 38) years. It was determined that 51.9 % of the mothers collect and store their breastmilk and later give it to their babies. 77.8 % (n = 21) of the mothers reported that breast milk can be collected and stored, and it can be given to baby if it was collected and stored under appropriate conditions. It was denoted that 44.4 % (n = 12) of the mothers have opinion that storing breastmilk can cause loss of nutritional value. The rate of mothers that knew correct storing time of breast milk at at room temperature, at refrigerator shelf, at deep freezer were 14.8 % (n = 4), 22.2 % (n = 6), 25.9 % (n = 7), respectively.

48.1 % (n = 13) of the participants reported correct heating method of stored breast milk. 70.4 % (n = 19) of the mothers gave no answer to the question that “Is breast milk can be heated in a microwave oven?”. 25.9 % (n = 7) of the participants stated that they had no idea about it. The rate of the mothers that knew correct consuming time of frozen breast milk after thawed was 40.7 % (n = 11).

Conclusion: Mother having multiple babies needs having information about storing and later using breast milk.

329 – POSTER SESSION

ORAL SUPPLEMENTATION WITH PROBIOTICS IN PREMATURE INFANTS- A RANDOMISED CLINICAL TRIAL

E. Coleta¹, M. Gheonea², M. Sarbu²

¹Neonatology, ²Emergency Hospital Craiova, Craiova, Romania

Background: Recents studies suggest that supplementation with probiotics may inhance intestinal function in premature infants and also prevent necrotising enterocolitis.

Objective: To evaluate the efficacy of probiotics on the digestive tolerance to enteral feeding in very low birth weight premature babies. **Materials and methods:** We conducted a study over 10 months period in a tertiary intensive care unit. The trial included 60 low birth weight premature babies. Thirthy one babies(group A) received human milk and probiotics—*Lactobacillus reuteri*—and 29 babies (group B) received human milk alone, for their duration of staying in intensive care unit.

Results: In the group of infants who received oral probiotic, gastro-intestinal tolerance improved and the time of reaching full enteral feeding was shorter. No adverse reaction or infection was observed.

Conclusions: Supplementation with may improve intestinal tolerance to enteral feeding in low birth weight premature babies, allowing an early reach of full feeds.

330 – POSTER SESSION

24-HOUR PROTEIN, ARGININE AND CITRULLINE METABOLISM IN FED CRITICALLY ILL CHILDREN DOES NOT SHOW A CIRCADIAN RHYTHM

C.T. de Betue¹, D.A. van Waardenburg², K.F. Joosten³, N.E. Deutz⁴, M.P. Engelen⁴

¹Intensive Care and Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, Rotterdam, ²Pediatrics, Maastricht University Medical Center, Maastricht, ³Intensive Care, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands, ⁴Department of Health & Kinesiology, Texas A&M University, College Station, TX, USA

Objectives: In the past 20 years it has become apparent that disruptions of circadian rhythms, which are regulated by clock genes, are associated with metabolic pathologies and increased morbidity [1]. In critically ill adults circadian rhythms of hormones and vital functions show large disturbances [2]. The objective was to study whether a circadian rhythm is present in protein metabolism in continuously fed critically ill children.

Methods: In 8 critically ill children receiving continuous nutrition a 24-h stable isotope tracer protocol with hourly arterial blood sampling was conducted, using L-[ring-²H₅]-phenylalanine, L-[²H₂]-tyrosine, L-[²H₃]-leucine, L-[¹⁵N₂]-arginine and L-[¹³C-²H₄]-citrulline intravenous tracers and L-[¹⁵N]-phenylalanine and L-[¹³C]-leucine enteral tracers.

Results: No circadian rhythm was apparent in amino acid enrichments and protein kinetics. See Fig. 1 for average enrichments. There was an upward trend in tracer enrichments, especially for phenylalanine. This indicates tracer recycling, which is a methodological problem inherent to prolonged tracer studies.

Fig. 1 24-h enrichments

Conclusions: In continuously fed stable critically ill children amino acid appearances and protein kinetics do not show a circadian rhythm.

Whether this is an adaptive mechanism or pathologic remains to be studied. We recommend not extending stable isotope tracer protocols longer than 10 h, because of potential tracer recycling which may result in underestimation of protein kinetic indices.

References

1. Bass et al (2010) *Science* 330:1349–54
2. Paul et al (2007) *Chronobiol Int* 24:45–61

331 – POSTER SESSION

COMPARATIVE CHARACTERISTICS OF THE RESULTS OF INDIRECT CALORIMETRIC AND CALCULATED BY CHILDREN WITH SEVERE THERMAL TRAUMA

J. Erpuleva¹, A. Lecmanov², P. Rossaus²

¹ICU, Children's Hospital, ²Institute for Children Diseases, Moscow, Russia

Introduction: Severe thermal injury causes hyper metabolism with catabolism, gastric erosion. “Overfeeding,” as well as “underfeeding” of the child in an intensive care unit, and may not want to burden the patient.

The aim was to evaluate the effect of nutritional support in early post severe burn period to assess the energy requirements of children in critical condition using the indirect calorimetry and compared the results with the use of design formulas (WHO, Curreri, the Harris-Benedict).

Methods: Energy demand study conducted in 35 patients aged 2–14 years with severe thermal trauma conducted in the early 3–5 days of injury in the period from September 2010 to December 2012. All patients were on mechanical ventilation. The daily energy requirements were determined by indirect calorimetry (Medgraphics, USA) and the calculation formulas WHO, Careri, Harris-Benedict.

Results: Indirect calorimetry energy consumption in the initial day of injury in patients with burns <30 % of body averaged 1,994 ± 10 kkal/24 h, according to the Harris-Benedict formula—2,257 ± 12 kkal/24 h, WHO formula—1,438 ± 11 kkal/24 h. In patients with burns over 30 % of the body were 3,109 ± 21 kkal/24 h, according to the Harris-Benedict—2,128 ± 17 h kkal/24 WHO—1,876 ± 19 kcal/24 h, Curreri—3,010 ± 24 kkal/24 h, respectively.

Conclusion: The results showed that in patients with thermal injuries, the most informative is the formula Curreri. Energy demand calculated in others formula significantly distort the true results.

332 – POSTER SESSION

EARLY BLOOD TRANSFUSIONS AND IRON METABOLISM IN NEWBORNS, BORN BEFORE 33RD GESTATIONAL WEEK

V.A. Georgieva¹, V. Nedkova², P. Yordanova-Laleva³

¹Neonatal Department, ²Pediatric Clinic, ³Department of Clinical Laboratory, University Hospital, Pleven, Bulgaria

The low birth weight infants require many blood transfusions (BTs) despite the progress of clinical medicine. BTs up to 28th postnatal day are labeled early (EBTs), and those after-late. EBTs are due to

haemolysis and haemorrhage, late BTs are almost exclusively due to anaemia of prematurity.

Objective: To study the influence of EBT over the iron indices in premature infants.

Materials and methods: 102 infants born before 33rd gestational week (GW) were surveyed. They are divided in two groups: control (group 0) without EBT (35 babies) and group 1 with EBT (67 babies). The iron indices (serum levels of ferritin—Ferr, transferrin—Tf, soluble transferrin receptors—sTfR, iron—Fe, total iron binding capacity—TIBC, saturation of transferrin—SatTf) are examined up to the discharge.

Our results: Group 1: Ferr levels are higher throughout the entire study period, Fe is higher in 30th, 33rd and 36th GW, TIBC is lower in 33rd and 36th GW. Group 0: Tf rises sharply in 36th and 39th GW and sTfR is higher. Iron deficiency (SatTf ≤ 20 %) is more often found in group 0 in 30th GW (56 vs. 5 %), but iron status normalizes to the discharge. More than 1/3 of the patients have iron overload, that latter is 3 times more common in group 1.

Conclusion: EBT in preterm infants leads to serious disorders of iron metabolism. This results in high risk of iron overload to the discharge.

333 – POSTER SESSION

PREVALENCE OF VITAMIN D DEFICIENCY IN HOSPITALIZED VERSUS HEALTHY CHILDREN: INDIAN SCENARIO

R. Gupta¹, S. Basu²

¹Pediatrics, ²Clinical Biochemistry, Institute of Child Health, Kolkata, India

Introduction and aim: This study aimed to determine the prevalence of vitamin D deficiency in Indian children and compare vitamin D status of hospitalized children and sick outpatients, with those of healthy matched controls.

Methods: A retrospective study (Jan–Dec 2012) on children (mean age: 6 years, males: 55.6 %) included 180 out-patients and 34 in-patients of a pediatric hospital who were investigated for vitamin D status. 36 controls had serum 25 hydroxycholecalciferol (25(OH)D), calcium, phosphate, alkaline phosphatase (ALP), and parathyroid hormone (PTH) assayed.

Results: The median 25(OH)D level (ng/ml) of inpatients (13.3) was significantly lower compared to outpatients (18.65) and healthy controls (18.40). In-patients had greater (41 %) severe deficiency cases (<10) than outpatients (23.8 %, $p = 0.055$) and controls (13.8 %, $p = 0.015$). The overall prevalence of deficiency (<20) was equivalent in the three groups (61.8, 54.4 and 58.3 %, respectively), and showed seasonal variance. Overall, 25(OH) D levels showed significant correlation with serum calcium ($r = +0.24$, $p = 0.003$), correlated negatively with age ($r = -0.26$, $p = 0.001$) but showed no significant correlation with ALP, phosphate or PTH levels. However, in the deficient group, there was significant negative correlation with PTH ($r = -0.46$, $p = 0.015$).

Conclusions: Vitamin D is highly prevalent in Indian children, including healthy subjects, especially in winter months. Hospitalized children are severely deficient more often and should be evaluated for correction. Low serum calcium and higher pediatric age warrant vitamin D screening. Deficiency, per se, is associated with lower calcium and higher PTH levels, suggestive of high bone turnover, and should be supplemented adequately.

334 – POSTER SESSION

DIAGNOSING METABOLIC ACIDOSIS IN THE CRITICALLY ILL NEONATES: TRADICIONAL OR STEWART'S METHOD?

D. Hadzic, N. Mladina, F. Skokic

Pediatrics Clinic, University Clinical Center of Tuzla, Tuzla, Bosnia-Herzegovina

Background: Neonates have a high affinity for acid–base disorders. Prompt and precise interpretation of blood gases is essential in providing neonatal care. Recent new approaches to acid–base physiology allowed a comparison between Stewart's versus traditional method of acid–base analysis. Although reports about the correlation between acid–base abnormalities and outcome are contradictory, metabolic acidosis remains a strong indicator of poor prognosis in critically ill patients. Aim of this study is to analyze the frequency and severity of acid–base disturbances, especially metabolic acidosis in critically ill neonate with two assessment methods.

Methods: Data were prospectively collected from 101 consecutive neonates, admitted to the Department of intensive therapy and care, Pediatrics clinic of University Clinical Center of Tuzla during 2011. We analyzed acid–base parameters by the traditional and Stewart's method.

Results: With the traditional method the most common disorder was acidosis (metabolic 79.2 %, and respiratory 54.5 %). In 63 neonates (62.4 %) were identified mixed acid–base disorders. With Stewart's analysis the most common disorders were metabolic (acidosis 98 % and alkalosis 95 %). Tested by kappa statistics, followed by nonparametric Spearman's correlation two methods confirmed an excellent correlation for identification of respiratory disorders, weak statistically significant correlation for identification metabolic acidosis, and no statistically significant correlation in identification of metabolic alkalosis.

Conclusions: Metabolic acid–base disorders identified by Stewart method were more numerous. This confirms the thesis about the presence of a large number of complex and mixed acid–base disturbances in critically ill neonates. Stewart's methodology is clearly identified them, while using the traditional methodology, they stayed hidden.

335 – POSTER SESSION

INTERMITTENT AND CONTINUOUS ENTERAL FEEDING IN A PEDIATRIC INTENSIVE CARE UNIT

T. Kendirli, N. Taşyapar, M. Güneş, Ç. Ödek, A. Yaman, E. İnce

Pediatric ICU, Ankara University School of Medicine, Ankara, Turkey

Aim: The aim of this study is evaluation to tolerability, sufficient volume and calory reaching for nutrition and effect to hospital LOS of intermittent (IF) and continuous feeding (CF) in critically ill children.

Materials and methods: This blind-controlled and cohort study was conducted in PICU in Ankara University School of Medicine, between September 1, 2011 and March 31, 2012.

Results: During study period, 136 patients were admitted to our PICU and 36 of them were included. We started continuous and intermittent feeding in 17 (46 %), 20 (54 %) patients, respectively. There wasn't significant difference between two groups for ages, initiation feeding volume, the time of the feeding initiation and time of reaching total

volume. There were 15 (75 %) and 15 (88.2 %) mechanical ventilated patients in IF and CF group, respectively ($p = 0.306$). There weren't statistical difference in adverse effects of feeding methods as residual volume, distension, vomiting and diarrhea between IF and CF group. The tolerability ratio of initiation feeding methods was same in both groups (87.5 %). In IF group, 5 of them were couldn't tolerate to feeding and changed to CF and they tolerated to this method. Their PICU LOS were 15.5 ± 12.3 and 23.1 ± 14.6 day in IF and CF group, respectively ($p = 0.033$).

Conclusion: Both intermittent and continuous enteral feeding methods are useful in critically ill children.

336 – POSTER SESSION

THE EFFECT OF A PROTEIN-ENERGY ENRICHED FORMULA ON ACHIEVEMENT OF NUTRITIONAL GOALS IN CRITICALLY ILL CHILDREN

D. Kerklaan, J.M. Hulst, M.E. Augustus, J. Olieman, S.C.A.T. Verbruggen, C.T.I. de Betue, K.F.M. Joosten

Department of Pediatric Intensive Care, Erasmus MC, Sophia Children's Hospital, Rotterdam, The Netherlands

Background and aims: Adequate enteral nutritional intake is difficult to achieve in critically ill children.

The aim of this study was to investigate if administration of a protein-energy enriched formula (PE-formula) may help to achieve nutritional targets earlier.

Methods: Observational, retrospective study. Total daily intakes were determined in the first week after admission in infants ≤ 1 year admitted to the PICU for at least 4 days. Infants receiving exclusively enteral feeding with a standard or PE-formula at day 4 of admission were included. Target goals for energy and protein were: resting calculated energy expenditure $+10$ % for the first 2 days; recommended dietary allowances (RDA) for day 3–7, and protein 1.8 g/kg/day. Actual intakes were compared to nutritional goals and differences between the groups were calculated.

Results: Forty infants with various diagnoses (53 % male, median age 0.16 years) were included, 14 received PE-formula. The study comprised 219 complete feeding days (77 PE and 142 standard). Using a PE-formula, on significantly more days the targets for energy (58 vs. 39 %) and protein (69 vs. 37 %) were achieved. Overall, compared with target goals, significantly higher median percentages of energy and protein intake were obtained with a PE formula than with a standard formula (energy 114 vs. 96 % and protein 130 vs. 92 %, respectively).

Conclusion: Achievement of nutritional goals in critically ill children remains difficult. In daily practice, administration of a PE-formula can promote the achievement of nutritional goals, especially protein targets.

337 – POSTER SESSION

STEP-BY-STEP IMPROVEMENTS OF MONITORING AND DIAGNOSTICS OF HUMAN RECOMBINANT AND ENDOGENIC ENDOCRINE EPO

V. Lakhtin, M. Lakhtin, A. Aleshkin, S. Afanasiev, V. Aleshkin

Medical Biotechnology, G.N. Gabrichevsky Research for Epidemiology & Microbiology, Moscow, Russia

Objective: Endogenic human erythropoietin (ehEPO) and less acidic recombinant hEPO (rhEPO) are highly varied and needed controls during treatments and therapy.

Aim: Evaluation of step-by-step procedure features of simplification and improving rhEPO detection.

Materials and methods: We developed improved procedure of EPO visualization (2.5 days): sample concentrate screening [1], plate IEF-PAG [2] in urea at pH 2–6, semidry multiblotting [3] as PAG-Durapore-ImmobilonP (up and down, pH-step-by-step, binary Immobilon, Ping-Pong), immobilon staining [4] with immune sandwich using biotin–streptavidin–peroxidase system, intermembrane acidic transfer [5] of peroxidase activity, immobilon treatments [6], visualization regimes [7] using BioChem System (UVP, Calif.).

Results:

1. Preliminary dot-blotting detection of rhEPO using pH treatments was developed. Thermoprobings, also cases of concentrate gelling (homogeneous or biphasic from healthy or anemia donors) increased EPO resolution.
2. Expansion into other tracks resulted in track side arcs near start (semidry gel).
3. Durapore (semidry) resulted in weakened (compared to control) spots in the rhEPO containing region. Track tree branching on Immobilon at the level of expected rhEPO beginning (from cathode) was registered.
4. Branching resulted in narrowing adjacent tracks in ehEPO region and appearance own track rhEPO external spots.
5. Peroxidase transfer improved EPO bands distribution.
6. Washings at $\geq 50^\circ\text{C}$ resulted in excellent background.
7. BioWest (peroxidase chemiluminescent substrate) at $\geq 50^\circ\text{C}$ and pH ≥ 8.5 increased EPO discrimination picture. Stepwise kinetic luminescence optimum registration allowed sharp rhEPO detection.
8. In accordance to our conception of visual rhEPO—ehEPO conversion, monitoring coefficients for calculation of rhEPO relative levels in urine of patients with renal insufficiency were proposed.

Conclusion: Indicator features and improvements allow successful EPO detection (also in special cases).

338 – POSTER SESSION

THE IMPACT OF EARLY NUTRITIONAL SUPPORT STRATEGIES ON PHYSICAL DEVELOPMENT AND NUTRITIONAL STATUS OF PRETERM INFANTS IN XI'AN

H. Li, M.K. Sungkur, S.M. Padari, Q. Su, Y. Zhang, L. Yang

Division of Neonatology, the First Affiliated Hospital of Medical School, Xi'an Jiaotong University, Xi'an, China

Objectives: Early feeding strategy in infants has a positive effect not only on their physical development but also on their brain development. This study was designed to evaluate the incidence of extrauterine growth restriction (EUGR) in premature neonates at time they are discharged from the hospital and determine the factors associated with the occurrence of EUGR in Xi'an City of China.

Methods: Weight, length and head circumference of 104 premature infants in the Neonatal ICU of our hospital were serially measured

from birth till discharge. The infants were classified into three birth weight groups and five gestational age groups.

Results: Of the 104 preterm infants, the percentage number of small for gestational age (SGA) at birth was 15.3, 14.4, and 8.6 % for weight, head circumference and length, respectively. At discharge from hospital, the incidence of EUGR was 49.0, 27.8, and 27.8 %, respectively. Duration of parenteral nutrition (PN), time to achieve total calorie of 120 kcal/kg/d, time to reach full feed, birth weight and length of hospital stay were significantly different between non-EUGR and EUGR groups ($P < 0.05$). Through logistic regression analysis, birth weight, length of hospital stay, gender and duration of PN were found to be significantly associated with growth retardation ($P < 0.05$).

Conclusions: Early intravenous nutrition and enteral feeding can reduce the incidence of EUGR. Birth weight, length of hospital stay, gender, and duration of PN are risk factors for EUGR.

Acknowledgements: This work was supported by the National Natural Science Foundation of China (No. 81070883).

339 – POSTER SESSION

IMPLEMENTATION OF REGIONAL CITRATE ANTICOAGULATION FOR HEMOFILTRATION IN CHILDREN

J.-M. Liet¹, B. Gaillard-Le Roux¹, F. Barrière¹, E. Allain-Launay², N. Joram¹, J.-M. Dejode¹, G. Roussey², J.-C. Rozé³

¹*Pediatric Intensive Care Unit, ²Pediatric Nephrology, ³Neonatology and Pediatric Intensive Care Unit, Hôpital Mère-Enfant CHU Nantes, Nantes, France*

Background and aims: In continuous veino-venous hemofiltration (CVVH), regional citrate anticoagulation offers an attractive alternative to systemic heparinization, especially in high bleeding risk patients. We report the implementation of this alternative in a university affiliated 12-bed PICU.

Methods: We used a commercially available hemofilter with automated procedures. Only standard solutions were employed to reduce complexity. Hemofiltration was performed with pre-filter citrate anticoagulation, post-filter reinjection, and no dialysis. Citrate rate was set to meet a circuit citrate concentration of 2.2 mmol/L, that could be modified to obtain circulating ionized calcium < 0.5 mmol/L. CVVH was performed using an 18 mmol/L citrate solution and a phosphate-containing post-dilution solution. Beyond the filter, calcium was continuously infused to maintain systemic ionized calcemia 1.1–1.25 mmol/L.

Results: We studied seven children 10 ± 8 years old (weight range 15–66 kg), admitted over a 14-month period. All patients were critically ill and underwent a course of CVVH, as part of their management. Disease categories included sepsis with multiorgan dysfunction, two children; and haemolytic uremic syndrome, five children. Average time of therapy was 3.6 ± 1.1 days. Initial settings: blood flow 101 ± 36 mL/min; citrate 745 ± 290 mL/h; post-dilution 750 ± 290 mL/h; negative balance 57 ± 56 mL/h; ultrafiltration rate 30 ± 2 mL/min/1.73 m². Eleven CVVH sessions were performed with filter life 30.3 ± 22.3 h (total 330). Stopping causes: 55 % scheduled, 18 % catheter malfunction, 9 % catheter clotting, 18 % alarm handling/technical issues. No children had metabolic or bleeding complications. Creatininemia decreased from 586 ± 424 $\mu\text{mol/L}$ to 290 ± 150 (H24).

Conclusions: Regional citrate anticoagulation can be used for children using standardized methods.

340 – POSTER SESSION

NEURO-ENDOCRINE STRESS RESPONSE IN NEWBORNS WITH KIDNEY DISTURBANCE DUE TO ASPHYXIA

A. Loboda

Pediatrics with Medical Genetics, Sumy State University, Sumy, Ukraine

Participation of IL-1 β in implementing stress reaction determined by its influence on the level of glucocorticoids and central brain structures. This cytokine is one of the main triggers of the neuro-endocrine stress response.

Objectives: To examine the neuro-endocrine stress response on the basis of study of the dynamics of interleukin-1 β (IL-1 β) and cortisol in serum during the neonatal period in newborns with kidney disturbance after asphyxia.

Methods: The study involved 100 full-term infants with signs of nephropathy: 50 children who had severe asphyxia, and 50 children with moderate asphyxia. Comparison group included 20 children without asphyxia at birth. Disturbance of kidney function diagnosed if blood creatinine level over 89 μ mol/l, blood urea more than 8 mmol/l, urine output <1 ml/kg/h. Serum IL-1 β and cortisol levels were determined at 1–2, 7–8 and 25–30 days of life by ELISA.

Results: Asphyxia, regardless of its severity, stimulates the production of IL-1 β , enhances strength and correlation between IL-1 β and cortisol, which causes an increase its level in the serum. Continuous stimulation of the adrenal cortex by cytokine in case of severe asphyxia leads to a change in the correlation's character (-0.328 , $p < 0.05$) and inhibition of cortisol production by the end of the neonatal period.

Conclusions: Cortisol level in children with disturbance kidney function during the neonatal period depends on the severity of asphyxia and levels of IL-1 β . Depletion of hypothalamic–pituitary–adrenal system in case of severe asphyxia disrupts stress-induced response and adaptation newborn to extrauterine life.

341 – POSTER SESSION

THE IMPORTANCE OF WEIGHT IN PEDIATRIC INTENSIVE CARE MORTALITY

P. Macao, C. Pinto, A. Dias, T. Dionisio, A. Dinis, L. Carvalho, J. Farela Neves

Pediatric Intensive Care Unit, Hospital Pediátrico Coimbra, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Background and aims: Nutritional status has significant effects on morbidity and mortality in the general population. Our aim was to evaluate the relationship between weight on admission and risk of mortality in PICU patients.

Methods: All children admitted to the PICU between 2007 and 2011 were included. The following variables were analysed: gender, age, weight and weight-for-age z-score, prognostic scores (PIM-2 and PRISM), diagnosis and outcome. Upper extreme of weight-for-age z-score was defined ≥ 1.881 (P97) and lower extreme ≤ -1.881 (P3).

Results: Overall 1804 children were included. Median age was 11.7 months (IQR 0.8 - 97.0). Median weight-for-age z-score was -0.78 (IQR -1.92 to 0.16). 2 % had z-score ≥ 1.881 . Mortality was 3.7 % and standardized mortality by PIM-2 and PRISM was 0.8 and 0.9, respectively.

When comparing children who died ($n = 67$) with the surviving ones ($n = 1,737$) no significant differences were found regarding the median weight-for-age z-score (-0.94 vs -0.78 ; $p = 0.565$). However, the mortality rate in the upper extreme z-score was significantly higher than the remaining children (12.1 vs 3.6 %; $p = 0.032$). In the lower extreme of z-score (3.9 vs 3.6 %; $p = 0.802$) no differences were observed. Through logistic regression analysis, the upper extreme of weight-for-age z-score was proved to be an independent risk factor for mortality.

Conclusions: Patients in the lower extreme of the weight-for-age z-score were over-represented. A significant relationship between mortality and upper extreme of weight-for-age z-score was observed in PICU patients, confirming the initial hypothesis. These results need further validation, in order to allow inclusion of weight-for-age z-score in prognostic scores.

342 – POSTER SESSION

METRICS OF BLOOD GLUCOSE VARIABILITY IN INTENSIVE CARE: THE EFFECT OF SAMPLING FREQUENCY BIAS

A. Plunkett, K. Morris

Paediatric Intensive Care, Birmingham Children's Hospital, Birmingham, UK

Objectives: Existing evidence linking glucose variability with intensive care mortality is derived from observational studies, which do not account for the effects of frequency of blood sampling. We aimed to test the hypothesis that metrics of blood glucose variability are influenced by sampling frequency.

Methods: Single-centre, observational study in a 20-bedded British Paediatric Intensive Care Unit (PICU). Retrospective data collection from a cohort of 3,773 patients admitted to the PICU. The data set included all blood glucose measurements, Paediatric Index of Mortality (PIM) score, length of intensive care admission and intensive care mortality. Average Actual Sample Frequency (ASF) in each patient was calculated as total number of blood glucose samples divided by length of stay in hours. Modelled sampling frequencies (MSF) were produced (0.05, 0.1, 0.15, 0.2, 0.25 samples per hour), using randomly selected samples from each patient. The following metrics of glucose variability were calculated at each MSF value: coefficient of variation (CV), mean amplitude of glucose excursion (MAGE), glycemic variability index (GVI), standard deviation (SD) and range of glucose.

Results: All metrics of glucose variability were significantly influenced by modelled sampling frequency value. ASF was significantly higher in intensive care non-survivors, compared with survivors: median ASF (IQR) = 0.36 (0.31–0.46) vs. 0.33 (0.29–0.38), respectively ($p < 0.0001$).

Conclusions: Metrics of blood glucose variability are influenced by sampling frequency. Observational studies of glucose variability in intensive care are therefore prone to sampling bias. Future studies should be prospectively conducted to ensure controlled sampling frequency across the study cohort.

343 – POSTER SESSION

PRESENTATION OF THE PATIENTS WITH PROPIONIC ACIDAEMIA

M. Rafique

Paediatrics, College of Medicine, King Khalid University, Abha, Saudi Arabia

Background: Propionic acidaemia (PA) is a global metabolic disease. It presents with variable symptoms/signs and may produce an array of complications which significantly deteriorate the patients' quality of life.

Objectives: To evaluate the clinical features, physical findings, diagnosis and laboratory parameters with which the patients with PA were admitted.

Methods: The records of diagnosed cases of PA were reviewed, retrospectively.

Results: We analyzed 133 admissions in 26 patients. Majority (85 %) of patients exhibited clinical manifestations in 1st week of life. These were lethargy, fever, poor feeding, vomiting, dehydration, muscular hypotonia and respiratory symptoms in 51–92 % admissions. Dehydration was found in 92 %, shock & hypotension in 8–12 %, encephalopathy, disturbance of tone & reflexes in 5–50 % and malnutrition in 77–83 % admissions. Metabolic crises were diagnosed in 83 %, respiratory diseases in 30 % diarrhoea in 9 % and sepsis in 6 % admissions. In laboratory evaluations, mean propionylcarnitine (C3) was found 18.76 $\mu\text{mol/L}$ (normal: <4.33) and mean C3/C2 ratio was 1.86 (normal: <0.1). Hyperammonaemia was observed in 96 %, hyperuricaemia in 92 %, acidosis in 77–81 %, hypocalcaemia in 65 %, hypoglycaemia in 12 %, hypoproteinaemia in 27 %, hypoalbumaemia in 77 % and mildly disturbed liver enzymes in 17–41 % admissions. Pancytopenia and ketonurea was found in about 1/3rd admissions. CT scan and MRI brain showed, generalised brain oedema in 17 % and cerebral atrophy in 25 % admissions.

Conclusion: PA usually presents with wide spectrum of clinical features, disturbances of laboratory parameters and complications, which perhaps with early diagnosis and in time intervention may be preventable.

344 – POSTER SESSION

INFECTION IN CRITICALLY ILL PEDIATRIC PATIENTS ON CONTINUOUS RENAL REPLACEMENT THERAPY

M.J. Santiago, J. López-Herce Cid, J. Lopez Gonzalez, S.N. Fernandez Lafever, M. Garcia Sanprudencio, R. Gonzalez Cortes, J. del Castillo Peral

PICU, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Background: Continuous renal replacement therapy is frequently used in critically ill children and may increase the risk of infection. However, there are no studies that have analysed the incidence, characteristics and prognosis of infection in critically ill children on CRRT. This study examined the incidence and outcomes associated with infections developing in patients during and after a CRRT.

Methods: A prospective, single-centre register of critically ill children treated with CRRT.

Results: 55 children were treated with CRRT between June 2008 and January 2011. 43 patients (78.2 %). The most common conditions in patients requiring CRRT were heart disease (69 %), and sepsis (16 %). 40 % under 1 year of age presented one or several infections. Infection occurred a median of 11 days after CRRT initiation (IQ range: 4 to 21 days). 21 patients (48.8 %) developed one infection, 7 (16.2 %) two and 15 (34.9 %) three or more infections. The most frequent infection was catheter related bacteriemia, with no differences between the localization of the catheter. The only predicted infection factor was the duration of CRRT longer than 4.5 days. Mortality was 31 %. There was no difference between the mortality of patients with infection 30.2 %, and that of patients without infection 33.3 % ($p = 0.84$).

Conclusions: Infection rate is high in critically ill children treated with CRRT. More than 4 days of CRRT increases the risk of infection. However, infection did not increase mortality in children on CRRT. Future studies should evaluate techniques to manage this complication to improve overall prognosis.

345 – POSTER SESSION

ANALYSIS OF MATERNAL FACTORS AND SHORT TERM MORBIDITY ASSOCIATED WITH LOW BIRTH WEIGHT (LBW) INFANTS AT A TERTIARY CARE NICU

V.V. Shukla, S. Pereira, V. Joshi, P. Joshi

NICU, Kokilaben Hospital, Mumbai, India

Introduction: Fetal growth depends on intricate mechanisms involving various maternal, placental and intrinsic fetal factors, many of which are unknown. India contributes to 60 % of global LBW neonates. There is lack of data regarding associations and complications of the same from India, especially differences between appropriate for gestational age (AGA) and small for gestational age (SGA)-LBW neonates.

Methods: Data of various maternal and neonatal variables of LBW babies was collected and analyzed prospectively over 18 months.

Results: Total study participants were 79. Term infants were 16.5 % and pre-terms were 83.5 % (AGA/SGA = 56 %/44 %). Amongst SGA babies 40 % were asymmetrically and 60 % were symmetrically growth restricted.

The positive predictive value of oligohydramnios, abdominal circumference <2 SD (AC <2 SD), oligohydramnios + AC <2 SD & Doppler abnormalities for association with fetal growth-restriction were 63, 57.1, 100 & 64 %, respectively.

The significant maternal risk factors associated with LBW were primigravidae, multiple gestation, hypertension and pregnancy induced hypertension.

Respiratory distress syndrome (RDS) (28 %), mechanical ventilation (MV) (33 %), supplemental oxygen (70 %), apnoea (32 %), bronchopulmonary-dysplasia (BPD) (7.6 %), hyperbilirubinemia (76 %), sepsis (31 %), meningitis (14 %), necrotising-enterocolitis (NEC) (11.4 %), feeding intolerance (60 %), polycythemia (10 %), thrombocytopenia (18 %), blood transfusion requirements (59.6 %), intraventricular hemorrhage (IVH) (5 %), periventricular leukomalacia (9.9 %), patent ductus arteriosus (9 %) and hypocalcemia (16.4 %) were the significant complications associated with LBW infants vs. normal term infants.

Feeding intolerance (60 vs. 40 %), polycythemia (72 vs. 28 %), IVH (75 vs. 25 %) were significantly higher in SGA Vs. AGA infants. RDS (78 vs. 22 %), MV (73 vs. 27 %), apnoea (87 vs. 13 %), BPD (77 vs. 23 %) were significantly higher in AGA vs. SGA infants.

Conclusion: Good antenatal care, surveillance and neonatal care is required to manage LBW babies given the high rates of associated complications and sequelae.

AGA and SGA-LBW infants have diverse complications and cannot be considered alike.

346 – POSTER SESSION

IMPACT OF IMPLEMENTING KANGAROO MOTHER CARE PROTOCOL IN A TERTIARY CARE NICU

V. Shukla, M. Unadkat, V. Joshi, P. Joshi

NICU, Kokilaben Hospital, Mumbai, India

Introduction: Preterm neonates are vulnerable to life threatening complications because of adaptation challenges, faced by them in the extrauterine environment. This explains why prematurity is the leading cause of neonatal deaths worldwide. KMC is a novel method of providing a thermoneutral and developmentally supportive care for premature neonates. We did a prospective study to measure the effects of KMC on neonates and their mothers.

Methods: Neonates <2,000 g were studied. Neonates born after January 2010 (after implementation of KMC-protocol) to November 2011 were compared to neonates born from February 2009 to January 2010 (when KMC was not routinely practiced). Study questionnaire included details of various maternal and neonatal variables. Individual interviews were done with the mothers in the KMC group for assessing experience and change in perception before and after KMC provision.

Results: KMC was associated with significantly decreased length of NICU stay (P value = 0.029).

The babies in KMC group had significantly better weight gain (P value = 0.034), thermal regulation, fewer episodes of hypothermia and the need for overhead warmers in this group was also significantly shorter (P value = 0.036).

The mothers in KMC group were significantly more comfortable and confident in nursing, providing care after discharge and breast feeding their babies (all P values <0.005). They were significantly less stressed and were likely to continue KMC at home because of the observed advantages (P value <0.001).

Conclusion: Protocol based KMC provision is extremely beneficial to the baby and the mother.

Apart from various benefits to the neonate, it also improves maternal confidence.

347 – POSTER SESSION

CLINICAL, BIOCHEMICAL AND RADIOLOGICAL MANIFESTATIONS OF VITAMIN D DEFICIENCY RICKETS IN NEWBORNS PRESENTED WITH HYPOCALCEMIA

A. Soliman¹, H. Salama², E.S.A. Shatla², S. Alomar², S. Bedair³

¹Hamad Medical Center, ²NICU, ³Radiology, Hamad Medical Center, Doha, Qatar

Background: Neonatal hypocalcemia due to maternal vitamin D Deficiency (VDD) still occurs in countries with high prevalence of VDD.

Objective: To describe the clinical, biochemical and radiological manifestations of 10 full-term (FT) newborns (6 M, 4 F) presented to with symptomatic hypocalcemia (seizure) secondary to VDD during the first 10 days of life.

Results: All newborns were exclusively breast fed since birth with all mothers had low 25 hydroxy vitamin D (25OHD) level <10 ng/ml. FT VDD newborns with hypocalcemia secondary to VDD presented with generalized convulsions (10/10) craniotables (8/10) but none had rachitic chest rosaries or joint broadening. Cranial ultrasonographic evaluation was normal. They had serum 25OHD concentrations = 9.8 ± 1 ng/ml. 6/0 % had increased PTH concentrations (>60 ng/ml) and 60 % had decreased magnesium concentrations (<0.7 mmol/L). Serum ALP concentrations were significantly higher than normal newborns. All other laboratory results (liver function tests, urea and electrolytes, C reactive protein, lumbar puncture, blood culture, lactate) were normal. In all patients, seizures ceased within 2 days of starting treatment with alphacalcidol and calcium. Radiological manifestations included metaphyseal band of relative lucency (osteopenia), just under the line of provisional calcification, within distal radius (7/10), femur (4/10) and tibia (3/10), mild cupping and haziness of distal radius (1/10).

Conclusion: The manifestations of VDD differ considerably in newborns compared to older infants. VD supplementation for mothers and newborns should be considered to avoid short and long term complications of VDD in countries with high prevalence of VDD.

348 – POSTER SESSION

TOTAL PARENTERAL NUTRITION DELIVERY—A MIXED BAG

H. Spiers, A. Mahaveer

Neonatal Intensive Care, St Mary's Hospital, Manchester, UK

Objectives: Maintaining nutritional intake is an essential part of intensive care in the preterm infant as calorific reserves are low. Total parenteral nutrition (TPN) is an effective way of maintaining growth while establishing enteral feeds in this population. We looked at our current practice of prescribing and delivery of TPN.

Methods: A retrospective case note review was undertaken on 20 babies who received TPN in a 3 month period.

Results: Babies studied were between 23 and 30 weeks gestation. Average birth weight was 870 g (567–1,266 g). The average age at the time of decision to start TPN was 30 h (1–109) and at TPN commencement was 50 h (7–157), giving an average delay of 19.5 h (6–57) between these events.

11 babies had TPN through longline where the average time to start was 63 h (25–157) compared to 28 h (7–64) in the 7 patients who received TPN through their umbilical catheter.

Conclusions: Babies needing TPN have been adequately recognised and the decision to start is made appropriately. However, there is significant delay in premature babies receiving TPN, the commonest reason for this appears to be venous access (5/12). Unavailability of TPN service from pharmacy accounted for delay in a quarter of the babies studied.

We recommend increasing the use of umbilical catheters for commencement of TPN. We also suggest that premade standard bags of TPN are made available to minimise the delay for times when pharmacy service is unavailable. We plan to re-audit this in 6 months time.

349 – POSTER SESSION

THE INFLUENCE OF PROBIOTICS ON THE PH OF STOOL IN PRETERM INFANTS

L. Stankovic, Đ. Čećez, K. Dragutinovic, T. Sljivancanin

Gynecology and Obstetrical Clinic 'Narodni Front', Belgrade, Serbia

Introduction: Colonization of bowels in premature baby with lactic bacteria happens later than in term children. It has been shown, that the stool of children who were fed with breast milk had lower pH, than the stool of the children who were fed with formula milk.

The aim of our study was to investigate whether over time, with longer use of probiotic lactic bacteria, these bacteria colonize the intestine and decreases the pH of the stool?

Materials and methods: Primary groups (20 males and 17 female) include infants fed with formula milk for premature babies with probiotic *Lactobacillus rhamnosus* Liobif $\times 2\frac{1}{2}$ ampoule per day, gestational age 32.99 ± 1.33 , body mass of $1,642.43 \pm 219.61$ g, Apgar score in the first minute of 7.32 ± 1.0 and in fifth 8.03 ± 0.83 . The study included 8.27 ± 1.79 at day of life. In the study, which lasted 28 days, the testing of pH stool was scheduled 9 times for each child. Out of planned 333 stool samples we analyzed 306. We determined pH of each stool sample. By method of non-parametric correlation characteristics of the PH stools & day of the studies the following linear correlation was obtained: $r = -0.421$, $df = 306$, $t = 8.439$, the probability of the null hypothesis $p (H_0) < 0.001$.

Results: The values of pH stool decrease during the study.

Conclusion: Longer use of probiotics is associated with improved bowel colonization of lactic bacteria and lower pH stool.

350 – POSTER SESSION

DIFFERENCE OF SERUM SELENIUM CONCENTRATION BETWEEN HEALTHY TERM NEONATES AND SICK/ PREMATURE NEONATES

S. Tsuzuki¹, N.S. Morimoto¹, S. Hosokawa², T. Matsushita¹

¹Pediatric Department, ²NICU, National Center for Global Health and Medicine, Tokyo, Japan

Objectives: It was frequently pointed out in recent days that trace elements were playing an important role in neonates. For instance, some neonatologists reported the possibility of relation between serum selenium concentration and bronchopulmonary dysplasia. The main objective of this study is to examine the difference of serum level of trace elements between healthy/mature neonates and sick/premature neonates.

Methods: From January to December 2012, 44 neonates born in National Center for Global Health and Medicine (NCGM), Tokyo, Japan, were enrolled and serum specimens were collected in order to measure serum level of iron, zinc, copper, and selenium at the point of day 5. We compare the results between healthy/mature babies who did not admit during their mother's admission and sick/premature babies who admitted to NICU or nursery room soon after birth by unpaired two tailed t test.

Results: 26 admitted babies showed lower serum selenium concentration than 18 healthy babies did (45.7 vs. 54.4 $\mu\text{g/l}$, respectively,

$p < 0.01$). No significant difference was found in serum level of iron (115.3 vs. 99.1 $\mu\text{g/dl}$, $p = 0.38$), zinc (83.4 vs. 73.3 $\mu\text{g/dl}$, $p = 0.09$), copper (49.3 , 55.0 $\mu\text{g/dl}$, $p = 0.30$). Babies did not admit were heavier ($3,050.7 \pm 301.4$ vs. $2,650.1 \pm 484.5$ g, respectively) and more mature ($39\text{w}2\text{d} \pm 7.5\text{d}$ vs. $37\text{w}0\text{d} \pm 17.8\text{d}$, respectively) than admitted babies. The way of feeding did not influence obviously the concentration of four trace elements.

Conclusions: It was suggested that sick or premature babies showed lower serum selenium level than healthy term babies did.

351 – POSTER SESSION

IMPROVEMENT OF NUTRITIONAL STATUS ASSESSMENT IN PAEDIATRIC INTENSIVE CARE UNITS: EVALUATION OF PROFESSIONAL PRACTICES

F.V. Valla¹, C. Ford-Chessel¹, J. Berthiller², E. Javouhey¹, N. Peretti³

¹Pediatric Intensive Care, ²Research Evaluation and Medical Information, ³Pediatric Nutrition Unit, Hospices Civils de Lyon, Lyon, France

Background: In Europe, under-nutrition at admission is diagnosed in 20 % of children in paediatric intensive care units (PICU), and is known as a cause of morbidity. Global nutritional status assessment (NSA) is essential to detect undernutrition, and consists of anthropometric measurements and of calculation of undernutrition indexes as weight for length, length for age... these measurements and calculation are difficult in PICU (oedema, scoliosis, retraction, lying patients), and lead to a lack of NSA. We tried to evaluate the efficiency of the implementation of NSA guidelines for PICU patients.

Methods: Our PICU nutrition support team designed an evaluation of professional practices study, in our PICU (Lyon-France). An audit was made on the medical records of all the 41 and 55 patients admitted in February 2011 and 2012, analysing NSA quality regarding measurements of weight, length, head and brachial circumferences, and calculation of undernutrition indexes. In-between, we implemented guidelines of PICU NSA, teaching the whole team measurement techniques, (including extrapolation of length from ulna length), and undernutrition indexes interpretation.

Results: Weight was measured in more than 90 % of patients in both populations. Respectively in 2011 and 2012, length and head and brachial circumferences were measured in 32 and 65 % ($p = 0.002$), undernutrition indexes calculated in 20 and 74 % ($p = 0.0004$), and NSA mentioned in patient synthesis in 15 and 60 % folders.

Conclusion: We succeed to implement lasting practices regarding global NSA in PICU. This is the first step to detect, prevent or treat undernutrition, and adapt the global nutrition approach.

352 – POSTER SESSION

PROTOCOL DRIVEN ENTERAL NUTRITION IN CRITICALLY ILL CHILDREN: A SYSTEMATIC REVIEW

J.J.-M. Wong¹, C. Ong², W.M. Han², J.H. Lee³

¹Pediatric Medicine, KK Women's and Children's Hospital, ²Department of Nutrition and Dietetics, ³Children's Intensive Care Unit, KK Women's and Children's Hospital, Singapore, Singapore

Background and aim: Use of feeding protocols to provide timely enteral feeding can potentially prevent malnutrition in the paediatric intensive care unit (PICU). However, the efficacy has not been well established. This systematic review aims to assess the impact of feeding protocols on clinical outcomes in critically ill children.

Methods: We searched four major databases using predetermined keywords and MESH terms. We included feeding protocol studies conducted in a PICU that reported at least one of the following outcomes: mortality, length of stay, duration of mechanical ventilation, gastrointestinal intolerances, infective complications, time to initiate and achieve goal feeds.

Results: We screened 854 citations. Nine studies (one randomised controlled study and eight observational studies) were included. The randomised controlled study compared two different timings of initiation of feeding protocols in children with burns. Two studies were conducted among children with hypoplastic left heart syndrome and have significant risk of bias because there was a change in surgical technique during the conduct of the studies. Six studies were in multidisciplinary PICUs, of which four did not have a control arm. There is weak evidence that the use of feeding protocols improves the timeliness of feed initiation, achievement of goal feeds and enhances feed tolerance; evidence for improvement in clinical outcomes is not robust.

Conclusions: Current medical literature lacks strong data on protocol driven feeding in critically ill children. There is urgent need to conduct more studies to determine clinical benefits.

353 – POSTER SESSION

PEDIATRIC FULMINANT HEPATIC FAILURE (FHF)—OUR FIRST EXPERIENCE WITH FRACTIONED PLASMA SEPARATION AND ADSORPTION (FPSA) IN CHILDREN

T. Zaoral¹, M. Hladik², M. Nowakova²

¹Pediatrics, PICU, ²Pediatrics, University Hospital Ostrava, Ostrava, Czech Republic

Pediatric fulminant hepatic failure (FHF) is a devastating disease. The mortality rate may reach 80–90 % in the absence of liver transplantation. Despite the improvement in the paediatric intensive care, the orthotopic liver transplantation remains the only effective treatment. Extracorporeal liver support can be employed as a strategy for bridging to transplantation or recovery and could be potentially life saving procedure in an emergency. Regarding acute liver failure and FPSA, only few data are currently available only in adults, not in children.

We describe our experience with FHF in two children treated with artificial extracorporeal treatment—fractioned plasma separation and adsorption. The children were qualified for the procedure according to the King's College Hospital criteria. Their general status was assessed on basis of GCS, pediatric end stage liver disease score (PELD), and the 4-grade encephalopathy classifications. The procedures were performed with the Prometheus 4008H Fresenius Medical Care unit. The procedure was performed as rescue therapy in 7 year old girl, 22 kg (intoxication by *Amanita phalloides*) and in 1 year old infant, 8.8 kg (unknown etiology). The 5 procedures were of mean duration 13.5 h. There were statistically significant reductions in total bilirubin, ammonia, and aminotransferase levels. Both children did not survive.

Even though the Prometheus FPSA-System was an effective detoxication method both children with FHD died.

Neuro Critical Care (354–379)

354 – POSTER SESSION

RETROSPECTIVE RE-AUDIT ON NEONATAL CRANIAL ULTRASOUND SCANS AND DEVELOPMENTAL FOLLOW UP IN A LEVEL 2 NEONATAL UNIT IN UK

D. Abraham, P. Rajagopal, A. Manzoor, M. Ahmed

Department of Paediatrics, Queen's Hospital Burton, Burton upon Trent, UK

Cranial ultrasound is the most widely used neuroimaging procedure in newborns. It is very useful in detecting intraventricular haemorrhage, ischaemic changes (periventricular leukomalacia), hydrocephalus and developmental anomalies. ELGAN study has also shown that clinicians can use ultrasound to detect markers of white matter damage (ventriculomegaly, echodensity, and echolucency) as predictors of developmental impairment.

Objectives: To audit our adherence to our guidelines for performing cranial ultrasound scan and neurodevelopmental follow up in neonates. We also looked into long term neurodevelopmental outcome of these neonates and whether this has any correlation between abnormal cranial USS results.

Methods: All neonates born in a 14 month period who satisfied the inclusion criteria were picked up by going through neonatal admissions book, NNU statistics and clinic letters.

Results: 37 cases were identified satisfying inclusion criteria of which 9 cases were excluded as they were either transfer in from other units or were transferred out on day of birth. 90 % of neonates had their first scan between Day 1 and Day 3. 26 out of 28 neonates (93 %) attended neurodevelopmental follow up at the time of audit. Abnormal scans were noted in 17 % cases.

Conclusions: There was significant improvement in the scanning rates and percentage of babies attending neurodevelopmental screening from the previous audit. Nearly 90 % of neonates had their first scan by Day 3 and the rest (3 cases) missed the target by one day. 40 % cases with abnormal neurodevelopmental outcome had normal scans and this correlates with published data.

355 – POSTER SESSION

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME IN A 7 YEARS OLD BOY—CASE REPORT

A. Bampanelou, F. Nikolaou, G. Sideri, E. Ourani, J. Papadatos

Pediatric Intensive Care Unit, Aglaia Kyriakou Children's Hospital, Athens, Greece

Introduction: Posterior Reversible Encephalopathy Syndrome (PRES) is a neurotoxic state associated with a number of complex clinical conditions (autoimmune diseases, bone marrow transplantation, sepsis). This rare syndrome, first described in 1996, has characteristic findings in MRI.

Case report: We present the case of a 7 years old boy with a history of intermediate β -thalassemia, treated by transfusions bi-monthly, who presented agitation for the last 15 days, lumbar and abdominal pain for the last 2 days and was admitted with non-febrile focal seizures and apnea in ED. As the seizures did not

resolve he was transferred to PICU and intubated. CT scan was not conclusive and MRI findings were suggestive for PRES, combined with clinical picture. Extended clinical and laboratory investigations revealed positive IgM and IgG enterovirus antibodies. His clinical course was uneventful except sporadic hypertensive crisis treated with hydralazine. He had mechanical ventilation for 24 h and full recovery after 3 days. Control MRI, 1 month later was normal.

Conclusion: According to literature β -thalassemia is not related with PRES. In our case enterovirus infection triggered PRES

356 – POSTER SESSION

EXCEPTIONAL ABDOMINAL COMPLICATIONS OF THE VENTRICULO PERITONEAL DERIVATIONS. ABOUT TWO YOUNG INFANTS

S. Blibech^{1,2,3}, N. Kasdallah¹, H. Ben Salem¹, M. Yedeas⁴, M. Doagi⁵

¹Military Hospital of Tunisia, ²University of Medicine of Tunisia,

³Neonatal Intensive Care Unit, University of Medicine of Tunisia,

⁴Neurosurgery, ⁵Neonatal Intensive Care Unit, Military Hospital of Tunisia, Tunis, Tunisia

Background and aims: The establishment of a branch in the peritoneum may be complicated by purely abdominal problems (10 % of cases). Migration are rare, they represent 8.8 % of these complications. Peritonitis associated with occlusion clamp is also rare.

Methods:

Case 1: There is a newborn female who was transferred to 20 days life for treatment of hydrocephalus. Ventriculoperitoneal derivation (VPD) was set up in 45 days living with suites and a single output of 2 months. She was readmitted at the age of 4 and a half months for exteriorization of the catheter distal anal valve justified the withdrawal and the establishment of an external bypass. The child died 2 days after.

Case 2: There is a newborn female who was hospitalized 19 days for life support with a paralyzed myelomeningocele. Neurosurgical intervention with a VPD took place at age 3 ½ months. The VPD was removed 12 days after surgery because a refractory sepsis with progressive abdominal distension. 13 days post operative, laparotomy performed three intra peritoneal abscess and colonic occlusion clamp. The patient is still hospitalized.

Conclusion: Mechanical complications valves DVP appear dependent on the type of material implanted. We discuss the main mechanical and infectious complications DVP, their mechanisms of occurrence and prevention.

357 – POSTER SESSION

IS TRANSCRANIAL DOPPLER SONOGRAPHY PULSATILITY INDEX (PI), REFLECTS INTRACRANIAL PRESSURE (ICP)?

H. Bouguetof^{1,2}, K. El Halimi^{1,2}, M.A. Negadi^{1,2}, D. Boumendil^{1,2}, Z. Mentouri^{1,2}

¹University Hospital of Oran, ²Laboratory of Pediatric Accidentology, Oran, Algeria

Background: Patients with intracranial pathology, especially in severe trauma brain injuries (STBI), it is desirable to have knowledge

of the intracranial pressure (ICP). To investigate the relationship between ICP and transcranial Doppler (TCD) derived pulsatility index (PI), a prospective study was performed on children admitted to our pediatric intensive care unit (PICU).

Method: One investigator conducted all TCD examinations. TCD measurements were performed parallel to the intraparenchymal ICP registration and were conducted transtemporally using a traditional 2-MHz transducer on the middle cerebral artery (MCA). PI = peak systolic-end diastolic velocities/mean flow velocity) was calculated

Results: 58 children with STBI who had an intraparenchymal catheter for registration of the ICP were investigated. ICP registrations were made parallel with all TCD measurements in 40 patients. A total of 232 TCD measurements were made. 18 children present high ICP. Mean of age was 10 years, 5 girls and 13 boys. The average time of arrived in pediatric surgeon emergency was 3,5 h, mean Glasgow coma score was 06/15. A significant correlation was found between the ICP and the PI with a correlation coefficient ($ICP = 12,825 PI + 38,253$). The correlation between the cerebral perfusion pressure (CPP) and PI was significant with a correlation coefficient of ($CPP = -14,562 PI + 70,413$).

Conclusion: The absolute value of the PI is reliable noninvasive indicator of ICP in children with severe TBI. A strong correlation between PI and ICP was demonstrated. Therefore, PI may be of guiding value in the invasive ICP placement decision in the neuro-intensive care patient.

358 – POSTER SESSION

OUTCOME OF CONVULSIVE STATUS EPILEPTICUS (CSE) IN CHILDREN TREATED IN THE PEDIATRIC INTENSIVE CARE UNIT IN ALGERIA

D. Boumendil^{1,2}, M.A. Negadi^{1,2}, K. El Halimi^{1,2}, H. Bouguetof^{1,2}, Z. Mentouri^{1,2}

¹University Hospital of Oran, ²Laboratory of Pediatric Accidentology, Oran, Algeria

Introduction: CSE is associated with significant morbidity and mortality.

Purpose: Aim is to evaluate outcome of CSE in children and to define predictors for morbidity and mortality.

Methods: Prospective study included 233 children with 245 episodes of CSE from 2008 to 2010. Outcome was classified in three categories: unchanged neurologic status, neurologic consequences, and lethal outcome. Univariate and multivariate regression analyses were used to define predictors of mortality and morbidity of CSE.

Key findings: Neurologic status was unchanged in 160 children (65.3 %) and neurologic consequences occurred in 30 patients (12.7 %); case-fatality ratio was 22.4 %. Mortality was related to progressive encephalopathy (OR 7.13; 95 % CI 0.63–80.18) and acute symptomatic (OR 4.46; 95 % CI 2.30–8.66) etiologies, new onset of CSE (OR 3.505; 95 % CI 1.567–7.842) and focal convulsive type of CSE (OR 1.80; 95 % CI 0.94–3.46) and duration of CSE >2 h (OR 2.54; 95 % CI 1.319–4.89) and younger age (OR 2.395; 95 % CI 1.134–5.058). Neurologic consequences were associated, acute symptomatic (OR 22.26; 95 % CI 5.16–95.92), duration of SE >2 h, (OR 6.786; 95 % CI 2.708–17.00) and refractory SE (OR 5.208; 95 % CI 2.093–12.96). Multivariate analyses showed that etiology of SE and very long duration of SE was predictors of mortality and morbidity.

Significance: Outcome of CSE in children is favorable in most of the cases, but mortality and morbidity rates are still high. Etiology and duration were the main predictors of mortality and morbidity.

359 – POSTER SESSION

CONTINUOUS PROPOFOL INFUSION IN NEUROCRITICAL CHILDREN

R. Bustos Betanzo

PICU, Hospital Guillermo Grant Benavente and Clinica Sanatorio Aleman, Concepcion, Chile

Objective: To describe the sedation with continuous propofol in neurocritical children and its effects on lactate, pH creatine kinase (CK) and triglyceride (TG).

Methods: Prospective study. Laboratory parameters were measured before and daily during the infusion. The propofol dose was limited to 4 mg kg h. Patients were divided according infusion <or> to 48 h. Values are expressed as mean (SD).

Results: 37 children were included. The main indication were severe TBI 12, refractory status epilepticus 9, postoperative 6, hypoxic ischemic encephalopathy 4. Propofol was used for 47.9 (12.3) h with a total cumulative dosage of 4,297 (4,721) mg. The infusion rate was 3.3 (1.3) mg kg h. No patient develops PRIS or other adverse effects. In patients who received an infusion ≥ 48 h, a greater proportion ($p < 0.05$) required vasoactive drugs and more time on mechanical ventilation and ICU stay. Also in this group, the time of infusion; and the accumulated dose, were significantly higher ($p 0.002$) compared to children with <48 h infusion, 86.5 (54.6) vs 21.6 (9.4) h and 7,235 (6,108) vs 2,294 (1,724) mg, respectively. The levels of lactate, CK, TG, and pH were not significantly different between the two groups.

Conclusions: Continuous infusion of propofol at doses below 4 mg kg h, even for periods ≥ 48 h was safe and did not cause significant increases in markers of PRIS. More studies are needed to confirm these findings.

360 – POSTER SESSION

A MODIFIED CRIB II SCORE AS AN USEFUL METHOD TO PREDICT BRAIN DAMAGE IN PRETERM INFANT: A OBSERVATIONAL STUDY

A. Castronovo¹, A. Russo¹, G. Terrin², F. Natale¹, S. Arachi¹, C. Di Biasi³, S. Caoci¹, M. De Curtis¹

¹Department of Pediatrics, ²Department of Gynecology-Obstetrics and Perinatal Medicine, ³Radiology, La Sapienza University of Rome, Rome, Italy

Background and aim: Clinical Risk Index for babies (CRIB) is a widely used method to define mortality risk of preterm infant. We investigate the utility of the CRIB score to predict neurological outcome.

Methods: We conducted a prospective observational cohort study on neonates with a gestational age (GA) at birth ≤ 30 weeks, observed in

Neonatal Intensive Care Unit of University of Rome “Sapienza” from January 2009 to May 2011. CRIB-II modified score (Manktelow et al. Arch Dis Child Fetal Neonatal 2010; 95:F9) was calculated in all enrolled subjects. Neurological outcome was evaluated by serial cranial ultrasounds (US) within 40 weeks of post-conceptional age, brain Magnetic Resonance Imaging (MRI) at GA equivalent to term (40 ± 3 weeks).

Results: We enrolled 89 neonates (GA 27.2 ± 2.4 weeks, birth weight 1015 ± 386 g, male 42.7 %). The modified CRIB-II score resulted significantly lower (7.6 ± 3.0) in 67 survived respect to died infants (14.0 ± 3.1 , $p < 0.001$). Pearson test showed a positive correlation between CRIB-II score and the occurrence of intraventricular hemorrhage (IVH) revealed by cranial US ($r = 0.429$, $p < 0.001$) and white matter anomalies at MRI ($r = 0.400$, $p < 0.001$). At the optimal cut off value of 9, we calculated the accuracy of CRIB-II score to predict the occurrence of IVH (for IVH: sensibility 75 %, specificity 73 %, PPV 65 %, NPV 81 %) and white matter damage (sensibility 54 %, specificity 70 %, PPV 61 %, NPV 64 %).

Conclusions: Modified CRIB-II score is a valuable method to predict occurrence of brain injury in preterm born babies.

361 – POSTER SESSION

PAEDIATRIC HEAD INJURIES—A LONDON TRAUMA CENTRE PERSPECTIVE

S. Chandrashekhara, F. Murray, B. O'Neill

Department of Paediatric Anaesthesia, Royal London Hospital, London, UK

Background and aims: In infancy and childhood, traumatic head injury is among the commonest causes of death and permanent disability. Our aim was to determine the demographics, mechanism of injury and immediate outcomes in children with a significant head injury admitted to our regional trauma centre.

Methods: A retrospective review of all paediatric trauma patients aged 0–16 years managed initially in the resuscitation room over a 3-year period. Data was collected from trauma notes, trauma database and intensive care discharge summaries.

Results: Of the 340 children with a significant head injury, 72 % were male.

The age breakdown was as follows: 31 % <5 years, 34 % aged 5–12 years and 35 % adolescent.

The most common mechanisms of injury were road traffic accidents (RTA) (55 %) and falls from a height (31 %).

However, on sub-group analysis, falls accounted for 53 % pre-school children whereas RTA accounted for 70 % of admissions in the 5–12 year group. Assaults constituted 23 % of admissions in the adolescent group.

3.5 % children died in the first 24 h, 27 % required neuro-critical care and a further 63 % were admitted for overnight observation. 15 % were transferred to a specialized paediatric neurosurgical centre for further management.

Conclusion: Road traffic accidents are the leading cause of serious head injury in children presenting to our trauma centre. There is a significant incidence of pre-school children falling from significant heights and adolescents who are victims of serious assault, both of which may have serious public health and education implications.

362 – POSTER SESSION

BILIRUBIN ENCEPHALOPATHY (KERNICTERUS) AMONG FULL TERM LIBYAN INFANTS

N.S. El-Honi¹, M.S. El-Mehabresh², M.A. Shlmani², A.Y. Mersal³

¹Pediatrics, NICU, ²NICU, University of Benghazi, Benghazi, Libya,

³Pediatrics, NICU, King Faisal Sp. Hospital, Jeddah, Saudi Arabia

In mid eighty Kernicterus has become a disease of the past; the term kernicterus literally means “yellow kern”, with kern indicating the affected brain (the basal ganglia, hippocampus, geniculate bodies and cranial nerves nuclei, cerebellum can also be affected;).

This study to report the early reappearances of Kernicterus among new born infants in Benghazi children hospital between January 2001 and June 2002.

Method: A retrospective study was performed between January 2001 through June 2002, based on the data collected from the hospital registry include: infants born >37 weeks, age, sex, weight on admission, indirect bilirubin >20 mg/dl with direct bilirubin <10 mg/dl, mode of therapy, coomb's test, signs of bilirubin encephalopathy, infants and mother blood groups septic screen and out come.

Results: 1,585 infants admitted to Benghazi children hospital NICU, 400 infants have hyperbilirubinemia. 280 (70 %) infants had bilirubin >20 mg/dl. male to female ratio was 1.5:1, Peak serum bilirubin at age 48–72 h was 45 mg/dl; 210/280 (75 %) infants treated with phototherapy alone; 80 infants met the criterion for exchange transfusion (ET), 2/280 (0.07 %) infants died before the (ET), 8/280 (2 %) need (ET) but blood was not available, 70/280 (25 %) infants treated with combined exchange transfusion (ET) and phototherapy.

62/280 (22 %) infants had ABO incompatibility, 42/280 (14.9 %) had Rh incompatibility, 176/280 (63.1 %) causes could not be identified. 41 (14.6 %) infants developed Kernicterus.

Conclusion: This study demonstrated that kernicterus has reappeared again. The prevalence estimated at 15 %. An immediate aggressive therapy would certainly have make kernicterus is never event.

363 – POSTER SESSION

CORRELATION BETWEEN THE CYP450 AND GSTM1, GSTT1, NAT2 GENOTYPES ON TOLERABILITY OF VALPROIC ACID IN CHILDREN WITH EPILEPSY

O. Globa¹, N. Averiyanova², N. Andreenko¹, T. Podkletnova¹, L. Kuzenkova¹, V. Pinelis³

¹Neurology, ²Laboratory of Genetics, ³Membranology and Genetic Group, Institute of Paediatrics Scientific Center of Children's Health, Moscow, Russia

Objectives: It is well known, that children with epilepsy receiving the valproic acid may have the side effects not depending on the dose of medication. These side effects may be very serious for patient health and life. We investigated the effect of cytochrome P450 genetic polymorphisms and GSTM1, GSTT1, NAT2 genetic polymorphisms on the side effects in children with epilepsy received the valproic acid.

Methods: In 33 patients aged from 6 months to 16 years with different forms of epilepsy and different illness duration but having side effects such as encephalopathy, epilepsy worsening, hepatotoxicity, muscle fatigue, thrombocytopenia, gastrointestinal problems, etc. the polymorphisms of CYP (CYP1A1, CYP2C9 (A1075C, C430T), CYP2D6 (G1934A, DelA2637) CYP2C19 (G681A) and the some genes of the second phase of biotransformation GSTM1(Del), GSTT1 (Del), NAT2 (S1 (T341C), S2 (G598A), S3 (G857A) were studied. DNA samples analysis was performed with method of oligonucleotide biochips hybridization (BIOCHIP Ltd, Russia).

Results: Heterozygous on CYP1A1—5 patients (15.1 %), heterozygous CYP2C9 (C430T, A1075C)—12 children (36.3 %), CYP2C19 (G681A)—9 hetero and 1 homozygous (30 %), CYP2D6 (G1934A, DelA2637)—19 patients (57.6 %). The second phase of biotransformation shows the homozygous deletion GSTM1 in 21 patients (63.6 %), GSTT1 in 4 patients (12.12 %), NAT2 hetero/homo 27 patients (81.8 %). Two and more polymorphisms on cytochrome P450 and GSTM1, GSTT1, NAT2 had 93.9 % of epileptic patients.

Conclusions: In our investigation the main role in side effects developing in children with epilepsy receiving the valproic acid plays the genetic polymorphisms in CYP2C9, CYP2D6, GSTM1 and NAT2 and those children having two and more of genetic polymorphism. These results lead to the dose or drugs personification in epilepsy therapy.mm?>

364 – POSTER SESSION

CASE REPORT OF MIDAZOLAM TOXICITY IN NEWBORN

A. Gupta, U. Angadi, A. Vora

Paediatric Intensive Care, Glenfield Hospital, Leicester, UK

Objectives: Midazolam is a short acting benzodiazepine commonly used for sedation in paediatric intensive care. Recent Cochrane review concluded insufficient data to promote the use of intravenous midazolam infusion as a sedative for neonates undergoing intensive care and raised concerns about the safety of midazolam in neonates. Also the pharmacokinetics of midazolam in neonates undergoing extracorporeal membrane oxygenation (ECMO) is altered.

Methods: Term baby with severe meconium aspiration syndrome and persistent pulmonary hypertension refractory to conventional management was put on ECMO at 21 h age. She was cooled for 48 h and sedated with midazolam (1–4 µg/kg/min) and morphine (10–40 µg/kg/h) which were weaned and stopped at 53 (32 h of infusion) and 62 h age (62 h of infusion), respectively.

Result: Her pupils remain equal and reactive but cough and gag reflexes were absent and she showed no spontaneous movement even after being off all sedatives for 60 hours. Cerebral function activity monitor showed a low voltage trace, her cranial ultrasound on day 1 and CT Brain on day 5 were normal. Serum midazolam levels were found extremely high 1,097 ng/ml (normal range 80–250 ng/ml) even 24 h after stopping midazolam. After day 5, she became more responsive and was neurologically appropriate from day 7 of life.

Conclusion: Even a routine dose of midazolam infusion for relatively short time has a potential to reach toxic level in neonates and may be due to delayed clearance. Sedation holiday in neonates may help. Further trials on pharmacokinetics of midazolam in neonates are needed.

365 – POSTER SESSION

OUTCOMES OF NEONATES FOLLOWING THERAPEUTIC HYPOTHERMIA FOR HYPOXIC ISCHAEMIC ENCEPHALOPATHY—EXPERIENCE FROM A LEVEL 3 CENTRE

L. Halpern, N. Lofitou, R. Cowie, P. Chandra

Neonatology, University Hospital of Coventry and Warwickshire, Coventry, UK

Background: The British Association of Perinatal Medicine recommends total body cooling (TBC) as standard treatment for moderate to severe hypoxic ischaemic encephalopathy since 2010. Our unit has provided TBC since September 2010.

Aims: To evaluate the characteristics of the babies that underwent TBC in our unit since its introduction as a standard treatment.

Methods: Retrospective review of case notes of babies who received TBC between September 2010 and July 2012. Outcome data were collected using clinical reporting system and contacting the referring units.

Results: 22 babies received TBC of which 14 were out born. 6 babies did not fulfil all 3 criteria for TBC. 20/22 babies were >36 weeks gestation. 16/22 had a significant contributory perinatal event; 80 % of these were abnormal cardiotocography. The median age to achieve the target temperature (33–34 °C) was 3 h 45 min. All babies had cerebral function monitoring and 15/22 had EEG. 14/22 babies had clinical seizures and 50 % needed treatment for coagulopathy. 15/22 had MRI and 8 were abnormal. Outcome data were available in 19/22. Five babies died, nine had normal neurology and five had significant neurological abnormality at discharge. 6/8 babies who had severe EEG abnormalities had abnormal neurology or died.

Conclusions: Two-thirds of babies who received TBC were out born. The majority of babies who received TBC had identifiable perinatal events. In our experience, abnormal EEG correlated with abnormal MRI but not necessarily to abnormal development and more clarity is required in selecting babies for TBC especially in babies <36 weeks.

366 – POSTER SESSION

NEUROPROTECTIVE EFFECT OF OLIVE OIL IN THE HIPPOCAMPUS CA1 NEURONS FOLLOWING ISCHEMIA—REPERFUSION IN MICE

J. Hassanshahi

Physiology, Tehran University of Medical Sciences, Tehran, Iran

Introduction: Oxidative Stress is considered to be involved in a number of human diseases including ischemia. Preliminary studies confirmed reduction of cell death in brain following treatment with antioxidants.

Aim: According to this finding, we study the relationship between consumption of olive oil on cell death and memory disorder in brain ischemia. We studied the protective effect of olive oil against ischemia–reperfusion.

Materials and methods: Experimental design includes three groups: intact (n = 8), ischemic control (n = 8) and treatment groups with olive oil (n = 8). The mice treated with olive oil as pre-treatment for a week. Then, ischemia induced by common carotid artery ligation and following the reduction of inflammation (a week after ischemia), the mice post-treated with olive oil. Nissl staining applied for counting necrotic cells in hippocampus CA1. Tunnel kit was used to quantify apoptotic cell death while to short term memory scale, we apply y-maze and shuttle box tests and for detection the rate of apoptotic and treated cell, we used western blotting test for bax and bcl2 proteins.

Results: High rate of apoptosis was seen in ischemic group that significantly associated with short-term memory loss. Cell death was significantly lower when mice treated with olive oil. The memory test results were adjusted with cell death results and bax and bcl2 expression in all groups' comparison. Ischemia for 15 min induced cell death in hippocampus with more potent effect on CA1.

Conclusion: Olive oil intake significantly reduced cell death and decreased memory loss.

367 – POSTER SESSION

THE NEUROLOGICAL COMPLICATIONS OF CHICKEN POX IN CHILDREN

G. Jugulete^{1,2}, M. Luminos^{1,2}, M. Merisescu^{1,2}, M. Vasile¹, E. Osman¹

¹Pediatric, Institute of Infectious Diseases 'Prof. Dr. Matei Bals',

²Infectious Diseases, University of Medicine and Pharmacy 'Carol Davila', Bucharest, Romania

Background and aims: Chicken pox (varicella) is an extremely contagious childhood infectious disease caused by the varicella-zoster virus, usually with a benign evolution. Sometimes, it can have an unfavorable evolution, the neurological complications being the most severe.

Material and method: We have carried out a retrospective study over a period of 5 years on all severe cases of chicken pox admitted into the National Institute of Infectious Diseases "Prof. Dr. Matei Bals", in which we have closely followed the neurological complications. In these patients, we have monitored age, sex, background, clinical form and the type of neurological complications.

Results: Between 2008 and 2012, 410 children were admitted with the diagnosis of chicken pox. The sex distribution showed a slight prevalence of male children (56 %). Most of the cases were registered in the 3–5 years age group (72 %) and 68 % of patients originated from rural areas. Out of all cases, 15.1 % presented neurological complications, the most frequent of which were: febrile seizures, cerebellar ataxia, facial paralysis, Guillan–Barre syndrome and acute encephalitis. 4 of these cases were extremely severe, presenting acute encephalitis with status epilepticus which required orotracheal intubation with mechanical ventilation. Two of the patients, which were immunocompromised, had unfavorable evolutions resulting in death.

Conclusions: The varicella-zoster infection can present severe clinical forms with development of complications, major neurological sequelae and sometimes death in the immunocompromised patients. Vaccination remains the only prophylaxis for this disease.

368 – POSTER SESSION

NEUROLOGICAL OUTCOME IN NEWBORNS WITH PERINATAL RISK FACTORS IN PRIMARY PAEDIATRIC PRAXIS

E. Karabeg, F. Čatibušić-Hadžagić, A. Karabeg

Joint Praxis 'Dr Karabeg' Sanski Most, Sanski Most, Bosnia-Herzegovina

Goal: Determine the frequency, importance and impact of risk factors (RF) on child's neurodevelopment.

Methods: Psychomotor development has been evaluated by the use of Munich Functional Scale first year.

Results: Out of 203 newborns (with 1 or more RF in anamnesis), neuro-risk at 96 is low while high at 107; 124 are male (61.08 %), 79 female (38.91 %). Neurodevelopmental outcome at the age of 12 months was normal—187 (92.11 %), slowed—11 (5.42 %) and pathological—5 (2.46 %).

Most frequent RF: unfavorable family anamnesis (32.48 %), cesarean (28.47 %), neurological disorders (27.37 %), mother's diseases during pregnancy (23.36 %), congenital malformations (21.53 %), genitourinary system infections (20.44 %), unfavorable reproduction anamnesis (18.98 %), newborn's hemolytic disease and hyperbilirubinemia (15.69 %), serious infections of newborn (15.33 %), respiratory disorders (9.49 %), newborn intensive care longer than 24 h (8.03 %), preterm birth (8.03 %).

Statistical importance have respiratory diseases, congenital malformations, pregnancies' durations less than 37 weeks, newborn intensive care longer than 24 h, body weight inadequate to gestational age, mother's unfavorable reproduction anamnesis, asphyxia, birth weight under 2,500 g, serious infections of newborns and neonatal resuscitation. Factors analysis determined the deviated neurological status in children with three or more risk factors. Total number of present RF significantly influence the neurodevelopmental outcome (IS $\chi^2 = 8.871$; C = 0.29; p < 0.05).

Conclusion: Cohesion of individual RF and their influence on child's neurodevelopmental outcome have been noted. Statistically significant deviations in neurodevelopmental outcome and greater possibility of the development of cerebral palsy were noticed in children with three or more risk factors.

369 – POSTER SESSION

FACTORS INFLUENCING DECISION OF ADMISSION TO INTENSIVE CARE FOLLOWING CONVULSIVE STATUS EPILEPTICUS IN CHILDREN

M.F. Knezevic-Pogancev¹, A. Doronjski², A. Stojadinovic³, T. Redžek-Mudrinic¹, I. Starčević-Peričin¹

¹Department for Developmental Neurology and Epileptology,

²Intensive Care Unit, ³Department for General Pediatrics, University of Novi Sad, Institute for Child and Youth Health Care of Vojvodina, Novi Sad, Serbia

The aim of the study was to identify decisions that influence admission to the Intensive Care unit in children presenting convulsive status epilepticus.

We evaluated 50 admissions with convulsive status epilepticus to Institute for Child and Youth Health Care of Vojvodina, over period

from 2002 to 2011th year. 26 required admission to Intensive Care unit, and 24 were managed on a pediatric ward. We compared demographic data, convulsive status epilepticus cause and duration as well as initial antiepileptic therapy management.

There was no age and gender difference between children. One child admitted to Intensive care unit had previous diagnosed epilepsy, as well as 5 admitted on a pediatric ward. Median duration of pre-hospital seizure activity was 45 min for children admitted to Intensive Care unit, and 20 min for children admitted on a pediatric ward. 30 % of children admitted on Intensive Care unit had central nervous system infection, while only 10 % of the children admitted on a pediatric ward. Febrile seizures were the most common etiology in both groups. All the children admitted to the Pediatric intensive care unit did not achieve seizure control after two doses of benzodiazepines. 10 % of them need ventilator support, all suffering severe central nervous system infection.

Convulsive status epilepticus duration and first antiepileptic drug insufficient was the most common factor which influences admission to Intensive care unit. Recognition of pre-hospital administration of benzodiazepines and adherence to therapeutic guidelines may reduce the need for admission to Intensive care unit.

370 – POSTER SESSION

THE INFECTIOUS TRIGGER OF POLYRADICULONEURITIS IN CHILDREN

M. Luminos^{1,2}, G. Jugulete^{1,2}, M. Vasile¹, M. Merisescu^{1,2}, E. Osman¹

¹Pediatric, Institute of Infectious Diseases 'Prof. Dr. Matei Bals',

²Infectious Diseases, University of Medicine and Pharmacy 'Carol Davila', Bucharest, Romania

Background and aims: Acute polyradiculoneuritis is a predominantly motor generalized demyelinating peripheral neuropathy. It is an autoimmune acute condition and it is preceded by a bacterial or viral infection and, in some cases, by vaccination. It is characterized by inflammatory lesions in the spinal anterior horns. Progressive symmetrical motor deficit with an ascending pattern is present in this condition.

Method and material: We have carried out a study over a period of 5 years on children admitted into the National Institute of Infectious Diseases "Prof. Dr. Matei Bals" with the diagnosis of acute polyradiculoneuritis, in which we have monitored age, sex, background, the infectious trigger and clinical form of the disease.

Results: Between 2008 and 2012, we have registered 52 cases of acute polyradiculoneuritis. In 39 cases we have identified the infectious trigger: 9 cases of varicella-zoster virus infection, 7 Epstein Barr, 6 cytomegalovirus, 2 Herpes simplex virus, 3 Influenza viruses, 3 adenovirus, 4 *Borrelia burgdorferi*, 3 *Mycoplasma pneumoniae* and 2 Rickettsia. Two of the patients presented descending types of illness. All cases have been confirmed with electromyography (EMG) and serological tests and have received treatment with human immunoglobulines. The evolution was favorable in all cases although some patients required further neuromotor rehabilitation. No deaths were registered.

Conclusions: Polyradiculoneuritis is a severe neurological disorder, mostly secondary to an infection. Our study highlights the fact that most (48 %) of the etiological agents acting as infectious triggers are part of the Herpesvirus family (VZV, HSV, EBV, CMV).

371 – POSTER SESSION

CEREBRAL ELECTRIC AND HEMODYNAMIC RESPONSES OF THE HEALTHY AND ILL PRETERM NEWBORNS, AN ELECTRO-OPTICAL IMAGING STUDY

M. Mahmoudzadeh¹, G. Dehaene-Lambertz², M. Fournier¹, G. Kongolo¹, S. Goudjil¹, F. Wallois¹

¹INSERM U1105, Laboratoire de Neurophysiologie, Faculty of Medicine, University of Picardie, Amiens, ²Unité INSERM 562 'Neuroimagerie Cognitive', CEA/NeuroSpin, Gif/Yvette, France

Background and aims: Can we detect language impairment during the early phase of infancy? To what extent the neonate is predisposed to learn language, and to what extent the implicit neural circuits are “prewired” to process language input early in infancy. Functional imaging contributes to our understanding of brain function in the aftermath of prematurity.

Methods: Continuous measurements during sleep were performed in healthy (n = 12) and Intra Ventricular Hemorrhage (IVH grade III & IV, n = 7) preterm neonates (28–32 weeks GA) using functional Near-Infrared Spectroscopy (fNIRS) in conjunction with EEG.

Results: We showed that the preterm brain is able to discriminate a change of phonemes (ba vs ga) and a change of voices (male vs female). The dynamic of the responses reveals a structured network evolving differently in time and space (temporal/frontal lobes areas, left/right hemispheres). The study described here aims also to investigate the impact of the IVH on auditory hemodynamic responses. While EEG disclosed active language neural network, fNIRS revealed much weaker auditory hemodynamic responses, showing neurovascular coupling impairment.

Conclusions: The present data confirm the existence of neurovascular coupling in healthy premature brain. It also shows that ill premature neonates are unable to process syllabic stimuli, a step for language acquisition ability. These results demonstrate that particular regions of the cortex, critical for language acquisition and processing, contain innate language specific representations in early infancy. In addition, the approaches we developed provide early diagnosis of auditory neurovascular coupling impairment in IVH preterms which is known to induce learning disabilities.

372 – POSTER SESSION

THE EFFECT OF WHOLE-BODY COOLING ON HEMATOLOGICAL AND COAGULATION PARAMETERS IN ASPHYXIC NEWBORNS

M.Y. Oncel¹, O. Erdevi², E. Calisici¹, S.S. Oguz¹, F.E. Canpolat¹, N. Uras¹, U. Dilmen¹

¹Neonatology, Zekai Tahir Burak Maternity Teaching Hospital,

²Neonatology, Ankara University School of Medicine, Ankara, Turkey

Background and aims: Perinatal asphyxia (PA) is a term used to describe the presence of abnormal neurological manifestations in the neonatal period. To investigate the effect of neonatal asphyxia on hemostasis, and to evaluate the effect of whole body cooling on hematological parameters.

Methods: Hematological parameters evaluated on the first day of patients with PA before start of hypothermia were compared with

those of healthy controls. The effects of whole body cooling on the same parameters were also evaluated on the fourth day.

Results: A total of 17 neonates with PA and 15 healthy controls were included. Mean values for PT, INR, aPTT, and d-dimer obtained on the first day were significantly higher in the PA group compared to healthy controls ($p \leq 0.001$ for all comparisons), whereas platelet count, levels of fibrinogen, factors II, V, VII, IX, X and XI were significantly lower ($p \leq 0.005$ for all comparisons). Levels of factor XIII were normal in both groups. In the study group, mean values for PT, INR, aPTT and d-dimer evaluated on postnatal day 4 were significantly lower compared to values obtained on the first day of birth in PA group ($p < 0.05$ for all comparisons), with statistically significant increases in mean levels of fibrinogen, factor II, V, VII, IX, X and XII ($p < 0.05$ for all comparisons).

Conclusions: PA results in significant reductions in levels of factors of the extrinsic pathway and has been associated with thrombocytopenia and disseminated intravascular coagulation. Hypothermia may actually improve the clinical picture in such patients rather than aggravating the hemostatic disturbance, particularly with the implementation of supportive treatment.

373 – POSTER SESSION

ONLINE STRUCTURED AEEG TEACHING IMPROVES AEEG INTERPRETATION BY BOTH SUBJECTIVE AND OBJECTIVE CRITERIA

W.B. Poon^{1,2,3}, V. Tagamolila¹

¹Neonatal and Developmental Medicine, Singapore General Hospital,

²Duke-National University of Singapore, ³Yong Loo Ling School of Medicine, National University of Singapore, Singapore, Singapore

Background: aEEG is increasingly commonly used in NICUs worldwide in screening, diagnosis, monitoring and prognostication of various neurological conditions. However, teaching of aEEG interpretation is highly variable in methodology, quality and effectiveness worldwide.

Online teaching ensures consistently high quality, labour efficient teaching which can be accessed by students at their own convenience and pace of learning.

Aim: To assess aEEG interpretation skills before and after an online, structured aEEG teaching programme, and to gather feedback about its effectiveness.

Methods: Surveys were performed on nurses and doctors, both before and after 3 sessions of online aEEG teaching. Baseline characteristics of participants were gathered, as well as subjective and objective criteria for effectiveness.

Results: A total of 37 NICU staff were involved, including 32 nurses and 5 doctors. Statistically significant improvement in subjective knowledge score ($p = 0.01$) was found pre and post online teaching. There was a high incidence of appreciation for the need to know aEEG (93.1 %). There was also an improvement in knowledge of the indications, although this was not significant. Passing rates for correct aEEG interpretation of tracings, (defined as 3 or more out of 5 correct answers) improved from 13.6 to 81.8 % ($p = 0.047$). Post teaching, 96.0 % felt the teaching was well structured and 77.8 % felt duration was optimal. In addition, 80.0 % felt they were able to systematically approach aEEG interpretation and 70.4 % felt they could interpret normal aEEG with confidence.

Conclusion: Online, structured aEEG teaching effectively improves aEEG interpretation and should be considered as the method of choice.

374 – POSTER SESSION

STUDY OF SEROPREVALENCE OF CYSTICERCOSIS IN CHILDREN PRESENTING WITH SEIZURE AT BPKIHS

R.R. Singh¹, S. Sharma², N.K. Bhatta¹

¹Dept. of Pediatrics & Adolescent Medicine, BP Koirala Institute of Health Sciences, Dharan, ²Dept. of Pediatrics, Nobel Medical College, Biratnagar, Nepal

Background: Cysticercosis a serious infection of CNS in children & common in this region of Nepal due to rearing of pigs, consumption of pork & raw vegetables, and poor hygiene.

Aims: To find out the seroprevalence of cysticercosis in children presenting with seizure and to study the risk factors associated with it.

Methods: This case control study was conducted in Pediatrics dept. from July 2008 to June 2009. Along with detail data & clinical examination, serum samples of 50 children >1 year up to 14 years with seizures within 1 month as well as from 50 age-matched controls were subjected to sandwich ELISA which detected cysticercus antigen. CT head and EEG were done as and when required.

Results: Seroprevalence of cysticercosis in children presenting with seizure was found to be 8 % (4 out of 50 children) and none were positive for Ag-ELISA in controls. The risk factors significantly associated with a positive Ag-ELISA were pork consumers and pig rearers. ELISA positivity were more in consumers of raw vegetables. CT scan head of 31 children showed 25 % with features suggestive of neuro-cysticercosis. Kappa measurement of agreement between CT scan head showing live cysts and Ag-ELISA positive was found to be 76.3 %.

Conclusion: The seroprevalence of cysticercosis in children presenting with seizure was found to be 8 %. Pork consuming and pig rearing were significantly associated with them. As cysticercosis is a common problem in Eastern Nepal, emphasis should be on appropriate intervention, prevention and health education at all levels.

375 – POSTER SESSION

S100B PROTEIN CONCENTRATIONS IN CORD BLOOD: CORRELATIONS WITH GESTATIONAL AGE IN TERM AND PRETERM INFANTS

A.N. Sofijanovska, O.V. Jordanovska

Intensive Care Unit, University of Children Hospital in Macedonia, Skopje, FYROM, The Former Yugoslav Republic of Macedonia

The aim of the study: The purpose of this study was to investigate the relationship between S100B concentrations within gestational age in normal preterm and term infants.

Methods: 119 neonates were recruited, divided into a control group (N = 48) and an overall risk group (N = 71). The risk neonates were categorized into subgroups according to their clinical presentation. A serum blood sample was obtained from each patient at three different time-points: 24 h post-injury, 4th and 7th day after the admission. S100B levels were measured using electro-chemi-luminescence Immuno Assay. We used SPSS 16.0 statistical programme. ANOVA was for repeated measures and statistical analysis of the S100B measurements taken for the preterm neonates. Friedman's non-parametric test was taken for statistical analysis of the values acquired from the serum S100B in the term neonates with asphyxia at three measuring time intervals.

Results: We see that the two risk subgroups in term and in preterm infants have average levels of measured S100B protein above the cut-off point at each measuring time-point. Furthermore, these levels increase along the following two measurements starting at the 24 h time-point after injury (AI) which is the 3rd and the 7th day after the admission.

Conclusion: S100 B protein in term and preterm infants is significantly higher in the first 24 h after birth. Thus, S100B protein is a good indicator of starting brain damage in term neonates, in the first 24 h after birth and is a indicator for early intervention. In preterm neonates it is indicator for possible early brain damage.

376 – POSTER SESSION

S100B PROTEIN MARKER FOR DETECTION OF BRAIN DISTRESS IN INTRAUTERINE GROWTH-RETARDED FETUSES AND NEONATES BORN WITH NEUROLOGICAL DEFICIT

A.N. Sofijanovska, O.V. Jordanovska

Intensive Care Unit, University of Children Hospital in Macedonia, Skopje, FYROM, The Former Yugoslav Republic of Macedonia

The aim of study: To determine whether S100 β , an acidic calcium-binding protein previously demonstrated as a reliable indicator of a brain lesion, could be helpful in detection of brain distress in intra-uterine growth-retarded fetuses, as well as in neonates born with neurological deficit.

Methods: A total of 90 neonates were recruited from the Neonatal Intensive Care Unit of the Pediatric Clinic A serum blood sample was obtained from each patient at 24 h after admission: 4th and 7th S100B levels were measured using ECLIA method.

Results: The Friedman test value χ^2 (2; N = 9) is 3.46 ($p > 0.05$) not statistically significant and therefore the within-subject differences in all measurement time-points are not significant. The Friedman test value χ^2 (2; N = 3) is 0.67 ($p > 0.05$) not statistically significant and therefore the within-subject differences in all measurement time-points are not significant. The monitoring of the level of S100 B protein on the 3rd, and the 7th day and not elevating from the level measured the first day also represents that the damage was done prior to the delivery.

Conclusion: This study provides evidence that circulating S100 β protein is increased in IUGR and the one with neurological defects fetuses and correlates with cerebral hemodynamics, suggesting that it may represent an index of cerebral cell damage in the perinatal period (although is not statistically significant as in asphyxiated neonates where is a parameter of early brain damage).

377 – POSTER SESSION

PITFALLS DURING NEONATAL TRANSPORT OF NEWBORNS WITH HYPOXIC ISCHEMIC ENCEPHALOPATHY TO SINGAPORE GENERAL HOSPITAL FOR HEAD COOLING

M.G. Tan, W.B. Poon

Neonatal and Developmental Medicine, Singapore General Hospital, Singapore, Singapore

Introduction: All three tertiary NICUs in re-structured hospitals started therapeutic hypothermia for moderate to severe HIE since

2010. Since then, SGH has been receiving neonates from private paediatricians for HIE cases. There is an urgent need to share these transport experiences so as to improve outcomes in these ill neonates.

Aim: To share the transport experience of neonates transferred to SGH NICU for HIE therapeutic cooling since 2010, in terms of clinical conditions before and after transfer, as well as complications during transport.

Materials and methods: A retrospective cohort study looking into detailed perinatal history, demographics, neonatal conditions and laboratory investigations were retrieved retrospectively from outborn HIE neonates of the Singapore General Hospital. The conditions of the babies on arrival would be summarized, as well as their subsequent management.

Result: Common complications of neonatal transport include excessive hypothermia leading to complications such as severe coagulopathy and difficulty in establishing vascular access on arrival, inadequate stabilisation of neonates before transfer and during transfer, as well as late transfers which exceed the time critical 6 h period to initiate therapeutic hypothermia.

Conclusion: All paediatricians, whether in public or private institutions, should recognize the role and the need for early transport, particularly the time-critical nature of such transfers. Adequate monitoring and stabilization before and during transport helps to optimize outcome in these critically ill neonates.

378 – POSTER SESSION

PSYCHIATRIC DISORDERS IN ADOLESCENTS MIMICKING EMERGENT NEUROLOGIC CONDITIONS

M. Vasilopoulou¹, C. Koutsaftiki¹, O. Giannouli¹, Z. Mpeka¹, E. Paraskevoulakos², A. Papavasiliou², L. Sianidou¹

¹PICU, ²Neurologic Department, Penteli Children's Hospital, Palaia Penteli, Greece

Background: Epilepsy features or other neurologic symptoms in adolescents can be attributed to psychiatric disorders.

Case report:

Case 1 15 years old male, was transferred to PICU after two episodes of loss of consciousness non-responding to painful stimuli, within an hour before admission. Numbness at the left side of his face—left leg, weakness and generalized myoclonic jerks preceded. iv diazepam was given. He gradually regained consciousness with normal neurologic evaluation. Myoclonic jerks had recurred 2 times within last year.

Case 2 17 years old female, transferred intubated from tertiary hospital because of generalized convulsive status epilepticus. The patient had three seizure episodes, 2 h duration each, the previous 2 days. The last 4 years, since her mother's death, she had repeated episodes of loss of consciousness in which bilateral motor activity was added. She was treated for epilepsy since last month.

Psychiatric evaluation in *case 1* revealed anxiety disorder after experiencing school-bullying, and in *case 2* depression after maternal loss. In PICU, both underwent thorough diagnostic evaluation (head CT, laboratory tests), with no remarkable pathologic findings. Assessment with video/EEG, demonstrated no epileptogenic activity while patients manifested "seizures."

Conclusion: Psychogenic non-epileptic disorders (PND) need high diagnostic suspicion. Since diagnosis cannot be relied on clinical manifestations alone, thorough investigation must be conducted with detailed description of episodes, referral to medical/psychosocial history, video/EEG recording, CT scan, provocation and placebo therapy

techniques and psychiatric assessment. PND management prevents recurrence, invasive treatments like intubation, or the burden of anticonvulsants.

379 – POSTER SESSION

SERUM TAU AND S-100B PROTEIN LEVELS IN NEWBORN INFANTS WITH HYPERBILIRUBINEMIA

S. Yeldan Vatansever, R. Duran, B. Acunaş, Ü. Vatansever, N. Aladağ Çiftçidemir

Trakya University, Edirne, Turkey

To determine the efficacy of Tau and S100B proteins, promising biomarkers in the detection and prediction of outcome in hypoxic or traumatic neuronal injury, in early detection of bilirubin-induced neurological dysfunction (BIND) in newborn infants with hyperbilirubinemia, 20 term infants with a diagnosis of hyperbilirubinemia requiring phototherapy and/or exchange transfusion and 20 term infants with normal findings were included as the control group. Blood samples were collected on admission during venipuncture for bilirubin level or biochemical tests both in study and control groups, a second sample was taken 48 h after admission only in the study group. Tau and S100B proteins were measured by enzyme-linked immunosorbent assay. A complete neurologic examination and BIND scoring was performed in all infants on admission and otoacoustic emissions (OAE) were measured.

Both Tau and S-100B protein levels were higher in those with total serum bilirubin levels over 20 mg/dL. Serum Tau protein levels were elevated in exchange-transfused ones, in those with a bilirubin/albumin ratio >7, with abnormal scoring of BIND on admission and after 48 h; and at 48th hours in those whose OAE results were abnormal. S-100B protein levels at admission were only higher in those with blood group incompatibility, and exchange-transfused ones. The sensitivity and specificity of Tau protein in the detection of abnormal BIND scoring on admission (cut-off 22 pg/ml) and 48 h (cut-off 772.2 pg/ml) were 83.3, 62.5 and 58.3, 100 %, respectively. In conclusion, serum Tau protein as a biomarker may be useful in determining BIND in term newborn infants.

Nursing Science Group (380–391)

380 – POSTER SESSION

MILK PRODUCTION IN MOTHERS OF LOW WEIGHT NEWBORN PREMATURE (LOWER THAN 1550 GRAMS)

L.S. Alves¹, G.M. Takeiti¹, M.A. Pessoto², E.V. Carmona¹, I.N. Vale¹

¹Nursing, ²Dr. José Aristodemo Pinotti Women's Hospital-CAISM, State University of Campinas, Campinas, Brazil

Objectives: Evaluate the milk production of the mothers of premature newborn infants hospitalized in the NICU.

Methods: Pilot with ten mothers and newborns premature infants in a maternity school from Brazil. Data collected during 1 month, with four interviews with each mother at intervals of 7 days (± 2 days). Variables studied: socio-demographic mother data; newborn characteristics, skin-to-skin contact; non-nutritive sucking; starting time of

extraction after delivery; strategies for increasing production, support network, participation in child care, time that the mother spent in neonatal unit and volume of expressed breast milk delivered to the human milk bank. Data were collected from July to October 2012.

Results: Adult mothers, married, with good educational level, resident in the metropolitan area of Campinas; premature low weight newborns; 70 % female. Low milk production, late start of extraction, low frequency of milk expression. Mothers mostly absent and not participating in the care of their children.

Conclusions: The results are similar to other studies showing the need of research for intervention.

381 – POSTER SESSION

MOTHERS' KNOWLEDGE AND PERFORMANCE ABOUT DIAPER RASH IN INFANTS WITH DIARRHEA (2011)

A. Arbabisarjou, M. Imani

Nursing, Zahedan University of Medical Sciences, Zahedan, Iran

Diaper rash is one of the most common skin disorders, occurring in 50 % of infants. The peak incidence is between 9 and 12 months. The aim of this research is assess the Mothers' knowledge and performance about caring diaper rash in infants' with diarrhea.

Methodology: This is a descriptive-analytical research. We assess 231 mothers whom have infants 6–60 months with diarrhea. Data gathered by questionnaire and interview I. The validity of questionnaire confirmed through experts (Pediatricians, Faculty members in nursing, health professionals) and its reliability after distributed in a sample of 30 mothers gained 93 % through Cronach's alpha. Data analyzed by experts through SPSS version 16.00.

Findings: Finding showed that the majority of mothers (90 %) have not knowledge about caring of diaper rash after diarrhea. Their knowledge was weak and they did not know how they treat or behave with diaper rash. About gaining information about skin care of diaper said we have not more information and knowledge to care it effectively (76 %). Analysis of questions about knowledge and performances highlighted that the mothers' knowledge about care of diaper rash was weak and their performances was weaker. Those mother who had diploma and higher, have more knowledge. Considering the weak result about knowledge and performance of mothers about diaper rash in infants with diarrhea and its complications, promotion of their knowledge suggested through health workshop and others training meeting by professional and governmental official is necessary.

382 – POSTER SESSION

IMPLEMENTATION OF PAIN AND WITHDRAWAL ASSESSMENT SCORES AT A PEDIATRIC INTENSIVE CARE

M. Bašková¹, P. Pokorná^{1,2}, V. Vobruba¹

¹Department of Pediatrics-PICU/NICU, General Faculty Hospital, Prague, Czech Republic, ²Intensive Care and Department of Pediatric Surgery, Erasmus MC-Sophia Childrens Hospital, Rotterdam, The Netherlands

Objectives: For the most accurate and objective assessment it is necessary to establish standards and adequate evaluation and (re)train of personnel.

Methods: At the intensive care unit about 350 pediatric patients are admitted of whom about 150 newborns. More than half of hospitalized patients require ventilatory support, and various invasive procedures, which is necessary to administer sedation and/or analgesia bolus or continuously drugs. For some patients as a result of high doses of analgesics withdrawal syndrome occurs. Pain and withdrawal assessment in children is essential for the implementation of the objective evaluation of pain scores by the COMFORT- B scale and the COMFORT- NEO scale, and for rating withdrawal syndrome we used the SOS scale. Seven physicians and 40 nurses and two carers were systematically trained at the ICU.

Results: In a 1-year period about 95 % of the health care workers were using assessment scores at a regular basis. Changes in prescriptions were consequently made by attending physicians following regular scoring by trained nurses only.

Conclusions: Gradual introduction of assessment scores has worked successfully and is useful during daily clinical practice. Moreover it can be easily explained to parents.

383 – POSTER SESSION

BEDSIDE PEWS IN AN ITALIAN PEDIATRIC BONE MARROW TRANSPLANT UNIT: PRELIMINARY RESULTS OF A LONGITUDINAL RETROSPECTIVE CHART REVIEW

O. Gawronski, A. Bertaina, F. Broccati, C. Cecchetti, I. Ciaralli, C. Ciscato, M. Cuttini, I. Dall'Oglio, V. Di Ciommo, E. Tiozzo

Ospedale Pediatrico Bambino Gesù, Roma, Italy

Objectives: The objective of this study is to evaluate the association between the Bedside PEWS and the urgent request of ICU consults, the decision to urgently transfer patients to PICU and inward cardiac arrest/death in the Italian setting of a pediatric bone marrow transplant unit.

Methods: The research is a case control study. Cases are defined by all patients who had one of the following events: urgent transfer to PICU, urgent PICU consult or unexpected death in the unit. Controls are defined by all the other patients present in the unit at the time of one of the events. The score is retrospectively measured at the time of the event and every 4 h for 36 h before the event took place.

Results: Preliminary data has been analyzed on 11 cases and 10 controls. Mean bedside PEWS score value at the time of the event was 12.4 for cases (SD $\pm$ 5.8), much higher than in controls (mean = 1.5 ± 1.0 ; $p < 0.001$). At 4 h before the event mean score value was 10.2 for cases and 1.5 for controls.

Conclusions: The association between the score and events in the unit seems to be very high. Further research on a larger sample is needed to evaluate the diagnostic accuracy of Bedside PEWS in predicting clinical deterioration events in the Italian context.

Parshuram et al. Multicentre validation of the bedside paediatric early warning system score: a severity of illness score to detect evolving critical illness in hospitalized children. Critical Care 2011

384 – POSTER SESSION

ASSESSMENT OF IMPLEMENTATION OF DEVELOPMENTAL CARE AND ITS BARRIERS IN THE NEONATAL INTENSIVE CARE UNITS

Z. Godarzi¹, O. Rahimi², A. Shamshiri³

¹Pediatric & Neonatal Intensive Care Unit, Tehran University of Medical Sciences, ²Neonatal Intensive Care, Bahrami Hospital, Tehran University of Medical Sciences, ³Epidemiology & Biostatistics, School of Health Tehran University of Medical Sciences, Tehran, Iran

Background and objective: Implementation of developmental care in neonatal intensive care unit (NICU) causes physiologic stability and energy conservation of neonates. Since the nurses face some barriers to the implementation of developmental care and considering the benefits of developmental care, so the present study aimed to investigate barriers and the implementation of developmental in neonatal intensive care units in teaching hospital of Tehran university of medical sciences.

Methods and materials: In this cross-sectional study, 138 nurses working in NICU were recruited to the study with census method in 2012. Data gathering tool was questionnaire related to barriers and implementation of development care.

Results: Average rates implementation developmental care in the NICU (66/53 %, respectively), developmental care aspects of routine and daily care of most (79/46 %), assessment and management of pain and stress rates (16/59 %) were implemented. The main barriers of aspects of developmental care was not having enough time to care and inappropriate NICU environment of space and the equipment. Institutional barriers to the mismatch between number of patients nurses (128 nurses, 92/75 %), fatigue and high workload (127 nurses, 92/03 %, respectively).

Conclusion: This study show that the implementation of developmental care aspects in the NICU is low and nurses often due to high workload and patient to nurse ratio mismatch faced with a lack of time could not provide developmental care for infants.

385 – POSTER SESSION

RELATION BETWEEN CHILD ABUSE BY PARENTS IN CHILDREN WITH CHRONIC ILLNESS AND SOME OF THE DEMOGRAPHICS CHARACTERS

M. Golchin¹, S. Ziaei¹, H. Naji², N. Safari¹

¹School of Nursing and Midwifery, Pediatrics Group, ²School of Nursing and Midwifery, Isfahan University of Medical Sciences, Esfahan, Iran

Background and aims: Child abuse is one of the most common health and social problem. The aim of this study was to determine relation between child abuse by parents with chronic illness and some of the demographics characters.

Methods: This is a descriptive-comparative study. One hundred and six 11–18 years old children with a chronic illness (such as Asthma, epilepsy, leukemia, diabetes and etc.) referred to health care center of Isfahan university of medical science were selected by convenient sampling. A questionnaire including demographic data and child abuse scale consist of questions in four domains

(neglect, emotional, physical and sexual) used for data collection. The questionnaire validated by content validity and reliability of questionnaires was estimated 0.78 by Cronbach's alpha. Data analysis were done by SPSS and using t test, correlation coefficient Pierson and spearman.

Results: Result contained a relation between sex, physical and emotional abuse ($p < 0.05$). A direct relation between age and neglect ($p = 0.002$) and also a direct relation between duration of disease and sexual abuse ($p = 0.01$), but there was a reverse relation between number of days of being Absent from school and neglect, physical abuse and total score of abuse ($p < 0.05$). Also result showed that there was a significant relation between neglect and total score of being abused and father's addiction.

Conclusion: Significant meaningful between demographic characters such as, sex, age and duration of children's illness with child abuse in one side and parent's drug addiction on the other side was found. This reveals that some cultural points in community gives an important role to chronic illness in children to prepare doing abuse.

386 – POSTER SESSION

HELPING CHILDREN AND ADOLESCENTS AT RISK OF DEVELOPING SUBSTANCE USE PROBLEMS: A SIGNIFICANT ROLE FOR NURSES

J. Mirlashari¹, A. Demirkol², J. Jahanbani³, M. Salsali⁴, H. Rafiey⁵

¹Neonatal Intensive Care, Tehran University of Medical Science, Nursing and Midwifery Faculty, Tehran, Iran, ²Addiction Medicine, Sydney University, Sydney, NSW, Australia, ³Pathology Department, Dental Branch, Tehran Islamic Azad University, ⁴Nursing, Tehran University of Medical Sciences, Nursing and Midwifery Faculty, ⁵Addiction, University of Social Welfare and Rehabilitation, Tehran, Iran

Background: A wide variety of factors are considered to contribute to the initiation of drug use.

Among them parenting and early childhood experiences are thought to be particularly important.

Aims: This paper aims to report on the results of a qualitative inquiry that explored the early childhood experiences of current substance-dependent young adults in Tehran, Iran, and the roles of nurses in the field of addictions in settings such as Iran were assessed.

Design and methods: The study was qualitative in nature.

Forty-four in-depth interviews were conducted with young men and women who were either in treatment for their addiction or were active drug users at the time of the interviews their parents and family members and nurses.

Results: The analysis of this study implicates traumatic childhood experiences, dysfunctional family dynamics, disconnect between parents and children, as well as parents' knowledge and attitudes about drug use and prevention as the determinants of initial drug use. Also analysis of interviews with nurses reveled categories like unfamiliar world of addiction and prejudice.

Conclusion: All determining factors identified by the participants of this study are within the scope of current nursing practice such as early childhood, community or school nursing, where there are great opportunities and unmet need for greater nursing involvement. Nurses who work with adolescents and families have a unique opportunity for prevention, early detection and timely intervention for drug dependency among at risk children.

387 – POSTER SESSION

URINARY INCONTINENCE, LOWER URINARY TRACT SYMPTOM AND QUALITY OF LIFE IN CHILDREN AND THEIR PARENTS. A REVIEW OF LITERATURE

F. Petrangeli¹, F. Suriano², T. Brancato², M.L. Capitanucci³, M. De Gennaro³, R. Alvaro¹

¹School of Nursing, University Tor Vergata, Rome, ²Department of Urology, Regina Apostolorum Hospital, Albano Laziale, ³Urodynamic Division, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

Background and aims: Urinary incontinence (UI) and Lower Urinary Tract Symptoms (LUTS) are common conditions in children and this often can have a marked impact on daily activities and quality of life (QoL). The aims of this review is to summarize the literature on QoL of children with UI and LUTS and their parents, and to identify factors that decrease QoL in affected children.

Methods: The CINAHL, PubMed, and ISI Web of Knowledge, Proquest were searched for publication until December 2012, to identify the QOL perception's in children, adolescents and their parents, using combination of different keywords.

Results: The literature data suggest that both patients and their families suffer of this conditions. Worse a child's symptoms are the greater the impact on the child and family. Self-esteem and mental health were the two most affected domains in children with UI. And enuresis profoundly affects child's and parent's life socially, emotionally, and behaviorally.

Conclusions: UI and LUTS significantly impair the quality of life in both children and teenager, and also have the negative effects on the parent's life. Early correct recognition of symptoms and treatment may improve health related quality of life in this population.

388 – POSTER SESSION

POWER INJECTABLE PICCS IN PEDIATRIC INTENSIVE CARE UNIT: A RETROSPECTIVE STUDY

M. Pittiruti¹, D. Celentano², D.G. Biasucci³, A. Mancino³, O. Genovese³, L. Muscheri²

¹Department of Surgery, ²Pediatric Intensive Care Unit, ³Emergency Department Pediatric Intensive Care Unit, 'A. Gemelli' Teaching Hospital Catholic University of The Sacred Heart, Milan, Italy

Background: Peripherally inserted central catheters (PICC) have many advantages in pediatric intensive care unit (PICU), particularly in children with coagulation abnormalities or at high risk for infection. Some disadvantages of standard PICCs (low flow rates; poor resistance to trauma and to high pressure infusion) have been overcome by power injectable polyurethane PICCs (PI-PICC).

Method: We have reviewed our experience with PI-PICC, with special regard to early and late complications. All PI-PICC were positioned in the deep veins of the arm by ultrasound guidance; tip position was verified by the intra-cavitary EKG method.

Results: In 18 months, we inserted 50 open-ended PI-PICC (thirty-seven 5Fr double lumen + three 4Fr double lumen + nine 4Fr single lumen + one 3Fr single lumen). All insertions were successful, with minimal complications (two local hematomas; two cases of repeated puncture before success; one malposition, in a patient with difficult

reading of the EKG due to artefacts). We reported no catheter-related bacteremia, no symptomatic venous thrombosis, and no accidental removal of the PICC. Lumen occlusions occurred rarely, and they were all overcome by simple flushing. All PI-PICCs had a good clinical performance (high flow infusion; easy monitoring of central venous pressure; contrast medium infusion for CT scan).

Conclusion: In PICU, PI-PICC are an ideal double/single lumen central line for any type of infusion, for hemodynamic monitoring and for high pressure injection of contrast medium. PI-PICC positioning by ultrasound guidance and EKG-guidance is 100 % successful and completely safe even in severely ill children.

389 – POSTER SESSION

NEWBORNS WEIGHT LOSS IN ROOMING-IN CARE

I.N. Vale¹, L.S. Alves¹, T.E. Casale¹, L. Supimpa¹, G.M. Takeiti², E.V. Carmona¹

¹Nursing, ²Women's Hospital Professor Dr. José Aristodemo Pinotti, State University of Campinas, Campinas, Brazil

Significant newborn's weight loss may lead caregiver for offering other milk to complement feeding, plus breast milk, as intervention. If nurses identify predictors of weight loss, they can perform early interventions to prevent this.

Objective: to evaluate factors related to weight loss of healthy newborns at a public teaching hospital, in Brazil.

Methods: A cross-sectional study, with 455 mothers and their babies, at Rooming-in care. Descriptive analysis was performed, with the intersection of variables of interest, using Chi square and Fisher's Exact Test (significance level 5 %).

Results: Newborns with birth weight loss over 10 and 8 % were 6.4 and 26.2 %, respectively. Majority of women were adult, multiparous, with partner, studied up to high school and presented at least one comorbidity related to lactogenesis II failure. Prevalence of induced labor and cesarean section was 43.7 %. Have reported milk letdown within 48 h, 15.6 % of women; 47 % have had nipple trauma and 11 % used some device (silicone nipple or shell). The middle-weight of the neonates was 3,237 g (min. 2,151–4,520 g max); 37.4 % suffered some kind of tocotraumatism; 30 % were kept in skin-to-skin contact with mother and 15.1 % presented poor sucking. Variables with possible association with greater weight loss: number of deliveries ($p < 0.003$), type of delivery ($p < 0.000$), use of devices ($p < 0.029$), birth trauma ($p < 0.018$) and small for gestational age newborns ($p < 0.06$).

Conclusions: Weight loss greater than expected may be related of delivery health care aspects, as well as maternal and newborn characteristics.

390 – POSTER SESSION

SKIN CONDUCTANCE MONITORING IN THE CARE OF (PRETERM) NEWBORNS; A STUDY OF THE LITERATURE

J. Wielenga

IC Neonatology, Emma Children's Hospital, Academic Medical Centre, Amsterdam, The Netherlands

Background: Behavioural responses to painful events are limited in preterm newborns. Physiological measures (HR, SpO₂) are commonly used. They have limited clinical use due to low specificity. Skin conductance (SC) can be used as a measure of neurophysiological arousal that follows activity in the sympathetic nervous system. For that SC can be used to evaluate reactions to pain. The aim of this study was to discover what is known about SC and how to value the measurement of SC in preterm's.

Methods: A systematic review of the literature until January 2013 was performed. Skin conductance was used as MESH term and newborn: birth—1 month as limit.

Results: The search resulted in 37 hits; 20 not relevant, one concerned the technique of measurement, four described the feasibilities of measuring SC, three used a before-during-after design and nine compared de SC with other pain indicators. Most studies used observational cohort designs, the number of included newborns were small (N = 10–71) and age differed from 22 weeks to term. SC appeared to be sensitive, distinguished pain from tactile stimuli, term had higher SC values compared to preterm newborns and a maturing pattern was visible with aging. SC seemed objective, variability between individuals was minimal, and it was not influenced by circulatory changes, cardiovascular drugs, environmental temperature, or changes in respiratory rhythm.

Conclusions: SC seems a promising tool. It is more sensitive and specific to pain than other available methods. It is not yet fully error proof, it is simple and easily performed.

391 – POSTER SESSION

A SYSTEMATIC LITERATURE REVIEW OF DRESSING TECHNIQUES FOR PERIPHERALLY INSERTED CENTRAL VENOUS CATHETERS (CVC) IN NEONATAL INTENSIVE CARE UNITS

J. Wielenga¹, A. Hilberdink², A. van den Hoogen³, Dutch Nursing Innovation and Research Group

¹IC Neonatology, Emma Children's Hospital/Academic Medical Centre, Amsterdam, ²IC Neonatology, Beatrix Children's Hospital, University Medical Center Groningen, Groningen, ³IC Neonatology, University Hospital Utrecht/Wilhelmina Children's Hospital, Utrecht, The Netherlands

Background: Peripherally inserted CVC's are often used in the care of (preterm) newborns. To reduce bloodstream infections, dressing techniques could be of main importance. Choices in dressings commonly depend on availability of materials in a hospital and are not based on available evidence.

Method: A systematic literature review and methodological critical appraisal according to the Dutch CBO-guideline to reveal available evidence on dressing techniques was performed.

Results: Three randomised controlled trials compared dressing techniques. Two of them compared a semi-permeable transparent dressing and a silver alginate maltodextrin patch, and one compared a semi-permeable transparent dressing with a chlorhexidine patch (respectively Hill 2010, Khattar 2010, Garland 2001) One of the silver alginate patch studies showed no significant differences in infection rates between the groups (12.4 % study vs. 17.2 % control. The other study found a decrease in bloodstream infection of 45.8 % per 1000 CVC-days difference in favour of the silver alginate patch which was however not significant. A significant increase (P < .0001) of the serum silver concentration, far below toxic level, was seen in

this study. In the chlorhexidine patch study, infants had less catheter tip colonisation (patch 15.0 vs. 24.0 % in transparent dressing group), but had significant more (P < .0001) serious skin deviations.

Conclusion: The two dressing techniques identified in this review, next to semi permeable transparent dressing, are still in an experimental stage. The use of these techniques is dissuaded, until new high-quality studies show that these alternative methods are effective and can be used safely.

Paediatric and Neonatal Intensive Care Nursing (392–443)

392 – POSTER SESSION

FORMING MOTHERS IN BREASTFEEDING AND NUTRITION IN A HIGH SEVERITY NEONATAL CENTRE: EXPERIENCE OF TEAM COORDINATED BY NURSE LACTANT CONSULTANT

P. Amadio, E. Renzetti, S. Blasetti, I. Dall'Oglio, A. Portanova, A. Dotta, G. Salvatori

Bambin Gesù Children Hospital, Rome, Italy

In our Department about 1000 newborn infants are followed every year because of extreme prematurity, major malformations or peri- and post-natal severe complications. A specific field of our intervention is aimed to encourage breast feeding, kangaroo care and to reach good skills of mothers of these critical newborns. We have a specific area dedicated to breast collection and education of mothers in lactation and feeding (9200 accesses per year) managed by a nurse lactant consultant. During 2012 we discharged 700 patients, all of mothers have been educated before discharge; in particular the following activities (number of lessons) have been organized and performed: 615 on how to consider each breastfeeding, 420 on how to attach the baby to the breast, 220 on how to manage continuous or intermittent enteral feeding at home, 55 on kangaroo mother care, 220 on how to increase milk production, 35 on how to restart milking, 120 on how to store and utilize breast milk at home. Our project will continue following the infants through an outpatient nursing follow up completely dedicated to nutrition, breast milk and development. This program will interface with all the others outpatient clinic for these classes of newborns affected by severe neonatal, often chronic, diseases.

Our experience show that not only healthy infant can and must be breastfed and that nurse lactant consultant may play a key role in helping mothers and improving baby-family link in patients with critical neonatal period experiencing life threatening events.

393 – POSTER SESSION

ALTRUISM, AN IMPORTANT MOTIVATOR OF BREAST MILK TO BREAST MILK BANKS

V. Bolton

School of Therapeutic Sciences, University of the Witwatersrand, Johannesburg, South Africa

Background: Breastfeeding is the nutritional gold standard for at risk newborns. Not all newborns have access to breastmilk. Donor breast

milk banks play a role in providing breast milk to those at risk neonates whose mothers are unable to provide them with adequate volumes of breast milk.

Objectives: Understanding the motives of lactating women who donate breast milk to a milk bank may be useful in ensuring adequate volumes of donated breast milk are available for such neonates.

Methods: The study consisted of a non-experimental descriptive survey that utilized a self administered questionnaire, consisting of three parts. The Volunteer Functions Inventory (VFI) formed one part of the questionnaire. The VFI is a validated tool used to examine six possible motives for participating in any voluntary activities, such as donation of breast milk. Donors of breast milk to seven breast milk banks were invited to participate in the study. Sampling was purposive as donors were self selected. A total of 91 questionnaires were received. The VFI was marked in accordance with the marking sheet. Data is presented graphically using descriptive statistics.

Results: Six possible motives are listed in the VFI as to why women donate breast milk to a milk bank. These include the values motive, defined as donating breast milk in order to express altruism and show humanitarian concern for others. This motive scored highest by the majority of participants, indicating that women who donate breast milk to a milk bank do so out of concern for others.

394 – POSTER SESSION

ANTIBIOTIC PRESCRIPTION IN A PEDIATRIC INTENSIVE CARE UNIT IN TUNISIA

A. Bouziri, A. Borgi, N. Ghali, M. Fares, A. Hamdi, K. Menif, N. Ben Jaballah

Pediatric Intensive Care Unit, Children's Hospital of Tunis, Tunis, Tunisia

Objectives: The antibiotic prescription in intensive care units (ICUs) is frequent using often broad-spectrum antibiotics. The total antibiotic consumption is approximately ten fold greater in ICU wards than in general hospital wards. The aim of this study was to evaluate the current use of antibiotics in a pediatric ICU in Tunisia.

Methods: A prospective study for a 1 year period from November 2009 to October 2010 was conducted. Antibiotic prescription and patient records were reviewed and analyzed. Rationality of antibiotic usage was also evaluated by analyzing the drug prescriptions.

Results: Of 768 patients admitted, 334 received antibiotic treatment during the study period (43.4 %), 27 cases (8.1 %) were due to nosocomial-acquired infections. Third-generation cephalosporins were the antibiotics most frequently prescribed (170/334, 50.9 %), followed by ampicillin (128/334, 38.3 %) imipenem (25/334, 7.5 %), fosfomycin/vancomycin (19/334, 5.7 %). Monotherapy represented 33.5 % of the prescriptions of antibiotics. Mean duration of antibiotherapy was 5.3 ± 3.6 h (1–39 h). The most common indication of antibiotherapy was community acquired respiratory infections. The empirical prescriptions were documented afterward in 67 % of cases. Eighty-two percent of the initial prescriptions seemed to be adapted to the identified or suspected bacteria.

Conclusion: interventional programs based on rational antibiotic prescription and aiming to minimize unnecessary cost of antibiotherapy and emergence of bacterial resistance should be implemented in our clinical settings.

395 – POSTER SESSION

EPIDEMIOLOGY AND RISK FACTORS OF HOSPITAL—ACQUIRED INFECTIONS: A PROSPECTIVE STUDY IN A PEDIATRIC INTENSIVE CARE UNIT

A. Bouziri, A. Borgi, N. Ghali, A. Hamdi, A. Khaldi, K. Menif, N. Ben Jaballah

Pediatric Intensive Care Unit, Children's Hospital of Tunis, Tunis, Tunisia

Introduction: In order to describe the epidemiologic profile of hospital-acquired infections (HAI), a prospective surveillance study from November 2009 through October 2010 was performed in the pediatric intensive care unit (PICU) of the University Children's Hospital of Tunis.

Methods: All patients who remained in the PICU for more than 48 h were included. Centers for Disease Control and Prevention criteria were applied for the diagnosis of HAI.

Results: Six hundreds thirty patients, aged 0–15 years were included. Thirty HAIs occurred in 27 patients. The HAI rate was 7.13/1,000 patient-days (4.76/100 admissions). Two types of infection were found: bloodstream infections (17/30, 56.7 %) and pneumonias (13/30, 43.3 %). Sixteen/17 bloodstream infections (94.1 %) occurred in patients with central venous catheter (CVC). CVC associated infection rate was 10.1 per 1,000 catheter days. Pneumonia had a density incidence rate of 4.9 per 1,000 mechanical ventilation-days. Gram-negative rods were involved in 80.7 % of HAIs. The most-common organisms causing HAIs were *Klebsiella pneumonia* (38.4 %), *Pseudomonas* (23 %) and *Coagulase-negative staphylococci* (19.3 %). The PICU crude mortality rate of infected patients was 48.1 %. Associated factors of HAIs were CVC and a prolonged duration of mechanical ventilation (≥ 7 days).

Conclusion: The majority of HAIs in our unit resulted from Gram-negative bacteria. HAI was associated with invasive procedures. Implementation of improved infection control practices is required.

396 – POSTER SESSION

PLACENTA PRAEVIA: FREQUENCY, MORBIDITY, MORTALITY AND STRUCTURE OF DEATH

G. Businoska-Ivanova^{1,2}, J. Ivanov^{1,3}

¹*Gynecology and Obstetrics Clinic, Faculty of Medicine,*

²*Department of Perinatology, Gynecology Obstetrics Clinic Skopje,*

³*Department of Gynecology and Obstetrics, Clinical Hospital Acibadem Sistina, Skopje, FYROM-The Former Yugoslav Republic of Macedonia*

Objective: The aim of this study is a retrospective analysis of premature neonatal death of newborns born to mothers with placenta praevia.

Materials and methods: There were analyzed the total number of births in specific period, the incidence of birth of newborns from mothers with Placenta Praevia, mortality of this group of newborns, the gestational age of deceased newborns, the time of death of these newborns, the structure of death according to diagnosis.

During the past 3 years (2009–2011) at Special Hospital for Gynecology and Obstetrics, there were 9,496 newborns. 9,415 were born alive (99.14 %), 81 died (0.85 %). Out all newborns, 20 or 0.21 %, were born from mothers with placenta praevia.

Results: The mortality in this group of newborns with placenta praevia is 17.39 %. The gestational age of all deceased newborns is <33 weeks. During the first 12 h the percentage of deaths is 50 %, from 13 to 24 h 25 %, from 25 to 48 h 12.5 % and after 48 h 12.5 %. According to patho-histological analysis that were done on 100 % of the deceased newborns, 38.1 % from this risk group of newborns died from hyalinomembrane disease as the main cause of death, 14 % from intercranial hemorrhage. 42 % had as a main cause of death hyalinomembrane disease and intercranial hemorrhage, and 6 % fall in the group of rare other causes.

The high percentage of death of these newborns is determined by maturity and adaptability of these newborns.

397 – POSTER SESSION

RIGHT PULMONARY AGENESIS WITH DEXTROCARDIA —CASE REPORT

R.M. Culcer, A. Dan, A. Culcer

Neonatal Intensive Care, University Hospital Bucharest, Bucharest, Romania

Background and objective: Pulmonary agenesis is a very rare embryological defect (1 per 25,000–35,000 live births) defined as complete absence of bronchus, parenchyma, and vessels. Pulmonary agenesis is often associated with acute respiratory distress and high mortality usually due to retention of bronchial secretions and inflammation.

Methods: We report one case of congenital right pulmonary agenesis with dextrocardia and compensatory hyperinflation of the opposite lung diagnosed antenatal (second trimester) during ultrasound examination and confirmed postnatal by chest X-ray, echocardiography, and CT examination.

A 3,500 g male neonate with a gestational age of 38 weeks was born by cesarean section to a 39-year-old woman whose pregnancy was complicated with oligohydramnios. The mother had a previous pregnancy history of fetal death with cardiac defects and Down syndrome. The mother did not use any drugs during her pregnancy.

Results: Postnatal clinical examination and radiographic examinations confirmed the prenatal diagnosis of isolated unilateral right-sided pulmonary agenesis with dextrocardia. A neonatal chest X-ray showed complete opacification of the right hemithorax with ipsilateral mediastinal displacement toward the agenetic lung, hyperexpansion of the left lung and dextrocardia. An echocardiographic and CT examination revealed right pulmonary agenesis with hypoplasia of the right pulmonary artery and dextrocardia. The infant was discharged on day 5 in good clinical condition.

398 – POSTER SESSION

TYPE OF NUTRITION AND POSTNATAL GROWTH IN PRETERM INFANTS UNDER 32 WEEKS OF GESTATIONAL AGE

O.M. Damian, S.M. Stoicescu

Neonatology, Institute for Mother and Child Care, Obstetric and Gynecology Clinical Hospital Polizu, University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

The authors proposed identification of postnatal growth differences rate in prematures under 32 weeks gestational age depending on the type of nutrition.

Methods: The lot included 30 prematures with a birth weight of 550–1,500 g, delivered under 32 weeks. Daily measurements of body weight, proteins and calories provided by enteral nutrition were made and also serial metabolic blood analysis, weekly: glucose, urea, creatinine, electrolytes, proteins, blood and stool cultures.

The postnatal age when enteral feeding was started, clinical status, mechanical ventilation support were noted.

The enteral feeding was monitored—gastric residue, regurgitations, vomiting and stools depending on nutrition type.

Collected data were processed by SPSS.

Results: Weight gain was observed after increasing calories and proteins intake. Formula feeding was associated with stationary weight curve. Growth gain was observed when increasing the caloric and proteic intake by enrichment of the breast milk with fortifiants. The values of the weight curve at discharge are situated between percentiles 10–25 %.

Conclusions:

1. Prematures under 32 weeks and under 1,500 g, remained a challenge of nutritional prescription, the purpose of every neonatologist being to avoid the postnatal growth restriction.
2. Enteral nutrition with breast milk alone is a gold standard for obtaining a healthy growth and development.
3. Breast milk fortifiers induce an accelerate growth similar to intrauterine gain, 10 g/24 h, removing RCIU risk.
4. The formula an alternative for avoiding the risk of postnatal growth restriction.
5. The continuous growth gain has the advantage of shortening hospitalisation, costs, complications.

399 – POSTER SESSION

STUDY ON PULSE OXIMETRY OXYGEN SATURATION LEVEL AND PARTIAL PRESSURE OF OXYGEN IN ARTERIAL BLOOD IN HOSPITALIZED NEONATE

J.C. Das¹, M. Shahidullah², S.T. Khanam³, M.A. Hafez⁴

¹Neonatology, Chittagong Medical College, Chittagong,

²Neonatology, Bangabandhu Sheikh Mujib Medical University,

³MCH, National Institute of Preventive & Social Medicine(Rtd),

⁴Epidemiology & Biostatistics, Bangladesh Institute of Health Sciences, Dhaka, Bangladesh

Introduction: Oxygen supplementation is frequently needed during newborn care. Pulse oximetry is a convenient method of monitoring oxygen (SpO₂). But partial pressure of oxygen in arterial blood (PaO₂) is considered to be the gold standard. Work on SpO₂ and PaO₂ on Bangladeshi neonate is lacking.

Objectives: Was to examine SpO₂ and PaO₂ values on hospitalized neonates and to observe normal SpO₂ values in relation to PaO₂ values.

Methodology: This was a *cross sectional analytical* study, carried out in BSMMU, Dhaka over a period of 1 year. Here, 140 hospitalized neonates were included. Pulse oximetry oxygen saturation readings (SpO₂) were taken on neonates. Blood samples from radial artery for partial pressure of oxygen (PaO₂) were taken during monitoring of SpO₂ from those neonates where consent for blood sampling was available.

Results: The mean SpO₂ reading was 94.3 ± 3.3 %. Simultaneous mean PaO₂ value was observed to be 121.6 ± 77 mmHg. Correlation

was observed between PaO₂ and SpO₂ ($r = 0.598$) readings. It was observed that when PaO₂ value was >100 mmHg, the observed mean SpO₂ value was 97.3 ± 1.3 %. When the mean SpO₂ readings were 94.8 ± 4.3 and 92.8 ± 2.6 %, the observed PaO₂ values were 100–80 and 80–50 mmHg, respectively. If PaO₂ value was <50 mmHg, the observed mean SpO₂ value was 85.5 ± 2.8 %. It was seen that SpO₂ at 94 and 87 % were the cut-off values to screen hyperoxic and hypoxic neonates, respectively.

Conclusion: The study concluded that SpO₂ readings between 87 and 94 % should be maintained to have normal PaO₂ value on neonate.

400 – POSTER SESSION

A DEVICE TO MONITOR NEONATAL CHEST WALL MOVEMENT DURING HFOV

T.A. Drewett¹, A.D. Shearman^{2,3}, L. Jardine^{2,3}

¹Biomedical Engineering, Mater Misericordiae Health Services,

²Neonatology, Mater Mothers' Hospital, ³Critical Care of the Newborn Group, Mater Medical Research Institute, South Brisbane, QLD, Australia

Background and aims: HFOV is used when conventional ventilation is failing to provide respiratory support for neonates. Pressure amplitude (ΔP) is set by visually assessing the chest wall oscillations (chest wiggle). This measurement is subjective and can be difficult to assess clinically. The aim of this study was to develop a device and software that could quantify chest wiggle.

Methods: A custom built device with analysis software was developed to non-invasively measure chest wiggle in real-time. A resuscitation mannequin with the device attached was ventilated with HFOV. HFOV frequency and MAP remained unchanged. Clinical staff experienced with HFOV (EXP) were blinded to the ΔP settings and the devices output and were asked to identify when “adequate” chest wiggle (CWA) occurred. The devices output and ΔP were recorded. The device output at CWA was determined. A “No clinical HFOV experience” group (N-EXP) were then shown a graphical representation of the devices output at CWA. N-EXP, blinded to the ΔP and the chest wiggle, used the graphical representation to determine CWA. ΔP and the devices output were then recorded.

Results: 22 EXP and 7N-EXP each undertook three trials. EXP mean ΔP at CWA by observation was 44 cmH₂O (9.4) and N-EXP mean ΔP at CWA by graphical representation was 41 cmH₂O (7.4) ($p = 0.21$).

Conclusions: The custom built device and software successfully monitored the HFOV chest wiggle on a mannequin. It was also demonstrated that the device could be used to successfully gauge CWA.

401 – POSTER SESSION

A RARE COMMODITY-ADVANCED NURSING PRACTICE SKILLS OPTIMIZE THE USE OF PAEDIATRIC INTENSIVE CARE BEDS WITHIN A SPECIALIST SERVICE

A. Fierens¹, L. Smith²

¹Tracheal Team, ²Cardio-respiratory Department, Great Ormond Street Hospital, London, UK

The Tracheal Team at Great Ormond Street Hospital is a unique service and the patients under our care will require a well prepared admission to an intensive care area due to the complexity and rarity of the disease.

Currently there is limited availability of paediatric intensive care (PICU) beds in the United Kingdom (UK) due to service competition for beds, as well as reduced availability of paediatric intensive care nurses and a lack of access to highly skilled medical doctors due to current European Working Time Directives.

As a small specialist team functioning within a quaternary hospital we are continually required to look at new ways of delivering PICU care. One of these approaches is through developing autonomous intensive care nursing practice using the advanced skill model.

The tracheal clinical nurse specialist (CNS), who has extensive intensive care experience, uses a combination of communication, service knowledge and advanced skills (to Masters level) to keep the use of PICU beds to a safe minimum whilst still maintaining high quality care (supported by PREMS).

Areas of advanced nurse practice include triaging PICU patients from national and international destinations, expert communication with referrers, requesting investigations such as bronchoscopies and bronchograms, nurse led ward round and decision making, new prescriptions and medication modifications, leading discharge planning, ongoing communication and treatment plans, audit and data collection. If this model continues to optimize the access and use of PICU beds for a patient group this model of Advanced Nursing Practice should continue to develop further.

402 – POSTER SESSION

IMPACT OF HEAT AND ULTRAVIOLET EXPOSURES DURING VANCOMYCIN INFUSION ON THE DRUG AMOUNT DELIVERED IN NEONATAL INTENSIVE CARE UNIT

A. Foinard¹, B. Décaudin^{1,2}, D. Lannoy^{1,2}, N. Simon^{1,3}, C. Barthélémy¹, L. Storme⁴, P. Odou^{1,2}

¹Laboratoire de Biopharmacie, Pharmacie Galénique et Hospitalière, Faculté des Sciences Pharmaceutiques et Biologiques, ²Institut de Pharmacie, CHRU Lille, ³Unité de Pharmacologie Antitumorale, Centre Oscar Lambret, ⁴Service de Réanimation Néonatale, Hôpital Jeanne de Flandre, CHRU Lille, Lille, France

Objectives: This study aimed to assess the impact of heat and ultraviolet exposures on the final amount of vancomycin delivered to the patient in neonatal intensive care unit (NICU).

Methods: We performed the study according to the NICU administration conditions. The infusion lines passed through an incubator thermostated at 33 °C and also irradiated with a neonatal phototherapy lamp. Vancomycin syringes (40 mg in 14.4 mL) were infused at 0.3 mL/h over a 24-h period ($n = 9$). The same tests were replicated at the room temperature (20 °C) and ambient light. For both tests, two types of infusion lines were tested:

- (1) opaque infusion lines in polyvinyl chloride ($\varnothing = 1.5 \times 3.0$ mm, $L = 150$ cm, $Vol = 3.10$ mL),
- (2) non-opaque infusion lines in polyethylene ($\varnothing = 1.0 \times 2.0$ mm, $L = 150$ cm, $Vol = 1.5$ mL).

Vancomycin amounts were measured at the outlet of lines by an UV spectrophotometric method. A Mann–Whitney's test was used to

compare the vancomycin amounts at the outlet of the opaque and non-opaque lines.

Results: Our results expressed as median values [min–max] in milligrams showed a significant difference between the two types of infusion lines for the two infusion conditions.

Table 1

Infusion conditions	Non-opaque line	Opaque line	P value
33 °C and UV light	35.85 [35.18–36.81]	37.55 [36.53–38.08]	<0.001
20 °C and ambient light	37.00 [35.47–37.95]	37.98 [36.83–36.68]	0.012

Conclusions: We require at present the use of opaque lines for intravenous administration of vancomycin in NICU.

403 – POSTER SESSION

PREVALENCE OF PATIENT-VENTILATOR ASYNCHRONY DURING THE ACUTE AND WEANING PHASE OF PAEDIATRIC MECHANICAL VENTILATION

N. Gal, R.G.T. Blokpoel, M.C.J. Kneyber

Department of Paediatrics, Division of Paediatric Intensive Care, Beatrix Children's Hospital, University Medical Center Groningen, Groningen, The Netherlands

Background and aims: Mechanical ventilation is one of the most common indications for children to be admitted to the pediatric intensive care unit (PICU). In adults it has been shown that patient-ventilator asynchrony (PVA) occurs frequently and is associated with increased morbidity. To date, PVA in children has little been studied. The aim of this study was to test the hypothesis that PVA in mechanically ventilated children occurs frequently but is less prominent during the weaning phase.

Methods: All mechanically ventilated children aged 0–18 years who initiated and maintained spontaneous breathing were eligible for inclusion. Excluded were patients with nervous system and neuromuscular disorders. Patient-ventilator asynchrony was identified by a random 15-min continuous recording and off-line analysis of the pressure–time and flow–time waveforms using Ventview 2 (Dräger, Lubeck, Germany). Patient-ventilator asynchrony was categorized and labeled into four different groups: (1) trigger asynchrony, (2) flow asynchrony, (3) termination asynchrony and (4) expiratory asynchrony. Baseline demographic and clinical data were recorded. Data were expressed as mean $\pm$ standard deviation (SD), or percentage (%) of total.

Results: So far, N = 8 patients have been included. The total number of studied breaths was N = 5,621. PVA occurred in 27 % of all breaths during the acute phase, and in 19 % of all breaths during the weaning phase.

Conclusion: The preliminary results of our study suggest that the prevalence of PVA during paediatric mechanical ventilation may be similar between the acute and weaning phase.

404 – POSTER SESSION

BLOOD IN THE NAPPY: NOT ALWAYS HORMONAL

S. Harikrishnan, B. Reichert, C.K.I. Harikumar

Paediatrics/Neonatology, University Hospital of North Tees, Stockton-on-Tees, UK

This abstract of an interesting case is presented due to its rarity and potential complications of missing a timely diagnosis.

A term female infant weighing 3.77 kg born by LSCS for pathological CTG was admitted at 40 h of age, due to presence of blood in the nappy. Her mother was on Aspirin during pregnancy for high BMI and h/o three spontaneous miscarriages. Baby had a palpable left flank mass, macroscopic and microscopic haematuria and thrombocytopenia (platelet count 41) on admission. She was started on IV fluids for probable renal vein thrombosis. Renal ultrasound 12 h later showed enlarged left kidney with loss of cortico-medullary differentiation. IV fluids were discontinued after 24 h and hydration maintained by breast and top up feeds. Platelet count normalized and gross haematuria resolved within 48 h. Repeat ultrasound after 3 days showed improving but unresolved renal changes. Her blood pressure and renal function tests remained within normal range. Relevant thrombophilia screen was negative for Factor V Leiden mutation and anti phospholipid antibody. Repeat ultrasound after 3 weeks showed normal kidney with signs of full recovery. She is for long term follow up and assessment of protein C and S at a later stage.

Renal vein thrombosis accounts for 10 % of neonatal thrombosis and is associated with morbidity and mortality. RVT typically presents with one of the cardinal features; flank mass, haematuria or thrombocytopenia. Our child had all the three features and ultrasound findings suggestive of RVT with signs of full recovery at 3 weeks.

405 – POSTER SESSION

METAMIZOL IN POSTOPERATIVE NEONATAL INTENSIVE CARE

T. Howell, N. Bachmaier, A. Lange, M. Heckmann

Neonatology and Pediatric Intensive Care, Children's Hospital Universitätsmedizin Greifswald, Greifswald, Germany

Background: Neonatal postoperative pain management often is not yet sufficient. A standardised postoperative pain management was implemented for the NICU using an escalation scheme.

Aim: To identify side effects when using metamizol in postoperative pain management for neonates.

Methods: “Off-label-use” was discussed with the parents, written consent was given. 70 neonates (ranging from 22 6/7 to 41 4/7 weeks of gestation), were operated between 1st day of life and 3 months, weighing 470–9,900 g (median 2,712 g) between 1/2010 and 12/2012. Surgery included laparotomy, craniotomy and ductus ligation. The neonatal infant pain score (NIPS) was used to assess pain. Postoperatively, all children were given metamizol (40 mg/kg per day) or a combination of metamizol/morphine (40/0.1 mg/kg/day) for 3 days or until pain score was negative. Side effects such as hypotension (necessity of inotropes) or changes in blood, count were compared preoperatively with postoperative measurements at day 1, 3 and 7.

Vomiting and constipation were registered, both being common postoperative complications and difficult to verify after abdominal surgery.

Results: 54 children only had metamizol, 10 morphine and 4 a combination of metamizol/morphine. All infants had increased postoperative NIPS (Mean 1.34–1.43 at day 1), reduced to 0.49 at day 7. Medication was given mean 3.42 days. None showed negative side effects, compared to preoperative measurements. Blood glucose concentrations and electrolytes were stable.

Conclusion: The postoperative use of metamizol in preterm infants and term neonates seems to be feasible regarding short-term complications. Further studies need to identify possible long-term effects.

406 – POSTER SESSION

CHRONIC KIDNEY DISEASE IN CHILDREN: THE NATIONAL PEDIATRIC HOSPITAL EXPERIENCE IN HANOI, VIETNAM

N.T.Q. Huong¹, T.D. Long¹, F. Bouissou², J.-L. Bascands³

¹*Pediatric Nephrology, Hanoi Medical University, Hanoi, Vietnam,*

²*Pediatric Nephrology, Hôpital des Enfants, ³Renal and Cardiac Remodeling-team 5, Toulouse III Paul Sabatier University, Toulouse, France*

Aim: The goal of this descriptive study was to evaluate the aetiology and the socioeconomic status in hospitalized children in Hanoi and propose solutions to improve prevention and basic health care of patients with chronic kidney disease in Hanoi City.

Methods: We analyzed the records of all the 152 hospitalized children with chronic kidney disease in the Hanoi hospital from January 2001 to December 2005.

Results: The incidence of paediatric chronic kidney disease native to Hanoi City was estimated to be 5.1 per million-child population (pmcp). Median age was 11.29 years; 60.5 % were boys and 39.5 % were girls; 65 % of patients were in end-stage renal disease. Cause of chronic kidney disease included glomerulonephritis (66.4 %) and congenital/hereditary anomalies (13 %). In 19.8 % of children, the aetiology was unavailable. During hospitalization, 5 patients died and 76 patients (50 %) refused the treatment although beneficiary of health insurance. Thirty patients (19.74 %) received peritoneal dialysis and hemodialysis, seven patients received renal transplantation with a familial living donor.

Conclusion: Late referral and limited facilities for renal replacement therapy explain the poor outcome in this study. We need a program to delineate the burden of chronic kidney disease and improve primary health care for health promotion and prevention of paediatric chronic kidney disease.

407 – POSTER SESSION

EBV AND BK VIRUS PCR MONITORING IN KIDNEY TRANSPLANTATION AS A GUIDE LINE OF IMMUNOSUPPRESSIVE THERAPY

N.T.Q. Huong¹, C. Azéma², M. Rémésy², S. Decramer², F. Bouissou²

¹*Pediatric Nephrology, Hanoi Medical University, Hanoi, Vietnam,*

²*Pediatric Nephrology, Hôpital des Enfants, Toulouse, France*

Immunosuppressive (IS) therapy in transplantation is mainly empiric. Over immunosuppression leads to side effects, especially virus proliferation.

Objective: EBV and BKV PCR monitoring experience in kidney transplantation in Pediatrics Hospital in Toulouse France.

Methods: We report 12 children, out of 70 successive kidney transplantation, who experienced prolonged positive blood PCR test for 7 EBV (4 reactivation, 3 primary infection) and 5 BK virus (3 proven BKV nephropathy) undergoing classical triple IS therapy (steroid/AZA or MMF/CsA or FK). In these patients we prospectively decided to decrease the drug dosage, first anti metabolite and second anticalcineurin, until a negative PCR test was obtained.

Results: The lowering of the IS drugs allowed to negative clinical virus symptoms and PCR test in all of the patients without any rejection (follow up from 1 to 5 years) and lymphoma. The drug dosage was continuously adapted to the level of PCR test and today four patients remain free of anticalcineurin, and one of them had only low dose of steroid, eight continue triple therapy with half dosage of AZA or MMF and low level of anticalcineurin trough level in sera (CsA 60–70 ng/ml, FK 3–5 mg/l).

Conclusion: Routinely virus detection is mandatory in transplantation. An EBV or BK virus blood PCR positive test is a sign of over IS and allows to decrease the IS regimen with no risk of rejection and to cure the viral disease and avoid EBV B lymphoma that we had previously experienced.

408 – POSTER SESSION

COMPARISON OF NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY WITH AND WITHOUT PROPHYLACTIC SURFACTANT IN PRETERM NEONATES

M. Imani¹, R. Derafshi¹, A. Arbabisarjou²

¹*Department of Pediatrics, ²Department of Nursing, Zahedan School of Nursing and Midwifery, Zahedan University of Medical Sciences, Zahedan, Iran*

Background: A method of MV is continuous positive airway pressure (CPAP) especially for neonates is Nasal CPAP in which surfactant is administered to them via tracheal instillation. The aim of present study was comparing nasal continuous positive airway pressure NCPAP therapy with and without prophylactic surfactant in preterm neonates.

Patients and methods: This is a randomized clinical trial study performed on 80 newborns (28–34 weeks) whom were born in Ali-e-bne-Abitaleb hospital affiliated to Zahedan University of Medical Sciences. Subjects were randomly classified in two groups. The data collected through direct observation and 14 purposeful items by researcher. Both groups received surfactant (Curosurf, Parma, Italy) at 100 mg/kg/24 h or 4 ml/kg/24 h with NCPAP and NCPAP alone.

Results: Results revealed that six neonates who received only NCPAP and four patients who received NCPAP and surfactant underwent MV. After a week follow up, 33 neonates who received only NCPAP and 36 patients who received CPAP and prophylactic surfactant remained alive. There was no significant difference between the groups regarding adverse outcomes ($P = 0.518$).

Conclusions: According to the results of this study, NCPAP is indictable as a safe protocol for RDS in preterm neonates. Further research is required to clarify and validate our findings.

409 – POSTER SESSION

THE INFLUENCE OF LATERAL AND SUPINE POSITION ON BACTERIAL COLONIZATION OF ENDOTRACHEAL TUBE IN NEONATES ADMITTED TO NICU

S.Z. Jalali¹, S.H. Mojtabaei¹, A. Heidarzadeh², F. Aghamahi¹, M. Ahmad Soltani³

¹Pediatric/Neonatal Intensive Care Unit, Guilan University of Medical Sciences/17 Shahrvir Hospital, ²Pediatric/Neonatal Intensive Care Unit, Guilan University of Medical Sciences, ³Obstetrics & Gynecology, Guilan University of Medical Sciences/ Alzahra Hospital, Rasht, Iran

Objective: Recent data suggest that during mechanical ventilation, lateral patient position (in which the endotracheal tube is horizontal) decreases the incidence of bacterial colonization of ventilated neonates. The objective of this study was to evaluate the influence of lateral and supine position on bacterial colonization of endotracheal tube in neonates.

Methods: We conducted a prospective, randomized, clinical trial with 31 intubated neonates (intubated within 48 h after birth); 16 neonates were positioned supine (supine group), and 15 were maintained in the lateral position (lateral group). Tracheal aspirates were cultured in second and fifth days of mechanical ventilation. Data were analyzed with SPSS version 16.

Results: In the 2nd day of ventilation, positive cultures were recognized in 6.2 % of supine group and 6.7 % of lateral group. After 5 days, tracheal cultures were positive in 25 % (4 neonates) of supine group and 13.3 % (2 neonates) of lateral group that was not statistically significant ($P = 0.9$ in second day and $P = 0.9$ in the fifth day). The most common organisms isolated from tracheal aspirates were Gram-negative rods (*Klebsiella*).

Conclusion: Since respiratory contamination is very common among ventilated neonates and the effect of lateral position on bacterial colonization of endotracheal tubes of intubated neonates was not established in our study, further studies are required to suggest ways to decrease bacterial colonization of intubated neonates.

410 – POSTER SESSION

THE EFFECTS OF NOISE RECOGNITION EDUCATION ON NOISE LEVELS IN THE NICU

E.K. Jang, R. Namgung, E. Jang, J. Ehum, S. Kim

NICU, Severance Children's Hospital, Seoul, Republic of Korea

Background: Excessive auditory stimulation is well-known to cause stress response in premature infants. An exposure to continuous and loud noise is also associated with hearing loss of premature infants with the immature auditory system.

Objective: The purpose of this study is to investigate short and long term effects of a noise recognition educational program (NREP) on noise levels in the NICU.

Design/methods: To decrease noise level in NICU environment, we provided NREP with all nurses and nurse aids working in the NICU

for 2 weeks. The hourly average noise levels in decibels (dB) was measured 2 days and 2 weeks after education for short term effect and 1 year after education for long-term effect.

Results: Mean noise-levels before education was 66.8(±2.94) dB. The mean noise level decreased to 61.5(±0.55) dB in 2 days($p < 0.001$), and 61.3(±0.95) dB in 2 weeks after education ($p < 0.001$). There was no difference in noise levels between 2 days and 2 weeks ($p = 0.010$). One year after education, the noise levels slightly increased to 64.25(±1.09) dB compared with the noise level on 2 weeks after education($p < 0.001$), but the noise level measured 1 year after education was still lower than mean noise-level before education ($p < 0.001$).

Conclusion: Noise recognition educational program is found to assist to reduce noise levels about 8.2 % for short term and 3.9 % for long term. Education effect lasted for 1 year ($p < 0.001$). We suggest that a regular periodic monitoring and education for nurses may be required to reduce the noise level in NICU.

411 – POSTER SESSION

MANIPULATING POSITIVE END EXPIRATORY PRESSURE TO RECRUIT LUNG VOLUME IN MECHANICALLY VENTILATED CHILDREN

J. Jauncey-Cooke^{1,2}, F. Bogossian², C.E. East^{2,3}, T. Pham¹, C. Grant¹, A. Schibler¹, MCH Paediatric Critical Care Research Group

¹PICU, Mater Children's Hospital, ²School of Nursing & Midwifery, The University of Queensland, Brisbane, QLD, ³Dept. of Perinatal Medicine, The University of Melbourne, Royal Women's Hospital, Melbourne, VIC, Australia

Background: Mechanically ventilated children are at risk of chronic de-recruitment with low tidal volume ventilation and acute de-recruitment with each disconnection from the circuit and application of suction. Lung recruitment manoeuvres have demonstrated gain in end expiratory levels (EEL) in both adult and experimental studies.

Aim: To quantify the impact of two different methods of manipulating PEEP on EEL and regional gas distribution as measured by electrical impedance tomography (EIT).

Method: A randomised crossover clinical trial in 60 intubated and mechanically ventilated children in a PICU. Forty children underwent two methods of lung recruitment following endotracheal suctioning: a double baseline PEEP manoeuvre—held for 2 min and an incremental PEEP manoeuvre, each step held for 1 min. Twenty children acted as controls. EIT measurements to quantify EEL were taken at baseline and at 15 min intervals throughout the study period.

Results: The Double PEEP manoeuvre showed significant and sustained improvement in global EEL from baseline up to 120 min ($P < 0.01$ ANOVA). Global EEL did not change with the Incremental PEEP manoeuvre or in the control group. The Double PEEP manoeuvre also demonstrated preferential ventilation distribution towards the dependent regions of the lung ($P = 0.03$ ANOVA). Nil adverse events were observed.

Conclusion: Significant increases in EEL were achieved globally with a simple Double PEEP manoeuvre. Distribution of ventilation in dependent regions also increased, suggesting genuine alveolar recruitment that was sustained for up to 120 min.

412 – POSTER SESSION

FACTORS INFLUENCING THE FORMATION OF SEVERE HYPERBILIRUBINEMIA IN NEWBORNS IN NORTHERN CHINA

M. Jiang

Beijing Children's Hospital of Capital University of Medical Sciences, Beijing, China

Objective: This study aimed to analyze genetic mutation and clinical diseases associated with the formation of severe hyperbilirubinemia in newborns.

Method: Northern China infants suffering from hyperbilirubinemia admitted in the neonatal ward of Beijing Children's Hospital from March 2011 to 2012 were selected. The experimental group consisted of infants with peak level of serum bilirubin higher than 342 $\mu\text{mol/L}$ 14 days after birth. The control group consisted of term infants and premature infants with 220.5–342 and 256.5–342 $\mu\text{mol/L}$ peak level of serum bilirubin 14 days after birth, respectively. A logistic regression model was used to analyze the factors influencing severe hyperbilirubinemia in newborns, including infection, asphyxia, cephalohematoma, premature birth, ABO or RH hemolysis, inherited metabolic diseases, as well as mutagenic factors of UDP-glucuronoyltransferase1A1 (UGT1A1) gene 211 locus and organic anion transporter 2 (OATP2) gene 388 locus.

Result: The experimental group consisted of 97 patients and the control group consisted of 105 patients. Infection was the most common cause of severe hyperbilirubinemia in newborns. Logistic regression analysis showed that only the mutagenic factors UGT1A1 gene 211 locus and OATP2 gene 388 locus had a statistical difference between the experimental group and control group.

Conclusion: Mutations of UGT1A1 gene 211 locus and OATP2 gene 388 locus may be the main cause of severe hyperbilirubinemia.

413 – POSTER SESSION

PREVENTION OF CORNEAL ABRASIONS IN CRITICAL CARE TRANSPORT

R. Kent, F. Rajah

Embrace, Sheffield Children's NHS Trust, Barnsley, UK

Background: Corneal abrasion is a concern for all children who are deeply sedated or receiving neuromuscular blocking agents whilst being ventilated. It is possible that the risks are increased during the transport process due to the increased frequency of patient intervention and patient movement during this time. A variation in practice has been observed in corneal abrasion prevention strategies within Embrace Transport Service*. There are no guidelines within this area of practice.

Objectives: To establish the incidence and type of corneal abrasion strategy use within critical care transport. Provide evidence for the formation of guidelines.

Method: All Embrace medical and nursing staff were given a questionnaire to complete consisting of 10 questions.

Results: There were 39 replies (100 % response rate). 97 % of staff can list corneal abrasion strategies, but currently only 3 % consider it for neonates and 18 % consider it for children they transfer ventilated.

For both neonates and paediatrics six different varieties of eye protection are currently used including passive closure, no eye protection, Geliperm, lacrilube, tape and eye drops. No consultants or medical trainees had received education on corneal abrasion prevention.

Conclusions: Inadequate eye protection is used in both neonatal and paediatric transport. Guidelines are required for consistency. Education and training is required within this area. *Embrace is Yorkshire and Humber Infant and Children's Transport Service.

414 – POSTER SESSION

NEWBORNS OPEN-SYSTEM ENDOTRACHEAL SUCTIONING METHODS APPLICATION IN ESTONIAN CHILDREN INTENSIVE CARE UNITS

S. Läänelaid¹, R. Sommer², A. Saareall²

¹Tartu Health Care College, ²Tartu University Hospital, Tartu, Estonia

Aim of the study: To describe the open-system endotracheal suctioning methods in newborns in Estonian children intensive care units. The research sample consisted of intensive care nurses of "Tartu University Hospital Anaesthesiology and Intensive Care Clinics Children ICU" and of "Tallinn Children Hospital ICU". Data was collected during 2 months in 2011 using survey protocol and questionnaires.

Knowledge and experience of participants on preparatory activity prior to open-system suctioning varied: half of them carried out the appropriate hand hygiene, however, all subjects used gloves prior to suctioning; None of them performed newborns' chest auscultation in practice to comprehend pulmonary assessment; Majority of them performed preoxygenisation prior to the suctioning process, but mistakes occurred in using higher oxygen value than prescribed in current research recommendations. Most participants chose appropriately sized catheter for the size of endotracheal tube.

Most participants used saline prior to suctioning; completed the procedure in 15 s and made up to three passes per episode to remove tracheal secretions. Observation revealed that all participants started the suctioning process when the catheter felt resistance and, according to questionnaire, knew to advance the catheter to the carina and withdraw it 1 cm before applying suction. All used negative pressure only in withdrawing catheter from the endotracheal tube.

After suctioning no nurse performed newborns' chest auscultation to assess the efficacy of the suctioning. Almost all assessed newborns' cardiopulmonary status before, during and after the endotracheal suctioning procedure; increased FiO_2 levels to pre-suctioning value after the stabilization of newborns' cardiopulmonary status.

415 – POSTER SESSION

NURSE LED WEANING AND EXTUBATION ON PICU: A SURVEY OF THE PERSPECTIVES OF MEDICAL STAFF

B. Lakin¹, A. Scally¹, L. Tume^{1,2}

¹Department of Paediatric Intensive Care, Royal Liverpool Children's NHS Foundation Trust, Liverpool, ²University of Central Lancashire, Preston, UK

Objectives: Nurse led weaning and extubation is established on our PICU with 40 nurses having completed comprehensive training. Nevertheless, there is a perception that it is underutilized. The process is being reviewed to identify problems with the process and barriers to greater implementation. As part of this review we carried out a survey of medical staff perceptions on our PICU.

Methods: An electronic survey consisting of open and close ended questions was sent to our medical staff.

Results: The response rate was 46 % with responses from PIC consultants (n = 5), speciality trainees (n = 3), registrars (n = 5) and advanced nurse practitioners (n = 4). Median experience on PICU was 3.5 years (range 1 month–25 years).

All respondents were aware of the process. Only 2/17 (12 %) expressed concern—relating specifically to extubation. Most (15/16 (94 %)) stated that ventilator duration might be reduced by more nurse led weaning.

Several important qualitative themes emerged. Nurses qualified to wean were infrequently identified at the start of shift. Low awareness often results in difficulty in encouraging and supporting the process—suggestions including greater nursing and medical proactivity and implementing organisational changes. Other themes were—the protocol itself is too restrictive and that partnership/communication during the process is vital.

Conclusions: Medical staff view nurse led weaning positively but identified that the process, communication and partnership could be improved. Together with a similar survey of nursing staff, we hope to improve the process for all involved. We hope that this will result in improved patient care.

416 – POSTER SESSION

NURSING INTERVENTIONS IN A NEWBORN WITH A CONGENITAL DIAPHRAGMATIC HERNIA (CDH) IN EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO)

R. Marques, Z. Soares, **M. Vieira**

Paediatric Intensive Care Unit, CHLN: Hospital de Santa Maria, Lisbon, Portugal

Background and aims: Congenital diaphragmatic hernia (CDH) is an anatomical defect of the diaphragm, frequently associated with significant pulmonary complications and mortality, due to protrusion of abdominal viscera into the chest cavity. We aim to describe the case of a 38-week-old female child with prenatal diagnosis of left-sided CDH with hypoplastic left lung and pulmonary hypertension. High frequency oscillatory ventilation and inhaled nitric oxide were started at birth, but she maintained persistent hypoxemia. By the 12-h of life, she was started on veno-arterial extracorporeal membrane oxygenation (ECMO-VA) and transferred to Paediatric Intensive Care Unit (PICU). On day-4 she underwent CDH repair surgery. On day-12 she was submitted to thoracotomy because of thoracic hematoma. ECMO was delivered for 27 days, two circuit changes were necessary due to coagulopathy issues. Nurses maintained closed monitoring with checklist verification at least every 2 h to assure that the extracorporeal technique was uneventfully. The child left the PICU after 2 months and 12 days, with non-invasive ventilation support and a normal neurological status.

Method: Analyse the importance of nursing interventions in ECMO through a case study format.

Conclusion: This case demanded for a highly skilled multidisciplinary team. Nurses, on their own, have very important roles in different steps of the treatment, from the ECMO cannulation to the systematic evaluation of the newborn's overall condition, the

treatment and the life support efficiency. Moreover, nursing interventions are directed to promote the child's rest and well-being in a safe environment, allowing time for healing.

417 – POSTER SESSION

PROTOCOLS IN PICU: THE REALITY IN OUR UNIT

R. Marques, H. Oliveira, M. Ferreira, J. Rios, F. Abecasis, A. Gomes, A. Ferreira, I. Rodrigues, **M. Vieira**, P. Evangelista

Paediatric Intensive Care Unit, CHLN: Hospital de Santa Maria, Lisbon, Portugal

The application of protocols in a Paediatric Intensive Care Unit (PICU) improves the critical care and promotes a better outcome in different areas of interventions. The aims of these protocols are to define a set of procedures that, when implemented together and involving the multidisciplinary team, can further enhance patient care. In our PICU we are currently implementing three new performance protocols, namely Enteral Feeding, Pain Management and Fever Management. The first one provides a focused approach to reach children's individual nutritional needs according to their clinical condition and to allow greater autonomy for professionals in order to achieve nutritional objectives in a more effective way. The second one aims a faster and more efficient pharmacological intervention towards pain according to the score determined by the different scales evaluation. The last one was implemented to better treat fever according to the specific disease, recognizing that in some cases higher temperatures can have a protective role, while in other cases it should be aggressively treated. In the future we want to assess how these protocols can change our daily practice.

Identify the main benefits of protocol implementation in our PICU. Using guidelines and evidence-based interventions to design unit protocols. Based in scientific knowledge, on bundles research and in our practice results, three protocols were developed in our PICU in order to standardize the procedures in enteral feeding and in pain and fever management. The success of this implementation relies on the effort of all the health professionals.

418 – POSTER SESSION

PHARMACOLOGICAL INTERVENTION GUIDELINES TOWARDS PAIN IN A PICU

R. Marques, Â. Ferreira, I. Rodrigues, J. Rios, M. Ferreira, **M. Vieira**

Paediatric Intensive Care Unit, CHLN: Hospital de Santa Maria, Lisbon, Portugal

Background and aims: The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.” Whether acute or chronic pain, health professionals should be aware that this induces unbearable suffering that reflects negatively in the child's welfare. Its treatment is, therefore, clinically and ethically required. Given the importance of an effective pharmacological intervention towards pain in a Paediatric Intensive Care Unit (PICU) setting, pain management guidelines were developed by a multidisciplinary team of paediatric

intensive care professionals and are being implemented since December 2012. It is our purpose to reduce the incidence and severity of pain in all paediatric patients admitted in the PICU.

Methods: The guidelines are based on both behavioral and self report evaluation of pain using different scales according to the child's age, development and clinical status. Such instruments allow the record of a pain score as the fifth vital sign, supplemented by its subjective characterization, pharmacological and non-pharmacological interventions undertaken and their effectiveness.

Results: Based on the resulting score, the nurse is free to change the prescribed analgesic therapy infusion within a pre-established range.

Conclusion: With the implementation of these guidelines we hope to achieve a faster and more efficient pain management as it focus on a systematic and reproducible evaluation process.

419 – POSTER SESSION

NEONATAL OUTCOMES IN PRETERM PRELABOUR RUPTURE OF MEMBRANE <24 WEEKS AT ABERDEEN MATERNITY HOSPITAL

N. Masand, L. Thomas, L. Crichton

Obstetrics and Gynaecology, Aberdeen Royal Infirmary, Aberdeen, UK

Introduction: Preterm prelabour rupture of membranes (PPROM) before 24 weeks complicates <1 % of pregnancies. This study was conducted to identify risk factors that predispose to PPRM, the survival rates, short term outcomes and complications in neonates.

Methods: A retrospective case note review of all singleton pregnancies complicated by PPRM between 15 + 2 and 24 + 0 weeks of gestation between Jan 2008 and Nov 2012.

Results: A total of 32 cases were identified. The median gestation at PPRM was 21 weeks. Six patients opted for termination of pregnancy. Of the 18 live births, all received antibiotics and most (83 %) received a full course of steroids. Three patients received only one dose of steroids. 61 % had spontaneous vaginal delivery. The average gestation at birth was 26 + 4 weeks. Mean interval from PPRM to delivery was 35 days. All of the 18 babies suffered from RDS at birth. Of the 12 survivors to discharge, 64 % had chronic lung disease, 25 % developed seizures and 20 % had a significant intracerebral bleed. Only 2 patients went home with no co-morbidities.

Discussion: Preterm prelabour rupture of membranes is associated with high perinatal morbidity and mortality. Survival is more directly related to the timing of delivery, than the specific gestation of PPRM, providing PPRM occurs beyond 18 weeks gestation. Multidisciplinary counselling is essential so that patients can make informed decisions regarding their pregnancies.

Reference:

1. Azria E et al (2012) Comparison of perinatal outcome after pre-viable preterm prelabour rupture of membranes in two centres with different rates of termination of pregnancy. *BJOG* 119:449–457.

420 – POSTER SESSION

CIRCUMCISION IN MALES WITH BLEEDING DISORDERS

A. Modarresi

Pediatrics, Mashhad University of Medical Sciences, Mashhad, Iran

Introduction: Male circumcision practice is an invasive procedure that is using worldwide. It makes challenges to haemostatic system and its possible haemorrhagic side effects are more serious in bleeding individuals than normal subjects.

Aim: We aim to documentation type of coagulation therapy and post circumcision practice haemorrhagic presentation among 463 bleeder males of both common and rare bleeding disorders in north eastern part of country.

Methods: We retrospectively gathered information using evaluation medical records in three major hospitals during last 15 years and list of patients with bleeding disorders that obtained from haemophilia center. Also a call phone established for each bleeder person to complete data and updating of them. The survey took time from September 2009 to March 2011. The designed question form included data on doing circumcision or not, types of treatment before and post the procedure and occurrence of bleeding episodes after the surgery.

Results: Overall among 424 cases with various common and rare bleeding disorders who had circumcised, 239 cases (56.3 %) had passed the procedure with bleeding experience (indication of undiagnosed cases who underwent circumcision or inadequacy of coagulation therapy), while 185 cases (43.7 %) had passed it successfully and without noticeable bleeding experience. The types of coagulation therapy in each group have been cited.

Conclusion: The circumcision practice in unequipped medical center for bleeder ones may make challenges for them and medical services. Also it needed supervision of expert haematologist for adjusting treatment to ensure control of unwanted bleeding.

421 – POSTER SESSION

EXPOSING ROLES: A STUDY INTO SENIOR PICU NURSES' EXPOSURE TO VARIED ROLES IN A TERTIARY PICU

M. Norridge^{1,2}

¹PICU, Evelina London Children's Hospital, ²Child & Adolescent Nursing, King's College London, London, UK

Background and aims: Government policy and research evidence supports the suggestion that to maintain ICU skills and competency, nursing staff must care for a sufficient number of children needing level 2 care or above (DH 1997, Reddish & Kaplan 2007). The aim of this study was to investigate the exposure of senior PICU nurses to this group of patients and other role in a tertiary level PICU.

Methods: Routinely collected nurse allocation data from the paediatric intensive care unit (PICU) at the Evelina London Children's Hospital was retrospectively analysed for two time periods in 2005 and 2010. The frequency the roles: In-charge Nurse, Cardiac Bay Coordinator, Retrieval Nurse, Looking after level 2 and level 3 patients, were undertaken by each Senior Staff Nurses and Sisters were specifically studied.

Findings: The analysis exposed inconsistencies in nursing exposure to different roles. While this exposure improved in 2010 this did not reach statistical significance ($p = 0.42$). Notably the most senior nurses had reduced exposure to some roles, particularly caring for patients with increased acuity levels (2 % of allocations).

Conclusions: The inconsistency in role exposure has highlighted the need for greater consideration of roles undertaken by staff in performance management. Presentation of role exposure has become a routine part of the annual appraisal and review process. It is hoped that this will result in staff having a greater awareness of their practice.

422 – POSTER SESSION

TO EXPLORE THE NEONATAL CLINICIANS' BELIEFS AND ATTITUDES TOWARDS CARING FOR DYING NEONATES IN TAIWAN

N.-H. Peng¹, C.-H. Chen², H.-L. Liu¹, H.-Y. Lee³, H. Huang⁴, Y.-C. Chang⁵, S.-Y. Wu¹

¹Nursing College, Central Taiwan University of Science and Tech.,
²Taichung Veterans, ³Nursing Department, Chang Bing Show Chwan Memorial Hospital, ⁴School of Nursing, China Medical University, Taichung, ⁵Department of Mathematics, Tamkang University, Tamsui, Taiwan R.O.C.

Objectives:

- (1) To explore attitude and beliefs of neonatal clinicians toward nursing care for dying neonates;
- (2) To estimate the influence of neonatal clinicians' personal and professional characteristics on their attitudes towards end-of life care for dying infants;
- (3) To compare the attitudes and beliefs of neonatologists and nurses towards providing end-of-care for dying neonates.

Design: A cross-sectional design was used. A questionnaire was used to collect data from 103 neonatal clinicians in neonatal intensive care units (NICU).

Research results: A total of 24 physicians and 79 neonatal nurses were recruited from three level III NICUs at three medical centers. Research findings identified nine barriers hindering neonatal palliative care practice. 68 % participants agreed their personal attitudes about death affected their willingness to deliver palliative care ($n = 71$). Nurses more often than physicians agreed that staff go beyond what they feel comfortable with in using technological life support ($Z = -2.017$, $p = 0.044$). Compared with nurses, physicians slightly more often noted the lack of in-service education for offering support and communicating with parents of dying babies ($Z = -1.956$, $p = 0.05$). Research also found that cultural issues and religion were considered important by the majority of respondents in their effect on the neonatal clinicians' attitudes and beliefs towards caring for dying infants.

Conclusion: Further studies are needed to explore each barrier and to provide the in-service neonatal palliative care educational programs that are needed to decrease these barriers.

423 – POSTER SESSION

ENERGY EXPENDITURE IN PRETERM INFANTS DURING PERIODS OF ENVIRONMENTAL STRESS IN NEONATAL INTENSIVE CARE UNITS

N.-H. Peng¹, C.-H. Chen², J. Bachman³, H.-C. Lin⁴, L.-C. Huang⁵, T.-C. Li⁶

¹Nursing College in Central Taiwan University of Science and Technology, ²Division of Neonatology, Division of Neonatology in Taichung Veterans General Hospital, Taichung, Taiwan Republic of China, ³College of Nursing, University of Missouri, St. Louis, MO, USA, ⁴Division of Neonatology, Division of Neonatology in China Medical University Hospital, Taichung, Taiwan, ⁵School of Nursing, China Medical University, Taiwan and Adjunct Educational Supervisor, China Medical University Hospital, ⁶Graduate Institution of Biostatistics, China Medical University, Taichung, Taiwan Republic of China

Object: The research aims are to explore the energy expenditure in a group of preterm infants during the periods of environmental stress and to explore the relationship between energy expenditure and physiological signals of preterm infants.

Methods: Research design was an explorative secondary analysis research data from 37 preterm infants which included physiological signals and environmental stressors in neonatal intensive care units. The current study investigated the data of energy expenditure calculated using the heart-beats of preterm infants during the periods of environmental stress.

Results: A significant positive relationship between energy expenditure and different levels of nursing intervention was found (intervention 2, $p = 0.011$; intervention 3, $p < 0.0001$; intervention 4, $p < 0.000$; intervention 5, $p = 0.016$). The energy expenditures for different levels of nursing interventions were higher than for no intervention status, after adjusting for the effects of other factors. In addition, there was a significantly negative relationship between energy expenditure and oxygen saturation ($p < 0.001$), after adjusting for the effects of time, incubator noise, and light.

Conclusion: These research results confirmed that environmental stressors may impact the outcomes of growth and developmental outcomes in preterm infants by increasing their energy expenditure. Neonatal clinicians should minimize the environmental stressors in NICUs for decreasing the energy expenditure in preterm infants.

424 – POSTER SESSION

THE EDUCATIONAL NEEDS OF TAIWANESE NEONATAL NURSES REGARDING NEONATAL PALLIATIVE CARE

N.-H. Peng¹, C.-H. Chen², M.-C. Lee³, C.-C. Sheng⁴, L.-C. Huang⁵, S.-Y. Wu⁶

¹Nursing College in Central Taiwan, Taichung, ²Diversion of Neonatology in Taichung Veterans General Hospital, ³Chief of Diversion of Neonatology, Buddhist Tzu Chi General Hospital, ⁴Department of Nursing, Taipei Veterans General Hospital, ⁵School of Nursing, China Medical University, ⁶Nursing College in Central Taiwan University of Science and Technology, Taichung, Taiwan Republic of China

Objective: The purpose of this study was to explore neonatal nurses' experiences caring for dying neonates and their educational backgrounds regarding the palliative care, and to assess their educational needs of neonatal nurses regarding the neonatal palliative care.

Methods: A cross-sectional survey was used for this research. A research structural questionnaire was used to investigate different the different research goals.

Results: Research participants were 115 nurses in this survey. Few participants indicated having received neonatal palliative care education (13 %). Most participants responded that palliative care is necessary in neonatal nursing education (97.4 %). Participants responded that they were often or always exposed to death in NICU (62.6 %). However, few participants reported that they provided pain management to dying neonates (8.7 %) and also had few experiences on providing symptomatic care for dying neonates (19.1 %). fifty percent ranked "pain control" as the area in which they most require neonatal palliative care training. Another highly-ranked item was the discussion with parents and families about the outcomes of CPR and their neonate's progress.

Conclusion: Research results indicate that the education provided to neonatal nurses did not meet their distinctive needs. Neonatal nurses in Taiwan expressed an urgent desire for training in pain control and communication. Research results suggest that the most important topics

to trainees are pain management and end-of-life communication; additionally, non-pharmacologic pain control interventions may be important to learn and should be included in an educational program.

425 – POSTER SESSION

WHAT IS THE MANAGEMENT OF PAIN IN PREMATURE NEWBORN IN ANY ITALIAN NEONATAL INTENSIVE CARE UNITS (NICUS)?

F. Petrangeli, L. Borgia, R. Alvaro

School of Nursing, University Tor Vergata, Rome, Italy

Background and aims: Newborn in the NICUs undergo painful and stressful procedures and pain experienced during the neonatal period may lead to negative outcomes, especially in preterm neonates. Many studies have shown that pain induced by these procedures is not effectively prevented or is inadequately treated. The purpose of our study was identify the current medical and nursing practices in the assessment, management and treatment of procedural pain in premature newborn in same Italian NICUs.

Methods: A 35-item self report questionnaire was sent to 75 NICUs in Italy from October 2010 to October 2011. The main sections of the questionnaire were the following: information about hospital, assessment, management and treatment of pain. Frequency distribution, average value, median and range were computed.

Results: A total of 22 NICU (29 %) responded to the questionnaire. Data showed that the systematic evaluation of pain in premature newborn is still limited, non-pharmacological techniques are more prevalent than previous studies, but the use of kangaroo position and participation of parents are still not widespread, the use of analgesia and sedation is still rather low.

Conclusions: Hospitals should promote new policies and improve pain protocols in premature newborn with non-pharmacologic pain management techniques as the saturation sensory, non-nutritive sucking, breast-feeding or Kangaroo Mother Care. Furthermore the pharmacological treatment for pain by procedure should ensure both a sedation that effective analgesia, and nurses should always apply strategies such minimal touch, gentle handling, wrapping.

426 – POSTER SESSION

IMPACT OF PHYSICIANS' DEFINITIONS OF LIVE BIRTH ON INFANT MORTALITY RATE IN NEW YORK CITY

S. Ramsay

Binghamton University, Oxford, NY, USA

In 2008 a survey was conducted among obstetricians and neonatologists in administrative roles in New York City maternity hospitals that have neonatal intensive care units. The survey compared the physicians' definitions of live birth and fetal death, the gestational age at which they consider infants viable, their resuscitation practices for infants born at <28 weeks gestation and their practices for extremely premature labor and delivery.

This study uses the result of the 2008 survey and specified variables from the linked live birth/infant death data sets for 2007–2009 from New York City Department of Health and Mental Hygiene to

examine the impact of physicians' live birth definitions on the infant mortality rate in New York City maternity hospitals.

Hospitals whose neonatologists report that they follow the New York City reporting requirement and report all live births regardless of gestational age had mortality rate for infants born at <23 weeks gestation that was six times that of hospitals whose neonatologists reported that they include gestational age as part of their live birth criteria and as a result do not follow the New York City reporting requirement.

This study highlights the impact of the gap between clinical practices and reporting requirements for live birth. Whereas reporting requirements are based on definitions of live birth and fetal death, physicians make resuscitation and other clinical decisions regarding extremely premature infants based on definitions of viability and these resuscitation practices can impact infant mortality data.

427 – POSTER SESSION

NEEDS AND EXPECTATIONS, QUESTIONED AND CHALLENGED

G. Royé¹, M.J.J. Willemsen², J.M. Wielenga²

¹Emma Children's Hospital, ²Emma Children's Hospital, Academic Medical Centre, Amsterdam, The Netherlands

Objectives: This study answered the question which occupational needs nurses have in the working relationship with the unit management on the Neonatal Intensive Care Unit (NICU), of the Emma Children's Hospital (ECH). Answering this question will be the first step for the unit management to reduce the distance and estrangement that now exists within the work relationship with the nurses.

Methods: Focus group interviews (12 participants), personal interviews (12 participants) and a questionnaire among 100 nurses (82 % response) led to the composition of a top ten work-related needs.

Results: This study revealed that the unit management hardly meets the occupational needs of nurses within the work relationship. The main needs are clustered around the themes 'focus on the individual', 'focus on employability' and 'focus on communication' and serve as a basis for unit policy.

Conclusion: Based on this study the unit management should take the responsibility to meet the needs of the nurses by focusing on duty roster, a shared vision and an age-conscious human resource policy. On the other hand the unit management should point out the nurses own responsibility and the importance of a proactive attitude. An open discussion with the nurses, based on the revealed needs and awareness of interdependence, is an important first step. Not only to reduce the distance but also to restore the individual contact and thereby improving the team development and spirit.

428 – POSTER SESSION

TRANS CUTANEOUS BILIRUBINOMETRY FOR PRETERM

N. Sajjadian¹, R. Jahadi², N. Sajjadian¹

¹Pediatric, Tehran University of Medical Sciences, ²Surgery, Hormozgan University of Medical Sciences, Tehran, Iran

Hyperbilirubinemia is a common problem during neonatal period especially for preterms. Transcutaneous bilirubin measurement (TCB) by special devices had been documented as an effective tool for predicting neonatal jaundice in full term neonate, but for preterm infant the present evidences are controversial. We carried out a prospective study in Shariati Hospital NICU. 126 paired TCB/TSB measurements were obtained. TCB (on forehead and sternum) were obtained by JH2-1A device for every admitted preterm infant who clinically showed jaundice and total serum bilirubin (TSB) measurements was obtained within 30 min of TCB. 58 (46 %) were male and 68 (54 %) were female. The mean gestational age was 31 week and mean birth weight was $1,728 \pm 60$ gr. 30 % of neonates were ill. The mean value obtained by TBS was 8.8 mg/dl and for frontal TCB was 8.2 mg/dl and for sternal TCB was 7.4 mg/dl. There were good correlation between TBS and TCB and the maximum correlation were seen in 33–37 weeks of gestation and birth weight more than 2,500 gr with forehead TCB measurement. Healthy preterms had significant correlation of TSB and TCB ($r = 0.56$, $p < 0.001$) and ill preterm neonate had $r = 0.82$, $P < 0.001$. The correlation between TBS and TCB with and without phototherapy was $r = 0.66$, $p = 0.000$ and $r = 0.69$, $p = 0.000$, respectively. Although TCB measurement may underestimate TBS but there is significant correlation between TCB and TBS in preterms even in ill neonate or who receiving phototherapy and so reduces the number of blood sampling in preterm.

429 – POSTER SESSION

‘A STUDY OF NEONATAL JAUNDICE, RISK FACTORS IN NEONATES IN URBAN HOSPITAL OF RAJASTHAN’ INDIA

M.L. Sharma

WHO NPSP, Bikaner, India

Aims and objectives:

- (1) To study the incidence, etiology and outcome of neonatal jaundice in inborn babies at the Urban Private Hospital.
- (2) To identify factors determining the severity of hyperbilirubinemia DESIGN Retrospective analysis.

Materials and methods: We retrospectively evaluated all consecutive births babies with a diagnosis of neonatal jaundice at the Urban Private Hospital in 1 year. Infant with significant jaundice Investigation obtained in all cases with significant jaundice included maternal and neonatal blood groups, serial level of total serum bilirubin, direct bilirubin, hemoglobin and hematocrit. Case records of all new born infants were evaluated for details of the maternal, antenatal history, labor and mode of presentation and therapy of jaundice in the just 7 days of life. Cases were categorized according to the principal diagnosis.

Results: Out of total 940 live birth 50 newborn developed significant jaundice. 68 % were male, 32 % were female, 40 % were preterm and 56 % term, 4 % post term. 58 % had weight $>2,500$ g while 32 % had weight in range of 2001–2,500 g and 10 % had weight in range of 1,501–2,000 and $<1,500$ g. 10 % had onset within just 24 h, 70 % within 24–72 h and 20 % with onset >72 h. The diagnostic categories are idiopathic 32 %, sepsis 18 %, ABO incompatibility 22 %, Rh incompatibility 14 %.

Summary and conclusion: In summary significant neonatal jaundice occurred in about 4.5 % of live birth. 68 % were male and 40 % were low birth weight. Most common cause is haemolytic jaundice, ABO incompatibility is 22 %. Infection accounted in large proportion.

430 – POSTER SESSION

NURSES’ VIEWS ON APPROACHING PARENTS ABOUT RESEARCH WITHIN THE PICU

S. Siner, L. Byrne, E. Scott

PICU, Alder Hey Children’s NHS Foundation Trust, Liverpool, UK

Background: The number of research studies conducted in PICU is increasing [1,2]. PICU nurses worry about approaching parents regarding research at this stressful time.

Aims: To examine nurses’ views about approaching parents on PICU regarding research.

Methods: A 17 item electronic survey was sent to all nurses on the PICU regarding their views on approaching parents for research trials.

Results: 76 of 153 [50 % response rate] nursing staff completed the survey adequately representing the nursing demographic. 95 % of respondents had worked on PICU for 1 year or more.

91 % of respondents thought parents should be approached, although only 39 % thought this approach should be within 12 h of admission. Selected studies had ethical approval for deferred consent; 89 % of respondents replied that this was acceptable practice; however 48 % of this subgroup stated “it does not always feel right”.

The respondents were asked to rate five factors which might influence their view about when parents should be approached regarding research: the parent’s emotional state (100 %) and the child’s clinical condition (96 %) were highlighted as the most significant factors to consider when approaching parents.

Conclusion: The majority of nurses believe that approaching parents about research on the PICU is appropriate practice. However the parents’ emotional state and the child’s clinical condition significantly influence their views on the necessity and timing of this approach.

References:

1. MHRA/Department of Health (2004) Strategy on Medicines for Children.
2. The Health and Social Care Bill (2011) Factsheet C8 Embedding research as a core function of the health service.

431 – POSTER SESSION

IS THE ECHELLE DOULEUR ET INCONFORT NOUVEAU NE A VALID AND SENSITIVE TOOL FOR PAIN MEASUREMENT IN PRETERM NEONATES?

S. Steinnes¹, I. Schou-Bredal²

¹Neonatal Intensive Care Unit, Oslo University Hospital, ²University of Oslo, Oslo, Norway

Aim: To investigate if the Norwegian version of the EDIN scale is a valid and sensitive tool for assessing prolonged pain and/or discomfort in stable preterm neonates on mechanical ventilation or on nasal continuous positive airway pressure.

Methods: Two experienced nurses observed 33 preterm neonates eight hours each. Separate EDIN assessments were performed on 66 nappy change and repositioning (NCR) events and compared with assessments by the Premature Infant pain Profile (PIPP). Painful procedures such as suctioning and venepuncture were assessed by PIPP. Neonates received pain care according to unit policy.

Results: Infants gestational ages were mean 27, 1 weeks and mean postnatal age was 10, 8 days. Correlations were calculated between PIPP and EDIN on NCR 1 and NCR 2, and Spearman's rho were 0, 60 ($p < 0, 01$) and 0, 57 ($p < 0, 01$) respectively. The Intraclass Correlation Coefficient was used to calculate inter-rater reliability, and was moderate to poor. The highest ICC was found for the variable "quality of sleep" and the lowest for the variable "quality of contact with nurses". 20 of 33 had skin-to-skin contact with a parent (mean 129, 8 min) on observation day. The low EDIN scores suggest infants in non-pain situations.

Conclusion: The Norwegian version of the EDIN scale is recommended for assessing prolonged pain and discomfort in preterm neonates on ventilator support. When implementing EDIN in clinical practice, nurses should perform paired assessments during the implementation period to improve reliability.

432 – POSTER SESSION

PRENATAL CORTICOSTEROID THERAPY IN PRETERM INFANTS ≤ 32 WEEKS GESTATION: MULTICENTRE STUDY

S.M. Stoicescu¹, M.L. Ognean², A.S. Craciun³, L. Nastase⁴, O. Boanta², A. Stanescu³

¹Neonatology Dpt., Institute for Mother and Child Care, Obstetric and Gynecology Clinical Hospital Polizu, University of Medicine and Pharmacy Carol Davila, Bucharest, ²Neonatology Dpt., Clinical County Emergency Hospital, Sibiu, ³Neonatology Dpt., Cantacuzino Maternity, ⁴Neonatology Dpt., Institute for Mother and Child Care, Obstetric and Gynecology Clinical Hospital Polizu, Bucharest, Romania

The efficiency of antenatal corticotherapy in reducing RDS incidence, severity, and perinatal mortality in preterm infants has been clearly demonstrated.

Aim: Evaluation of the antenatal corticosteroid prophylaxis in preterm neonates ≤ 32 weeks gestation.

Materials and methods: We analyzed the data reported prospectively by three regional hospitals (A, B, C) between 01.01.2010 and 31.12.2011. The data of all preterm infants ≤ 32 weeks gestation were collected in the National Registry for RDS. The outborns were excluded from the analysis.

Results: During the period of the study 513 preterm infants were admitted in the 3 maternities, 413 inborn (213 in 2010, 210 in 2011). The study group had a mean GA of 29.44 ± 2.31 weeks and mean BW of $1,338.94 \pm 401.56$ g. 32.8 % of the infants received prenatal corticosteroids in 2010, and 38.1 % in 2011. Prenatal corticosteroid therapy was administered in 42.8 % in 2010 and 33.6 % in 2011 in the centre A, 29.8 % in 2010 and 23.4 % in 2011 in the centre B, 28.8 % in 2010 and 64.4 % in 2011 in the centre C. The mean GA at the last corticosteroid administration was: 28.04 ± 2.43 weeks (A), 29.35 ± 2.84 weeks (B), 30.15 ± 1.83 weeks (C), and 28.97 ± 2.52 weeks (the whole group). The time elapsed from the last corticosteroid dose and birth was variable, from 1 to 840 h (46.33 ± 96.64 h). No significant differences were found between the infants with and without prenatal corticosteroid prophylaxis as regards the infants' and pregnancies characteristics ($p > 0.05$, $r < 0.3$).

Conclusion: The analysis shows different attitudes towards prenatal corticosteroid prophylaxis in preterm infants and failure to complain guidelines.

433 – POSTER SESSION

EFFICIENCY OF PRENATAL CORTICOSTEROID THERAPY IN PRETERM INFANTS ≤ 32 WEEKS GESTATION: MULTICENTRE STUDY

S.M. Stoicescu¹, M.L. Ognean², A.S. Craciun³, L. Nastase⁴, O. Boanta², A. Stanescu³

¹Neonatology Dpt., Institute for Mother and Child Care, Obstetric and Gynecology Clinical Hospital Polizu, University of Medicine and Pharmacy Carol Davila, Bucharest, ²Neonatology Dpt., Clinical County Emergency Hospital, Sibiu, ³Neonatology Dpt., Cantacuzino Maternity, ⁴Neonatology Dpt., Institute for Mother and Child Care, Obstetric and Gynecology Clinical Hospital Polizu, Bucharest, Romania

The efficiency of antenatal corticotherapy in reducing RDS incidence and severity and perinatal mortality in preterm infants has been clearly demonstrated.

Aim: Evaluation of the impact of prenatal corticosteroids on the short term outcome in preterm neonates ≤ 32 weeks gestation.

Materials and methods: We analyzed the data reported prospectively by three regional hospitals (A, B, C) between 01.01.2010 and 31.12.2011. The data of all preterm infants ≤ 32 weeks gestation were collected by the National Registry for RDS and analysed using IBM SPSS Statistics 19. P was considered statistically significant when < 0.05 .

Results: The study group comprised 513 infants (100 were outborns, therefore excluded), had mean GA of 29.44 ± 2.31 weeks, mean BW of $1,338.94 \pm 401.56$ g, and 36.31 % received prenatal corticosteroids. No differences were found between preterm infants with or without antenatal corticosteroid prophylaxis as regards prenatal characteristics, pregnancy complications, birth resuscitation and incidence of perinatal complications except the need for surfactant administration, CPAP support, incidence of maternal fetal infections, ROP and severe ROP, all of which more frequently encountered in the group receiving corticosteroid prophylaxis ($p < 0.05$). Given these conflicting data, the analysis was done comparing only the infants that received a complete course of corticoids with those without any prophylaxis and we found decreased duration of CPAP and MV ($p < 0.5$), decreased need for CPAP and MV, reduced incidence of PDA, PVL, BPD, severe ROP and neonatal sepsis ($p > 0.05$) in those receiving prophylaxis.

Conclusion: Only a complete course of corticosteroids has significant favourable effects on the perinatal course of the small preterm infants.

434 – POSTER SESSION

PAIN IN INFANTS AND CHILDREN; FOCUS ON PHYSIOLOGICAL PAIN ASSESSMENT TOOLS

H. Storm

Medical Faculty, University of Oslo, Oslo, Norway

Background and objective: In the US it is mandatory to assess and treat pain. Similar guidelines are established in Europe. The objective is to discuss the physiological pain assessment tools for infants and

children and to conclude if they can fulfil a validated standard for pain assessment.

Methods: The physiological pain assessment tools for infants and children; heart rate (HR), peripheral oxygen saturation (only for infants), and emotional sweating (skin conductance responses/s (SCR/s)) are discussed according to the criteria from Berede (1).

Results: HR is influenced from respiratory rhythm, changes in blood volume status, drugs acting on the blood circulation, environmental temperature, and emotional stress, and is therefore less specific to pain than the SCR/s which only is influenced from emotional stress. For infants and children, the inter-individual variation for SCR/s is low compared to HR and peripheral oxygen saturation when the patients are at the same pain/discomfort level. Different from HR, SCR/s is not dependent of age. Both HR and SCR/s reacts immediately and works in real time. At patients postoperatively, at the intensive care units, and at the neonatal units, SCR/s has high sensitivity to monitor pain, but lower specificity. SCR/s is therefore most accurate to assess pain when compared to HR and peripheral oxygen saturation. All physiological pain tools should be used as adjunctive warning tools to correct against the lower specificity.

Conclusions: SCR/s is suitable for pain assessment if used as an adjunctive warning tool.

Reference:

Berede C (2009) *Anesthesiology* 111: 473–4.

435 – POSTER SESSION

UMBILICAL VENOUS CATHETERS: ANALYSIS OF TIP POSITIONING AND SUCCESS RATE OF PULL BACKS FROM HIGH POSITIONS OVER 2.5 YEAR PERIOD

K. Sujay Manoharan¹, J. Egyepong²

¹General Paediatrics, ²Neonatal Intensive Care Unit, Luton and Dunstable Hospital NHS Trust, Luton, UK

Background: Incorrect tip position of UVC is common and associated with higher complication rates. Success rate after ‘pull-back’ of high UVC tips is unknown.

Objectives: To determine

- Number of UVCs tips in ‘ideal’ positions.
- Tip positions after adjusting/‘pull-back’.
- Complications of sub-optimal tips.

Methods:

- Retrospective Review in a Tertiary NICU.
- From: January 2010 to June 2012.
- Review of initial and final positions after ‘pull-back’.
- Definitions used: Accepted tip =0.5 cm from Diaphragm; Malpositioned tip is defined as >0.5 cm above or below Rt. Hemi-diaphragm.

Results:

- UVCs done =209.
- Tip positions—15 % ‘ideal’, 23 % high, 62 % low.
- 47 High tips ‘pulled-back’: 10.6 % same, 40.4 % ‘ideal’, 48.9 % low.
- Complications observed: 1 rupture of the catheter into heart, 1 TPN-ascites, 4 cases of atrial thrombi, 1 case of 2 UVCs in same patient.

Fig. 1

Fig. 2

Conclusions:

- Poor ‘ideal’ position success rate.
- Tips around T8–T9 were in correct position (IVC diaphragmatic aperture).
- ~1/2 of high UVCs were ‘pulled-back’ into the liver.
- Very minimal complication rates.
- Care when estimating length to pull out.

436 – POSTER SESSION

OPEN AND CLOSED ENDOTRACHEAL SUCTION SYSTEMS IN INTUBATED NEONATES

P.T. Taheri, N. Asgari, M. Mohammadzadeh, M. Golchi

Pediatric Nursing Department, Faculty of Nursing and Midwifery, Isfahan, Iran

Background: The study aimed to review the effect of two open and close suctioning methods on respiratory parameters of infants undergoing mechanical ventilation.

Methods: In this cross-sectional clinical trial study, forty-four infants among the infants underwent mechanical ventilation in NICU of Isfahan’s Al-Zahra Hospital were selected by simple continuous sampling method. The samples randomly divided into two groups. In the first group; first, open suctioning and then after 3 h of cleaning,

closed suctioning was done and in the second group, first closed suctioning and after 3 h of cleaning, open suctioning was implemented and respiratory rate (RR) and percentage of arterial blood oxygen saturation was reviewed and compared before, during and after each type of suctioning. Data were analyzed using ANOVA with repeated measures and independent *t* test through Software SPSS 16.

Results: There was a significant difference between mean respiratory rate and arterial blood oxygen saturation in infants before, during and after the closed and open suctioning. The percentage of arterial blood oxygen saturation had a significant reduction in open method compared to closed method on the same time and immediately after suctioning and RR in 3 min after suctioning in both steps in open method.

Conclusion: Results showed that close method causes fewer changes in hemodynamic status of infants. Therefore, in order to prevent from respiratory complications in infants, nurses are recommended to perform the endotracheal tube suctioning in closed method.

437 – POSTER SESSION

PREDICTORS OF HOSPITAL MORTALITY OF EARLY INFANTS WITH SEPSIS

M. Vasiljevic

Institute for Neonatology, Belgrade, Serbia

Aim: Determination of predictors of hospital mortality in early infants with sepsis.

Materials and methods: The study included 68 preterm infants, 28–32 weeks of gestation, which are bacteriologically examined for the purpose of diagnosis of sepsis. The study group included 38 children with sepsis, and the control group included 30 children without sepsis.

The results: Between the groups, there was no significant difference with DAP (39.5 vs. 43.3 %, $p = 0.48$). Patients with sepsis were more likely to have anemia (100 vs. 86.7 %, $p = 0.020$) and were more likely reanimated (52.6 vs. 10.0 %, $p < 0.0001$) than patients in the control group. Patients with sepsis had a higher heart rate ($195.55 \pm 11.80/\text{min}$ to $154.75 \pm 27.52/\text{min}$, $p < 0.0001$), higher levels of CRP (15.13 ± 10.93 to $3.45 \pm 2.49 \text{ mg/l}$, $p < 0.0001$), higher EDD (14.99 ± 2.10 to $13.66 \pm 2.33 \text{ mm}$, $p = 0.016$) and left ventricular EDS (11.02 ± 1.19 to 10.80 ± 1.12 , $p = 0.005$), lower blood pH by Astrup (7.09 ± 0.12 to $7.28 \pm 0.04 \text{ mm}$, $p < 0.0001$), higher WBC count (18.68 ± 5.76 to 13.25 ± 3.58 , $p < 0.0001$), lower hemoglobin (155.95 ± 15.25 to 185.55 ± 41.76 , $p < 0.0001$) and a lower number of platelets in the blood (132 ± 41.76 to 201.97 ± 47.87 , $p < 0.0001$) than patients in the control group. Patients with sepsis had significantly higher hospital mortality (36.8 vs. 0 %, $p < 0.0001$) than patients without sepsis. In multivariate logistic regression, independent predictors of hospital mortality were resuscitation (OR = 7.91, $p = 0.049$), lower pH levels (OR = 0.10, $p = 0.039$) and a lower number of platelets in the blood (OR = 0.88, $p = 0.001$).

Conclusion: Independent predictors of increased hospital mortality in early infants with sepsis were resuscitation, lower blood pH and a low number of platelets in the blood.

438 – POSTER SESSION

THE STUDY ON THE EFFECT OF HBV INFECTED EMBRYOS ON PREGNANCY OUTCOME

X. Yang¹, Y. Feng¹, J. Yan², Y. Kong¹, X. Liu¹, X. Zhang¹, S. Lin¹, S. Zhang¹, L. Yi³

¹Department of Infectious Disease, Xi'an Jiaotong University,

²Shaanxi Provincial People's Hospital, ³Xi'an Jiaotong University, Xi'an, China

Background and objective: HBV vertical transmission is the main reason for chronic HBV infection, but there is no systemic conclusion about the effect of HBV infection on pregnancy outcome. This experiment is aimed to study the effect of HBV infected embryos on pregnancy outcome.

Methods: 75 couples who received ART treatment were followed up, among which 25 couples with at least husband or wife infected with HBV were group A, and 50 couples with negative serum HBV markers of both husband and wife were group B. The clinical pregnancy rate, early abortion rate, neonatal malformation rate, neonatal HBV infection rate, and HBV infection rate of 6-month-old infant of these two groups were compared, and Fisher's exact test was applied. HBV mRNA in abandoned embryos of the patients was detected by single-cell RT-PCR.

Results: Both early abortion rate and abortion rate with mother infected HBV in group A were significantly higher than that in group B ($P = 0.043$, $P = 0.030$), respectively. The clinical pregnancy rate, neonatal malformation rate, neonatal HBV infection rate, and HBV infection rate of six-month-old infants in group A and group B were all 0.

Specific HBV mRNA fragments were detected in 6 cases of 62 cleavage embryos in group A, and the positive rate was 9.7 % (6/62). The positive rate with mother and father infected with HBV were 13.2 % (5/38) and 5.6 % (1/18), respectively.

Conclusion: HBV infection can increase the early abortion rate of pregnancy, and the reason may be related with HBV infected embryos.

439 – POSTER SESSION

A STUDY ON STAPHYLOCOCCUS SPP. STRAINS ISOLATED FROM VENOUS AND URINARY CATHETERS IN NICU OF HAMADAN HOSPITALS, IRAN

R. Yousefimashouf¹, N. Molazadeh²

¹Department of Microbiology, ²Hamadan University of Medical Sciences, Hamadan, Iran

Background and aim: *Staphylococcus* coagulase negative strains are colonized on epiderm and distribute in environment and outer bodies apparatus such as protez and intera-venous catheters. The aim of this study was the frequency of *Staphylococcus* coagulase negative isolated from venous and catheters children hospitalized in NICU of Hamadan hospitals and determination of antibiotics resistance patterns in Hamadan, the west of Iran.

Methods: We collected 108 samples randomly from patients who were hospitalized in NICU hospitals of Hamadan and they needed to venous or urinary catheters. One specimen of each patient was taken and inoculated into carrier transported media and transferred to bacteriology laboratory to identification of strains. Antibigram was performed by Kirby-Bauer method. Data was analyzed using SPSS 15 software.

Results: Out of 108 tested samples, 32.7 % of patients had urinary catheter and 67.3 % had venous catheter. 28 % of tested samples had positive culture. The positive cases were significantly found in those children who had been used catheter more than 48 h ($P = 0.00$). From the positive cases, *Staphylococcus epidermidis* (40.4 %), *Acinetobacter baumannii* (10.6 %) and *E. coli* (8.5 %) were the most common isolates. The most rate of resistance of *Staphylococcus epidermidis* was against to erythromycin and ampicillin. The most rate of sensitivity of *E. coli* was against to gentamicin and *Pseudomonas aeruginosa* to ciprofloxacin.

Conclusion: Our results showed the high contamination in used catheters particularly in those patients who needed to catheter for long time. We also indicated the high drug resistance in strains isolated from catheters.

440 – POSTER SESSION

NOSOCOMIAL PATHOGENS IN NEONATAL INTENSIVE CARE UNIT

S.E. Youssef

Infection Control, Org PF Teaching Hospitals, Institutes, Alexandria, Egypt

Introduction: It is unrealistic to hope for a germ free NICU. The NICU hygiene is affected drastically by the medical staff and the internal environment.

This study will describe some of interactions between the laboratory and the improper housekeeping procedures.

Methods: The present study was conducted in NICU Damanhour Teaching Hospital. Where the cleanliness and sanitation was evaluated by bacteriological examination of the umbilical stump and the internal environment of the wards represented by floor, air, baby balance, baby heater, air condition device and baby care units.

Disinfectant till the air wards rapidly becomes saturated with H_2O_2 aerosol. Also suggested a safe new technique for cleaning and sanitation of baby incubators by washing and drying then using stabilized hydrogen peroxide/silver ions which changing to water and oxygen after use instead of formalin gas or other toxic disinfectants as glutaraldehyde 2 % or hypochlorite solution (125 ppm available chlorine) which they should be rinsed thoroughly with water. H_2O_2 process takes 45 min only instead of 48 h in case of formalin so we can save more lives by our limited number of baby incubators, also this safe technique succeeded 100 % in removing all pathogenic microorganism.

Conclusion: The study revealed failure of routine housekeeping process, and suggests protocol to control and prevent NICU nosocomial infections, it also proposed a new technique, for cleaning and disinfecting Wards and baby incubators which decreased the mortality and morbidity rates among neonates.

441 – POSTER SESSION

IN SITU SIMULATION

N.M. Zaid, I. Ostrovich

PCICU, Sheba Hospital Tel Hashomer, Ramat Gan, Israel

In situ simulation, simulation that is physically integrated into the clinical environment, provides a method of experiential learning to improve teamwork skills in high-risk areas. The purpose of the present study was to evaluate the impact of using in situ simulation on time response of the team to clinical emergency situations. Simulations training took place in actual clinical settings and the participants were on-duty during their actual workday. Every day an emergency practice took place based on advanced scenarios, in a designated room. The room is equipped with video cameras and a pediatric human patient simulator to create a realistic experience. 150 trainings were conducted and videotaped for documentation and debriefing. Each in situ simulation takes about 10–15 min. Training for the emergency situations became a daily routine. Response time decreased from a mean of 1 min 11 s. to a mean of 32 s. In situ simulation contributes to high-level team performance.

Training for the emergency situations became a daily routine. Response time decreased from a mean of 1 min 11 s. to a mean of 32 s. In situ simulation contributes to high-level team performance.

442 – POSTER SESSION

CONTINUOUSLY INTRAVENOUS PUMPING OF HEPARIN PREVENT DEEP VENOUS THROMBOSIS RELATED WITH CENTRAL VENOUS CATHETER

P. Zheng

Intensive Care Unit, Wuhan Asia Heart Hospital, Wuhan, China

Objective: To evaluate the effectiveness and safety of continuous intravenous pumping of heparin for the prevention of deep venous thrombosis related with central venous catheter after cardiac operation.

Methods: 112 infants of congenital heart disease (CHD) after surgery were divided randomly into two groups: experimental group and control group (age range: 0~3 months). Experimental group were treated with continuously intravenous pumping of heparin. The initial dose was 5 U/kg/h. Adjust the dose of heparin to maintain APTT from 55 to 60 s. Control group received intravenous pumping of physiological saline. Deep vein thrombosis were detected with Color Doppler ultrasound after 3, 7, 9, 14 days after surgery. Compare the rate of deep vein thrombosis and observe adverse reactions.

Results: Deep vein thrombosis was observed in three patients of control group. One patient had deep vein thrombosis in experimental group. The rate of deep vein thrombosis of two groups had statistical difference. Drainage in postoperative in two groups have no statistical difference.

Conclusion: Continuous intravenous pumping of heparin for the prevention of deep venous thrombosis related with central venous catheter after cardiac operation is safe and effective.

443 – POSTER SESSION

CREATIVE NATIONAL STANDARDS FOR CARING OF NEONATAL WHO NEEDS PHOTOTHERAPY, IN IRAN

S. Ziaei¹, M. Golchin¹, H. Heydari¹, S. Salehi²

¹*Pediatrics and Neonatal, Medical Sciences of Isfahan University,*

²*Nursing, Khorasgan Islamic Azad University, Isfahan, Iran*

Objectives: Infant mortality rate in developing countries is 15–30 per 1,000 birth. Regarding World Health Organization know essential practicable standards to provide for accurate practice in hospital and health centers so, Creating national care standards in intensive infant units are essential.

Methods: This is a multiple triangulation study done in the nursing and midwifery faculty of medical sciences of Isfahan University. First of all, international care standards were extracted from the net, of 10 different countries. Second, by using Delphe method, these standards were selected by a questionnaire as well as the viewpoints of 42 clinical experts in the country, and their suggestions regarding desirability and applicability of these standards and according to the executive and sociocultural situation in the country, were investigated through a descriptive method. Results of this stage were analyzed via descriptive statistics.

Results: Majority of the participants (40.5 %) had master degree 45.2 % of them were 36–45 years old, in addition, the majority of them had the practical experience of 2–10 years generally and 6–10 years particularly in the NICU. Finally, 14 standards related to caring during the phototherapy, according 97.5–100 % desirability rate were achieved.

Conclusions: In this study, final standards have been created. The results will be presented on site. Creating nursing standards by experts and deserved people, leads to the increase in the quality of nursing care.

Pharmacology (444–456)

444 – POSTER SESSION

NEONATAL HYPOGLYCEMIA AFTER MATERNAL USE OF LABETALOL

B.S. Blomjous, S.D. Sie, M.M. van Weissenbruch

Neonatology, VU University Medical Center, Amsterdam, The Netherlands

Background and aims: Labetalol is thought to be safe and effective to treat hypertension during pregnancy. Nevertheless, beta-adrenergic blockade of labetalol can result in hypotension, bradycardia and hypoglycemia in the newborn. Care-takers should be aware of these potential complications. However, unnecessary admission of the neonate should be avoided. This study evaluates possible neonatal effects after maternal use of labetalol.

Methods: All infants born alive in the VU University Medical Center between 1 January 2011 and 1 September 2012, with a gestational age of ≥ 36 weeks exposed to labetalol ≤ 48 h prior to delivery were included. Labetalol dosage and route of administration, gestational age, birth weight, maximum carbohydrate intake (MCHI) and the incidence of hypotension, bradycardia and hypoglycemia were obtained from maternal and neonatal records.

Results: In this period, 37 neonates were exposed to labetalol. Seven patients were excluded because of incomplete data. Labetalol was administered orally in 27 (200–1,800 mg/day) and intravenously in 3

(480–2,400 mg/day) mothers. Hypoglycemia occurred in 13 infants (43 %), in which 8 infants needed intravenously administration of glucose (mean MCHI 6.5 mg/kg/min). 8 of 13 infants with hypoglycemia were born at term and appropriate for gestational age (AGA). Hypoglycemia occurred < 10 h after birth.

Conclusions: Hypoglycemia occurred in 43 % of prenatally exposed (pre) term neonates, possibly due to decreased gluconeogenesis. Adequate monitoring of blood glucose during day 1 in (term and preterm) neonates after prenatal exposure of labetalol is therefore recommended.

445 – POSTER SESSION

LOW CONTRIBUTION OF RENAL ELIMINATION TO CLEARANCE OF PROPYLENE GLYCOL IN PRETERM AND TERM NEONATES

R.F.W. de Cock¹, K. Allegaert², S. Vanhaesebrouck², J. de Hoon², R. Verbesselt², M. Danhof¹, C.A.J. Knibbe^{1,3}

¹*Leiden/Amsterdam Centre for Drug Research, Leiden, The Netherlands,*

²*University Hospitals Leuven, Leuven, Belgium,*

³*St. Antonius Ziekenhuis, Nieuwegein, The Netherlands*

Introduction: Despite limited information on the pharmacokinetics of excipients, propylene glycol (PG) is often used as a co-drug both in adults and children. The aim of this study is to characterize renal elimination in relation to hepatic clearance of propylene glycol in preterm and term neonates.

Methods: The pharmacokinetic analysis of PG was performed in NONMEM 6.2. on the basis of PG concentrations in plasma and/or urine samples for a total of 69 (pre)term neonates (birth weight 630–3,980 g, gestational age 24–41 weeks, postnatal age 1–29 days) who received PG co-administered with IV paracetamol (5–10 mg/kg/6 h) or phenobarbital (5 mg/kg/day) or both.

Results: A one compartment model parameterized in terms of renal clearance, hepatic clearance and volume of distribution was found to adequately describe the observations in both plasma and urine. After the first dose, renal elimination of propylene glycol was 15 % of total clearance which increased over time to 25 % at 24 h after the first dose. This increase was best described by a hyperbolic function based on time after the first dose.

Conclusions: Renal elimination of PG in (pre)term neonates is low compared to hepatic clearance, particularly compared to the reported percentage of 45 % in adults. To evaluate whether the reported increase in renal elimination of PG over time after first dose indicates an auto-induced increase in renal secretion or failure of tubular reabsorption of PG, further research is needed.

446 – POSTER SESSION

ADJUNCTIVE CLONIDINE IN THE SEDATION OF MECHANICALLY VENTILATED CHILDREN: A PILOT RANDOMIZED TRIAL

M. Duffett^{1,2}, K. Choong¹, J. Foster³, K. Menon⁴, M. Meade², D.J. Cook²

¹*Pediatrics,* ²*Clinical Epidemiology and Biostatistics, McMaster University, Hamilton,* ³*Pediatrics, University of Western Ontario, London,* ⁴*Pediatrics, University of Ottawa, Ottawa, ON, Canada*

Objectives: Clonidine is often used as a sedative in critically ill children, but its effectiveness has not been tested in a large, rigorous randomized controlled trial (RCT). Our objectives in this pilot RCT were to assess the feasibility of a larger trial with respect to:

- (1) Timely enrollment,
- (2) Effective screening,
- (3) Protocol adherence, and
- (4) Recruitment.

Methods: Randomized, concealed, blinded, placebo-controlled, pilot trial. Eligible patients were hemodynamically stable children aged 1 month–18 years who were expected to require at least 2 days of mechanical ventilation and who required an opioid or benzodiazepine infusion for sedation. Children were randomized to enteral clonidine 5 mcg/kg or placebo every 6 h in addition to usual sedation.

Results: We enrolled 50 children in 2 centres. The median (IQR) age was 2.5 (0.7–5.2) years and PRISM score on PICU admission was 12 (8–15). In terms of feasibility outcomes: 35 (70 %) were enrolled within 1 day of becoming eligible (mean 1.2 days). 91 (88 %) of 104 eligible patients were approached for consent, 87.5 % of doses were administered according to protocol and on average 1.7 children were enrolled/month. The median (IQR) duration of ventilation and PICU stay was 6 (3–11) and 10 (7–21) days, respectively. 6 (12 %) children had doses held or modified due to hypotension and the incidence of clinically diagnosed withdrawal was 32 %.

Conclusions: This pilot trial suggests that a larger RCT to evaluate the effect of clonidine on clinically important outcomes is feasible.

Funding: New Investigator Fund, Hamilton Health Sciences.

447 – POSTER SESSION

URINARY NGAL LEVELS EARLY AFTER PEDIATRIC KIDNEY AND LIVER TRANSPLANTATION: A PILOT STUDY

V. Gijzen^{1,2}, A. Zwiers¹, R. van Schaik³, O. Soldin⁴, S. Soldin⁴, D. Hesselink⁵, I. Nulman^{2,6}, G. Koren^{2,6}, S. de Wildt¹

¹Intensive Care and Pediatric Surgery, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands, ²Clinical Pharmacology and Toxicology, Hospital for Sick Children, Toronto, ON, Canada,

³Clinical Chemistry, Erasmus MC, Rotterdam, The Netherlands, ⁴Oncology, Medicine, Physiology and Biophysics, Georgetown University Medical Center, Washington, DC, USA, ⁵Internal Medicine, Division of Nephrology and Renal Transplantation, Erasmus MC, Rotterdam, The Netherlands, ⁶Ivey Chair in Molecular Toxicology, Department of Medicine, University of Western Ontario, London, ON, Canada

Background: Urinary neutrophil gelatinase-associated lipocalin (uNGAL) is a promising biomarker to monitor acute kidney injury (AKI). However, after pediatric transplantation the pattern of uNGAL levels is not known in the early post-transplant period. We aimed to describe the pattern of uNGAL levels in this population in a pilot study.

Method: We evaluated daily uNGAL levels up to 14 days in 10 kidney (KT) and 12 liver transplant recipients (LT) receiving tacrolimus. uNGAL cut-offs of 2.2 and 135 ng/ml were used, as previously found in healthy children (<2.2 ng/ml) and children at risk for AKI (>135 ng/ml).

Results: In KT recipients, the median uNGAL level was 14.9 (IQR: 29.6) ng/ml. Sixty-two of the uNGAL measurements (92.5 %) were above 2.2 ng/ml and three (4.5 %) in two patients were above 135 ng/ml. All KT patients had an uNGAL >2.2 ng/ml at least once during the first 14 days after transplantation. In LT recipients, the median uNGAL level was 13.6 (IQR: 21.9) ng/ml. 90 % of all uNGAL measurements were above 2.2 ng/ml. Seven uNGAL measurements (7 %) in two LT patients were higher than 135 ng/ml. No relation was found between high uNGAL levels and AKI.

Conclusion: This is the first study in pediatric transplant recipients reporting uNGAL levels up to 14 days post-transplantation. Although, most uNGAL levels were not suggestive for AKI, they were higher than reported in healthy children, suggestive of sub-clinical renal function. We suggest uNGAL to be investigated as an early biomarker for subtle renal function loss.

448 – POSTER SESSION

ORAL BIOAVAILABILITY AND CLEARANCE OF THE BENZODIAZEPINE MIDAZOLAM FROM PRETERM NEONATES TO ADULTS: A POPULATION PHARMACOKINETIC ANALYSIS

I. Ince^{1,2}, S.N. de Wildt¹, M.Y.M. Peeters³, K. Burggraaf⁴, E. Jacqz-Aigrain⁵, J.S. Barrett⁶, M. Danhof², C.A.J. Knibbe^{1,2,3}

¹Erasmus MC: Sophia Children's Hospital, Rotterdam, ²Leiden/Amsterdam Center for Drug Research, Leiden, ³St. Antonius Hospital, Nieuwegein, ⁴Centre for Human Drug Research, Leiden, The Netherlands, ⁵University Diderot, Paris, France, ⁶Children's Hospital of Philadelphia, Philadelphia, PA, USA

Objectives: In the PICU, midazolam is regularly administered orally in the absence of IV access. The lack of information on maturation of intestinal CYP3A, the drug metabolizing enzyme which is involved in oral absorption of midazolam, hampers adequate dosing of oral midazolam in children. The aim of this study was to investigate CYP3A mediated oral bioavailability (F) and clearance (CL) of oral midazolam across the pediatric age range.

Methods: Pharmacokinetic (PK) data were obtained from a combined dataset of 7 previously reported studies in 52 preterm infants (26–37 weeks, PNA 2–13 days), 305 children (3 month–18 years) and 20 adults, who received IV and/or PO midazolam. Population PK modeling was performed using NONMEM v6.2, and the influence of PNA, bodyweight (BW), and study population was investigated.

Results: Midazolam F was negatively influenced by BW in an allometric function and decreased from 67 % (29–100 %) in a preterm neonate (0.77) kg to 17 % (7–27 %) in an adult (70 kg). BW influenced midazolam CL in a previously introduced allometric function with a BW dependent exponent (BDE), gradually changing from 0.82 in a preterm neonate (0.77 kg) to 0.28 in an adult (70 kg).

Conclusions: Midazolam F decreases from preterm neonates to adults, leading to higher systemic availability of midazolam concentrations in preterm neonates (67 %) compared to older children or adults (17 %). This information may aid to design dosing guidelines for oral CYP3A substrates in children, which take into account maturation in CYP3A mediated drug metabolism.

449 – POSTER SESSION

EXPRESSION OF INTESTINAL AND HEPATIC DRUG TRANSPORTERS DURING CHILDHOOD: AGE MATTERS!

M.G. Mooij¹, B.A.E. De Koning¹, U.I. Schwarz², J.S. Leeder³, R. Gaedigk³, J.N. Samsom⁴, E. Spaans¹, D. Tibboel¹, R.B. Kim², S.N. De Wildt¹

¹Department of Intensive Care and Pediatric Surgery, Erasmus MC: Sophia Children's Hospital, Rotterdam, The Netherlands, ²Division of Clinical Pharmacology, University of Western Ontario, London, ON, Canada, ³Division of Clinical Pharmacology and Therapeutic Innovation, Children's Mercy Hospitals and Clinics, Kansas City, MO, USA, ⁴Laboratory of Pediatric Gastroenterology, Erasmus MC, Rotterdam, The Netherlands

Objectives: Many drugs are prescribed to children and substrate to drug transporters. Transporters are membrane-bound proteins involved in drug absorption and disposition. Variation in transporters may affect drug levels and efficacy. However little is known about developmental changes of transporter expression during childhood. These changes may impact drug levels resulting in over- or underdosing when unaccounted for.

Aim: To assess whether intestinal and hepatic transporter expression is age-related.

Methods: Expression was determined using postmortem liver (fetuses n = 9, neonates n = 21 [birth–1 month], infants n = 8 [1 month–12 months], children n = 3 [1 year–17 years], adults n = 11) and surgical small bowel samples (neonates n = 21, infants n = 7, children n = 1, adults n = 11). Target gene expression was determined using real time RT-PCR compared to adult expression using the $\Delta\Delta C_t$ -method. Significance level was set at $p < 0.05$.

Results: Hepatic expression of MDR1 was significantly lower in fetuses, neonates and infants compared to adults. Hepatic expression of MRP2, OATP1B1 and OATP1B3 in all age groups was significantly lower compared to adults. Intestinal expression of MDR1 and MRP2 was comparable with adults. However, intestinal OATP2B1 expression was significantly higher in neonates and infants compared to adults.

Conclusion: Hepatic and intestinal drug transporter expression show organ- and transporter-specific maturation patterns. Suggesting substrate drugs to transporters may be subject to age-related changes in absorption. Studies on protein expression and in vivo activity are needed to predict the clinical relevance. This may impact dosing of substrate drugs to children of different ages.

Supported by Novartis investigator-initiated grant.

450 – POSTER SESSION

INCIDENCE AND NATURE OF HALOPERIDOL RELATED ADVERSE EVENTS IN CRITICALLY ILL CHILDREN WITH DELIRIUM

V. Slooff¹, E. Spaans¹, E. van Puijenbroek², N. Jessurun², M. de Hoog¹, D. Tibboel¹, S. de Wildt¹

¹Intensive Care and Department of Pediatric Surgery, Sophia Children's Hospital, Rotterdam, ²Netherlands Pharmacovigilance Centre, Lareb, 's Hertogenbosch, The Netherlands

Introduction: As delirium in critically ill children is increasingly recognized, more children are treated with the antipsychotic drug haloperidol. Little is known on its safety in this context.

Objective: To investigate the incidence and nature of adverse events associated with administration of haloperidol and its relationship with dose.

Methods: All patients admitted to the PICU between January 2000 and July 2011 who received haloperidol for delirium were included. Charts were evaluated using a predefined list of adverse events. Symptoms possibly related to haloperidol were evaluated for probability of causality using the Naranjo score, by two clinical pharmacologists and the Netherlands Pharmacovigilance Institute (lareb.nl).

Results: Fifty-two patients [median (range) age 10.6 (0.3–18.8) years] received the drug for treatment of delirium. In six patients (11 %) seven adverse events were documented. These included extrapyramidal reactions (n = 2), extrapyramidal reactions + hyperpyrexia (n = 1), neuroleptic malignant syndrome (n = 1), long QT (n = 1), and isolated muscle rigidity (n = 1). Adverse events were rated as doubtful (n = 1), possible (n = 2), probable (n = 2) and definite (n = 1). The median (range) haloperidol dose was similar between patients with and without adverse events [0.03 (0.02–0.06) mg/kg/day vs 0.02 (0.003–0.08) mg/kg/day, $p = 0.08$].

Conclusion: To our knowledge this is the largest pediatric cohort studied for haloperidol-related adverse events. A significant proportion of patients develop adverse events. As haloperidol adverse events are correlated with dose in adults, our findings suggest that dosing in our pediatric population is suboptimal. Studies are needed to determine the optimal haloperidol dose for ICU delirium in children.

451 – POSTER SESSION

SUGAMMADEX TO REVERSE PROLONGED NEUROMUSCULAR BLOCKADE AFTER USE OF VECURONIUM INFUSIONS IN FOUR NEONATES

H.L. Turnham¹, E. Ledger², P. Weir², J. Brierley¹

¹Paediatric Intensive Care, Great Ormond St Hospital, London,

²Paediatric Intensive Care, Bristol Royal Hospital for Children, Bristol, UK

Background and aim: Sugammadex is a new and novel agent that reverses muscle relaxation of the amino steroid neuromuscular blocking drugs (NMBD). Vecuronium is an amino steroid NMBD commonly used as an infusion in paediatric and neonatal intensive care units. Infants are at risk of prolonged effect due to the combination of low neonatal acetyl choline production, large volume of distribution and reduced excretion of the drug and its metabolites. Prolonged muscle relaxation may require a lengthened period of ventilation with an associated increase in morbidity. Currently there are no suitable agents available to reverse profound and prolonged muscle relaxation. Acetyl choline esterase inhibitors (AChEI) cannot be used until there is 75–80 % recovery in neuromuscular function. Significant stimulation at muscarinic receptors by AChEI's causes bradyarrhythmia, salivation and bronchoconstriction therefore need to be given with anticholinergic drugs which in turn can cause tachycardia's.

Method: We describe the use of sugammadex in four neonates who received prolonged infusions of vecuronium following surgery and in whom the use of sugammadex immediately reversed the effects of profound muscle relaxation allowing weaning of ventilation and extubation.

Conclusion: The use of sugammadex to reverse profound and prolonged neuromuscular block may reduce length of stay in the intensive care unit, morbidity of prolonged ventilation and be cost effective.

452 – POSTER SESSION

CHILDREN WITH DOWN SYNDROME ADMITTED TO THE PICU AFTER SURGERY: AGITATED PATIENTS OR BIASED CAREGIVERS?

A. Valkenburg¹, M. Van Dijk¹, B. O'Hare², C. Breatnach², D. Tibboel³

¹Pediatric Surgery, Erasmus University Medical Center: Sophia Children's Hospital, Rotterdam, The Netherlands, ²Anaesthesia and Critical Care Medicine, Our Lady's Children's Hospital, Dublin, Ireland, ³Intensive Care, Erasmus University Medical Center: Sophia Children's Hospital, Rotterdam, The Netherlands

Background and aims: About 50 % of the children with Down syndrome undergo surgery for congenital anomalies. They are often seen as more agitated but less sensitive for pain. The aim was to retrospectively and prospectively evaluate analgesia and sedation requirements in children with Down syndrome.

Methods: Retrospective analysis of analgesia/sedation requirements and pain/distress scores in 15 children with Down syndrome and 30 without after surgery for congenital duodenal obstruction.

Prospective analysis of analgesia/sedation requirements, pain/distress scores and morphine pharmacokinetics in 18 children with Down syndrome and 16 without after congenital heart surgery.

Local ethics approval was obtained for both studies.

Results: Both the retrospective and the prospective analysis did not show any differences in the pain scores of both groups. The percentage of scores indicating oversedation was 18 % in children with Down syndrome after cardiac surgery and 7 % in controls ($P < 0.001$).

Analgesia and sedation requirements were comparable between both groups in the retrospective as well as the prospective analysis. Population pharmacokinetic analysis revealed no statistically significant differences in pharmacokinetic parameters of morphine between the children with and without Down syndrome.

Conclusion: Children with Down syndrome are not more agitated after surgery for congenital anomalies. There is no reason to adjust postoperative analgesia and sedation in these children. The next step is to develop and investigate evidence-based analgesia and sedation guidelines for children undergoing surgery for congenital anomalies.

453 – POSTER SESSION

TRENDS IN SEDATIVE USE IN THE PICU, UTRECHT, THE NETHERLANDS

M.M. van der Zalm¹, S. van Gestel¹, D. Broekhuizen², Y.T. Liem², E. Koomen³

¹Pediatric Intensive Care Unit, ²Department of Clinical Pharmacy, ³Department of Perioperative Care and Emergency Medicine, University Medical Center Utrecht, Utrecht, The Netherlands

Objectives: Sedation is part of routine care in pediatric intensive care. In recent years, there is growing attention for the use of less sedatives, or daily interruption of sedation. In our perception, however, we used more sedatives over time. We therefore investigated trends in the use of sedatives in our pediatric intensive care unit (PICU).

Methods: We performed a retrospective cohort study in a PICU at an academic hospital in the Netherlands. All admissions between

January 2003 and January 2012 were included. Length of stay in PICU and total number of ventilation days were compared with the pharmaceutical database of medication delivery.

Results: A total 5,785 patients were admitted to the PICU during the years 2003–2012 with a mean of 643 patients per year. These patients received 26,713 days of mechanical ventilation. The use of benzodiazepines decreased significantly over the years from 92 mg per day of ventilation to 66 mg per day of ventilation (beta-coefficient -0.92 , $p = 0.01$, $R^2 0.84$; Fig. 1).

Fig. 1

The use of morphine en clonidine remained constant over the years. The use of propofol increased until 2006 thereafter a sudden decrease was seen.

Conclusions: Our findings show that in our PICU significantly less benzodiazepines have been used over time. There was no shift towards other types of sedatives.

454 – POSTER SESSION

UPTAKE OF MIDAZOLAM TO CEREBROSPINAL FLUID AFTER SINGLE DOSE OF RECTAL MIDAZOLAM

N.J. Vet¹, S.N. de Wildt¹, K. Gayadien², R. Pieters², H. de Loor³, D.R. Kuypers³, D. Tibboel¹, M. de Hoog¹

¹Intensive Care, ²Paediatric Oncology, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands, ³Nephrology and Renal Transplantation, University Hospital Leuven, Leuven, Belgium

Background and aim: Midazolam is a short-acting benzodiazepine and directly acts on targets in the central nervous system (CNS). The effect of midazolam in the CNS depends on the concentration of the drug at the site of action. Since there is no possibility of direct measurement of brain concentrations of drugs, cerebrospinal fluid (CSF) drug concentrations may be an alternative matrix. However, data on CSF pharmacokinetics are scarce. Our aim was to determine midazolam and metabolites concentrations in serum and CSF after rectal administration in children.

Methods: Pediatric oncology patients (0–17 years) scheduled for lumbar puncture were included. During induction, midazolam 0.2–0.5 mg/kg was administered rectally. Blood and CSF samples were drawn after

administration. Midazolam and metabolites were determined by a validated liquid chromatography tandem mass spectrometry method.

Results: 16 patients were included: 9 boys and 7 girls. Mean (SD) age was 7.6 (5.3) years. In 11 patients midazolam was found in CSF. The concentrations of midazolam in serum and CSF are shown in Table 1.

Table 1 Concentration of midazolam in serum and lumbar CSF after a single rectal dose

Patient	Time (min)	Serum (ng/ml)		Time (min)	CSF	
		MDZ	OHM		MDZ	OHM
1	50	56.5	22.0	41	0.97	0.95
2	–	40.8	14.0	–	0.82	0.55
3	21	117.4	155.3	12	1.04	0.9
4	130	111.7	40.8	20	1.39	0.56
5	30	8.2	38.0	30	<LOQ	0.23
6	25	70.2	42.2	25	<LOQ	<LOQ
7	–	–	–	15	0.98	0.2
8	–	–	–	30	<LOQ	<LOQ
9	40	34.8	10.9	30	0.41	0.18
10	23	86.8	22.6	16	<LOQ	<LOQ
11	30	82.7	29.4	22	1.33	0.79
12	30	58.1	17.7	25	1.34	0.4
13	15	88.6	7.0	10	0.28	<LOQ
14	31	91.6	28.8	19	1.44	0.36
15	25	64.9	25.5	12	<LOQ	<LOQ
16	30	49.6	13.5	25	0.81	0.37

Time time after administration of midazolam, MDZ midazolam, OHM 1-hydroxy-midazolam, LOQ limit of quantification

Conclusions: Within 1 h after rectal administration, midazolam was present in CSF, which is compatible with the rapid onset of action of midazolam. Midazolam and OHM concentrations in CSF were consistently very low compared to plasma concentrations. Further research is needed to determine if CSF can be used as surrogate for intracerebral midazolam disposition.

455 – POSTER SESSION

GLYCOPEPTIDE-INTERMEDIATE STAPHYLOCOCCUS AUREUS (GISA) INFECTIONS IN PAEDIATRICS

A. Wolfler¹, A. Camporesi², E. Zoia¹, A. Mandelli¹, I. Salvo¹

¹Pediatric Anesthesia and Intensive Care, ²Children Hospital Vittore Buzzi, Milano, Italy

Multiresistant bacteria are a burden problem in ICU and the management of invasive MRSA infections is difficult if GISA strains are isolated. Daptomycin should be considered the drug of choice for rescue therapy in case of MRSA infection if vancomycin has failed. **Case report:** A 7-year-old Egyptian child presented in our hospital with fever and leg pain, few days after mild leg trauma. MRI confirmed osteomyelitis and he underwent drainage of the lesion. MRSA was isolated from bone and blood with this antibiogram (MIC): vancomycin 0.5, linezolid 2, rifampicin 0.5, clindamycin 0.25. The

patient was started on vancomycin, ceftriaxone and clindamycin, but his conditions worsened with sepsis and pustules and skin exfoliation. Bone scintigraphy showed no resolution of the infection. Daptomycin for suspected GISA infection at dosage of 10 mg/kg and rifampicin were started. On day 5 dosage was reduced to 6 mg/kg because of no reference about paediatric use. Due to patients worsening, the dosage of daptomycin was raised again to 10 mg/kg with success. Antibiotic therapy was discontinued after 6 weeks with resolution.

Conclusion: MRSA is becoming less susceptible to vancomycin. Daptomycin is rapidly bactericidal against Gram-positive organisms, including MRSA, and although not FDA-approved for bone and joint infections, clinical experience shows good activity in osteomyelitis. Pediatric dosage has not been established yet. Recent reports show dosages >6 mg/kg/12 h may be needed in children to achieve a drug exposure similar to adults and our experience agrees with these reports.

456 – POSTER SESSION

VALPROIC ACID INDUCED ACUTE PANCREATITIS AND MULTIORGAN FAILURE IN A CHILD

A. Yaman¹, T. Kendirli¹, Ç. Ödek¹, Ö. Bektaş², Z. Kuloğlu³, M. Koloğlu⁴, E. İnce¹, G. Deda²

¹Pediatric Intensive Care, ²Pediatric Neurology, ³Pediatric Gastroenterology, ⁴Pediatric Surgery, Ankara University, Ankara, Turkey

Valproic acid (VPA) is still an important antiepileptic drug with the broadest spectrum used in all types of seizures and syndromes. It has serious adverse effects such as hepatotoxicity, hyperammonemic encephalopathy, coagulation disorders and pancreatitis. The incidence of VPA-associated pancreatitis has been estimated to be 1:40,000. We present a 6-year-old boy who developed acute pancreatitis (AP) and multiple organ failure after 3 months of VPA therapy. Patient's laboratory values showed that his kidney and hepatic function had impaired and thrombocytopenia and coagulopathy had developed. Patient's abdominal tomography showed a suspected appearance which was consistent with pancreatitis. Since amylase and lipase levels were found to be high acute pancreatitis was considered. Patient improved after cessation of VPA treatment. Ten days later patient recovered both clinically and laboratorial. Consequently, patient was discharged with cure. In conclusion, AP is a rare, severe adverse reaction to VPA treatment. If a child who is receiving VPA, develops abdominal pain and vomits, VPA-associated pancreatitis must be considered.

Respiratory Failure (457–495)

457 – POSTER SESSION

THINK AGAIN: SALBUTAMOL THERAPY IN ACUTE WHEEZE

R. Abusamra, M.C. Avanis, Y.-M. Liu, M. Vaidya

Paediatric Critical Care, Royal London Hospital, London, UK

Background and aims: A raised lactate is a documented side effect of salbutamol used in the management of children with acute wheeze.

The aim of this study was to identify the incidence of lactic acidosis following salbutamol therapy and how this relates to patient characteristics (age, weight, ethnicity) and dose of salbutamol.

Methods: Retrospective analysis of case notes of 35 children (17 boys) admitted to Paediatric Critical Care Unit (PCCU) at the Royal London Hospital requiring intravenous salbutamol, for treatment of asthma or viral induced wheeze, between February 2010 and October 2012. This produced 36 separate patient encounters suitable for analysis. The lactate was measured as part of routine blood gas analysis.

Results: Twenty-nine of 36 encounters demonstrated a raised lactate. The mean age was 4.8 years and average weight was 26.1 kg. In 7 out of 36 encounters, the lactate was normal with an average age and weight of 3.1 years and 17.3 kg, respectively. All children of Afro-Caribbean ($n = 10$) descent displayed a raised lactate as opposed to 52 % ($n = 11$) of Asian children. Twenty encounters demonstrated raised lactate following treatment with inhaled or nebulised salbutamol alone, the average dose being 0.7 mg/kg; the mean lactate was 3.6 (2.2–7.6). The remaining nine encounters developed a lactic acidosis after commencing intravenous therapy.

Conclusions: Shortcomings of this study include: retrospective; timing of lactate analysis non-standardised; no correction for confounding factors. However, we have demonstrated that lactic acidosis can develop with nebulised or inhaled salbutamol. Further large prospective trials are needed.

458 – POSTER SESSION

RESPIRATORY DISTRESS SYNDROME AND PERINATAL ASPHYXIA: THE MOST COMMON INDICATION FOR MECHANICAL VENTILATION

L.B. Banjac, L. Dragaš, D. Dakić, J. Raonić, G. Banjac

Neonatology, Institute for Children Diseases, Podgorica, Montenegro

Introduction: Mechanical ventilation (MV) indications are established on the basis of: clinical condition, respiratory function, laboratory and radiological findings. The most common diseases in newborns that require use of MV are: respiratory distress syndrome (RDS), perinatal asphyxia (PA), apnea and aspiration syndrome. RDS appears due to lack of surfactant. Clinical signs of RDS are manifested 4–6 h after birth, as trias of symptoms (tachypnea, cyanosis, dyspnea). PA is a disorder of the gas exchange in fetal placenta during the labour or in the newborn's lungs after the birth. It is expressed immediately after the birth with cyanosis or paleness, irregular or absent respiration, bradycardia and hypotonia. The main purpose of mechanical ventilation is to provide satisfying respiratory function by oxygenotherapy and supporting ventilatory function. In the study we analyzed the part and importance of RDS and PA, as the indication for mechanical ventilation.

Methodology: This observational study included all newborns (75) that required MV in tertiary neonatal center in Montenegro from 01.01.2010–31.12. 2010.

Results: Out of the total number of hospitalized newborns (676), 75 (11 %) required MV. The average gestational age of ventilated newborns was 33.9 ± 5.5 weeks, the average birth weight was $2,149.5 \pm 966$ g. The most common indications for starting MV were: RDS, PA and meconium aspiration syndrome. RDS was the reason for mechanical ventilation in 25 (33.3 %) and PA in 15 (20 %) newborns.

Conclusion: Every tenth (11 %) newborn hospitalized in tertiary neonatal center, requires MV. RDS and PA are the most common indications for MV in newborns.

459 – POSTER SESSION

CONGENITAL DIAPHRAGMATIC HERNIA: SURVIVAL IN A 5 YEAR COHORT AND EFFECTS OF PRENATAL DIAGNOSIS AND PLANNED DELIVERY ON OUTCOME

G. Bentsen¹, G. Aksnes², T. Haugen¹

¹Division of Emergencies and Critical Care, ²Division of Cancer Medicine, Surgery and Transplantation, Oslo University Hospital: Rikshospitalet, Oslo, Norway

Background and aims: Congenital diaphragmatic hernia (CDH) still carries a considerable mortality, and measures to improve treatment and logistics are on-going. In our institution, we had a 30-day-survival of 80 % in the period 2000–2007. Since then we have made an effort to schedule children with known CDH for planned delivery to be able to optimize postnatal treatment. We evaluated to what extent this has been successful and our current survival rate.

Methods: From PICU admission records and surgical records, we have identified all newborn CDH patients referred during the last 5-year period (2008–2012).

Results: 32 patients were identified, all referred were admitted. 30-day survival was 88 % (28/32). 27 were alive by 1.1.2013. Two patients were treated with ECMO, one survived. A prenatal diagnosis was made in 15 patients, 10 delivered with a planned procedure. All patients with a prenatal diagnosis of CDH were delivered and treated at our hospital. None of these 15 children needed CPR at birth compared to five out of 17 in the other group (RR 0.000, $P = 0.067$). None had mask ventilation compared to nine in the other group (RR 0.000 $P = 0.015$). The mortality was 1 of 15 vs. 3 of 17 (RR 0.38 $P = 0.60$). Three of five resuscitated died.

Conclusions: We find the survival rate satisfactory. We hypothesize that increased prenatal diagnosis rate and planned delivery can reduce the rate of CPR situations at birth, thus avoiding possible harm. The number of patients in this study is too small to document outcome effects.

460 – POSTER SESSION

OCCURENCE OF PATIENT-VENTILATOR ASYNCHRONY IN MECHANICALLY VENTILATED CHILDREN

R. Blokpoel¹, D. Markhorst², M. Kneyber³

¹Pediatric Intensive Care Unit, Beatrix Children's Hospital, UMCG, Groningen, ²Department of Paediatrics, Division of Paediatric Intensive Care, VU University Medical Center, Amsterdam, ³Department of Paediatrics, Division of Paediatric Intensive Care, Beatrix Children's Hospital, University Medical Center Groningen, Groningen, The Netherlands

Introduction: Patient-ventilator asynchrony (PVA) occurs frequently in mechanically ventilated adults and is associated with increased morbidity. The occurrence of PVA in mechanically ventilated children has little been studied. The aim of this study was to test the hypothesis that PVA in mechanically ventilated children is common.

Methods: Mechanically ventilated children who were able to initiate and maintain spontaneous breathing were included. Patients

unable to initiate and maintain spontaneous breathing were excluded. PVA was identified by 30-min recording and analysis of the pressure–time and flow–time waveforms. PVA was categorized into four groups: trigger asynchrony, flow asynchrony, termination asynchrony and expiratory asynchrony. Baseline demographic and clinical data were recorded.

Results: So far 20 patients have been included. Patients were (2.8 ± 2.29) days on the ventilator. Mean age was (1.69 ± 3.71) years. $N = 8$ patients had a pulmonary diagnosis and 60 % patients had diseases of non-pulmonary origin. A total of 21,626 ($1,081 \pm 293$) breaths were analysed. PVA was seen 5,919 times (296 ± 186). Trigger asynchrony occurred in 3,331 breaths (56.3 %) and was mainly insensitive trigger ($N = 2,842$, 48.0 %), double triggering occurred in 256 breaths (4.3 %), auto-triggering in 128 breaths (2.2 %), trigger delay in 105 breaths (1.8 %). Flow asynchrony occurred in 231 breaths (3.9 %), termination asynchrony in 2,322 breaths (39.2 %) (delayed termination in 1,617 breaths (27.3 %) premature termination in 705 breaths (11.9 %). Expiratory asynchrony occurred in only 35 breaths (0.6 %).

Conclusion: PVA is very common in mechanically ventilated children. The predominant cause was trigger insensitivity.

461 – POSTER SESSION

CRANIOFACIAL MICROSOMIA AT THE PAEDIATRIC INTENSIVE CARE UNIT

C.J.J.M. Caron, K.F.M. Joosten, B. Pullens, I.M.J. Mathijssen, E.B. Wolvius, M.J. Koudstaal

Dutch Craniofacial Centre, Erasmus Medical Center-Sophia Children's Hospital, Rotterdam, The Netherlands

Introduction: Craniofacial microsomia (CFM) is a congenital anomaly affecting the first and second pharyngeal arches and is characterized by asymmetric underdevelopment of the mandible, the maxilla, the ear and the soft tissues. According to a few studies children with CFM are more likely to have airway difficulties as a result of the underdevelopment of the mandible. It is unknown how many of these children are admitted to the PICU for respiratory distress.

Objective: To identify the number of patients with CFM who were admitted to the PICU for respiratory distress.

Methods: Clinical data of 90 CFM patients born between 1993 and 2012 were retrospectively screened for demographic data, affected side, history presence, outcome of the sleep study and treatment of the airway difficulties.

Results: In 88 of 90 CFM children the mandible was involved unilaterally, in 1 bilaterally and in 1 the affected side was unknown. Because of the clinical history of respiratory distress in 5 children a sleep study was performed (mean age 2.2 years (range 8 days–7 years)). In four of these five children an obstructive sleep apnea syndrome was diagnosed (3 male, 1 female) (3 severe, 1 moderate). In 1 child central apnea syndrome was diagnosed. These 5 children were admitted to the PICU for respiratory support, which consisted of CPAP for a prolonged period of time.

Conclusions: In this study the incidence of respiratory distress was low in CFM, but a few have severe respiratory distress necessitating respiratory support.

462 – POSTER SESSION

PASSIVE RESPIRATORY MECHANICS IN VENTILATED CHILDREN WITH ARDS

G. Chidini¹, A. Marino², E. Calderini¹, M. Brioni², I. Cigada², F. Menga², D. Chiumello³

¹*Pediatric Intensive Care Unit, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico,* ²*Università degli Studi di Milano,* ³*Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan, Italy*

Background and aims: Data on respiratory mechanics in ventilated children with ARDS are scarce. To assess lung and chest wall role in respiratory mechanics, subjects with primary ARDS and without lung disease were studied. Static respiratory system (E_{RS}), lung (E_L) and chest wall (E_{CW}) elastances were obtained with interrupter technique¹.

Methods: Sixteen sedated and paralyzed mechanically ventilated children, nine with ARDS (ARDS group, mean weight 17 ± 6 kg) and seven without lung disease (control group, mean weight 17 ± 7 kg) underwent a Functional Residual Capacity (FRC) measurement with helium dilution technique during volume-controlled ventilation (TV 8 ml/kg, PEEP 4 cm H₂O). Statistical significance was defined as $p < 0.05$.

Results: Data are expressed as mean $\pm$ SD. E_{RS} and E_L were higher in the ARDS group compared with control group (107.9 ± 50.2 vs 65.34 ± 18.49 cm H₂O/L, $p = 0.05$ and 91.9 ± 41 vs 49.5 ± 16 cm H₂O/L, $p = 0.023$, respectively) while the values of E_{CW} were similar in the two groups (15.9 ± 9.7 vs 15.7 ± 8.25 cm H₂O/L, $p > 0.05$). Although not statistically significant, FRC was decreased in ARDS group compared with the control group (198 ± 87 mL and 255 ± 112 mL, ns, respectively). Plateau transpulmonary pressure ($P_{plat_{pl}}$) was correlated with $P_{plat_{aw}}$ in both groups ($p = 0.031$, $R^2 = 0.51$ in ARDS group and $p = 0.024$, $R^2 = 0.67$ in control group).

Conclusions: The determinant of E_{RS} increase in primary ARDS is E_L while E_{CW} is not involved. $P_{plat_{aw}}$ can be used as an estimate of $P_{plat_{pl}}$ to set the ventilator at bedside.

References:

1 Chiumello D (2008) Am J Resp Crit Care Med 178:346–355.

463 – POSTER SESSION

IMPACT OF POSITIVE FLUID BALANCE ON DURATION OF VENTILATION IN PAEDIATRIC INTENSIVE CARE

R. Davies¹, H.L. Turnham², M. Peters²

¹*Newcastle University, Newcastle upon Tyne,* ²*Paediatric Intensive Care, Great Ormond St Hospital, London, UK*

Background and aims: Early fluid resuscitation improves outcome but later a positive fluid balance is harmful [1–4] North American studies demonstrate that ventilator free days (VFD) are inversely related to day 3 cumulative fluid balance [1] Our UK practice includes wider diuretic use. We hypothesised that day 3 fluid balance has no detectable influence on VFD.

Methods: Consecutive admissions over 6 months to a tertiary PICU were reviewed. Patients >1 month old and those ventilated >24 h with adequate data were included. Demographics, primary diagnosis, net day 1 and 3 fluid balance, ventilator free days in 28 (VFD28), diuretic use and duration of admission were collected. Patients were screened for acute respiratory distress syndrome (ARDS) using the 2012 Berlin criteria [5].

Results: 135 of 308 admissions satisfied inclusion criteria. 37/135 (28 %, 95 % CI 21–36 %) met ARDS criteria. 60 % (81/135, 95 % CI 52–68 %) received diuretics. VFD28 were equivalent in patients with day 3 positive cumulative balance in both the whole population (Mann–Whitney $p = 0.34$) and the ARDS subset ($p = 0.6$). After severity of illness adjustment with PIM2r in a multiple regression model, cumulative fluid balance was unrelated to VFD28. Any diuretic use was associated with increased VFD28 ($p = 0.015$) alone, and after adjustment for PIM2r.

Conclusions: We were unable to detect an influence of fluid balance on length of ventilation in the first 28 days of PICU either in crude or severity-of-illness adjusted analysis. Widespread diuretic use may have contributed to this pattern. Formal prospective studies of fluid balance algorithms are required to determine optimal approaches.

464 – POSTER SESSION

RESPIRATORY INDUCTANCE PLETHYSMOGRAPHY MAY IDENTIFY THE OPTIMAL CONTINUOUS DISTENDING PRESSURE IN PAEDIATRIC HIGH-FREQUENCY OSCILLATORY VENTILATION

P. de Jager, B. Veldsema-Hakvoort, M. Kneyber

Beatrix Children's Hospital, Groningen, The Netherlands

Background and aims: Assessment of lung recruitability during paediatric high-frequency oscillatory ventilation (HFOV) is difficult and at present guided by clinical surrogate parameters including the transcutaneously measured oxygen saturation (SpO_2). We hypothesized that respiratory inductance plethysmography (RIP) may be a useful bedside tool during the staircase recruitment manoeuvre.

Methods: Children with moderate-to-severe acute hypoxemic respiratory failure who were oscillated with the Sensormedics 3100A or B oscillator were eligible for inclusion. Two RIP bands were placed: one around the patient's chest just below the inframammary line, and the second around the abdomen. The SpO_2 was continuously measured using Masimo technology. Each patient was routinely subjected to a staircase recruitment manoeuvre (i.e. stepwise increase and decrease of the continuous distending pressure (CDP) to identify the point of maximal compliance change of the pressure–volume loop on both the inflation and deflation limb). Data are expressed as mean $\pm$ standard error, and were analyzed using the student t test. $P < 0.05$ was accepted as statistically significant.

Results: So far, $N = 23$ patients have been enrolled. Sixteen of these (69.6 %) showed an increase in RIP arbitrary units (AU), suggestive for an increase in aerated lung volume. In nine of these (56.3 %) patients this coincided with an increase in SpO_2 .

Conclusions: Our study suggests that RIP may be useful to identify recruitability during the staircase recruitment manoeuvre in paediatric HFOV. Lung recruitability was not associated with improved oxygenation in all patients.

465 – POSTER SESSION

ASSOCIATION OF SEVERE RETINOPATHY OF PREMATURITY (ROP) WITH DURATION OF MECHANICAL VENTILATION AND SUPPLEMENTATION OF OXYGEN THERAPY

B.S. Dunjic¹, N.S. Ristovski¹, A.J. Oros², O.J. Antonovic¹, V.V. Bankovic¹, M.R. Stankovic¹, M.S. Dunjic³

¹Department of Neonatology, Obstetric and Gynecology, University Clinic Belgrade, Belgrade, ²Clinic of Ophthalmology, School of Medicine, Novi Sad, ³Department of Ob/Gyn, School of Medicine, University of Pristina, Belgrade, Serbia

Background: Retinopathy of prematurity (ROP) is a serious complication characterised with abnormal vascular development of retina in premature infants. Recent advances in neonatal care have improved the survival rates for premature infants. The aim of this study was to explore whether a severe form of retinopathy of prematurity can be influenced by duration of mechanical ventilation (MV) and by supplementation of oxygen (O_2).

Methods: The 3 years prospective-retrospective study was conducted on the Department of Neonatology of Ob/Gyn Clinic, Clinical Center of Serbia. Study group consisted of 69 premature infants with severe active ROP level 3 +, "threshold disease", which required surgical treatment-laser photocoagulation. Control group consisted of 69 premature infants who have not had changes in blood vessels of the eye or had milder degrees of ROP (I and II), and in which there was no indication for surgical treatment. Duration of mechanical ventilation and supplementation of oxygen were observed.

Results: 33 (from 69) premature infants required MV in study group (E). Mean 9.85 days. 13 (from 69) infants required MV in control group (C). Mean 6.31 days. T test: $p = 0.062$ was not statistically significant. Premature infants in both groups required supplementation of oxygen. In observed group: mean 23.99 days, in control group: mean 12.10 days. T test: $p < 0.001$ was statistically significantly high.

Conclusions: In this study duration of MV was not a risk factor, but duration of oxygen therapy was statistically significantly high risk factor for development of severe ROP.

466 – POSTER SESSION

EXPERIENCE OF INHALED NITRIC OXIDE IN NEONATES WITH PULMONARY HYPERTENSION IN A TERTIARY NEONATAL CENTRE IN THE UK

S. Gaddam Bhoomaiah, S.V. Rasiah

Birmingham Women's Hospital NHS Foundation Trust, Birmingham, UK

Background: Inhaled nitric oxide (iNO) is used to manage term babies with evidence of pulmonary hypertension. There is currently no evidence for its use in preterm babies.

Aims: To review the outcomes of neonates with pulmonary hypertension treated with iNO in a tertiary neonatal unit.

Methods: Data was obtained from the neonatal electronic database (Badger) from January 2009 to December 2011 and outcomes reviewed.

Results: Of the 3,934 admissions, 77 babies were treated with iNO. After exclusion of 31 babies with congenital diaphragmatic hernia (CDH), 46 babies were included in the study.

Table 1

Patient data	<27 + 6 (n = 16)	28 – 36 + 6 (n = 14)	>37 (n = 16)
Mean gestational age, weeks(range)	25 + 4(24 + 6 – 27 + 6)	30 + 3(28 – 36 + 4)	39 + 2(37 – 42)
Mean birth weight, gram (range)	835(500–1170)	2,115(730–3,700)	3,195(1,620–4,398)
ECHO/clinical evidence of pulmonary hypertension	12/4	12/2	14/2
iNO: Early <2 days/late >2 days	7/9	9/5	13/3
Referral for ECMO	0	0	1
CLD (at 36 weeks CGA)	2	1	0
Oxygen at discharge	1	0	0
Death: Early/late iNO (%)	3/6(56 %)	3/3(42 %)	1/1(12.5 %)

Conclusion: Our results highlight the role of iNO as mainstay therapy in term babies with pulmonary hypertension. Preterm babies especially those <28 weeks gestation have a poor outcome.

References:

1. Barrington KJ, Finer N (2010) Nitric oxide for respiratory failure in preterm infants. *Cochrane Database Syst Rev* CD000509.
2. Konduri GG, Solimano A (2004) A RCT of early vs standard iNO therapy in term and near-term newborn infants with hypoxic respiratory failure. *Pediatrics* 113:559–64.

467 – POSTER SESSION

RESPIRATORY SUPPORT FOR HEMATOLOGIC AND ONCOLOGIC PATIENTS IN INTENSIVE CARE

P. García-Soler, J.M. González-Gómez, C. Yun Castilla, G. Milano-Manso

Pediatric Critical Care Unit, Complejo Hospitalario de Málaga, Málaga, Spain

Objectives: To describe the respiratory support and their outcomes in pediatric patients with hematological and oncologic diseases admitted in a pediatric intensive care unit (PICU).

Methods: Retrospective observational study in children with hematological and malignancies who required respiratory support in a PICU, from 2008 to 2012. Data are reported as mean values and SD (normally distributed) and median values and interquartile range (distribution non-normal).

Results: 45 episodes from 29 patients, with a median age of 54 months (91–106). 31/45 were admitted from the hospital ward, 5/45 from the operating room, 5/45 from other hospitals and 3/45 from the emergency area. 22/45 had neutropenia, 18/45 after bone marrow or stem cell transplantation. 25 were admitted because of respiratory failure, 6 due to septic shock, 6 for neurological disorders and 5 after surgery. The mean PRISM was 17.12 and the median

PICU stay was 11(4–27). 26 had respiratory failure type I, 15 type II and in 4 patients the respiratory support for other medical circumstances. At admission the median $\text{SaO}_2/\text{FiO}_2$ was 250(158.5–311.5) and at the beginning of respiratory support was 237.5(105.5–277.5). They received noninvasive ventilation (NIV) in 26 cases [median duration 3(1–5) days], invasive ventilation in 17 (median duration 8 days) and HFOV 14 cases. The success rate for NIV was 50 %, median time to intubation of 21.5 h(10–48). 13 patients died, 7/13 due to refractory hypoxemia.

Conclusions: Respiratory failure is common in these patients and carry a significant morbidity. Type I respiratory failure is frequent and failure rate of NIV is higher than in other pediatric patients.

468 – POSTER SESSION

EXPLORING TTN NEW RISK FACTORS AND CHILDHOOD ASTHMA

Z. Gundogdu

Child Health and Diseases Department, Kocaeli University, Faculty of Medicine, Kocaeli, Turkey

Background and aims: This study aims to determine new risk factors (maternal allergic rhinitis, eczema) associated with TTN as well as effect of TTN treatment (oxygen, mechanic ventilation) on childhood asthma. Common independent risk factors related to both TTN and asthma were also interrogated.

Methods: 1,471 children were delivered in a special neonatal care and maternal delivery unit between January 2007 and April 2012. Newborns with gestational age (GA) <34 weeks, congenital anomalies, Apgar scores <7 at 5 min or whose mothers with alcohol or drug addiction were excluded. 1,318 child were included. Study also included a phone survey between June and August 2012. Parents were asked a questionnaire adopted from (ISAAC). 592 children were involved.

Results: 281 (21.3 %) children developed TTN. The GA, gender, birth weight (LGA, SGA, AGA), elective caesarean section (ECS), maternal allergic diseases (asthma, eczema, allergic rhinitis), parity, number of children were compared between TTN and total population and found statistically significant all of risk factors included maternal allergic rhinitis and eczema. 11 % of TTN and 3.2 % of without TTN have led to childhood asthma.

Maternal asthma and allergic rhinitis for TTN was found to be independently associated with childhood asthma (adjusted OR 1.22, 95 % CI: 0.58–2.56, P 0.59). TTN treatment (especially O_2) was related to childhood asthma more so for female infants.

Conclusions: Maternal allergic rhinitis and eczema appears risk factors for TTN. TTN treatment is also related to asthma. Our prospective study shows and valuable that relation between TTN and early childhood asthma.

469 – POSTER SESSION

BENCH TEST ASSESSMENT OF MAINSTREAM CAPNOGRAPHY DURING HIGH FREQUENCY OSCILLATORY VENTILATION

C.M. Hartdorff, M. van Heerde, D. Markhorst

Pediatric Intensive Care, VU University Medical Center, Amsterdam, The Netherlands

Objectives: To assess the feasibility, stability and predictability of CO₂ measurement using a main stream capnograph in a high frequency oscillatory ventilation circuit.

Methods: A commercially available capnography was mounted into a high frequency oscillatory ventilator patient circuit, adjustable CO₂ flow was introduced into an artificial lung and the output of the CO₂ sensor assessed under varying ventilator settings. Influence of oxygen content, pressures, heat and moisture were recorded.

Results: A linear relationship between CO₂ flow rate and measured CO₂ concentration was found. Varying ventilator settings influenced the measurements, but the results remained within a range of 1.5 mmHg above or under the mean measurement value (Fig. 1). Measurements remained stable despite humidification, heat, pressure amplitudes or mean airway pressure changes.

Conclusions: From this bench test, we conclude it is feasible to measure CO₂ using a main stream capnography during high frequency oscillatory conditions, these measurements were stable during the experiment. Changes in CO₂ production or output can be detected. The system may prove to be of clinical value, but further vivo measurements are warranted.

Fig.1 Adapted Bland—Altman plot for pooled measurement

470 – POSTER SESSION

THE USE OF LUNG ULTRASOUND IN DIAGNOSIS OF PNEUMOTHORAX

N.S. Jakšić Ristovski, B.S. Dunjić, T.V. Nikolić, M.R. Stanković

Department of Neonatology, Clinic of Obstetrics and Gynecology, Clinical Center of Serbia, Belgrade, Serbia

Objectives: Pneumothorax is acute lung injury which sometimes requires the emergency diagnosis and treatment. The aim of study was to determine whether ultrasound can be used in diagnosis of pneumothorax in newborn infants.

Methods: In 16 newborn infants with gestation age (range 27–39 weeks) and birth weight (1,000–4,150 g) pneumothorax was suspected on the basis of lung ultrasound findings. All newborns had respiratory distress in the time of ultrasound. A high-resolution linear probe 10 MHz was used for lung examination. After lung ultrasound X-ray was done in all infants.

Results: In 16 neonates with suspected pneumothorax on the basis of lung ultrasound findings the diagnosis of pneumothorax was confirmed by the X-ray in 15 infants and only in 1 was hyperinflation. In 16 infants were present A lines, there were no sliding of pleura in any case and lung point were in 9 infants.

Conclusion: We have found that lung ultrasound can be used with confidence for urgent diagnosis of pneumothorax.

471 – POSTER SESSION

NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA) IN PEDIATRIC INTENSIVE CARE: A RANDOMIZED CONTROLLED TRIAL

M. Kallio¹, O. Peltoniemi¹, E. Anttila¹, T. Pokka¹, T. Kontiokari²

¹Department of Pediatrics, Oulu University Hospital, ²Oulu University, Oulu, Finland

Background: Neurally adjusted ventilatory assist (NAVA) has been shown to improve patient-ventilator synchrony during invasive ventilation.

Aim: To study NAVA as initial ventilation mode in pediatric intensive care and compare it to current standard conventional ventilation in terms of the duration of mechanical ventilation and the amount of sedation needed.

Methods: 170 PICU patients were randomized to conventional ventilation or NAVA. To enable comparison between different sedative agents, a “sedative unit” for each drug was developed.

Results: Time on ventilator after study recruitment was 19.0 h in the NAVA group and 24.7 h in the control group ($P = 0.34$). The amount of sedation needed did not significantly differ between the groups ($P = 0.20$). When postoperative patients were excluded, the amount of sedation was significantly lower in NAVA group (0.80 vs 2.23 units/h, $P = 0.03$). Lower peak inspiratory (12.9 cm H₂O vs 15.2 cm H₂O) and mean airway pressures (7.4 cm H₂O vs 8.2 cm H₂O) were found in the NAVA group ($P < 0.001$ and $P = 0.001$ respectively). The PaO₂/FiO₂ -ratio during NAVA was higher than in the control group (403 vs 360 mmHg, $P = 0.017$). There were no significant differences in other ventilatory- or vital parameters, arterial blood gas values or complications.

Conclusions: NAVA is a safe and feasible primary ventilation mode in children. It outperforms standard ventilation in some aspects as it is able to reduce the need of sedation during longer treatment periods and to enhance oxygenation even with lower airway pressures. (ClinicalTrials.gov identifier: NCT01056939).

472 – POSTER SESSION

DEMOGRAPHICS OF VENTILATED INFANTS WITH BRONCHIOLITIS TRANSFERRED TO PAEDIATRIC INTENSIVE CARE IN YORKSHIRE AND HUMBER IN 2010/2011 AND 2011/2012

A.B. Kelly, F. Rajah

Embrace, Yorkshire & Humber Infant & Children's Transport Service, Sheffield Children's Hospital, Barnsley, UK

Viral Bronchiolitis is the most common cause of acute respiratory failure in Paediatric Intensive Care (PIC) admissions in the United Kingdom. The risk factors for the development of severe bronchiolitis include prematurity, age of <2 months, low birth weight and rapid onset of severe respiratory symptoms. In 2011/2012 it had been observed that bronchiolitis infants requiring ventilation and transfer to PIC were smaller, with a higher incidence of prematurity than previous years.

Aims: To determine the demographics of infants with bronchiolitis requiring ventilation and transfer by Embrace, Yorkshire and Humber Infant and Children's Transport Service, in 2010/2011 and 2011/2012; comparing groups with respect to weight; age; gestational age at birth and referral; co-morbidity; severity of illness on admission to hospital.

Method: Retrospective data collected from transfer records over 2 seasons; 1 November to 30 March 2010/2011 and 2011/2012.

Results: 120 infants required ventilation and transfer to PIC; 55 in 2010/2011 and 65 in 2011/2012. Patients transferred in 2011/2012 were smaller and younger. Incidence of prematurity increased markedly, 49 % in 2010/2011 compared to 60 % in 2011/2012 with a doubling of late preterm 33–37 weeks from 20 to 40 %. Over 40 % required ventilation on the day of admission to hospital; 42 % in 2010/2011 and 49 % in 2011/2012.

Conclusions: The results reflect findings of other studies and staff perceptions. The increase in late preterm infants may reflect changing neonatal care, with earlier discharge or an annual variation.

473 – POSTER SESSION

3 YEAR EXPERIENCE IN THE USE OF INHALED NITRIC OXIDE IN PREMATURE INFANTS IN A TERTIARY NEONATAL UNIT

A. Kopuri^{1,2}, G. Erumbala², M. Anthony²

¹Paediatrics, University of Oxford, ²Neonatology, Oxford University Hospitals NHS Trust, Oxford, UK

Objectives: To review the use of inhaled Nitric Oxide (iNO) in premature infants to treat pulmonary hypertension (PHN) in our tertiary neonatal unit.

Context: In our unit, iNO therapy is only offered as a last resort to premature infants if there is a demonstrable clinical or echocardiographic evidence of PHN.

Methods: Retrospective analysis was performed on all premature infants (<35 weeks gestation) who were born between 2010 and 2012 and were treated with iNO. Data was compiled from SEND database system and clinical notes. The project received institutional approval as a clinical audit.

Results: 82 infants received iNO therapy, of whom 35(42 %) were premature (<35 weeks gestation). Mean gestation at birth was 29 weeks (23.34). Mean corrected gestation at the time of commencement of iNO was 29.5 weeks. Primary cause of pulmonary hypertension was respiratory distress syndrome in 57 %. Other causes were sepsis and diaphragmatic hernia. 75 % needed iNO within the first 72 h of life, median age being 0 days (0.31). Concurrent use of inotropes was common (96 %). ECHO evidence was sought in 71 % of infants. Commonest dose of iNO at start was 20 ppm. (Median = 20, Range = 5–20). Mean duration of therapy was 5 days. 15 % of these infants had Intra Ventricular Hemorrhages (IVH) before iNO therapy. 42 % of infants had IVH at anytime afterwards. Incidence of Necrotizing Enterocolitis was 28 %. Survival to discharge was 48 %.

Conclusions: Selective use of iNO therapy may improve survival, but further research is required to define the risks, including IVH causation.

474 – POSTER SESSION

ASSOCIATION OF IL-10 – 1082 G ALLELE WITH SEVERE RESPIRATORY DISTRESS SYNDROME: A PILOT STUDY

K.H. Lee, H.S. Jo

Pediatrics, CHA Bundang Medical Center, CHA University, Seongnam-si, Republic of Korea

Purpose: Although prematurity of the lung is the primary cause of neonatal respiratory distress syndrome (RDS), several factors including inflammatory response may contribute to the pathogenesis. Interleukin-10 (IL-10) is an important anti-inflammatory cytokine, and –1082 G allele is associated with higher IL-10 production. We investigated whether IL-10 – 1082 polymorphism G is associated with the severity of RDS in the preterm Korean infants.

Methods: 64 preterm infants who developed RDS and delivered at CHA Bundang Medical Center between July 1, 2011 and June 30, 2012 were analyzed for IL-10 – 1082 genotype. We reviewed the records and compared the differences in the perinatal characteristics and variables relating to RDS severity and neonatal pulmonary outcomes.

Results: Patients with IL-10 – 1082 G/A genotype were 6 (9.4 %) and those with A/A genotype were 58 (90.6 %). Gestational age (30.90 ± 3.60 vs. 31.04 ± 2.60 weeks) and birth weight (1.620 ± 470 g vs. 1.670 ± 510 g) were not different ($P > 0.05$) between the groups. The level of FiO_2 at 24 h after birth (0.43 ± 0.15 vs. 0.28 ± 0.71 mmHg, $P = 0.01$) and the incidence of retinopathy of prematurity ($P = 0.009$) were higher in the –1082 G/A group.

Conclusion: We have identified associations between IL-10 – 1082 G allele and the severe subgroup of RDS in the Korean preterm study population. Our results support that RDS is a multifactorial disease influenced by inflammatory sequence in the immature lung.

475 – POSTER SESSION

RESPIRATORY DISTRESS SYNDROME IN LATE PRETERM INFANTS: SAUDI TERTIARY CARE EXPERIENCE

A.Y. Mersal¹, A. Almahboosh¹, B. Bensadeq², E. Mersal¹

¹Pediatrics, ²Research Center, King Faisal sp. Hospital-Jeddah, Jeddah, Saudi Arabia

Introduction: Late preterm infants (LPI) are born at a gestational age between 34 weeks and 36 weeks and 6 days. They have higher morbidity and mortality than term infants (gestational age ≥ 37 weeks) due to their physiologic and metabolic immaturity, LPI would miss the surfactant surge which generally occurs around 34 weeks hence they are at risk of Respiratory distress syndrome.

Patients and methods: Newborn infants who were born between July 2008 and July 2010 would be identified using NICU and Labor and delivery registry of King Faisal Specialist Hospital (Gen. Org.) - Jeddah. The data of Newborn infants who had respiratory distress collected factors studied including antenatal steroid, gestational age, sex, birth weight, surfactant, CPAP IPPV, complications, out come and hospital stay.

Results: 210 infants' charts met the defined criteria over 3 years Oct 2008–Oct 2010 studied. 37/75 (49.3 %) male, 38/75(50.6 %) female. mean gestational age 34.7 weeks. mean weight 2.2 kg. 75/210 (34 %)

infants had respiratory distress, none of the mothers received antenatal steroid. The radiological RDS made on 23/75 (30.6 %); 38/75 (50.7 %) diagnosed with transient tachypnea of newborn (TTN) required oxygen, CPAP in 36/75 (48 %), surfactant required in 1/75 (1.3 %), PPV in 1/75 (1.3 %).

Pneumothorax 2/75 (2.7 %), hospitals stay longer for RDS group 3.96 vs 8.76 days. no mortalities.

Conclusion: Results is comparable with previously reported results; our complications low. Suggest use of early CPAP in LPI.

476 – POSTER SESSION

EFFECT OF HIGH-FLOW NASAL CANNULA NASAL ON NASOPHARYNGEAL AIRWAY PRESSURE AND RESPIRATORY MUSCLES LOADING IN YOUNG INFANTS WITH BRONCHIOLITIS

C. Milesi, J. Baleine, S. Matecki, A. Jacquot, G. Cambonie

Hospital Arnaud de Villeneuve, Montpellier, France

Objective: To determine the efficacy of high-flow nasal cannula (HFNC) at different flow level on respiratory distress symptoms, nasopharyngeal airway pressure and respiratory effort in young infants with acute respiratory syncytial virus bronchiolitis.

Design: Prospective study. Setting: The paediatric intensive care unit of a university hospital.

Patients: Twenty-one <6 month/old infants, with severe respiratory distress. Interventions: Oesophageal pressure (Pes) and nasopharyngeal airway pressure (NAP) was measured simultaneously after 5 different flow of 1,4,6 and 7 l/min delivered through a HFNC. Measurements and results: Respiratory distress was quantified with a specific scoring system (m-WCAS). Mean respiratory rate (RR), inspiratory time over total time or respiratory cycle (Ti/Tot), nasopharyngeal pressure, Swing Pes and respiratory effort with the Pes-derived inspiratory muscles pressure–time product (PTPes_{insp}) was reported from the pressure curve.

Results are presented below: flow [1/7 l/min]; p (1–7 l). NAP (cm H₂O) [0.2 (0.9)/4 (2)]; 0.0001. Swing Pes [24 (12)/15 (7)]; 0.0003. PTP/min [546 (330)/289 (166)]; 0.0002. RR (breath/min) [81 (16)/65 (15)]; 0.01. Ti/Ttot [0.43(0.9)/0.36 (0.1)]; 0.002. mWCAS [2.3 (1)/1 (1)]; 0.0006.

Conclusions: In young infants with severe acute respiratory syncytial virus bronchiolitis nasopharyngeal airway pressure increase with flow delivery through HFNC. The result is a proportional decrease of respiratory muscles load and respiratory distress symptoms improvement.

477 – POSTER SESSION

AUDIT ON THE USE OF SURFACTANT IN A TERTIARY NEONATAL UNIT

N. Nallapeta¹, B. Gill², R. Alia², C. Thompson², H. Holroyd²

¹Community Paediatrics, Leeds Community Health Care Trust,

²Neonatal Unit, Leeds Teaching Hospital NHS Trust, Leeds, UK

Background: Neonates <28 weeks have very little surfactant production and prophylaxis with surfactant before developing RDS is the best approach. Current evidence shows that early and enough

(200 mg/kg) replacement of surfactant reduces mortality and morbidity including oxygenation deficit, pulmonary air leaks and reduces duration of ventilatory support. For the later preterm, >28 weeks GA who require intubation or have worsening respiratory distress, surfactant administration as prophylaxis is shown to have better outcome than when it is given as a rescue therapy for RDS.

Aim: Compare the current practice of use of surfactant against existing guidance. (Leeds Teaching Hospitals NHS trust Neonatal handbook, RCPCH guidelines, BAPM guidelines).

Method: Retrospective Data was collected looking into details of time, dose and number of times Surfactant used in <28 weeks and 28–32 weeks gestation babies.

Results: In the prophylaxis group (12 babies) -most had it within 30 min of birth and were <1.5 kg at birth, all of them had dose of 100 mg/kg. 5 out of 12 babies required 2nd dose.

In Rescue group (9 babies) Surfactant use was for confirmed Respiratory Distress Syndrome—85 % had 200 mg/kg dose. They rarely needed 2nd dose.

Conclusion and recommendation: Audit highlighted many things, one main thing was that around half of prophylaxis group required second dose and the rescue showed the need for changing to a higher first dose (200 mg/kg). A trust guideline for the use of surfactant was produced post this audit in line with the current best practice and European consensus on RDS management 2010 update.

478 – POSTER SESSION

ASYMPTOMATIC LACTIC ACIDOSIS INDUCED BY TREATMENT WITH SALBUTAMOL. CLINICAL STUDY

M.L. Neamtu^{1,2}, L. Dobrota^{1,2}

¹Pediatric Clinic, Pediatric Clinic Hospital, ²CCMRP, Lucian Blaga University, Sibiu, Romania

Background: Asymptomatic lactic acidosis (ALS) has been less reported during acute severe asthma linked to salbutamol therapy.

Aim: To demonstrate ALS in children with respiratory diseases requiring salbutamol therapy.

Method: Prospective study, included children admitted in PICU during 6 months period. Inclusion criteria: admission for acute respiratory failure due to respiratory diseases, salbutamol therapy initiated only in PICU. Exclusion criteria: shock, sepsis signs, lactic acidosis >2 mmol/l at the admission. All children received daily salbutamol <800 mcg (group A) and 800–1,200 mcg (group B), depending on age and symptoms. The acid–base, lactate assessment was made at the admission, 6, 12, 48 h, or as needed. Salbutamol was discontinued at lactate >4 mmol/l.

Results: 98 children were included in the study, 8.16 % asthma, 54.09 % bronchiolitis, 37.75 % pneumonia. After 6 h, 25 children had blood lactate values up 2 times higher than initial levels (11, group A and 14, group B), after 12 h, 43 (20, group A and 23, group B). At 48 h, 9 children, from group B, presented values 2–2.5 mmol/l. ALS was associated with higher dosage of salbutamol (p < 0.006), at 12 h (p < 0.0001). Salbutamol was discontinued at 5 children from both groups. No other specific therapy was necessary.

Conclusions: ALS was observed at higher dosage of salbutamol, mostly after 12 h, could be solved without specific therapy but require monitoring up to 48 h.

References:

Muhammad Ganaie, Rodney Hughes (2011) An unusual case of Lactic Acidosis. BJMP 4(2): a420.

479 – POSTER SESSION

THREE YEARS EXPERIENCE WITH NON INVASIVE VENTILATION IN A PEDIATRIC INTENSIVE CARE UNIT

F. Nikolaou, A. Patsoura, A. Prezerakou, P. Bonos, J. Papadatos

Pediatric Intensive Care Unit, Aglaia Kyriakou Children's Hospital, Athens, Greece

Objectives: The aim of the present study is to evaluate the effectiveness of NIV in children admitted to our PICU for acute respiratory failure (ARF) due to different conditions.

Material/method: Retrospective review of 31 children age >15 days admitted to the PICU with ARF who received NIV via nasal or facial mask as part of their treatment between January 2010 and December 2012. The causes of ARF were:

Pneumonia (10), viral bronchiolitis (8), status asthmaticus (4), acute cardiac failure due to myocarditis (2), postoperative atelectasis (3), myasthenic crisis (1), acute upper airway obstruction (1), fat embolism (1) and congenital heart disease-bronchopulmonary dysplasia (1). We selected the NIV/Pressure Control ventilation mode. Respiratory rate, heart rate, arterial pH, pO₂ and pCO₂ were recorded before, 2 h after the initiation of NIV/PC and then, when needed.

Results: NIV/PC was well tolerated without complications and was associated with improved gas exchange, decreased work of breathing and endotracheal intubation avoidance in 24 patients (medium ventilation time 2 days). Seven patients did not improve so they had to be intubated. The underlying disease was the main factor for NIV failure in children with ARF (metabolic disorders or neuromuscular diseases).

Conclusion: NIV/PC ventilation seemed to be effective in the treatment of children with ARF. As literature suggests NIV is a safe method of treatment and diminishes intubation rate in children with ARF.

480 – POSTER SESSION

EPIDEMIOLOGY AND ADJUNCTIVE CRITICAL CARE THERAPY OF SEVERE NEONATAL RESPIRATORY FAILURE IN GERMANY

C. Patry, S. Hien, S. Demirakca, J. Reinhard, T. Schaible, ESPED-Studygroup

University Children's Hospital, Intensive-Care Unit and Neonatology, University Medicine Mannheim, Mannheim, Germany

Background and aims: Adjunctive critical care therapies like Surfactant, inhalative Nitric Oxide (iNO), High Frequency Oscillatory Ventilation (HFOV) and Extracorporeal Membrane Oxygenation (ECMO) are used to treat neonates suffering from severe respiratory failure. This study aims to assemble national epidemiologic data as well as more information about the effectiveness of these adjunctive therapies in neonates >34 + 0 weeks of gestation.

Methods: From July 2011 till December 2012 all children's hospitals in Germany have been requested to report their numbers of cases via

the German institution "ESPED". According to their cases specific questionnaires have been sent to all participating children's hospitals in Germany every month.

Results: 237 questionnaires have been evaluated (mean gestational age 37 + 3, 145 male and 92 female patients). Respiratory Distress Syndrome (RDS) was the most common disease (39.2 %), followed by pneumonia and sepsis (21.5 %), Meconium-Aspiration-Syndrome (MAS) (15.5 %) and Diaphragmatic Hernia (15.5 %). Surfactant has been used 187 times, iNO 96 times, HFO 80 times and ECMO 41 times. The most effective treatment was Surfactant-Therapy with a reported effectiveness of 88.8 % in RDS and 53 % in MAS. In cases without response to adjunctive therapies we count 23 cases of death. Out of these 23 cases only 6 patients were allocated to an ECMO-Centre and received an ECMO-Therapy.

Conclusions: Severe neonatal respiratory failure has a remarkable mortality which might be reduced by allocating critically ill neonates to high leveled centres offering the option ECMO.

481 – POSTER SESSION

PREDICTIVE FACTORS OF FAILURE FOR NON-INVASIVE VENTILATION (NIV) IN POST-EXTUBATION PATIENTS

L. Pérez-Baena¹, M. Pons-Odena¹, F.J. Cambra¹, V. Modesto², L. Hernandez¹

¹PICU, Hospital Sant Joan de Déu, Universitat de Barcelona, Barcelona, ²PICU, Hospital La Fe, Valencia, Spain

Objectives: To identify predictive failure factors for non-invasive ventilation (NIV) and describe characteristics in post-extubation (pNIV) samples in children with acute respiratory failure.

Patients and methods: Prospective cohort study with consecutive sampling of patients treated on NIV for ARF after extubation admitted to PICU between 2005 and 2010. Patients without previous intubation during admission or those with palliative indication for NIV were excluded. Patients were analyzed separately as rescue NIV (r-NIV): NIV used after extubation if respiratory failure reappeared, or elective NIV (e-NIV): NIV used immediately after extubation to prevent respiratory failure. Patient's demographic data, underlying disease, physiologic data (including SpO₂/FiO₂ ratio (SF)) previous, at 2, 8, 12 and 24 h were collected. NIV failure, defined as need for intubation, was the primary outcome. Descriptive, Uni- and Multivariate statistic analysis (Cox Regression) was performed to identify predictive factor for NIV failure.

Results: The sample consists of 316 patients. 113 r-NIV and 203 e-NIV. 203 were male (64.5 %). r-NIV patients, median age was 12 months (IQR 1.8–91) and e-NIV patients 4.6 months (IQR 1.2–47). NIV failure occurs in 16 % (r-NIV) (95 %CI 9.5–24 %) and 25 % (e-NIV) (95 %CI 19–31 %). Lower SF ratio values at 2 h showed an increased risk of NIV failure (Hazard ratio (HR) 0.996; 95 % CI 0.992–0.999). Separate analysis of e-NIV showed SF ratio at 2 h and age as predictive factors of failure (HR 1.006; 95 % CI 1.001–1.011).

Conclusion: Lower SF ratio values at 2 h and age are predictive factors of NIV failure in post-extubation patients.

482 – POSTER SESSION

ACUTE LUNG INJURY IN VIETNAMESE CHILDREN: RISK FACTORS ASSOCIATED WITH MORTALITY AND PROLONGED MECHANICAL VENTILATION

P.H. Phan¹, P.R. Beasley², J. Risser², F. Charles², N.T. Liem¹

¹The National Hospital of Pediatrics, Hanoi, Vietnam, ²University of Texas Health Science Center at Houston, Houston, TX, USA

Background and aims: Understanding about factors associated with adverse outcomes of acute lung injury (ALI) in children remains incomplete. This study aimed to identify predictors of mortality and duration of mechanical ventilation in children with ALI in Vietnam.

Methods: Clinical data were collected prospectively from 101 patients with ALI who were admitted to the National Hospital of Pediatrics in Hanoi, Vietnam from January 2011 to January 2012. All patients were followed until hospital discharge or death. The outcomes were in-hospital mortality and ventilator-free days. Significant associated factors with outcomes were evaluated by multivariate logistic regression to identify the independent predictors of outcomes.

Results: The case mortality rate was 63.4 %. Multivariate logistic regression analyses revealed that:

- (1) Male sex;
- (2) Time staying in intensive care prior to ALI diagnosis;
- (3) The presence of non-pulmonary organ system dysfunction within 24 h of ALI onset;
- (4) The initial severity of hypoxemia, as measured by PaO₂/FiO₂ ratio;
- (5) The presence of non-pulmonary organ system dysfunction on day 3 from ALI onset, and
- (6) The presence of any hospital acquired infection during admission were independent factors associated with mortality and prolonged mechanical ventilation.

Conclusions: We found a high case mortality and prolonged mechanical ventilation among a cohort of pediatric ALI patients in a low- resource critical care setting. Factors that independently predicted the adverse outcomes were identified easily. Identifying these factors early in the course of ALI will help to determine appropriate treatment modalities and improve outcomes of children with ALI.

483 – POSTER SESSION

USE OF SILDENAFIL IN PULMONARY HYPERTENSION (PH) ASSOCIATED WITH BRONCHOPULMONARY DYSPLASIA (BPD) IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS

M. Pierro¹, E. Ciarmoli¹, M. Colnaghi¹, A.M. Colli², S. Gangi¹, M.A. Galli², V. Cecchetti¹, P. Salice², F. Schena¹, F. Maglioli Carpano¹, F. Magrini², F. Mosca³

¹NICU, Department of Clinical Sciences and Community Health, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico,

²Department of Cardiovascular Medicine-Perinatal and Paediatric Cardiology, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, ³Università degli Studi di Milano, Milan, Italy

Background and aim: PH is a complication of BPD and is associated with increased morbidity and mortality. Its incidence is unknown and treatment is not yet standardized.

We evaluated the incidence of PH related to BPD and our experience with Sildenafil.

Methods: We retrospectively analyzed VLBW infants admitted at our center between 01/2007 and 12/2011. BPD is defined as need for O₂ dependency at 36 weeks post-menstrual age (PMA), PH as systolic pulmonary artery pressure (PAP) above 40 mmHg. Sildenafil was discontinued when PAP was normal at two subsequent evaluations. Data were analyzed with SPSS v 18.

Results: 649 VLBW infants were enrolled. Mean PMA and birth weight were 29 ± 2.8 weeks and 1,136 ± 274 g, respectively. Since 45 patients died, 605 were analyzed. Out of these, 87 (14.2 %) developed BPD. PH was detected in 14/87 (16 %) and they were treated with Sildenafil (2.5 ± 1.25 mg/kg/day). The incidence of PH in severe BPD was therefore 27 % (14/51). Mean PMA at diagnosis was 46 ± 9.7 weeks and mean PAP 53 ± 16 mmHg. Three patients (21 %) died before discharge, three patients (14.3 %) discontinued Sildenafil before discharge and eight patients (57 %) were discharged on Sildenafil. Sildenafil was successfully weaned by 5.2 ± 4.7 months in five patients. Three patients are still under treatment (11.6 ± 7.4 months). There were no adverse effects related to chronic Sildenafil treatment in our group.

Conclusions: PH is emerging as a serious problem in VLBW with severe BPD. Chronic use of Sildenafil seem to be safe in newborns, although further studies are needed to confirm this.

484 – POSTER SESSION

PREDICTIVE FACTORS OF NIV FAILURE IN PATIENTS TREATED WITH INITIAL NON-INVASIVE VENTILATION

M. Pons-Odena¹, A. Medina², D. Vila¹, L. Rodriguez¹, F.J. Cambra¹

¹PICU, Hospital Sant Joan de Déu, Universitat de Barcelona, Barcelona, ²PICU, Hospital Central de Asturias, Universidad de Oviedo, Oviedo, Spain

Objectives: To identify predictive factors of failure for non-invasive ventilation (NIV) in initial NIV (i-NIV) in children with acute respiratory failure (ARF).

Patients and methods: Prospective cohort study with consecutive sampling of patients treated on NIV for ARF admitted to PICU between 2005 and 2009. Patients with previous intubation during admission or those with palliative indication for NIV were excluded. Patient's demographic data, physiologic data (including SpO₂/FiO₂ (SF) ratio) previous, at 2, 8, 12 and 24 h were collected. NIV failure, defined as need for intubation, was the primary outcome. Descriptive, Uni-Multivariate statistic analysis was performed (Binary Logistic and Cox Regression).

Results: The sample consists of 282 patients. 182 male (64.5 %). Median age was 12 months (IQR 1.9–49). NIV failure occurs in 82 patients (29 %; 95 %CI 23.6–34.5 %). Duration of NIV treatment (median 38.5) h.(range 0–320). Median PICU length of stay was 7.2 days (IQR 1–45). Being older than 6 months old protected of NIV failure (Hazard ratio (HZ) 0.375; 95 % CI 0.171–0.820). Higher IPAP at 2 h (HZ 1.275; 95 % CI 1.046–1.408), Heart rate (HR) at 2 h (OR 1.02; 95 % CI 1.008–1.034) and patients treated with CPAP showed a higher risk of failure compared to bilevel (BLPAP) (OR 7.8; 95 % CI 3.5–17.4). Higher SF ratio values at 2 h showed a decreased risk for NIV failure (OR 0.991; 95 % CI 0.986–0.996).

Conclusion: Age below 6 months, being treated with CPAP instead of BLPAP, lower SF ratio, higher IPAP and higher HR values at 2 h are predictive factors for NIV failure in initial NIV.

485 – POSTER SESSION

IS $\text{SpO}_2/\text{FiO}_2$ (SF) RATIO BETTER PREDICTOR OF NIV FAILURE THAN TYPE I/II RESPIRATORY FAILURE?

M. Pons-Odena¹, A. Medina², V. Modesto³, A. Felipe¹, F.J. Cambra¹

¹PICU, Hospital Sant Joan de Déu. Universitat de Barcelona, Barcelona, ²PICU, Hospital Central de Asturias. Universidad de Oviedo, Oviedo, ³PICU, Hospital La Fe, Valencia, Spain

Background: In previous studies, Respiratory failure type I (hypoxemic patients) has been identified as a predictive factor of NIV failure.

Objectives: To compare the value of different predictive failure factors for non-invasive ventilation (NIV) in children with acute respiratory failure (ARF).

Patients and methods: Prospective cohort study with consecutive sampling of patients treated on NIV for ARF admitted to PICU between 2005 and 2009. Patients with palliative indication for NIV were excluded. Patient's demographic data, type of RF (I/II), physiologic data (including $\text{SpO}_2/\text{FiO}_2$ ratio (SF)) previous, at 2, 8, 12 and 24 h were collected. NIV failure, defined as need for intubation, was the primary outcome. Descriptive, Uni- and Multivariate statistic analysis was performed.

Results: The sample consists of 491 patients (156 type I and 335 type II). 310 were male (63.25 %). NIV failure occurs in 23 % (type I RF) (95 %CI 16–30 %), 33 % (type II RF) (95 %CI 28–38 %). Lower SF ratio values at 2 h showed an increased risk of NIV failure (Odds ratio (OR) 0.994; 95 % CI 0.990–0.997). Being younger than 6 months old also increased risk of NIV failure (OR 2.1; 95 % CI 1.27–3.6) and patients treated with CPAP showed a higher risk of failure compared to bilevel (BLPAP) (OR 2.5; 95 % CI 1.4–4.5). RF Type I/II was excluded from the model.

Conclusion: In our population type II RF has greater failure rate than type I RF. Lower SF ratio at 2 h seems to be better predictive factor of NIV failure than Respiratory failure type I/II.

486 – POSTER SESSION

WHAT ARE THE CRITERIA USED IN CLINICAL PRACTICE TO INITIATE NONINVASIVE VENTILATORY ASSISTANCE IN CHILDREN WITH SEVERE BRONCHIOLITIS?

R. Pouyau¹, H. Daoud¹, J. Berthiller², F. Baudin¹, C. Didier¹, F. Cour-Andlauer¹, E. Javouhey^{1,3}

¹Pediatric Critical Care Unit, Hôpital Femme Mère Enfant, Hospices Civils de Lyon, Lyon-Bron, ²Pôle Information Médicale Evaluation Recherche, Hospices Civils de Lyon, ³University Claude Bernard Lyon 1, Lyon, France

Objectives: To investigate criteria used to initiate noninvasive ventilatory assistance (high flow cannula (HFC), nasal CPAP (nCPAP), or noninvasive positive pressure ventilation (NIPPV)).

Methods: All children admitted to PCCU-ICU, during 2011/2012 epidemic for severe bronchiolitis requiring ventilatory assistance were included. We asked caregivers to fulfill standardized questionnaires collecting prospectively clinical, biological and radiological criteria.

Results: Among the 128 children included, 91 were treated by HFC, 34 received nCPAP and 3 NIPPV. 46 children failed to HFC: one death, 4 secondary treated by NIPPV (one failure) and 41 by nCPAP (9 failures treated by NIPPV with one subsequent failure). Among the 15 children with nCPAP failure one was intubated, 14 were put on NIPPV (one failure). Five (4 %) children were finally intubated. nCPAP group had a lower weight (3.7 vs 4.0 kg, $p < 0.05$), presented more apneas (32.3 vs 16.5 %, $p = 0.05$) and more neurological signs (36.4 vs 13.5 %, $p < 0.01$) compared to HFC group. Hypercapnic acidosis was similar between the two groups. The 30 children requiring NIPPV had a median age of 28 days (18–56), had frequently apneas (37 %), neurologic abnormalities (45 %) and profound hypercapnic acidosis: median pH = 7.27 (7.24–7.32), median $\text{pCO}_2 = 9.08$ kPa (7.63–9.95).

Conclusions: Noninvasive ventilatory technics allowed to avoid intubation. Children with low weight, apneas and neurological symptoms were more frequently treated by nCPAP than by HFC. NIPPV can be used when children failed, even for the youngest with apnea and severe hypercapnic acidosis. To determine exact indication of each technic comparative studies are required.

487 – POSTER SESSION

RESPIRATORY SUPPORT IN RETRIEVALS OF CRITICALLY ILL INFANTS: HIGH-FLOW NASAL PRONG THERAPY IS SAFE AND MAY REDUCE INTUBATION RATES

L. Schlapbach^{1,2}, J. Schaefer¹, A.-M. Brady¹, S. Mayfield¹, A. Schibler¹

¹Paediatric Critical Care Research Group, Paediatric Intensive Care Unit, Mater Children's Hospital, Brisbane, QLD, Australia,

²Neonatal and Pediatric Intensive Care Unit, Department of Pediatrics, University of Berne, Bern, Switzerland

Background: Optimal respiratory support for interhospital transport of critically ill children represents a challenge. High flow nasal prong (HFNP) therapy has emerged as a promising support mode in PICU patients, but no data are available on HFNP use in retrievals. We aimed to assess safety of HFNP during retrievals of critically ill children and its impact on need for invasive ventilation (IV).

Methods: Retrospective study including infants ≤ 2 years transported by a paediatric retrieval team to the tertiary PICU between 2005 and 2012. Comparison of IV rates before (2005–2008) and after introduction of HFNP (2009–2012).

Results: 793 infants were retrieved. The mean transport duration was 1.4 h (range 15 min–8 h), with a mean distance of 205 km (2–2,856). Before introduction of HFNP, 7 % ($n = 23$) were retrieved on non-invasive ventilation (NIV) and 49 % ($n = 163$) on IV. After introduction of HFNP, 33 % ($n = 150$) were retrieved on HFNP, 2 % ($n = 10$) on NIV, whereas IV decreased to 35 % ($n = 162$, Chi square $p < 0.001$). In patients retrieved on HFNP, none required intubation during retrieval, and none developed pneumothorax or cardiac arrest. The rate of retrieved infants requiring intubation for respiratory reasons during the first 24 h after PICU admission did not change significantly (2.4 versus 3.6 %, $p = 0.42$).

Conclusions: HFNP therapy is a safe respiratory support mode to transport infants with mild to moderate work of breathing. The increasing use of HFNP was paralleled by a significant decrease of IV

during retrieval. Importantly, we did not observe an increase in delayed intubation in PICU.

488 – POSTER SESSION

ASSESSMENT BY NURSES AND DOCTORS OF HFOV CHEST WALL MOVEMENT ON A NEONATAL MANNEQUIN

A. Shearman^{1,2}, T. Drewett³, L. Jardine^{1,2}, J. Fu⁴

¹Neonatology, Mater Mothers' Hospital, ²Critical Care of the Newborn Group, Mater Medical Research Institute, ³Biomedical Electronics, Infrastructure Services, Mater Misericordiae Health Services, ⁴Clinical Research Support Centre, Mater Medical Research Institute, South Brisbane, QLD, Australia

Objectives: Assessment of chest wall movement, or chest wiggle (CW), during HFOV is an essential but subjective clinical skill. Oscillatory pressure amplitude (ΔP) may be initially set by observing CW and can determine alveolar CO_2 . Alterations in CW can also indicate a change in lung compliance. We aimed to see if there was any difference between experienced clinical nursing and medical staff in their subjective assessment of “adequate” (CWa) and “excessive” (CWe) CW.

Methods: A resuscitation mannequin (SimNewB) on HFOV was observed by clinical staff blinded to the ΔP . ΔP was increased by one of the investigators and measurements recorded when participants indicated that CWa and CWe had occurred. Each participant undertook three trials. HFOV frequency and MAP were unchanged during the trials.

Results: 13 nurses and 9 doctors were enrolled. Analysis showed that there was no training effect over the 3 trials ($p = 0.43$). All trials were then pooled for each group. There were no statistically significant differences between nurses and doctors in the median (IQR) ΔP (cm H_2O) for CWa (41 (11), 44 (17), $p = 0.66$) or CWe (64 (13), 62 (11) $p = 0.53$). Possible confounders such as years of experience and self-rated confidence in the use of HFOV had no effect on the outcomes.

Conclusions: In this small sample size investigation, experienced clinical nursing and medical staff make the same visual judgement of two clinically important HFOV assessments, namely, adequate and excessive chest wiggle. A larger sample size is required to confirm these findings.

489 – POSTER SESSION

ANALYSIS OF THE PRESSURE WAVEFORM PRODUCED BY TWO COMMERCIALLY AVAILABLE BUBBLE CPAP SYSTEMS

A. Shearman^{1,2}

¹Neonatology, Mater Mothers' Hospital, ²Critical Care of the Newborn Group, Mater Medical Research Institute, South Brisbane, QLD, Australia

Objectives: Bubble CPAP (BCPAP) generates a complex pressure waveform. We aimed to investigate the effects that flow and pressure have on two commercial BCPAP systems.

Methods: BABI (Plus) and Fisher & Paykel (BC161-10, BC180) BCPAP systems were connected to a test lung. A flowmeter delivered

flow (4, 6, 8 L/min) over 3 pressure markings (4, 6, 8). Pressure was measured within the nasal interface and the test lung. Six 20 s samples were analysed for each combination. Outcomes measured were; average pressure (xPressure), average pressure amplitude (xAmp), maximum power frequency (PowerF) and total power (TPower).

Results: Table 1. Analysis (ANOVA) of the effect of flow and pressure on the BCPAP systems outcomes at measurement sites.

Table 1 Analysis (ANOVA) of the effect of flow and pressure on the BCPAP systems outcomes at measurement sites

Intervention	Outcome	Nasal interface	Test lung
Flow	XPressure	0.61	0.74
	xAmp	<0.01	<0.01
	PowerF	0.31	0.02
	TPower	<0.01	<0.01
Pressure	XPressure	<0.01	<0.01
	xAmp	<0.01	<0.01
	PowerF	<0.01	<0.01
	TPower	<0.01	<0.01

Post hoc analysis showed that the BABI Plus BCPAP system had statistically lower xAmp and TPower, and a higher PowerF.

Conclusions: The two BCPAP systems produce different pressure waveforms in response to changes in gas flow and pressure settings. These differences may not be clinically important.

490 – POSTER SESSION

COMPARISON OF SpO_2/FiO_2 AND PaO_2/FiO_2 BASED MARKERS OF RESPIRATORY DYSFUNCTION IN NEONATES WITH NECROTISING ENTEROCOLITIS

N.Z. Sim^{1,2}, N.J. Hall^{1,3}, M.J. Peters^{4,5}, A. Pierro^{1,3}, S. Eaton¹

¹Surgery Unit, UCL Institute of Child Health, ²Neonatal Unit, University College London Hospital, ³Surgery Unit, Great Ormond Street Hospital, ⁴Critical Care Group, UCL Institute of Child Health, ⁵Intensive Care Unit, Great Ormond Street Hospital, London, UK

Objectives: Severity of illness scores may provide useful prognostic information and are used to guide inclusion into and monitor progress within clinical trials in intensive care. Assessment of respiratory function within such scoring systems frequently requires invasive arterial blood gas (PaO_2), a parameter which may not be readily available in neonates. We hypothesized that SpO_2/FiO_2 ratio can be substituted for PaO_2/FiO_2 in critically ill neonates with necrotizing enterocolitis (NEC).

Methods: Nine-hundred-forty-five paired datapoints (median 26 datapoints per patient [range 1–137]) were prospectively recorded from 26 neonates (median gestational age at birth 27 weeks [range 23–38]) admitted with confirmed NEC (Bell stage II/III). SpO_2 was recorded from a peripherally positioned pulse oximeter. We used quantile logistic regression to examine the relationship between SpO_2/FiO_2 and PaO_2/FiO_2 given the conditional nature of SpO_2/FiO_2 (i.e. a value above 100 %/0.21 [476.2] is not clinically plausible). SpO_2/FiO_2

threshold values that corresponded with clinically relevant $\text{PaO}_2/\text{FiO}_2$ values were determined.

Results: There was a highly significant relationship between $\text{SpO}_2/\text{FiO}_2$ and $\text{PaO}_2/\text{FiO}_2$ ($p < 0.0001$). $\text{SpO}_2/\text{FiO}_2$ values of 165, 270, 377, 439 correspond with $\text{PaO}_2/\text{FiO}_2$ values of 100, 200, 300 and 400, respectively. There was high correlation of respiratory function severity of $\text{SpO}_2/\text{FiO}_2$ category with $\text{PaO}_2/\text{FiO}_2$ using these described values (Kendall's Tau-b correlation coefficient 0.57, $p < 0.0001$).

Fig. 1

Table Number of paired datapoints within bounded severity categories

	$\text{SpO}_2/\text{FiO}_2$				
	>439	378–439	271–377	166–270	≤165
$\text{PaO}_2/\text{FiO}_2$ >400	30	6	16	5	2
301–400	43	20	35	18	0
201–300	52	44	124	60	10
101–200	6	24	66	184	67
≤100	0	0	4	18	111

Conclusions: These data allow $\text{SpO}_2/\text{FiO}_2$ to be used as a suitable substitute for $\text{PaO}_2/\text{FiO}_2$ in severity of illness scoring systems in this clinical setting. We intend to further validate these results on a second data set to improve their reliability.

491 – POSTER SESSION

RESPIRATORY SUPPORT IN CHILDREN WITH ROBIN SEQUENCE

M.J.S. van Lieshout, K.F.M. Joosten, L.J. Hoeve, I.M.J. Mathijssen, M.J. Koudstaal, E.B. Wolvius

Dutch Craniofacial Center, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands

Background and aims: Robin Sequence (RS) is a congenital disorder found in about 1 in 8,500 to 1 in 20,000 newborns. RS is classically characterized by mandibular hypoplasia, glossoptosis and upper airway obstruction. Management of the airway obstruction is highly controversial. In this study we report the use of respiratory support in children with RS in Rotterdam and consider our approach.

Methods: A retrospective cohort study of 59 children with RS (<1 year old) managed between 2000 and 2010. Data collected included clinical characteristics and management of airway obstruction.

Results: Prone position was successful in 69 % whereas 31 % of the children needed respiratory support because of (severe) respiratory distress. In the majority of children more modes of respiratory support were used. Respiratory support consisted of a nasopharyngeal airway ($n = 3$), oxygen supplementation ($n = 9$), continuous positive airway pressure ($n = 4$) and a tracheostomy ($n = 7$). Eight children underwent additional treatment by mandibular distraction. The overall need for respiratory support differed between children with isolated RS compared to children with non-isolated RS (17 vs. 52 %). Only 5 % of the children were in need of long term respiratory support.

Conclusions: Although the majority of children with RS can be treated by conservative measures such as prone positioning, about one-third of the children with RS needed respiratory support necessitating intensive care admission. Non-isolated RS children needed respiratory support more often compared to isolated RS children. A clear treatment algorithm will help the clinician to decide about the duration of different modes of respiratory support.

492 – POSTER SESSION

IMPLEMENTING BRONCHOSCOPY IN A PEDIATRIC INTENSIVE CARE UNIT: A VERY USEFUL AND SAFE TECHNIQUE

D. Vlainic, A. Hansmann, R. Knies, N. Freudenthal, N. Müller

PICU, Zentrum für Kinderheilkunde/Universitätsklinikum Bonn, Bonn, Germany

Objectives: In 2011 we started implementing flexible bronchoscopy in our PICU for management of critically ill patients. It was our goal to implement this technique as a routine diagnostic and interventional tool and to characterize possible benefits.

Methods: This is a prospective study including all patients who underwent bronchoscopy in our 10-bed pediatric ICU of a tertiary care children's hospital. All procedures were performed in 2012 by specially trained pediatric intensivists and video documented.

Results: 78 patients received bronchoscopy, 117 procedures were performed. Indications were: Treatment of atelectasis and obstruction (68 of 117 procedures), with improvement in ventilation parameters in 51 of 68 procedures (75 %); search for airways anatomic pathologies (51 of 117 procedures), with pathological findings in 28 of 51 procedures (54 %); BAL (37 of 117 procedures), with changed antimicrobial treatment in 15 of 37 cases (41 %). No procedure-related mortality, serious complications or other problems in patient status occurred.

Conclusions: Flexible bronchoscopy is a very safe and useful procedure in critical ill infants and children with a variety of diseases, and significantly contributes to their management. It should be a routine technique in pediatric intensive care units.

493 – POSTER SESSION

LEAK-COMPENSATION IS INEFFECTIVE IN VENTILATED INFANTS WITH HIGH TUBE LEAKAGE

M. Wald, M. Schöber

Paracelsus Medical University, Salzburg, Austria

Introduction: In neonates endotracheal tubes without cuffs are usually used. A frequent problem of these tubes is tube leakage. New ventilators are able to compensate for leakage. They show an end-expiratory tidal volume also in situations with high leaks. Volume guaranteed ventilation modes need this tidal volume to control the ventilator. The aim of this study was to determine whether ventilators are able to effectively manage leaks higher than 85 % of the per minute ventilation.

Method: Three different ventilators for infants with identical ventilation settings (per minute volume of 400 ml/min) were investigated. A port for a leak of 350 ml/min was installed between the flow sensor and the test lung for infants. The end-expiratory tidal volumes and the pressure in the test lung were measured without and with the leaks.

Results: The AVEA (CareFusion, USA) shows an expiratory tidal volume of $9.99(\pm 0.1277)$ ml without, and $2.77(\pm 0.1251)$ ml with leakage ($p < 0.001$). The Babylog 8000plus (Dräger, Germany) had an expiratory tidal volume of $9.29(\pm 0.0999)$ ml without and $7.39(\pm 0.0685)$ ml with leakage ($p < 0.001$). The Fabian (Acutronic, Switzerland) showed an expiratory tidal volume of $10.45(\pm 0.0827)$ ml without and $7.17(\pm 0.1031)$ ml with leakage ($p < 0.001$). The measured end inspiratory pressure in the test lung was equal with and without leakage.

Conclusion: None of the ventilators was able to show an adequate expiratory tidal volume with high leakage. The volume was much lower than the real tidal volume. In real ventilation with volume guaranteed modes the ventilator is not able to control the maximum pressure during high leak.

494 – POSTER SESSION

A MULTI-CENTER PROSPECTIVE STUDY OF MODE OF DELIVERY AND NEONATAL RESPIRATORY OUTCOMES

L. Yuan, Chinese Neonatal Network

Neonatal Division, Children's Hospital of Fudan University, Shanghai, China

Objective: To compare neonatal respiratory outcomes by method of delivery in a large diverse cohort in China.

Methods: 52 hospitals from 23 provinces of China were enrolled in this prospective study from May 1st 2010 to December 31st 2011. A standardized database was established in each hospital and all the data were transferred to Children's Hospital of Fudan University simultaneously. Birth complicated by known congenital anomalies was excluded. Associations between method of delivery and neonatal respiratory morbidities were estimated using logistic regression.

Results: Total 100,308 neonates were identified. The overall cesarean delivery rate was 46.68 % (range between 11.49 and 73.79 %). The proportion of elective cesarean delivery among all cesarean delivery was 84.41 %. Comparing to vaginal delivery, cesarean delivery was associated with increased morbidities of RDS (1.19 vs. 0.72 %, $p < 0.0001$, 95 %CI 1.449–1.887), TTN (1.11 vs. 0.29 %, $p < 0.0001$, 95 %CI 3.190–4.582) and respiratory failure (0.28 vs. 0.13 %, $p < 0.0001$, 95 %CI 1.576–2.835). The risk of TTN had no relationship with labor (1.08 vs. 1.12 %, $p = 0.772$, OR = 0.965, 95 %CI 0.759–1.228).

The overall lengths of hospitalization between vaginal and cesarean deliveries were 4.8 ± 4.0 days and 6.0 ± 4.4 days ($p < 0.0001$, 95 %CI $-1.31 \sim -1.18$) respectively. There was no significant difference in mortality.

Conclusions: The overall cesarean delivery rate nationwide was much higher than the appropriate rate. The respiratory morbidities were higher in cesarean delivery newborns, especially that of TTN with subsequent higher hospitalization rate.

495 – POSTER SESSION

INFLUENCE OF PRONE POSITION AND VENTILATION MODE ON LUNG HISTOPATHOLOGY IN EXPERIMENTAL MODEL OF ARDS

J. Žurek, M. Fedora, P. Košut, P. Dominik, M. Klimovič, M. Šeda

Department of Anesthesia and Intensive Care, School of Medicine, Masaryk University, Brno, Czech Republic

Objectives: Main goal of our study was to assess importance of prone position and ventilation mode (conventional and HFOV) application sequence on the histopathological image of lung tissue damage in experimental model of ARDS.

Methods: We enrolled total of 34 experimental models (piglets). Group 1 (control group) had conventional ventilation mode in supine position; group 2 (PP) had conventional ventilation mode with the circulation of prone position (6 h) and supine position (6 h); group 3 (HFOV) had HFOV ventilation mode in supine position during the whole experiment; group 4 (HFOV + PP) had HFOV ventilation mode in supine position for initial 6 h, afterwards the circulation of prone position and supine position was established; group 5 (PP + HFOV) had conventional ventilation mode with the circulation of prone and supine position and after 6 h model was switched to HFOV ventilation. We collected four lung tissue samples from each piglet—bilaterally from dorsocaudal (dependent, D) lung segments and bilaterally from ventrorostral (non-dependent, ND) lung segments. Detected changes in lung tissue were scored in extensity (e, 0–3) and intensity (i, 0–4).

Results: We found no significant differences in all studied parameters between all groups. Moreover, there was also no difference in intensity and extensity of changes in dependent and non-dependent lung segments.

Group	N	ND i Mean SD	ND e Mean SD	D i Mean SD	D e Mean SD
1 (control)	4	1,25 1,04	1,13 0,85	1,63 0,75	1,38 0,48
2 (PP)	8	1,25 0,76	1,13 0,58	1,56 0,73	1,44 0,78
3 (HFOV)	6	1,58 0,97	1,25 0,76	1,92 0,92	1,67 0,88
4 (HFOV + PP)	8	2,06 0,98	1,75 0,85	2,31 0,80	1,94 0,62
5 (PP + HFOV)	8	1,56 1,52	1,31 1,13	2,13 1,41	1,69 1,10

Histopathological image of lung tissue damage.

Conclusion: According to our results, it cannot be expressly stated which application sequence of ventilation mode and position is favorable in the context pathological changes development in lung tissue.

Study was supported by grant from IGA MZČR NS 11100-4.

Resuscitation and Emergency Medicine (496–533)

496 – POSTER SESSION

ULTRASOUND FOR VERIFICATION OF ENDOTRACHEAL TUBE POSITION AND DEPTH OF INSERTION: COMPARISON TO CAPNOGRAPHY AND CHEST X-RAY

P. Alonso Quintela¹, M. Mora Matilla¹, I. Oulego Erroz², S. Rodríguez Blanco³

¹Pediatrics, ²Pediatric Intensive Care, ³Neonatal Intensive Care, Complejo Asistencial Universitario de León, León, Spain

Background and aim: The aim of this study was to evaluate ultrasound (US) usefulness to verify endotracheal tube position (ETT) and depth of insertion compared to standard capnography and chest x-ray.

Methods: We enrolled patients who underwent emergency intubation in neonatal and pediatric intensive care unit. We verified correct ETT position with ultrasound (transversal and longitudinal views) and capnography immediately after every intubation attempt. When intubation was deemed correct by the attending physician, depth of insertion was assessed by ultrasound visualization of ETT tip and bilateral pleural movements (lung sliding sign) to detect ETT malposition. Afterwards x-ray was performed as usual. Time to perform and interpret these techniques was recorded. The attending physician was blinded to ultrasound information. Data are expressed as median (range) or number.

Results: 23 intubations and 18 x-ray in 15 patients were analyzed. Eight newborns [weight and gestational age: 1,180 g (540–3,150) and 30 weeks (24–40), respectively] and seven children [17 (4.5–45) kg and 3 years (8 months–12 years)]. US was comparable to capnography in the number of tracheal/esophageal intubations detected (18/5 vs 19/4, $p = 0.685$) and also in the estimation of ETT insertion depth (Correct/malposition: 16/2 vs 15/3, $p = 0.875$). However, important time differences existed [US: 15.5 (3–132) vs Capnography: 4.5 (3–8) s, $p < 0.01$; and US: 0.28 (0.14–0.42) vs x-ray: 21.5 (16–40) min, $p < 0.001$].

Conclusions: Ultrasound seems an effective but slower method to confirm TI compared to capnography. Ultrasound allows to rapidly discard ETT malposition and may reduce the routine use of x-ray after intubation.

497 – POSTER SESSION

OUTCOME IN PATIENTS WITH CONGENITAL DIAPHRAGMATIC HERNIA REQUIRING EXTRACORPOREAL MEMBRANE OXYGENATION

U. Angadi¹, P. de Siena², S. Spegginor², G. Peek², C. Harvey³, R. Ramaiah¹

¹PICU, ²Congenital Cardiac Surgery, ³ECMO, University Hospital of Leicester, Leicester, UK

Background: The outcome of extracorporeal membrane oxygenation (ECMO) in neonates with Congenital Diaphragmatic Hernia (CDH) is so variable that some centres refuse treatment on outcome grounds. We conducted a Retrospective Observational Study of our treatment since the treatment started in 1991 during which time there was one significant change in practice in 2007.

Methods: Dataset analysis included Pre ECMO factors (age, birth weight, blood gases, and ventilator settings) and ECMO variables (mode of ECMO, flow at 4 h and 24 h, liquid ventilation, inotropes, timing of repair, and complications on ECMO). Multiple logistic regression was applied to identify.

(a) Factors that predict outcome and

(b) Relation of complications during ECMO to outcome.

(c) Outcome difference in Roller pump and Centrifugal era.

Results: 79 neonates were treated during the study period (14 Right side CDHs). The survival to discharge was 62 %. The survival increased in the Centrifugal era ($n = 22$) compared Roller pump era ($n = 57$) although not statistically significant (72 vs 58 %, $P = 0.22$). Multiple logistic regression showed ECMO duration >1 week (63 vs 47 %, $P < 0.05$) and Renal complications (32 vs 12; $P < 0.05$) significantly increased mortality. Mean duration of ECMO (192 ± 198.8 vs 268 ± 172 h, $P < 0.05$) differed between survivors and non-survivors.

Conclusion: We have high survival rate in our centre for neonates needing ECMO for CDH. We advocate accepting all patients referred for treatment especially in the current Centrifugal era. Prolonged duration of ECMO and renal complications on ECMO were independently associated with mortality.

498 – POSTER SESSION

AN AUDIT ON THE TIME CRITICAL TRANSFERS, BY EMBRACE IN THE FIRST 24 MONTHS OF SERVICE

N. Athiraman¹, J. Oldfield²

¹Paediatrics, Doncaster Royal Infirmary, Salford Doncaster,

²Transport Service, Embrace, Barnsley, UK

Introduction: Time critical transfers involve critically ill infants requiring emergency transfer to specialist centres for further care. As delay in transferring these infants has been linked to increased morbidity and mortality, Embrace places an emphasis on immediate activation and mobilisation of the team (which is <20 min for Embrace and <60 min nationally), as well as quick and effective stabilisation of the infant before transferring to the specialist centre.

Aim: The audit aims to identify the activation, mobilisation and stabilisation times during time critical transfer to assess whether Embrace achieves its locally set target times for infants requiring time critical transfers.

Methods: This was a retrospective data collection from the Embrace database. All recorded time critical transfers by Embrace from December 2009 to December 2011 were included in the audit.

Results: During the study period, 429 infants were transferred by Embrace by time critical transfers. Embrace complied with their target for activation and mobilisation times in 69.6 % of times and 88.6 % for national target. The median stabilisation time was 115 min.

Conclusion: Embrace achieved their target of <20 min for activation and mobilisation time in two-thirds of transfers and complied with national guidance in 90 % of the times. Hence, shorter activation time of 20 min is achievable when the whole team works

towards achieving the target with good organisational and communicational skills. However, it is important to identify the associated outcomes and aim to improve service.

499 – POSTER SESSION

A STUDY TO ASSESS THE VALUE OF THORACIC COMPUTED TOMOGRAPHY IN PAEDIATRIC TRAUMA PATIENTS

M.C. Avanis¹, Y.-M. Liu¹, J. Masters², M. Vaidya¹

¹Paediatric Critical Care, Royal London Hospital, ²Paediatric Critical Care, Bart's and the London Medical School, London, UK

Background and aims: Computed tomography (CT) is becoming increasingly popular as a primary imaging modality in adult trauma patients. This study aims to examine the added value of Thoracic CT (TCT) in the context of paediatric trauma.

Methods: Retrospective review of case notes of 46 consecutive paediatric trauma patients aged 16 and younger who received a Chest X-ray (CXR) prior to TCT between July 2011 and April 2012 at a large tertiary paediatric trauma centre in East London.

Results: The main mechanisms of injury involved where road traffic accidents (46 %), stab injuries (35 %) and falls (15 %). Twenty-seven patients (59 %) underwent a TCT scan following a normal CXR. Of these, 7 (26 %) patients had new injuries detected. These included lung contusions (n = 6, 86 %) and rib fractures (n = 1, 14 %). Of the 19 (41 %) patients that had a TCT scan following an abnormal CXR, 14 (74 %) had additional injuries detected. These included lung contusions (n = 7, 50 %), fractured ribs (n = 1, 7 %) and a pneumothorax (n = 1, 7 %). The additional information from the TCT did not alter clinical management.

Conclusions: This study indicates a need for a comprehensive guideline for imaging in paediatric trauma, where the use of TCT is limited to specific patients, especially in view of the health implications that CT poses and source of financial burden for the NHS.

500 – POSTER SESSION

BLADDER RUPTURE FOLLOWING UMBILICAL ARTERY CATHETERISATION AND ITS CONSERVATIVE MANAGEMENT. CASE REPORT AND LITERATURE REVIEW

K. Bakaya, J.J. Varkey, H. Gaili, S. Besarovic

Women and Children's Hospital, Hull and East Yorkshire Women and Children's Hospital, Hull, UK

Introduction: Bladder perforation following direct umbilical artery catheterisation (UAC) is an extremely rare complication. Described below is a case of bladder injury following multiple unsuccessful attempts that resulted in urinary ascites, which was managed conservatively.

Case report: A 28 week preterm baby having normal anomaly scans was delivered by emergency caesarean section for pre-eclampsia and absent end diastolic flow. Direct umbilical artery catheterization was

attempted through an apparently normal 3-vessel umbilical cord, but unsuccessful. Progressive distension and discolouration of the anterior abdominal wall with oliguria and microscopic hematuria was noted. X-ray revealed a ground glass appearance with loops of bowel in the midline. Abdominal ultrasound showed a 2 mm defect in the bladder wall. It was managed conservatively with transurethral bladder catheterisation with good recovery.

Discussion: Literature review revealed only seven reports of bladder injury following attempts at direct UAC. The author found that in six of these instances urinary ascites were managed by surgical exploration, except in one case report making this the second case to be managed conservatively.

We opted for conservative management because of significant improvement in the abdominal distension after urinary catheterisation and no significant bleeding from the tear, sepsis or bowel protrusion into the bladder. The likely mechanism of bladder perforation was either the umbilical catheter entering through a patent urachus or by directly perforating the bladder passing through the fascia.

Intensivists inserting UACs need to have a high index of suspicion of bladder perforation especially if associated with abdominal distension, oliguria and haematuria.

501 – POSTER SESSION

EPIDEMIOLOGY OF PEDIATRIC TRAUMA PATIENTS AT BETANIA HOSPITAL OF PUEBLA, MEXICO: 5 YEARS REVIEW

J.A. Barrera Morán¹, Y. Martinez Tovilla²

¹Enseñanza e Investigación, Benemérita Universidad Autónoma de Puebla, ²Subdirección de Enseñanza, Investigación y Estudios de Posgrado, Hospital Universitario de Puebla, Puebla, Mexico

Introduction: Multiple trauma is the leading cause of death and disability in children between 5 and 18 years old, it represent a serious public health problem.

Material and methodology: An ambispective, longitudinal, descriptive and observational study with the following variables: Gender, age, type of trauma and evolution. For the database analysis was used descriptive statistics, frequencies and measures of central tendency.

Results: Of 17,040 patients, 3,128 met the criteria for multiple injuries, 55.5 % (1,720) were male and 44.5 % (1,408) female, the oldest age range was 18 years and the minimum of 0.08 with a mean of 9.6. The most often found lesion was head injury in 75 % associated with other serious chest injuries in 29 %, abdomen 17 %, pelvis and extremities in 39 %, mortality was 12 %. 55 % of patients admitted to the pediatric intensive care unit as priority 1, and of these 11.5 % died.

Conclusions: The multiple injuries annually produced as many deaths as all other causes, the etiology varies with age, patients under 3 years old falls from their own height are the most common, between 4 and 8 years old head injury was associated with thoraco-abdominal injury and femur fracture (Waddell's triad). Mortality has a biphasic pattern, 32 % (being 1 in 4). It is also important to note that interdisciplinary communication is required to further promote the survival prevalence. But the only possible strategy to reduce these risks and improve the quality of life is to promote a culture of prevention.

502 – POSTER SESSION

PERI-INTUBATION EVENTS IN CRITICALLY SICK INFANTS (<1YEAR) PRESENTING TO DISTRICT GENERAL HOSPITALS (DGH'S) PRIOR TO TRANSFER TO A REGIONAL PICU

A.A. Bendon¹, R. Asghar², T. Sundar³, R. Barber⁴, K. Parkins², R. Phatak², D. Grainger⁴

¹Paediatric Anaesthetics, ²North West and North Wales Retrieval Service(NWTS), Royal Manchester Children's Hospital NHS Trust, Manchester, ³Paediatric Intensive Care Unit, Alder Hey Children's NHS Foundation Trust, Liverpool, ⁴Paediatric Intensive Care Unit, Royal Manchester Children's Hospital NHS Trust, Manchester, UK

Background: NWTS is a regional retrieval team (RRT) commissioned for stabilisation, retrieval of sick children to PICU in Northwest England and Wales.

There is paucity of data on emergency intubation of critically ill infants.

Aims: To Highlight:

1. DGH team dynamics in managing critically ill infants
2. Induction agents
3. "Peri-induction" complications
4. NWTS (RRT) role

Methods: Retrospective data from retrieval forms in infants intubated in DGH between 1st December 2011 and 30th November 2012, referred to NWTS for transfer.

Results: 230 infants met the inclusion criteria.

Fig. 1

Discussion: 230/604 (40 %) children, transferred by the RRT were infants, 42 % aged 1 week–6 weeks.

These pose a challenge to DGH anaesthetists, with mainly adult practice and Paediatricians, with limited airway experience.

11 % were intubated in extremis, anaesthetists present in <50 % of intubations (73 % in infants >6 months), much lower than other age groups. RRT facilitated ENT management of difficult airway in four

Induction agents and complications

Thiopentone	19(8.2 %)
Ketamine ± Fentanyl	36(15.6 %)
Midazolam + Morphine	39(16.9 %)
Inhalational	17(7.3 %)
Documented Complications: 35(15.2 %)	
Hypotension	16(6.9 %)
Hypoxia	9(3.9 %)
Cardiac arrest	4(1.7 %)
Pneumothorax	3(1.3 %)
>3 attempts at intubation	16(6.9 %)

cases. Our data suggests, optimal team resource utilisation when managing critically ill infants will minimise adverse events. A prospective multi-centric study including outcome data is warranted.

503 – POSTER SESSION

SEAT BELT SYNDROME IN CHILDREN: THREE CASE REPORTS

T.S. Castro¹, C. Gomes², F. Abecasis³, F. Morais⁴, M. Vieira³, M. Gonçalves⁵, J. Fernandes e Fernandes^{6,7}

¹Pediatrics, Hospital Espírito Santo de Évora, EPE, Évora, ²Pediatrics, ³Pediatrics, Unidade de Cuidados Intensivos Pediátricos, ⁴Imagiologia, ⁵Pediatrics, Serviço de Cirurgia Pediátrica, ⁶Cirurgia Vascular, Hospital de Santa Maria, Centro Hospital Lisboa Norte, ⁷Director, Faculdade de Medicina da Universidade de Lisboa, Lisbon, Portugal

Misplaced seat belts can cause important traumatic injuries in thoracoabdominal wall, solid organs or hollow viscera and spinal cord. Aortic lesions occur less frequently.

We describe three cases of healthy children involved in road traffic accidents with important abdominal trauma, admitted to our PICU.

Case 1: 10-year-old girl, travelling in the back seat with fitted seat belt. Abdominal wall abrasive injuries in seat belt areas were observed, as well as hemoperitoneum, hepatic lacerations, retroperitoneal hematoma in relation to traumatic dissection, partial rupture and thrombosis of the abdominal aorta. A stent was placed by femoral catheterization. On D8 she referred abdominal pain and CT scan revealed intestinal perforation. Outcome was favorable after surgical intervention.

Case 2: 8-year-old boy, travelling in the back seat with misplaced belt. He had head trauma and blunt abdominal trauma. Abdominal ultrasound and CT scan showed duodenal hematoma, L2 fracture and post-traumatic pancreatitis, which were medically resolved.

Case 3: 4-year-old girl, travelling in the back seat with appropriate restraint system, who suffered left humeral diaphysis fracture, pneumo-peritoneum and pancreatic fracture. Exploratory laparotomy showed gastric perforation and duodenum rupture, as well as pancreatic fracture and complete laceration of the Wirsung, all of which were surgically corrected.

All patients fully recovered.

High-energy traffic accidents usually cause severe abdominal injuries. External lesions of the thoracoabdominal wall have a positive predictive value of internal injury.

Patient characteristics

Age	
<1 week	43(18 %)
1 week–6 weeks	97(42 %)
6 weeks–6 months	64(27 %)
6 months–1 year	26(11.3 %)
Weight (kg)	
<2.5	28(12.1 %)
2.5–5.0	158(68.6 %)
5.0–10.0	44(19.1 %)

CT scan, performed by experienced radiologists to allow for adequate protocol selection, should be the gold-standard for these patients evaluation.

504 – POSTER SESSION

COAGULOPATHY IN PAEDIATRIC TRAUMA PATIENTS: A 4-YEAR REVIEW OF FINDINGS AND OUTCOMES

H. Chahal, S. Chandrashekhara, N. Dobby, N. Edmonds

Paediatric Critical Care Unit, Royal London Hospital, London, UK

Background: Trauma-induced coagulopathy, independent of fluid resuscitation and transfusion, has been shown to be associated with an increased mortality in adult studies. Evidence-based improvements in transfusion resuscitation in children have lagged behind that of adults. We aim to determine the occurrence of coagulopathy in paediatric trauma patients presenting to a major trauma centre over a 4-year period and the final outcomes.

Methods: We reviewed our trauma database for all paediatric patients (0–16 years) from May 2008 to May 2012 presenting as a trauma call. We defined coagulation as being abnormal if the admission blood results revealed an INR ≥ 1.3 , APTT ≥ 33 or PT ≥ 13 as per hospital laboratory reference limits. Mortality was recorded at 28-day follow up.

Results: 997 paediatric trauma calls were recorded in our database during the 4-year period with coagulation results available in 289. 21 children died, 6 of these had no coagulation profile available.

Table 1

289 Patients	Coagulation normal n = 235 (81 %)	Coagulation abnormal n = 54 (19 %)
Sex M:F	181:54	41:13
Mean age	11	8
Death (n = 21)	2 (0.9 %)	13 (24 %)

Conclusions: Trauma-induced coagulopathy appears to occur predominantly in younger male patients and is strongly associated with a higher 28-day mortality. In 2009, we introduced a paediatric major haemorrhage protocol at our institution to facilitate the early correction of coagulopathy with a balanced ratio of blood products. Further studies are needed to evaluate whether this has subsequently improved morbidity and mortality in this population.

505 – POSTER SESSION

CARDIAC INVOLVEMENT IN HYPOXIC PERINATAL MYOCARDIAL INJURY

L. Dimitriu¹, A.G. Dimitriu²

¹Cardiology, Medex Medical Center, ²Cardiology, UMF ‘Gr. T. Popa’, Iasi, Romania

Purpose: To investigate the clinical aspects and diagnosis of cardiac involvement in perinatal posthypoxic myocardial injury.

Methods: Patients 84 newborns (0–14 days), normal birth weight, with perinatal hypoxia receiving resuscitation, without major congenital heart defects. In all cases were performed: clinical exam, ECG, chest X-ray (Rx.CT), Doppler echocardiography. 54 of patients were evaluated clinically and echo after 6 months.

Results: The patients had mainly signs of neurological post hypoxic suffering, heart failure (2 cases), a systolic murmur (41 cases) and without others signs of significant cardiac involvement. Chest X-ray: cardiomegaly (37). ECG: severe left ventricle (LV) repolarization disturbances and low voltage of QRS complexes (36), without ischemic changes. Doppler echo performed at 3–7 days of life: * the absence of other severe congenital cardiac anomaly; *permeability of foramen ovalae (100 % cases) to the forced foramen ovalae (gradient LA/RA > 8 mmHg); *myocardial hypertrophy (45 cases) mainly IVS (29), with mild to severe tricuspid regurgitation and right atrium dilation (28); the systolic function normal (all cases) and severe LV diastolic dysfunction (E/A < 1) in 48 cases. All the cases received spironolactone 1–2 mg/kg/day. Reevaluation at 6 months: the reduction of the myocardial hypertrophy, disappearance of the tricuspid regurgitation and normal LV diastolic function.

Conclusions: The perinatal hypoxia can induce the apparition of true cardiomyopathy posthypoxic at more than 65 % of patients, the signs of cardiovascular suffering missing often. Echocardiographic exam is the main method for diagnosis and follow up of perinatal hypoxic cardiomyopathy and is necessary from the first week of life.

506 – POSTER SESSION

TRANSFUSION REQUIREMENTS IN PAEDIATRIC TRAUMA: A LONDON TRAUMA CENTRE PERSPECTIVE

N. Dobby, H. Chahal, M. Vaidya, B. O’Neill, S. Chandrashekhara

Anaesthesia and Intensive Care, The Royal London Hospital, London, UK

Background: Our tertiary trauma centre in London receives approximately 250 paediatric trauma calls per annum. We reviewed the transfusion requirements and clinical outcomes for children admitted as trauma emergencies into the Accident and Emergency Department.

Methods: Our research group reviewed the notes and computerised records for all paediatric patients (0–16 years) who were admitted as trauma calls between May 2008 and May 2012. The total volume of blood transfused in the first 24 h was our primary end-point. Mortality at 28 days was the secondary end-point.

Results:

Years	No. of trauma calls	No. of children transfused	Age (years) Mean (Range)	Weight (kg) Mean (Range)	Blood transfused (ml/kg) Mean (Range)	Mortality No. (% of children transfused)
May 08–Apr 09	224	24	10 (2–16)	30 (10–40)	44 (9–105)	7 (29 %)
May 09–Apr 10	216	20	8 (0.25–18)	24 (6–40)	35 (8–146)	2 (10 %)
May 10–Apr 11	299	28	12 (1–15)	24 (8–38)	42 (9–263)	2 (7 %)
May 11–Apr 12	258	12	12 (1–16)	32 (10–40)	54 (7–199)	3 (25 %)
Total	997	84				14 (17 %)

Discussion and conclusion: 8.4 % (84/997) of all children presenting as a trauma call required blood transfusion. In these 84 children, we noted a mortality of 17 %. The number of children requiring transfusion has halved since 2011. The reduction in the number of children requiring transfusion may be due to a decrease in the incidence and severity of the trauma due to public health measures and education in schools. The implementation of the Paediatric Trauma Haemorrhage Guidelines in 2009 may have influenced the mortality reduction.

507 – POSTER SESSION

SURVEY OF NEONATAL CARDIOVERSION IN NON-CARDIAC CENTRES IN THE UK

S. Gaddam Bhoomaiah, R. Wijewardhane, S. Sivakumar

City Hospital, Sandwell & West Birmingham NHS Trust, Birmingham, UK

Background: DC cardio version is rarely needed in neonates, however, this could be effective and life-saving in certain arrhythmias like atrial flutter.

Objectives: Investigate facilities available for neonatal cardio version in non-cardiac units and to explore clinicians' experience and level of confidence in cardio version.

Methods: In March 2012, an on-line questionnaire pertaining to current set-up, experience, training and opinion towards cardio version in non-specialist setting, was circulated to all consultants registered with Paediatric Expertise Cardiology Special Interest Group, UK.

Results: 27 clinicians responded (5 neonatologists and 22 general paediatricians). Facilities for cardio version are available in 81 % of units. 92 % of responders are aware of location of defibrillator which is hands-free in 59 %. 45 % had some previous experience with cardio version (30 % involved on 1-3 occasions and 15 % on >3 occasions in last 10 years). 92 % received training in cardio version from advanced life support courses, 63 % during specialist registrar training, and 59 % from in-house training. 41 % would transfer to cardiac centre for cardio version, while 55 % would perform in their own ward.

Conclusions: It is promising that majority of clinicians are confident in performing this procedure locally with back-up of cardiac centre. To implement this safely and effectively, it is important to devise local pathways and improve training during higher specialist training as well as through mandatory in-house training & advanced life support courses.

References:

1. Van Gelder (1999) Pharmacologic vs. DC electrocardioversion of atrial flutter and fibrillation. *Am J Cardiol* 84.
2. Lisowski LA, Brenner JI (2000) Atrial flutter in the perinatal age group: diagnosis, management and outcome. *J Am Cardiol* 35(3): 771–7.

508 – POSTER SESSION

INFLUENCE OF GESTATIONAL AGE, TYPE OF BIRTH, AND RESUSCITATION IN THE RISK OF PNEUMOTHORAX IN THE FULL TERM NEWBORN

F. García-Muñoz¹, A.L. Díez Recinos¹, O. Aponte Contreras¹, C. Pérez Matos², L. Gutiérrez García², J.Á. García Hernández²

¹Neonatology, Hospital Universitario Materno-Infantil de Canarias, ²Gynecology and Obstetrics, Hospital Universitario Materno-Infantil de Las Palmas, Las Palmas de Gran Canaria, Spain

Background: Elective caesarean section before 39 weeks has been associated with a higher incidence of iatrogenic respiratory distress and pneumothorax in term newborn babies, probably because of a higher respiratory morbidity and the need of resuscitation. These factors have not been systematically evaluated in our patients.

Objective: To know whether the gestational age, type of delivery, and intensity of resuscitation, are associated with an increment in the incidence of pneumothorax in term neonates.

Patients and methods: Full term neonates born in our maternity from January 2006 to December 2010 were studied, together with the type of delivery (Vaginal, Forceps or Caesarean Section). Advanced CPR was defined as the need of bag and mask intermittent ventilation, intubation, chest compression and/or administration of medication. The diagnosis of pneumothorax was clinical and radiological in all cases.

Results: 32,238 full term new-borns were included. Type of delivery: Vaginal 76.1 %, C-Section 12.4 %, and Forceps 11.5 %. The incidence of pneumothorax was 0.316 %. It was significantly higher in C-Section (0.85 %), than Forceps (0.59 %) or non-instrumental Vaginal deliveries (0.19 %) ($p = 0.000$); in infants ≥ 40 weeks GA (0.37 %) than ≤ 39 weeks GA (0.24 %) ($p = 0.033$); and in advanced CPR (4.29 %) compared to basic CPR (0.18 %) ($p = 0.000$).

Conclusions: A GA ≥ 40 weeks, C-Section or Forceps delivery, and advanced CPR were significantly associated with a higher incidence of pneumothorax in full term newborn babies. We did not observe any increase of pneumothorax among neonates born through elective C-Section before 39 weeks of gestation.

509 – POSTER SESSION

RISK FACTORS FOR HIPOTHERMIA AT ADMISSION IN THE VERY-LOW-BIRTH-WEIGHT INFANT, AND ASSOCIATED MORBIDITY

F. García-Muñoz, S.M. Rivero Rodríguez, C. Siles Quesada

Neonatal Unit, Hospital Universitario Materno-Infantil de Canarias, Las Palmas de Gran Canaria, Spain

Background: Heat loss after delivery could interfere with adaptation due to metabolic and hemodynamic derangements. Associated perinatal factors and its relation with morbidity and mortality during the neonatal period have not been systematically studied in our unit.

Objectives: To know the temperature of VLBW infants on admission to our NICU, and to determine the associated perinatal variables, and the association of temperature with morbidity and mortality.

Patients and methods: Infants born in our maternity from January 2006 to November 2012, birth weights 401–1,499 g and/or <30 weeks GA, were included. Bivariate associations between antepartum/birth variables and admission temperature, and between this and selected morbidities and mortality were examined, followed by multivariable linear or logistic regressions to detect independent associations.

Results: 635 infants were included. Mean ($\pm$ SD) BW and GA were $1,137.6 \pm 257.6$ g, and 29.48 ± 2.82 weeks, respectively. Mean admission temperature was 35.8 ± 0.6 °C (range 33.0–37.8 °C). Proportion on infants with $T^a < 36$ °C: 44.4 %. Independently associated perinatal variables were chorioamnionitis, birth weight, vaginal

delivery, and advanced cardiopulmonary resuscitation. T^a at admission was inversely associated with severe intraventricular haemorrhage (grades 3 and 4) [(OR 0.377, 95 % CI 0.221 a 0.643), ($p = 0.000$)], and mortality [(OR: 0.329; 95 % CI: 0.208 a 0.519), ($p = 0.012$)].

Conclusions: Hypothermia on admission is frequent among our VLBW infants.

Although long-term consequences are not clearly established, maintaining normothermia is a widely accepted recommendation. Additional studies are necessary to better define the optimal strategies to achieve this objective.

510 – POSTER SESSION

THERAPEUTIC HYPOTHERMIA AND TEMPERATURE MAINTENANCE DURING POST PAEDIATRIC CARDIAC ARREST TRANSFERS: HOW GOOD ARE WE?

C. Gupta^{1,2}, K. Parkins^{1,2}

¹Paediatric Intensive Care Unit, Alder Hey Children's Hospital, Liverpool, ²North West and North Wales Paediatric Transport Service (NWTS), Royal Manchester Children's Hospital NHS Trust, Warrington, UK

Introduction: Use of Therapeutic Hypothermia (TH) post paediatric cardiac arrest (PPCA) may improve neurocognitive outcomes. There is yet to be widespread adoption of TH in PIC practice.

Objective: To identify incidence of TH and assess temperature maintenance during PPCA retrievals by a tertiary paediatric transport service (TPTS).

Method: Retrospective cohort study of 50 PPCA transfers (62 patients were referred, 12 died at referral centre) over a 2 year period (December 2010–November 2012). There was no active cooling equipment available to TPTS.

Results: All the 50 patients were transferred to a tertiary PICU. TH was specifically advised in 5/50 patients by TPTS at the time of referral. But active cooling (ice packs) was implemented in only 1 patient. Survival to discharge from PICU was 27/62 (44 %).

N = 50	Median	Inter quartile range
Age (months)	29	4–103
Stabilisation time (min)	162	125–253
Journey time (min)	40	30–52
Temperature at start of transfer (degree Celsius)	35.4	32.2–35.9
Temperature at end of transfer (degree Celsius)	34.8	32.5–35.9
Temperature difference during transfer (degree Celsius)	0	–0.4 to 0.5 P Value 0.87

Conclusion: There is low incidence of TH at referral hospitals. Most of the patients were relatively hypothermic (median temperature

34.8 °C) despite no active cooling. There was no significant change in temperature during transfer using passive cooling.

References:

1. Scholefield, Cochrane Library (2012) issue 5. J Emerg Trauma Shock I 3:3 I Jul–Sep 2010.

511 – POSTER SESSION

OUTCOMES FOLLOWING PAEDIATRIC CARDIAC ARREST: ARE THERE PREDICTIVE INDICATORS FOR SURVIVAL?

C. Gupta^{1,2}, K. Parkins^{1,2}, S. Mahoney¹, K. Thorburn¹

¹Paediatric Intensive Care Unit, Alder Hey Children's Hospital, Liverpool, ²North West and North Wales Paediatric Transport Service (NWTS), Royal Manchester Children's Hospital NHS Trust, Warrington, UK

Introduction: Survival after paediatric cardiac arrest in hospital (IHCA) or out of hospital (OHCA) is poor.

Objective: To identify the survival rate post cardiac arrest and predictive factors for survival.

Method: Retrospective cohort study of children referred to a tertiary Paediatric Transport Service during a 2 year period (December 2010–November 2012). All had suffered a cardiac arrest by the time of referral or during stabilisation prior to transfer.

Results: 62 children (median age 15.5 months, range 1 day to 15 years) were retrieved.

Table 1

N = 62	Survivors to PICU discharge Median (IQR)	Non survivors Median (IQR)	P value
Duration of cardiac arrest (min)	12 (3–20)	24 (11.25–40)	0.012
No. of doses of Adrenaline	2.5 (3.1, 0–4)	3 (3.9, 1–6)	<0.001
Post resuscitation variables			
pH	7.28 (7.165–7.38)	7.08 (6.8–7.15)	<0.0001
PaO ₂ (kPa)	30.85 (15.5–54.07)	20.35 (8.46–32.27)	0.03
Base excess	–5.4 (–6.6 to –1.85)	–14 (–20 to –9.9)	<0.001
Lactate	3.3 (2.3–5.6)	9.8 (5.9–12.7)	<0.0001
Blood glucose (mmol/L)	8.4 (7.4–13.5)	12.3 (7.2–16.5)	0.289

IQR: inter quartile range

28/62 (45 %) had suffered OHCA and 34/60 (55 %) IHCA. Survival to PICU discharge was 11/28 (40 %) of OHCA and 16/34 (47 %) of IHCA.

Conclusion: Post resuscitation base excess and especially pH and Lactate are significant indicators of survival. Further prospective studies are needed to delineate and validate these predictive factors.

References:

- Scholefield (2012), Donoghue (2005), Nadkarni (2006).

512 – POSTER SESSION

EMERGENCIES IN ECMO: A STRUCTURED ECMO-ABC EVALUATION

M. Hogeveen¹, A. van Heijst¹, T. Peeters¹, H. Zegers², M. Wijnen³, T. Antonius¹

¹Paediatrics/Neonatology, ²Dept of Cardiothoracic Surgery, Extracorporeal Circulation, ³Surgery, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Aim: According to ELSO guidelines, each ECMO centre has to develop a proper training program for their staff. Programs often consist of didactic courses, water drills and practice of both medical and mechanical emergencies. Simulation based techniques can be used to observe and improve integration of theoretical knowledge, practical and non-technical skills under real time pressure. With the use of our unique custom made simulator we are able to simulate all possible emergencies in relation to ECMO treatment in a standardized and integral way. In these simulation based ECMO emergencies training (ECMOSim) we observed that candidates struggle with the loss of a structured approach due to the fact that there are two patients: the patient manikin and the ECMO machine.

Materials and methods: We have developed a structured approach which integrates both ABCD evaluation of the patient and ABC evaluation of the ECMO system in a simple comprehensive way.

ECMO-ABC evaluation

A = Alarm

B = Buddy

delegate patient to buddy

buddy performs **ABCD** evaluation of patient

considers patient emergency settings

communicates with leader

C = Check and Communicate

Fig. 1 ECMO Circle

We will report preliminary information on the implementation and results of this structured approach in our ECMOSim training.

Conclusions: Continuous education and training is essential in high tech complex treatment modalities. A structured approach of emergency situations can possibly improve quality of care.

513 – POSTER SESSION

EPIDEMIOLOGY OF PEDIATRIC BURNED PATIENTS IN THE BURN UNIT STATE OF PUEBLA, MEXICO: 4 YEARS REVIEW

M.A. Kurezyn Díaz¹, Y. Martinez Tovilla², G. Victoria Morales³, J.A. Barrera Morán⁴

¹Subdireccion de Enseñanza, Investigación y Estudios de Posgrado, Pediatric Burn Unit of Puebla, ²Subdireccion de Enseñanza, Investigación y Estudios de Posgrado, Hospital Universitario de Puebla, ³Pediatric Burn Unit of Puebla, ⁴Enseñanza e Investigación, Benemérita Universidad Autónoma de Puebla, Puebla, Mexico

Introduction: Burns in pediatric patients are a public health problem, as well as risk of death that may involve disabling sequelae, functional and aesthetic, causing psychological, social, family and occupational throughout. Therefore, we describe the epidemiology of pediatric burned patients in the pediatric burn unit during the period 2009–2012.

Materials and methods: An ambispective, longitudinal, descriptive and observational study with the following variables: Gender, age, type of burn, percentage of burn, mechanism of injury. For the database analysis was used descriptive statistics, frequencies and measures of central tendency.

Results: Of 910 pediatric burn patients 52.6 % (479) were male and 47.4 % (432) female, the maximum age was 527 infants (57.9 %) and new born 2 (0.21 %). The most common mechanism of injury was scalding 587 (64.5 %) the least frequent chemical 2 (0.3 %). The percentage of body surface area burned was most frequent between 5 and 15 %, with peaks in the total second-degree burned children 719 (79.01 %). The mortality rate was 2.19 %.

Conclusions: Burns are presented in a similar percentage of boys and girls, the etiology and age group was the most common in infants and scald, which is consistent with that reported nationally and globally. Mortality in this study agrees with our report. Burns are common in our environment in children due to lack of development in the culture of prevention, so the psychological, physical and family are more than 90 % of patients, leading to a poor quality of life.

514 – POSTER SESSION

RELATIONSHIP OF FLUID BALANCE ON OUTCOME AMONG CRITICALLY ILL PEDIATRIC PATIENTS WITH SHOCK: A TEN YEARS RETROSPECTIVE STUDY

A.G. Lidua, M.L.U. Peralta, A. Marasigan, A. Florentino, J.A. Ong

Pediatrics, University of Sto. Tomas Hospital, Manila, Philippines

Objective: This study aims to determine the relationship between fluid balance and outcome among critically ill patients independent of severity of illness.

Methods: This is a retrospective case control, chart review conducted in a tertiary-care hospital from January 2002 to December 2011. Daily fluid balances and the cumulative fluid balance, and fluid overload during PICU stay were recorded. Statistical analysis for the fluid balance was obtained using the mean and standard deviation. Relationship between variables was ascertained through the Chi square test.

Result: A total of 51 patients fulfilled the criteria of shock. The biggest fluid balance was observed on the first and second PICU day. The mean value of the fluid overload of those who expired was 14.9 % obtained from values that ranged from 3.8 to 31.2 %. Evidently the fluid overload of those who expired were much higher than those who improved. The result of the Chi square test indicate that the positive and negative fluid balance on the first 2 days at PICU are not significant together with the cumulative fluid balance. The fluid balance on the third and succeeding days and fluid overload showed significant results.

Conclusion: There is no relationship on the cumulative fluid balance and outcome of critically ill pediatric patients. However, positive fluid balance on the third to succeeding days can have a poorer prognosis and negative fluid balance with a better prognosis. The fluid overload is a better predictor and has a greater impact in the outcome as compared to the cumulative fluid balance.

515 – POSTER SESSION

RESUSCITATION OF ASPHYXIATED NEWBORN PIGLETS CAN BE ACHIEVED IN SPITE OF SEVERE HYPOVENTILATION, WHETHER WITH OXYGEN OR AIR

R. Linner¹, D. Cunha-Goncalves¹, O. Werner², V. Perez-de-Sa²

¹Cardiothoracic Anesthesia and Intensive Care, ²Pediatric Anesthesia and Intensive Care, Lund University, Lund, Sweden

Objectives: Current guidelines state that asphyxiated neonates should primarily be resuscitated with air ventilation. The minute ventilation with air or oxygen needed for restoration of spontaneous circulation (ROSC) was assessed.

Method: Asphyxia was induced through hypoventilation, followed by apnea lasting until heart rate was <50 bpm and mean arterial pressure was <25 mmHg. Ventilation was then resumed and investigators, unaware of the composition or minute volume (MV) of inspired gas, gave closed chest cardiac massage. MV was varied between animals, and the one achieving ROSC by 10 min of resuscitation in 50 % of cases (Emv50) and the corresponding oxygen supply rate, Eosr50, were determined by fitting the parameters of the Hill equation to the observed dose–response.

Results: Median arterial pH and BE were 6.68 and –18 mmol/L at the end of asphyxia induction. ROSC occurred in 12 of 32 piglets. Emv50 with air and oxygen was 10.9, and 3.4 mL/kg/min, respectively (SE of difference 1.8; $p < 0.001$). Eosr50 was 3.6 and 2.8 mL/kg/min (not significant).

Conclusion: The rates of oxygen supply, required for ROSC, were similar whether the oxygen was delivered to the lungs as a component of air or in pure form. Emv50 with air was a small fraction of normal

minute ventilation. This supports the view that ventilation with air is usually sufficient in asphyxia.

Fig. 1 Dose response curves

516 – POSTER SESSION

COMPARISON BETWEEN DIFFERENT RESPIRATORY RATES DURING RESUSCITATION MANEUVERS IN A PEDIATRIC ANIMAL MODEL OF CARDIOPULMONARY ARREST

J. Lopez, J. Urbano, R. Gonzalez, M.J. Solana, J. Lopez-Herce

Pediatric Intensive Care, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Backgrounds and aims: International guidelines recommend 10–12 breaths per minute (bpm) during advanced pediatric resuscitation. We hypothesize that this respiratory rate (RR) could be insufficient. The aim of this study is to compare ventilation, oxygenation and recovery of spontaneous circulation (ROSC) with three different RR (10, 20 and 30 bpm).

Methods: An experimental model of asphyctic cardiopulmonary arrest (CA) in 35 piglets (median weight of 9 kg) was performed. Resuscitation with the three different RR was carried out. Achievement of ROSC and arterial blood gases profiles obtained at 3, 9, 18, 24 min after CA were compared.

Results: There were no statistical differences in pH although those with 30 bpm had higher values. Lower PaCO₂ was observed in the 30 bpm group (Table 1). There were no differences in oxygenation. Seventeen of thirty-five piglets (48.6 %) achieved ROSC: 36.4 % with 10 bpm, 53.8 % with 20 bpm and 54.5 % with 30 bpm ($p = 0.61$).

Table 1 PaCO₂ between groups. Median (Range)

	10 bpm	20 bpm	30 bpm	p (Comparative 10 bpm and 30 bpm groups)
Basal	77 (28)	92 (71)	87 (41)	0.116
3 min	75 (50)	63 (63)	55 (60)	0.173
9 min	46 (32)	46 (55)	29 (57)	0.106
18 min	48 (29)	53 (45)	35 (17)	0.03
24 min	70 (41)	61.5 (60)	39 (41)	0.03

Conclusions: RR of 30 bpm achieves better ventilation than lower rates without statistical differences in this animal model. There were no differences in the rate of ROSC.

517 – POSTER SESSION

EVOLUTION OF PRACTICE: SUSPECTED DUCT DEPENDENT CARDIAC DISEASE: YORKSHIRE & HUMBER EXPERIENCE

A.S. Mattara¹, A. Kashyap², Y. Singh², V. Ramalingam³, F. Rajah², G. Penman³

¹Paediatrics, Calderdale Royal Hospital, Halifax, ²Paediatric and Neonatal Transport, Sheffield Children's Hospital NHS Trust,

³Paediatric and Neonatal Transport, Sheffield Children's NHS Trust, Sheffield, UK

Introduction: The American College of Critical Care Medicine guidelines for management of neonatal septic shock recommends commencing prostaglandin infusion within 10 min of suspecting duct dependent cardiac disease. Our experience revealed delays in commencement of prostaglandin infusion. A survey of health professionals involved aided the introduction of a Yorkshire Neonatal Network and Yorkshire Paediatric Cardiology Network guideline regarding the use of Alprostadil in probable duct dependent congenital heart disease in Jan 2012.

Objective: To audit the management of suspected duct dependent cardiac disease in the Yorkshire and Humber region.

Methods: Prospective audit of all neonates transferred on prostaglandin infusion with no previous cardiac diagnoses between April 2011 and September 2012. Cases were identified from the Embrace [2] database and Echo diagnosis was confirmed from Leeds Paediatric Cardiology Department.

Results: During the study period all 61 patients were transferred successfully by Embrace on prostaglandin infusion (no adverse side effects).

18 (25 %) patients presented in shock and 36 (61 %) patients were ventilated. However, only 9(50 %) of the shocked patients were started on the guideline recommended dose of prostaglandin.

Overall 24 (39 %) patients were already started on prostaglandin at the time of referral and 9 of remaining 37 (24 %) patients had prostaglandin started in <20 min.

Since the introduction of regional guideline 59 % were already on prostaglandin at referral.

Conclusion: Guideline introduction has led to a greater proportion of patients on prostaglandin infusion in suspected duct dependent lesion at referral. On going training and a reaudit 12 months post guideline introduction is needed.

518 – POSTER SESSION

SHOULD NEW DEVICES BE TESTED WITH ADVANCED SIMULATION BEFORE INTRODUCING IN CLINICAL PRACTICE? VIDEO LARYNGOSCOPE AND CARDIOPULMONARY RESUSCITATION EXAMPLE

M. Mora Matilla¹, A. Rodríguez Nuñez², J. Moure Gonzalez³, I. Oulego Erroz¹, L. Sánchez Santos⁴, M. Fernández Sanmartín², A. Iglesias Vázquez⁴

¹Complejo Asistencial Universitario de León, León, ²Clinical University Hospital of Santiago de Compostela, FEGAS Advanced Simulation Center, ³Clinical University Hospital of Santiago de Compostela, ⁴FEGAS Advanced Simulation Center, Galicia's Public Emergency System, Santiago de Compostela, Spain

Introduction: New videolaryngoscopes and other devices designed to facilitate tracheal intubation (TI) have been released, offering significant advantages in terms of efficacy and safety. Their role in practice is unknown. Advanced simulation could offer a preliminary tool to test new devices before their trial in real patients. Resident's ability was tested for TI in infant and child manikins during continuous chest compressions (CC) with videolaryngoscope (Glidescope®).

Methods: 23 residents trained on infant (SimBaby®, Laerdal) and child intubation (Megacode Junior®, Laerdal) manikins participated. TI was performed by both standard laryngoscopy (SL) and Glidescope® while a colleague delivered continuous CC. Sequence of use of devices was randomized. Primary endpoints were the rate of successful placement of the tube in the trachea and the total TI time (TTI in seconds).

Results: In infant scenario, the median (IQR) TTI was significantly shorter with SL [28.2 (20.4–34.4) s] than with Glidescope® [38.0 (25.3–50.5) s] (p = 0.021). Participants who needed more than 30 s to intubate was also significantly higher with Glidescope (n = 13) than with SL (n = 7) (p = 0.01). In child scenario, the TTI [20.2 (18.6–25.1) vs. 22.3 (19.8–28.6) s] and number of intubation failures (3 vs 4) were similar with SL and Glidescope® laryngoscope.

Discussion: Glidescope® increases TTI when compared with SL and doubles the number of participants who would need more than 30 s to perform the procedure. Results with this device and SL are similar in child scenario. Testing with advanced simulation may be considered the first step in assessment of new medical devices.

519 (Abstract withdrawn)

520 – POSTER SESSION

LACTIC ACIDOSIS: A HIGHLY INDICATOR OF UNFAVORABLE OUTCOME IN CRITICALLY ILL CHILDREN

M.L. Neamtu^{1,2}, L. Dobrota^{1,2}

¹Pediatric Clinic, Pediatric Clinic Hospital, ²CCMRP, Lucian Blaga University, Sibiu, Romania

Background: Lactic acidosis (LA) is a common problem encountered in critically ill patients, defined as lactate level >5 mmol/l and serum

pH <7.35. Lactate level is often used as predictive indicator of unfavorable outcome (UO).

Aim: To demonstrate the effectiveness LA in predicting the UO.

Methods: Retrospective study conducted on critically ill children admitted in PICU, with severe sepsis, severe acute dehydration, and deceased by MultiOrgan Dysfunction Syndrome. The acid–base status (including lactate) assessment was made at entry, 6, 12, 24, 48, 72 h. Severe hyperlactatemia was defined as levels >5 mmol/l.

Results: Study was conducted on 23 deaths occurred between January 2011–December 2012. 21 (91.30 %) presented hyperlactatemia and 11 of them (52.8 %) severe hyperlactatemia; 7 (30.43 %) severe acidosis (pH < 7.20), 5 (21.73 %) severe hypercapnia (pCO₂ > 80 mmHg), 6 (26.08 %) severe hyponatremia (<120 mmol/l). LA was strongly predictive of UO if wasn't normalized within 48 h (p < 0.008), not so strongly predictive in children with primary metabolic acidosis (p < 0.04) and severe hypercapnia (p < 0.01). Hyponatremia (p = 0.4) and lactate level on admission (p = 0.1) did not predict poor outcome.

Conclusions: The acid–base status remains a serious prognostic marker, and lactate level a highly indicator of survival in critically ill children, even more the level exceeds 5 mmol/l and lactate clearance is very poor.

References:

Fall P, Szerlip H (2005) From sour milk to septic shock. *J Int Care Med* 20 (5).

521 – POSTER SESSION

HYPEROXIA IN CHILDREN TREATED WITH THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST: DOES IT INCREASE MORTALITY?

P. Puiman, L. van Zelle, E. de Jager, I. Reiss, C. Buysse

Pediatric Intensive Care, Erasmus MC-Sophia, Rotterdam, The Netherlands

Background and aim: Postischemic hyperoxia promotes free-radical generated injury contributing to neurologic injury and cardiac dysfunction and is associated with increased mortality after cardiac arrest (CA). Therapeutic hypothermia (TH) has shown to improve neurological outcome after CA in adults and birth asphyxia. We aimed to determine whether hyperoxia was associated with increased in-hospital mortality in children treated with TH after CA.

Methods: We conducted a retrospective cohort study between 2005 and 2012. Children with in- and out-of-hospital cardiac arrest preceding PICU admission and treated with mild TH (32–34 °C) for 24 h were included. Children with cyanotic congenital heart disease were excluded.

Results: Of 67 patients, 55 % (n = 37) died in the PICU. Sex, etiology of CA and first rhythm were significantly different in non-survivors compared to survivors at hospital discharge. Survivors were more often boys (p = 0.02), had a higher incidence of CA due to a cardiac etiology (p < 0.01) and had more frequently a shockable rhythm (p = 0.007). Mild TH was reached in 91 % patients in a median time of 6.7 h in survivors compared to 5.5 h in non-survivors (NS). Hyperoxia, defined as a maximal PaO₂ of ≥300 mmHg measured during the first 24 h after CA, was present in 53 % of survivors at discharge versus 43 % in non-survivors (NS). Hyperoxia or PaO₂ was not significantly different between two groups.

Conclusion: In the present study, hyperoxia was not associated with increased in-hospital mortality in children treated with TH after CA.

522 – POSTER SESSION

DIFFICULT AIRWAYS ENCOUNTERED IN PATIENTS REQUIRING TRANSFER BY EMBRACE, YORKSHIRE AND HUMBER INFANT AND CHILDREN'S TRANSPORT SERVICE, FOR SPECIALIST CARE

F. Rajah, A. Wagh, J. Oldfield

Embrace Yorkshire and Humber Infant and Children's Transport Service, Sheffield Children's Hospital NHS Trust, Barnsley, UK

Objectives: To identify number of patients with potential difficult airways requiring specialist intervention i.e. ENT and/or paediatric anaesthetist involvement prior to transfer by Embrace for ongoing management and to assess the availability of specialist support to referring hospitals and Embrace teams. Embrace is an expert transport service but not a definitive airway service.

Methods: Retrospective study of Embrace case-notes from April 2011–August 2012. Cases identified from Embrace database using key words.

Results: During study period 2,693 patients transferred (2,089 neonates and 604 paediatric patients). 130 patients identified and 119 cases notes studied. 53(2 %) potential difficult airways identified. 33 patients intubated and 20 self-ventilating.

Patient distribution by age

Age Group	Intubated (% of total patients within age group)	Self-ventilating	Total
>1 year	20 (95.2 %)	1	21
1 month–1 year	8 (53.3 %)	7	15
Neonates	5 (29.4 %)	12	17

Reasons for transfer: ENT assessment 17(32 %); Stridor 15(28.4); Croup 9(17 %); tracheitis 3(5.7 %); respiratory failure 5(9.4 %); other 4(7.5 %). 71 % patients intubated before arrival of Embrace. Patients intubated by: anaesthetist 74 %, ENT consultant 9.7 %, Embrace transport registrar 3.2 %, PICU consultant 3.2 %, unknown 9.7 %. Involvement of specialist teams to assess and intubate patients: anaesthetic teams involved in 100 % cases, ENT contacted in 88 % cases and involved in 30 % cases (2 cases required tracheostomies). Difficulty obtaining ENT support in 10 %.

Conclusions: Burden of potential difficult airways was 2 %, with 1 % confirmed difficult airways. No morbidity in any patients transported. Anaesthetic assistance always available. More ENT support required in District General Hospitals.

523 – POSTER SESSION

AUDIT OF EMBRACE, YORKSHIRE AND HUMBERS INFANT AND CHILDREN'S TRANSPORT SERVICE, INVOLVEMENT IN ACCIDENTS/INCIDENTS WHILE TRANSPORTING CRITICALLY ILL CHILDREN

F. Rajah¹, J. Longden¹, S. Omarr^{1,2}, L. Carr¹, A. Kelly³

¹Embrace Yorkshire and Humber Infant and Children's Transport Service, Sheffield Children's Hospital NHS Trust, ²Yorkshire

Ambulance Service, Barnsley, ³Embrace Yorkshire and Humber Infant and Children's Transport Service, Sheffield Children's Hospital NHS Trust, Sheffield, UK

Background and aims: During the course of a transfer the Embrace team may comprise a combination of ambulance drivers (nonparametric), nurses, Advanced Nurse Practitioners (ANPs) and doctors. Staff may be first at the scene and required to help at road traffic accidents (RTAs). While staff are highly trained in neonatal and paediatric resuscitation of hospital patients, their training is not that of stabilisation in a field setting.

We aimed to quantify the involvement of staff in unexpected incidents involving the public while on transport in order to analyse training gaps and ensure that safety for both staff and patients is maintained.

Methods: Retrospective analysis of incident reports and records from January 2010–January 2013.

Results: During the study period, 6,329 patients were transferred. Total number of incidents was 11 (0.17 % of transfers). Four incidences involved teams becoming involved with victims of RTAs. Six incidences were helping motorists or pedestrians and one incident delivering a baby on hospital grounds. One incident involved smoke in an Embrace ambulance requiring evacuation onto the hard shoulder.

Conclusion: Involvement with accidents/incidents involving the public is a rare event and therefore riskier as teams are much less used to dealing with them. Our team has learned that better personal protection equipment is needed such as helmets to go into cars during RTAs. High visibility jackets are required to be seen at sufficient distances to keep staff safe and more training is required to minimise the dangers of traffic.

524 – POSTER SESSION

PEDIATRIC INTENSIVE CARE PHONE TRIAGE: PROSPECTIVE STUDY IN A TERTIARY CARE CENTER

J. Rambaud¹, A. Chenouard¹, U. Gouot², P. Hubert¹, J. Bergounioux¹

¹Pediatric Intensive Care Unit, ²Informatics Department, Hospital Necker Enfant Malades, Paris, France

Introduction: Phone triage by pediatric intensivists is the main procedure of admission to intensive care department (ICU) with medical and legal issues. To improve and secure this daily activity, we propose to report phone triage in pediatric ICU.

Objectives: evaluate and analyze in detail the phone triage activity in a tertiary care center pediatric ICU.

Methods: We developed with the Informatics department of our hospital, a program allowing precise recording and classification of the phone triage. This program was developed using freeware (PHP, MySQL, javascript open Flash Chart). All the phone triage calls were systematically recorded on a 5 months period.

Results: 342 calls have been recorded on 5 months from March 2012 to September 2012, median was 2 calls per day (0–10). Half of the call came from inside the hospital, 40 % from outside and 10 % were from pediatric retrieval unit. 54 % of the calls resulted in ICU admission. 46 % of the patients were refused ICU admission. The

condition of the patient was not considered critical in 32 % of the cases, the unit was declared full in 34 % of the cases and 32 % of the patient were transferred to another intensive care unit or to emergency department. Decision to maintain the patient in the calling clinical department represented only 5 % of the phone triage decisions.

Conclusion: Our results shows that PICU phone triage represent a daily clinical activity that need to be precisely evaluated as it provides important information on patients orientation and department activity.

525 – POSTER SESSION

RESPONSE TO DIFFERENT ANTI CONVULSANTS IN PATIENTS PRESENTED WITH SEIZURES IN EMERGENCY DEPARTMENT OF THE CHILDREN'S HOSPITAL, LAHORE

N. Rana

Pediatrics Emergency, The Children's Hospital, Lahore, Pakistan

Aims: To determine the response of different anti-convulsants in children presented with seizures in Emergency Department.

Materials and methods: All patients from 30 days to 12 years of age with complaints of convulsions admitted in emergency department of Children's Hospital, Lahore from 15th Nov 2012 to 31st Dec 2012 were included. I/V line maintained and all relevant investigations sent. Drugs used in order of preference according to hospital protocol were: inj. medazolam, inj. phenytoin, inj. Sodium valproate, infusion of medazolam and general Anesthesia. Children with metabolic causes were excluded from study.

Result: 517 patients presented with seizures. 58 % were males. Patients were divided into four groups according to age. Maximum number of patients were from 6 months to 2 years (40 %). 18 % were controlled by 1st dose of inj. Medazolam, 8 % with 2nd dose and 1 % with third dose (27 % total). 73 % patients were treated with 2nd line drug. 40 % patients responded to 1st dose of inj. Phenytoin and 19 % with 2nd dose. 9 % patient's responded to 3rd line drug; infusion sodium valproate. 4 % responded to infusion medazolam. 1 % needed general Anesthesia. 170 patients were excluded from study. Convulsions of 89 patients were resolved on their way to hospital. 81 patients were excluded as they had metabolic causes of convulsions.

526 – POSTER SESSION

FEASIBILITY OF "AWAKE VENO-ARTERIAL EXTRACORPOREAL MEMBRANE OXYGENATION" IN PEDIATRIC PATIENTS WITH ACUTE CARDIAC FAILURE

F. Schmidt¹, M. Sasse¹, M. Boehne¹, T. Jack¹, A. Horke², K. Seidemann¹, H. Bertram¹, P. Beerbaum¹, H. Koeditz¹

¹Pediatric Cardiology and Intensive Care Medicine, ²Department of Cardiothoracic, Transplantation and Vascular Surgery, Medical School Hannover, Hannover, Germany

Objectives: In pediatric patients with cardiogenic shock (CS)/or acute cardiac failure (CF) extracorporeal membrane oxygenation

(ECMO) is often used as a bridging procedure to recovery or further implantation of an ventricular assist device (VAD). Although ECMO has been established as a routine procedure in pediatric tertiary care centers, the clinical pathway guiding these patients to fully recovery or further VAD implantation is one of the most challenging for pediatric intensivists.

Methods: We describe the use of veno-arterial ECMO (VA-ECMO) as a treatment strategy for acute cardiac failure in spontaneously breathing and conscious pediatric patients. It presents our experiences with the first three children treated using this concept. The mean age of the patients was 2.4 months (range 0–5 months). Mean amount of time on ECMO was 47.7 days (range 6.9–94.2 days).

Results: One patient fully recovered with his cardiac function while being treated on “Awake-VA-ECMO”, one was bridged to LVAD and one was successfully bridged to transplantation. Two of the three patients are alive without any recurrences. One patient died prior to further heart transplantation while being on intracardiac rotation pump. Although reintubation was necessary in two of our patients (due to interventional heart catheter) total time breathing spontaneously and being conscious while on ECMO was >80 %.

Conclusion: We conclude that the concept of “Awake VA-ECMO” is feasible and safe for the treatment of acute cardiac failure and can be used as a “bridging strategy” to recovery or further VAD implantation in pediatric patients.

527 – POSTER SESSION

INCIDENCE AND OUTCOMES OF ACUTE LUNG INJURY AND ACUTE RESPIRATORY DISTRESS SYNDROME IN PEDIATRIC INTENSIVE CARE UNIT IN MONGOLIA

E. Shonkhuuz¹, E. Tumurgur¹, O. Aatsan¹, A. Tsogbadrakh¹, B. Renchindorj¹, E. Batkhuu¹, B. Munkhuu², N. Jargalsaikhan¹

¹Pediatric Intensive Care Unit, ²Research Department, National Centre for Maternal and Child Health, Ulaanbaatar, Mongolia

Background and aims: Pediatric acute lung injury and acute respiratory distress syndrome is a devastating lung condition with high mortality being the end result of a wide variety of inciting events. The main purposes of the study were to determine incidence of the conditions and to report outcome.

Methods: Case records of children admitted to the Pediatric intensive care unit of the National Centre for Maternal and Child Health, Mongolia due to acute lung injury and acute respiratory distress syndrome from 2007 to 2012 were reviewed. The following criteria were used to diagnose the cases: acute onset, bilateral infiltrates on chest radiography, arterial oxygen tension/fraction of O₂ in the inspired gases, i.e., PaO₂/FiO₂ ratio <300 for acute lung injury and less than 200 for acute respiratory distress syndrome, and absence of clinical evidence of left atrial hypertension.

Results: A total of 61 children were diagnosed as acute lung injury and acute respiratory distress syndrome during study period giving an incidence of 11.5/1,000 admissions. The most (57.4 %) cases were males. Out of the total cases 44.3 % (27 cases) was diagnosed with acute lung injury and 55.7 % (34 cases) was diagnosed with acute respiratory distress syndrome. Primary lung pathology contributed to a (59.02 %) cases while the rest had nonpulmonary causes. The hospital mortality rate was 60.0 %.

Conclusions: The high incidence and mortality of pediatric acute lung injury and acute respiratory distress syndrome in Mongolia may necessitate more efforts to improve the accurate diagnosis and treatment system in the country.

528 – POSTER SESSION

RESPIRATORY NEONATAL ECMO. EXPERIENCE OF A HIGH VOLUME INSTITUTION

S. Speggorin, S. Robinson, C. Westrope, C. Harvey, G.M. Faulkner, G.J. Peek

Heart Link ECMO Unit, Glenfield Hospital, Leicester, UK

Background and aims: Extracorporeal membrane oxygenation (ECMO) is a proven therapy for severe neonatal respiratory failure. Our aim is to review the results of respiratory ECMO in babies at a high volume ECMO centre.

Methods: Between 2007 and November 2012, all newborn patients with respiratory failure refractory to conventional treatment who required ECMO support have been enrolled in this study. Demographic data, diagnosis, precannulation type of ventilation and blood gas parameters have been described and analysed. Types of cannulation and complications have also been evaluated.

Results: In the period observed, 186 patients matched the inclusion criteria. Mean age 3.6 ± 5.09 days. The most common diagnoses were meconium aspiration syndrome in 91 pts (48.9 %), Persistent fetal circulation (PPHN) in 45 (24.2 %), Congenital diaphragmatic hernia (CDH) in 22 (11.8) and septicemia in 15 (8.1). Veno-venous and veno-arterial cannulation were performed in 92 patients each. The mean overall ECMO time was 128 ± 112.6 h. ECMO was successful in 168 pts (90.3 %). Table 1 shows univariate analysis for the factors associated to increased hospital mortality.

Table 1 Univariate Analysis

Conditions associated with higher mortality	Significance (p value)
Older age at cannulation	0.034
Pre-ECMO lower pH	0.025
Longer duration on ECMO	0.043
Diagnosis of CDH or septicemia	<0.001
Pre-ECMO cardiac arrest	0.013
Non-conventional respiratory support	<0.001

Conclusions: Although this is a very difficult and challenging subgroup of patients, excellent clinical results can be obtained as a result of experience and teamwork. Older age, CDH, septicemia, precannulation status and non conventional ventilation are associated with higher mortality. Conditions associated with higher mortality. Significance (p value).

529 – POSTER SESSION

DELIVERY ROOM INTENSIVE CARE UNIT AND NEONATAL OUTCOME: A PROSPECTIVE STUDY

G. Terrin¹, A. Russo², F. Conte², M.G. Conti², E. Bacchio², A. Scipione², F. Messina³, M. De Curtis²

¹Department of Gynecology-Obstetrics and Perinatal Medicine,

²Department of Pediatrics, La Sapienza University of Rome, Rome,

³Perinatal Care, Evangelic Hospital V. Betania, Naples, Italy

Background and aims: Interventions performed in the first minutes of life of very low birth weight (VLBW) neonates may have a direct influence on immediate survival and morbidity. The use of all technologies of a neonatal intensive care unit (NICU) directly in a delivery room (DR) has been suggested, but data on the efficacy of this approach are still lacking. We aimed to investigate the advantage of resuscitation of preterm neonates at birth directly in the NICU.

Methods: We designed a prospective study on VLBW neonates born from January 2008 to April 2009. In the first 8 month of the study neonates were initially assisted in DR and then transferred in NICU (non-DR-NICU approach), in the subsequent period the neonates were assisted directly in the NICU at birth (DR-NICU approach). Main outcome of the study was neonatal morbidity during hospitalization.

Results: We observed 106 VLBW neonates (body weight $1,085 \pm 297$ g, gestational age 28.6 ± 3.4 weeks, male 48.1 %). Fifty were assisted according to DR-NICU approach. Main clinical and demographic characteristics of the 2 cohort were similar. Early use of non invasive ventilation was higher when DR-NICU approach was used (0 vs. 18 %, $p < 0.05$). Occurrence of intraventricular hemorrhage (34 vs. 12 %, $p = 0.008$) and late-onset sepsis (12 vs. 2 %, $p = 0.036$) were increased during non-DR-NICU compared to DR-NICU period.

Conclusions: DR-NICU approach favored the early use of non-invasive ventilation and reduce neonatal morbidity.

530 – POSTER SESSION

DOES BLOODY ASPIRATE REFLECT THE STATE OF UPPER GASTROINTESTINAL MUCOSA IN A CRITICALLY ILL NEWBORN?

R. Tomerak¹, A. El Badawy¹, A. Eskandar², A. Mahmoud¹

¹Pediatrics, ²Cairo University, Cairo, Egypt

Critically ill newborns have many risk factors to develop stress related mucosal lesions (SRML). We used upper endoscopy to evaluate the presence of SRML in these neonates, to know the specificity and sensitivity of the bloody gastric aspirate to detect SRML and to identify the risk factors associated with the presence of SRML and bloody gastric aspirate.

Patients and methods: This is a cross-sectional study done on 100 critically ill newborn after becoming clinically stable. SRML were diagnosed if there is hyperemia, erosions or ulcers in the esophagus, stomach, and/or the duodenum.

Results: SRML were found in 77 % of neonates in the neonatal intensive care units (NICU) though frank bloody aspirate was detected in only 22 % of neonates. The presence of bloody aspirate showed low sensitivity (24.68 %) for the presence of SRML and high specificity (86.96 %). The presence of bloody gastric aspirate showed a double fold risk for the presence SRML (OR = 2.184, CI = 0.584–8.171). Factors associated with SRML included respiratory distress ($p = 0.000$, risk = 4.006), the use of nasogastric tube ($p = 0.017$, OR = 3.281) and the use of triple antibiotics ($p = 0.001$, risk = 1.432). Factors associated with the presence of bloody gastric aspirate included the use of nasogastric tube (OR = 1.629, $p = 0.000$) and the presence of haemostatic disorders (OR = 3.143, $p = 0.039$). It was also associated with lower hemoglobin levels ($p = 0.000$).

Conclusion: SRML represents an under-diagnosed problem in NICUs. Absence of bloody gastric aspirate does not exclude the presence of SRML.

Reference:

- (2012) Arab J Gastroenterol. Published by Elsevier B.V.

531 – POSTER SESSION

EFFECTS OF SUSTAINED ABDOMINAL AORTA COMPRESSION ON CORONARY PERFUSION PRESSURES AND RESTORATION OF SPONTANEOUS CIRCULATION DURING CARDIOPULMONARY RESUSCITATION IN SWINE

M. Zhou

Affiliated Hospital of Zunyi Medical College, Zunyi, China

Objectives: The present study was undertaken to explore whether sustained abdominal aorta compression-cardiopulmonary resuscitation (SAAC-CPR), as a means, can raise coronary perfusion pressure (CPP) as well as restoration of spontaneous circulation (ROSC) during CPR. In the present study, we hypothesised that SAAC-CPR elevates CPP during CPR and improves ROSC, without causing liver laceration.

Methods: Animals were randomised into one of two groups (Standard CPR and SAAC-CPR). Ten domestic swine (22–25 kg) were anaesthetised, intubated and mechanically ventilated. Ventricular fibrillation was induced, and after 3 min of untreated ventricular fibrillation, the animals were treated with standard CPR (with simplex chest compression (SCC) and epinephrine) or SAAC-CPR (SCC with sustained abdominal aorta compression, without epinephrine). CPP and ROSC were compared.

Results: SCC with sustained abdominal aorta compression (SCC + SAAC) significantly increased CPP in comparison with SCC during CPR ($p < 0.05$). The increase in CPP with SCC + SAAC is equivalent to that achieved with epinephrine ($p > 0.05$). All animals in the standard CPR and SAAC-CPR groups restored spontaneous circulation. No liver damage was found in post-mortem examinations of the swine subjects.

Conclusions: During CPR, non-invasive SAAC can rapidly and reversibly raise the CPP as much as can epinephrine and is especially suitable for out-of-hospital CPR.

532 – POSTER SESSION

ASSOCIATIONS BETWEEN ACE GENE POLYMORPHISM AND THE COURSE OF ASPHYXIA IN NEWBORNS

T.K. Znamenskaya¹, N. Gorovenko², V.I. Pochilko³, S. Kyryachenko², O. Korobka³

¹State University « Institute of Pediatrics, Obstetrics and Gynecology NAMS in Ukraine », ²National Medical Academy of Post-Graduate Education named after P.L. Shupik, Kiev, ³Ukrainian Medical Dental Academy, Poltava, Ukraine

Background and aims: To study associations between polymorphism of ACE gene and the development of asphyxia as well as to investigate the state of hemodynamics on the 1st day of life in the term newborns, stratified in accordance to genotypes of the ACE gene.

Methods: We investigated the associations between polymorphisms of the angiotensin converting enzyme-1 (ACE-1) and the course of

asphyxia in 70 term newborns. Thirty-eight healthy controls were also genotyped. We measured the heart rate, blood pressure, urine output during the first day of life in newborns with different genotypes ACE gene.

Statistical package for social science (SPSS) program version 16.0 was used for analysis of data. Multiple regression analysis was performed to assess the combined influence of variables on asphyxia and hemodynamics values.

Results: The differences of D allele and D/I genotype of ACE gene were found significant between asphyxia group and the controls ($p = 0.004$). Score of the Apgar scale on the 1st min was significantly lower in babies with genotype D/D, than in children with genotype I/D. The absence of significant differences in heart rate, blood pressure, urine output during the 1st day of life in newborns with different genotypes of ACE gene was shown.

Conclusions: ACE D/D genotype implicated possible roles in the severe asphyxia among term neonates. This result might be useful in planning therapeutic strategies for individual patients.

533 – POSTER SESSION

TIME REQUIRED TO ACHIEVE STEADY STATE LUNG VOLUME DURING A SUSTAINED INFLATION IS VARIABLE IN THE SURFACTANT-DEFICIENT PRETERM LAMB

E. Zonneveld¹, D. Black¹, A. Rajapaksa¹, E. Perkins^{1,2}, M. Sourial^{1,2}, P. Davis^{1,3}, D. Tingay^{1,2,4}

¹Neonatal Research, Murdoch Childrens Research Institute, Parkville, ²Neonatology, Royal Children's Hospital, Melbourne,

³Neonatal Research, Royal Women's Hospital, Parkville,

⁴Paediatrics, University of Melbourne, Melbourne, VIC, Australia

Objectives: To describe the time required to stabilise, and model the behaviour of, global and regional lung volume during a sustained inflation (SI) in a preterm lamb model.

Methods: Eight 127 day gestation lambs were studied. Prior to delivery, lambs were intubated and electrical impedance tomography (EIT) electrodes applied. EIT was used to real-time monitor global, dorsal and ventral hemithorax lung volume. At birth a SI of 40 cm H₂O was applied until the global EIT volume signal was stable for 10-s. Single-phase and slow and fast-phase exponential models were applied post hoc in attempt to model the volumetric behaviour of the lung during the SI.

Results: The time required to achieve stable volume was variable; median (IQR) 82.6 (58.8, 89.9) s. The ventral (non-gravity dependent) hemithorax accounted for 68.5 (60.0, 69.1) % of all recruited lung volume during the SI. A single-phase exponential model could describe volume change in all lung regions; median (Range) R^2 0.934 (0.832, 0.978). Using this model the dorsal hemithorax stabilised a median (IQR) 4.0 (2.5, 6.9) s before the ventral ($p = 0.031$; Wilcoxon matched-pairs tests). A simulation program has been developed that automates the SI delivery based on clinical volumetric response using EIT.

Conclusions: In this preterm model, time to stabilise volume during a SI exhibited considerable variability between subjects and, to a lesser extent, within the lung. Fixed (or prescribed) time/pressure SI algorithms may not account for this. Direct measures of volume may aid in directing an individuals response to a SI at birth and warrant further investigation.

Ethics (534)

534 – LATE BREAKERS

BRAIN DEATH AND ORGAN DONATION DUE TO CHILD ABUSE

C. Rey¹, P. del Villar², S. Menéndez³, A. Vivanco³, A. Concha³, A. Medina³

¹Pediatrics, University of Oviedo and Hospital Universitario Central de Asturias, ²Pediatrics, Hospital Rio Hortega, ³Pediatrics, Hospital Universitario Central de Asturias, Oviedo, Spain

Objective: To describe two cases of child abuse that have caused brain death and subsequently were subsidiary for organ donation.

Clinical cases: A 4-year-old child was transferred to our PICU, unconscious. The parents reported that he had fallen to the ground when leaving the bath. At admission he presented Glasgow score 3/15, mydriatic pupils without light reaction; multiple bruises in different stages of evolution and blunt wounds. He was put on mechanical ventilation. Brain tomography showed a subdural hematoma and brain swelling. Abdominal tomography showed pancreatic contusion. He also presented retinal hemorrhages. Brain death was diagnosed. A 54-day-old infant was transferred to our PICU due to severe intracranial lesions. The parents reported a history of hypo-activity without history of trauma or shaking. He presented Glasgow score 3/15, anisocoria with mydriatic right pupil and generalized hypertonia. He was intubated and mechanically ventilated. He presented different stages of injuries in the neck, mandibula, nasal outer wing, mastoid region and parieto-occipital areas. Measures to control intracranial hypertension were performed but the patient progressed to brain death. In both cases, a probable diagnosis of child abuse was made and the appropriate legal steps were taken to obtain organ donation that finally was successfully performed.

Commentaries: Brain death is very uncommon in young children and, therefore there is a shortage of organ donation. Unfortunately, as we described in these cases child abuse can be a cause of brain death. Therefore, we must be aware to optimize the medical and legal management of these potential donors.

Haemodynamics and Congenital Heart Disease (535–539)

535 – LATE BREAKERS

PEDIATRIC VENTRICULAR ASSIST DEVICES: SINGLE CENTRE EXPERIENCE

J. Balcells¹, J. Sanchez-de-Toledo², M. Pujol-Jover¹, L. Gil-Juanmiquel¹, L. Renter-Valdovinos¹, F. Gran-Ipiña³, R. Abella⁴

¹Pediatric Critical Care Department, ²Cardiac Intensive Care Unit, ³Pediatric Cardiology, ⁴Pediatric Cardiac Surgery, Hospital Vall d'Hebron, Barcelona, Spain

Background and aims: To describe our experience with pediatric ventricular assist devices (VAD).

Methods: Retrospective review of medical records of children supported with VAD at our institution.

Data: median and range unless stated otherwise.

Results: From May 2006 to December 2012 fourteen children were supported. Characteristics: Age 4.1 years (7 months–15 years); weight 12 kg (6.5–60). Diagnoses: Dilated cardiomyopathy (n = 7; 50 %); congenital heart disease (n = 3; 21.4 %); restrictive cardiomyopathy (n = 2; 14.2 %); refractory arrhythmia (n = 1; 7.1 %); idiopathic ischemic heart disease (n = 1; 7.1 %). Seven patients (50 %) received ECMO before VAD; duration 9.7 days (1.3–33). Type of VAD: univentricular (n = 9; 60 %); biventricular (n = 6; 40 %); univentricular to biventricular (n = 0; 0 %). Patients with single ventricle physiology on VAD (n = 2; 14.2 %). Device: Excor-Berlin Heart® (EBH) (n = 10; 66.6 %), univentricular (n = 6; 60 %), biventricular (n = 4; 40 %); Centrimag-Levitronix® (LEV) (n = 5; 30 %), univentricular (n = 3; 60 %), biventricular (n = 2; 40 %). Duration of support 24 days (2 days–11.3 months); EBH 26 days (2–336); LEV 24 days (7–31). Complications: non CNS bleeding (n = 8; 57.1 %); CNS bleeding (n = 1; 7.1 %); cerebral ischemic event (n = 1; 7.1 %); hypoxic-ischemic encephalopathy (n = 1; 7.1 %); infections (n = 3; 21.4 %); renal failure (n = 5; 35.7 %); dehiscence of cannula insertion site (n = 3; 21.4 %).

Outcome: 10 patients transplanted (71.4 %); 4 died (28.6 %). Nine out of ten transplanted patients (90 %) survived to hospital discharge and 1 is still in PICU. Causes of death: septic shock (n = 1); brain death (n = 1); hemorrhagic shock (n = 1); life support withdrawn (n = 1).

Conclusions: Children can be supported with VADs to heart transplantation with an excellent survival rate.

536 – LATE BREAKERS

HEMODYNAMIC MANAGEMENT: AN INTERNATIONAL SURVEY AMONG PEDIATRIC INTENSIVE CARE PHYSICIANS

L. Frijns, J. Lemson

Intensive Care, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: Hemodynamic monitoring (HM) is an indispensable part of managing critically ill children and needs to be part of a strategy to provide an improvement in outcome. We conducted a survey to assess the use of various HM modalities and protocols for hemodynamic monitoring by pediatric intensive care unit (PICU) physicians.

Methods: 400 PICU physicians in 29 countries were sent a web-based survey.

Results: 83 physicians in 83 PICUs in 15 countries responded. Heart rate, blood pressure and lactate were considered the most important parameters of 21 clinical, biochemical or HM derived variables (Fig. 1). Central venous oximetry (ScvO₂) and lactate were considered important by, respectively, 71 and 79 % of respondents (percentage attributing a value >7 on a 0–10 scale).

Fig. 1

57 % of respondents indicate their PICU does not have or does not commonly use a protocol for hemodynamic management.

55 % of respondents indicate to sometimes or frequently use cardiac output (CO) monitoring (Fig. 2).

Fig. 2

Conclusions:

1. ScvO₂ and lactate are valued parameters, but despite international campaigns promoting an end-goal-directed approach to hemodynamic management using these parameters, such protocols are used infrequently.
2. CO monitoring is not widely used.

537 – LATE BREAKERS

CLINICAL SIGNS AND INCIDENCE OF HEART CONGENITAL SEPTAL DEFECT DURING NEONATAL PERIOD: THREE YEARS DATA OF A TERTIARY UNIVERSITY HOSPITAL CENTER

A. Koja¹, N. Koliçi²

¹Paediatrics, UHC "Mother Tereza", ²Neonatology, UHOG "Koco Gliozheni", Tirana, Albania

Septal defect (DIA, DIV, A-V defect) are the most frequent congenital heart defect, near 35–40 % of all of them. Prevalence is 7/1,000 live birth, and often are associated with other congenital heart defects. Large and not treated defects in the right moment are associated with serious complication.

A systolic murmur can be the first sign of the congenital heart defect in a newborn babies, and in the same time the most commune reason of for a cardio-paediatric consultation. Prevalence of presence of a systolic murmur neonatal period is different in different articles and is

published from 0.9 to 77.4 %. This difference in prevalence seems to be related to with the size of the study.

Aim: To assess the frequency of congenital heart septal defect in neonate referred to our pediatric cardiology service, the single pediatric cardiac tertiary center in Albania.

Methods: Were analysed retrospectively the data-base of the outpatient clinic of our service, all neonates during June 2009–June 2012, referred for evaluation by the Pediatric community. Referral reasons was a systolic murmur 80 %.

Results: A systolic murmur often is not associated with clinical manifestations, but is strongly related with a DIV. More affected are male neonates. The high incidence of these defects draws attention to a careful examination of newborns in terms of time to capture the heart defects that would later complicate the future of healthy children. Diagnosis and timely correction of congenital heart diseases, cures or improves quality of life.

538 – LATE BREAKERS

MANAGEMENT OF PATENT DUCTUS ARTERIOSUS AMONG INFANTS LESS THAN 28 WEEKS OF GESTATION AT BIRTH

J.V. Lingan, J. Cook

Geisinger Medical Center, Danville, PA, USA

Objectives: To determine the effects of prophylactic compared to selective treatment with Indomethacin on the rate of PDA surgical ligation, the incidence and severity of intraventricular hemorrhage (IVH), as well as other associated neonatal morbidities.

Methods: A change in practice from prophylactic Indomethacin to selective treatment with Indomethacin based on echocardiogram evidence of a hemodynamically significant PDA (hsPDA) was made in our institution. Retrospective chart review was conducted on all infants born <30 weeks of gestation from June 2010 to June 2012. Data collected included: demographics, incidence of hsPDA, PDA ligation rate, intraventricular hemorrhage and other secondary outcomes. Statistical analysis was performed using the Chi square test and the Fisher's exact test.

Results: A total of 118 infants met inclusion criteria; 61 received prophylactic Indomethacin and 57 infants received selective treatment. The groups had comparable baseline characteristics. Compared to the prophylactic group, the selective treatment group had a higher rate of surgical PDA ligation (14.6 versus 4.5 %, $P = 0.15$) and a higher incidence of severe IVH (36.6 versus 15.9 %, $P = 0.05$). All other outcomes including the incidence of PVL, pulmonary hemorrhage, pulmonary hypertension, CLD, SIP, NEC, sepsis, ROP, renal insufficiency and NICU length of stay were not statistically significant.

Conclusion: Prophylactic Indomethacin decreases the severity of IVH among infants <28 weeks of gestation at birth. Although the rate of surgical ligation of PDA did not reach statistical significance, there was an increase in trend with the selective treatment group.

539 – LATE BREAKERS

DETECTION OF MAJOR CONGENITAL HEART DEFECTS

B. Palanisami¹, J. Lim², N.V. Subhedar¹

¹Neonatology, Liverpool Womens Hospital NHS Foundation Trust,

²Paediatric Cardiology, Alder Hey Childrens NHS Foundation Trust, Liverpool, UK

Background: Congenital heart defects (CHD) are a leading cause of infant mortality. It has been suggested that newborn screening with pulse oximetry may be a screening test which is both clinically and cost-effective.

Objectives: We aimed to quantify the detection rate of major CHD in babies born at our regional perinatal centre and to describe the timing of diagnosis.

Methods: Information about babies born with cardiac anomalies was cross referenced against fetal and cardiac databases over a 12 month period in 2010. Major cardiac defects comprised 'critical' anomalies (those needing intervention in the first 28 days of life) and 'serious' cardiac anomalies (those needing intervention in the first year of life).

Results: 154 babies were admitted to the cardiac centre with critical (120) and serious (34) cardiac anomaly, of whom 20 babies were born at our centre. Of these 20 babies, 14 were diagnosed antenatally (11 critical, 3 serious) and five babies were diagnosed postnatally prior to discharge (3 critical, 2 serious). One critical lesion was not diagnosed prior to early transfer for intestinal surgery. The overall rate of major CHD in our cohort was approximately 2.4 per 1,000 livebirths.

Conclusion: The antenatal detection rate of major CHD at our centre was higher than in recently published reports. High antenatal detection rates are likely to reduce the clinical and cost-effectiveness of postnatal screening interventions for major CHD.

Healthcare (540–551)

540 – LATE BREAKERS

PERCEIVED HEALTH EFFECTS ASSOCIATED WITH VARIOUS FORMS OF TOBACCO: A CROSS SECTIONAL STUDY

J.J. Cheriathu¹, L.J. John², J. Muttappallymyalil³, J. Sreedharan³, S. Al Sharbatti⁴

¹Paediatrics, GMC Hospital, ²Pharmacology, ³Research Division,

⁴Community Medicine, Gulf Medical University, Ajman, Ajman, United Arab Emirates

Objectives: Use of tobacco is a worldwide problem that begins early in childhood and builds up to lifelong habit. This study determined the perception of school students regarding the health related risks associated with various forms of tobacco.

Materials and methods: This cross-sectional study was conducted among school students from Ajman, UAE. Student's perspective of health risk associated with various forms of tobacco was assessed using a self-administered questionnaire. Descriptive and inferential analysis of the data was performed using SPSS.19.

Results: 229 male and 182 female students (mean age: 15.6 ± 1 years) of Grade IX–XII, participated. More than 80 % were aware of health risks associated with tobacco use. Moderate-severe level of health risk was attributed to cigarette smoking, chewing tobacco, dokha, and sniffing tobacco by 93.4, 92.5, 89.9, and 89.1 %, respectively. About 78.6 % attributed moderate-severe health risk and 21.4 %, no/mild health risk with smoking shisha/hookah compared to other forms of tobacco ($p < 0.001$). Female students were more aware than males about health risks with shisha/hookah smoking ($p < 0.001$). There was no association between parent's educational qualification and student's perception of tobacco-related health risks. The common source of their information included television, internet and newspapers.

Conclusion: Students were aware of tobacco related health risks. Lower level of health risk was attributed to smoking shisha compared to other forms of tobacco. School-based programs with active involvement of adolescents could increase the awareness of tobacco related health risks especially the water pipe smoking.

541 – LATE BREAKERS

THE EXPERIENCES OF WOMEN WHO HAVE BABIES IN RISK OF CONGENITAL ANOMALY: QUALITATIVE RESEARCH

N. Canbulat, M. Çöplü

Nursing, Karamanoğlu Mehmetbey University, Central, Turkey

Prenatal Searching Tests are suggested to the pregnant women in many countries as a part of routine care before the birth and these tests are giving approximative informations about whether the baby has anomaly or not.

These qualitative research was conducted with 33–45 aged 11 women who have babies in risk of congenital anomaly. The data were obtained with half configured interview form. The women's marriage years were 13.45 ± 2.97 , birth numbers were 3.09 ± 1.37 , alive children numbers were 2.45 ± 0.52 , birth weeks were 15.55 ± 3.88 . It has been determined that the factors that affect mothers of babies with congenital anomaly risks are ignorance, fear-worry-anxiety (of complications of interventions, of missing malformations and of detection of malformations) and religious beliefs. Nurses and midwives can help in evaluating test programs and assessments or planning, application and management or can nurture assessed patients according to the results. Nurses can provide the information and help necessary in all stages of the process in order to minimise psychological costs.

542 – LATE BREAKERS

CHANGES IN THE DEMOGRAPHICS OF PATIENTS ADMITTED TO A SINGLE PAEDIATRIC AND NEONATAL INTENSIVE CARE UNIT OVER A DECADE

T. Ciomartan^{1,2}, O.M. Damian³, D.M. Damian³, F.N. Brezan^{1,2}, R. Cretu¹, I.A. Anca^{1,2}

¹Department of Paediatrics, Institute for Mother and Child Care "A. Rusecu", ²University of Medicine and Pharmacy 'C. Davila', ³Department of Neonatology, Institute for Mother and Child Care, Polizu Maternity Hospital, Bucharest, Romania

Objective: We analysed changes in the demographics of patients admitted to our Neonatal and Paediatric Intensive Care Unit between 1st January and 31st July 2009 compared with the similar period of 1999.

Materials and methods: Retrospective analysis of all charts of children admitted in the above mentioned periods. We performed a descriptive analysis of demographic data, reasons for admission, length of hospital stay and mortality. SPSS 13.0 was used for data analysis. A p value of <0.05 was considered statistically significant.

Results: A total of 511 patients had 561 records: 257 patients were from 1999, and 304 from 2009. In 2009 more patients came from rural areas ($p < 0.025$). Most of the patients were referred from another hospital; within the studied periods more came directly from home and less from the family doctor ($p < 0.001$). There were more newborns and less infants in 2009 vs 1999 ($p < 0.001$). There was a slight but not significant decrease in mortality rates (4.7 % in 1999 vs 4.3 % in 2009), mainly because of a significant and constant increase in case complexity in recent years and the availability of mechanical ventilation in 2009.

Conclusion: Within a period of only 10 years we observed an increased number of patients and a wider range of referral centres, especially those from rural areas; a similar trend was noted in the percentage of newborns in the total admissions and in the case complexity, which required the adaptation of our resources to the new conditions.

543 – LATE BREAKERS

A NEW QUALITY PERFORMANCE INDICATOR READY FOR USE: THE EMPATHIC-30 MEASURING PARENT SATISFACTION IN PAEDIATRIC INTENSIVE CARE UNITS

J.M. Latour¹, H.J. Duivenvoorden², D. Tibboel², J.A. Hazelzet^{2,3}, EMPATHIC Study Group

¹Pediatrics, Division of Neonatology, ²Intensive Care and Department of Pediatric Surgery, Erasmus MC: Sophia Children's Hospital, ³Strategy, Policy and Accountability IT, Erasmus MC: University Medical Center Rotterdam, Rotterdam, The Netherlands

Background and aim: The 65-item EMPATHIC questionnaire measures parental experiences and satisfaction. A shortened version is recommended to facilitate routinely use, to benchmark European PICU services, and to increase response rates. This study aimed to statistically shorten the EMPATHIC questionnaire and to validate the short version.

Methods: The 8 Dutch PICUs participated in the study. Multiple regression analysis was applied to eliminate redundant items and evaluating the explained variances. Pearson's product moment correlation coefficient was used for the linear association between the reduced domains. Validity was evaluated by R^2 -adjusted for internal cross-validations. Reliability was assessed by internal consistency.

Results: 3,354 (55.4 %) parents completed the 65-item EMPATHIC questionnaire. Statistical redundancy resulted in 30 items over five different domains: Information (5); Care and cure (8); Organization (5); Parental participation (6); and Professional attitude (6). Explained variance of the total scores was 97 % and within the individual domains ranged from 85 to 95 %. The domains of the 65-item and 30-item EMPATHIC questionnaires showed strong correlations ($r = 0.92$ – 0.97 ; $p < 0.001$). On domain level, cross-validation among 8 centres and across two time periods provided R^2 -adjusted values between 85 and 95 %. Cronbach's α reliability estimates on domain levels were between 0.73 and 0.93 and of the 30-item scale was 0.93.

Conclusions: The statistically shortened EMPATHIC-30 provides parents a feedback form taking less time to complete and the outcome covers at least 97 % of the variances of the 65-item EMPATHIC questionnaire. Benchmarking parent satisfaction outcomes facilitate European PICU healthcare professionals to identify quality of care improvements.

544 – LATE BREAKERS

PEDIATRICIAN'S ROLE IN PREVENTION OF LEARNING DISORDERS IN PRE-SCHOOL AND SCHOOL

M. Niazi¹, M.H. Noori²

¹Center Specific Learning Disorder, Isfahan, ²Esfahan University, Esfahan, Iran

Introduction: Recently the process of study and exploration of learning disorders had been developed remarkable and specialists concentrate it more than past and they believe that specific learning disorders cause to make low performance in necessary skills to communicate with others and its result are social relationship disorders, self-esteem reduction, victim and low performance of children and students in different levels. However some children have normal or high normal intelligence and also well hearing and visual perception but they can not learn educational subject by using of educational standard method so they were sent to education and habilitation specific learning disorder centers by pre-schools or consultants and child psychiatrist. At first these children have enough confidence to educational improvement but gradually they understand that other children are better than themselves in learning aspects. They feel they are differ from others by passing few months of academic year and their self-confidence become low. They hate school and their parent force them and make the condition difficult because their parents are not well informed and these parents and teachers compare them with others unjustly or humiliating. Gradually these children become depressed, anxious, victim and we cannot solve their problems completely. Therefore, pediatricians can help parents who are the first people on delay of motor or speech growth, impaired cognitive skills (visual, auditory), visual memory weakness, impaired speech or language skills...share with their children.

545 – LATE BREAKERS

PREVALENCE OF UNWANTED PREGNANCY AND THE FACTORS THAT AFFECT ON IN WOMEN MASHHAD CITY

R. Vakili, M. Kiani, M. Saeidi

Mashhad University of Medical Sciences, Mashhad, Iran

Introduction: 200 million pregnancies occur each year worldwide, that about 1/3 are unintended, and half of them will lead to abortion.

Materials and methods: Sectional study on 105 pregnant women referred to health centers that were selected cluster randomization. Results were analyzed in SPSS11.5 with appropriate analytical test.

Results: Mean maternal attitudes about unwanted pregnancy and its complications was 2.845 ± 5.495 of total score 10 and mean knowledge was 3.543 ± 12.085 of total score 20.

Prevalence of Unwanted Pregnancy in women was 29.5 and 28.3 % had a tendency to abortion. And contraception before pregnancy in 46.2 % was natural method and 30.8 % was condom. Significant association was found between mothers' education and unwanted pregnancy, Thus the incidence of unwanted pregnancy in women who their husbands and their had a university education was higher than at other women. ($p < 0.05$). Results showed that unwanted pregnancy in

working mothers was higher than the housewives ($p < 0.05$). There is a significant relation between the number of children and unwanted pregnancy, Thus the incidence of unwanted pregnancies in women who had three or more children was higher ($p < 0.05$). Prevalence of unwanted pregnancy in mothers who higher than 35 years was the most ($p < 0.05$).

Conclusion: About training different methods of contraception and the risks of unwanted pregnancy, especially among working women with higher education level and age be planned.

546 – LATE BREAKERS

OUR EXPERIENCE USING A VIDEO LARYNGOSCOPE

D. Sellick, D. Bartle

Child and Women's Health, Royal Devon and Exeter Hospital, Exeter, UK

Objectives: Neonatal intubation is technically difficult, however a necessary skill amongst Paediatric trainees.

Our aim was to analyse the role of a video laryngoscope in the intubation of neonates amongst new Paediatric trainees and also its role in cases of difficult intubation.

Methods: A Storz C-MAC video laryngoscope along with Size 0 and Size 1 Miller blades, was purchased for the Exeter Neonatal Unit, using funds from the Peninsula Deanery Innovation Fund.

The laryngoscope's use was analysed over a 10 week period in order to assess the success of neonatal intubations along with trainee and consultant feedback.

Results: The laryngoscope was used by three ST1 Paediatric trainees for their first attempts at neonatal intubation. Six out of six intubations were successful (four emergency and two elective).

Both trainees and Consultants felt the laryngoscope facilitated the teaching and process of neonatal intubation. It was used successfully in a case of neonatal subglottic stenosis, aiding intubation and enabling video footage to be sent to the receiving unit.

Conclusions: The video laryngoscope is an effective intubation tool. It enables greater visualisation of the laryngeal structures, thus facilitating teaching and improving technique of neonatal intubation amongst Paediatric trainees. This in turn has the potential to improve patient safety through fewer oesophageal intubations and faster procedure times.

547 – LATE BREAKERS

PDA LIGATION 'AWAY DAYS' PROVIDED BY TRANSPORT TEAMS: IS THIS THE WAY FORWARD?

A. Kage^{1,2}, L. Barker^{1,3}, R. Hall^{1,2,3}, A. Leslie^{1,2}, A. Grover^{1,2}, J. Behrsin^{1,2}

¹CenTre Neonatal Transport Service, ²University Hospitals Leicester NHS Trust, ³University of Leicester, Leicester, UK

Background and aims: In our area babies requiring patent ductus arteriosus (PDA) ligation require inter-hospital transfer to specialist paediatric cardiac hospitals. The CenTre transport team picks-up the baby from the referring neonatal unit, transfers to the cardiac PICU, takes the baby to surgery, reviews the baby post-operatively to ensure stability and transfers back to the referring unit. We describe a 3 year

experience with this type of transport, reviewing transport logistics and complication rates.

Methods: A retrospective review of all PDA transports conducted from 1st April 2010 to 31st March 2013.

Results: 41 PDA transfers were conducted, 1 baby was unfit for surgery when assessed on arrival and another was medically unfit to be transferred back the same day. The logistics of these transfers are shown in Table 1. The greatest proportion of transport time was spent from arrival at the cardiac centre to transfer into theatre at a median time of 2 h 50 min. Median total transport time was 11 h 24 min. Complications, defined as reintubation, hypotension, hypothermia, or acidosis (pH < 7.2) occurred in 19 (48 %) infants. These were all managed successfully.

Table 1 Timings spent at each transport stage

Time interval (N = 39)	Median time	Interquartile range
Time from arrival at cardiac centre to transfer to theatre	2 h 50 min	2 h–4 h 22 min
Time in theatre	2 h	1 h 32 min–3 h 22 min
Time for post-operative stabilisation	2 h 25 min	1 h 55 min–3 h 23 min
Total time for transport	11 h 24 min	9 h 43 min–12 h 44 min

Conclusion: PDA ligation ‘away days’ are time-consuming and arduous for transport teams. Post-operative complications are common but managed appropriately. There appear to be opportunities to potentially streamline and improve the service offered.

548 – LATE BREAKERS

A REVIEW OF BETAMETHASONE FOR FACILITATING EXTUBATION AND MANAGEMENT OF CHRONIC LUNG DISEASE IN PRETERM INFANTS

S. Nagar, G. Deshpande

NICU, Nepean Hospital, Sydney, NSW, Australia

Background: Bronchopulmonary dysplasia (BPD) is one of the most challenging and persistent problems of modern neonatal medicine. Use of dexamethasone is accompanied by adverse neurological outcomes, in particular hippocampal atrophy and cerebral palsy.

There is an important perceived need for a safe and efficacious steroid preparation. Surprisingly, betamethasone is not commonly used as a postnatal glucocorticoid. Antenatal betamethasone has been associated with a decreased risk of cystic PVL. The penetration of dexamethasone into the CNS is higher compared to betamethasone. Betamethasone has been used in pregnancy for over 20 years with high level of safety and efficacy. Recent animal studies suggest its vasoconstrictor effect and thus it might affect the incidence of IVH and PVL.

Methods: This prospective audit was approved by Nepean Human research Ethics committee in 2012.

Dose: 0.125 mg/kg IM for 3 days The changes in FiO₂ and MAP after starting Betamethasone were recorded every 6 h till 120 h after the first dose. For the safety data mean BP (invasive and non invasive) was recorded every 6 h for 120 h as also the blood glucose readings.

Results: This was a short experience of Betamethasone use in an Australian NICU. It suggests that betamethasone is useful and very well tolerated without any significant adverse events. Out of five infants, three were successfully extubated. In case of two infants it was changed to dexamethasone within 24 h of the first dose. Current policy in our NICU is to consider Betamethasone as a first line for postnatal steroids wherever possible.

Fig. 1

Results of the review/audit of betamethasone use

Gesta-tional age (wks)	Birth wt (grams)	Chorioam-nionitis	Antenatal steroids	Course started on day	Ventilation mode	Pre betameth-asone oxygenation index OI	OI (after the completion of the course)	Outcome
23	695	No	Incom-plete	12 23	HFOV	37 16	5 11	Extubated to BiPAP on day 26
23	655	No	Incomplete	39	SIPPV	4	3	Extubated to BiPAP on day 44
25	800	Yes	Complete	12	SIPPV	17	13	Changed to dexamethasone after 1 dose
26	890	Yes	Complete	14	HFOV	15	7	Extubated to CPAP on day 22
28	514	No	Complete	19	HFOV	29	28	Changed to dexamethasone after 48 h Died on day 25

549 – LATE BREAKERS

TRANSPORTED VENTILATED NEWBORN INFANTS ARE AT RISK OF IATROGENIC HYPOCARBIA

G. Penman¹, A. Kage², A. Leslie², J. Behrsin²

¹Nottingham University Hospitals, Nottingham, ²University Hospitals Leicester NHS Trust, Leicester, UK

Background and aims: Hypocarbica reduces cerebral blood flow, potentially impairing neurodevelopmental outcome. Avoiding hypocarbica in the ventilated infant during transport can be challenging. Physiology is changing with stabilisation, there are fewer opportunities for regular blood gas analysis, and transport ventilators are less sophisticated e.g. Babypac.

We sought to determine the scale of the problem and characterize babies most at risk.

Methods: Data from transports during the year 2011/12 were reviewed retrospectively. Babies with a pCO₂ <4 kPa at completion of transport were identified and their notes reviewed for additional data regarding diagnosis and respiratory status.

Results: There were 256 ventilated patients transferred of whom 32 (12.5 %) arrived at the receiving hospital with a pCO₂ below 4 kPa, and 5 (2 %) of those had a pCO₂ below 3 kPa. The majority of affected patients had HIE (25 %) or were premature (44 %). The category of transport was important with a trend for over-ventilation in the resource rather than uplift subgroup (20.9 vs 10.8 %). Babies with hypocarbica had minimal ventilator requirements during the transfer (FiO₂ 21–28 %, PEEP 5–6 mmHg, PIP 16–21 mmHg). Trajectory of pCO₂ from referral to departure was negative in 6/21 (29 %) patients. There was no association with gestation, weight or age in days.

Conclusion: Over-ventilation is a significant problem. We found no single factor identifying patients at risk. Until patient characteristics of at risk populations can be accurately defined any ventilated patient should be considered at risk of over-ventilation during transport. Clinical strategies to address this problem are required.

550 – LATE BREAKERS

REDUCING THE RISK OF UNPLANNED EXTUBATIONS IN PICU

L. Pritchard

PICU, Leeds General Infirmary/Embrace Transport, Leeds, UK

Objective: Unplanned extubation in PICU is an untoward event leading to increased duration of ventilation and hospital stay. As part of a drive to reduce the number of unplanned extubations, staff opinions were sought on factors leading to unplanned extubations and methods of decreasing the risk.

Method: An online survey was distributed amongst all medical and nursing staff. Responses were encouraged by word of mouth and posters in the staffroom.

Results: 28 responses were obtained. 28 % of respondents were consultants, 18 % junior doctors and the remainder nursing staff. 78 % of respondents had cared for a patient who had accidentally extubated. The main risk factors for unplanned extubations were felt to be training in endotracheal tube (ETT) taping methods, frequency of re-taping, inexperience of the nursing staff and low staffing levels in the unit. Suggestions to reduce the risk of unplanned extubations included training in taping methods and handling of intubated patients for both nursing and medical staff, regular ETT re-taping, review of the sedation scoring method and case reviews of unplanned extubations.

Conclusions: Based on the results of this questionnaire the following recommendations were made.

- Training sessions on ETT taping.
- Review of tapes every shift to assess need for re-taping.
- Improvement of sedation scoring method and review of sedation methods.
- Regular case reviews of unplanned extubation with feedback circulated in the staff newsletter.

References:

Rachman et al. (2009) Reducing unplanned extubations in a pediatric intensive care unit: a systematic approach. *Int J Pediatrics*.

551 – LATE BREAKERS

SUPPLEMENTS (IRON AND MULTIVITAMIN) IN CHILD AND ITS ASSOCIATION WITH GROWTH RATE OF MASHHAD CITY CHILDREN

R. Vakili, M. Saeidi, A. Bahreini

Mashhad University of Medical Sciences, Mashhad, Iran

Introduction: Vitamin deficiency and iron deficiency anemia are common nutritional problems, at least in children under 5. These materials shortage, especially in the first 2 years of life, impair physical and brain growth, reduces the child's learning ability, reduces body resistance against infections, behavioral changes, apathy and finally social and economic adverse consequences would be followed.

Methods: This study is a cross sectional descriptive study interviewing 300 mothers with their children from 6 to 24 months which referred to selected health centers. Information obtained from research tools was added into the SPSS11.5 software.

Results: In growth chart, 86.7 % of children showed appropriate growth, 10.3 % had delayed growth and 3 % had horizontal growth curve. In 80.7 % of families, maternal multivitamin and iron drops have been used to their children regularly, 1.7 % did not believe in these supplements and 17.7 % of mothers sometimes used these supplements for their children. Statistical correlation significant variables of parental education, family income, mothers referred to health centers for monitoring the growth and get face to face training of personnel center drops of multivitamin with iron and growth status of children variable is available, so children who regularly have used supplements and income level and above are literate parents have grown more favorable than the other kids. ($P < 0.05$).

Conclusion: Regarding the importance of iron and multivitamin use in children under 2 years, necessary training must be provided to mothers in this field by health centers personnel.

Infection, Systemic Inflammation and Sepsis (552–561)

552 – LATE BREAKERS

INCIDENCE OF CYTOMEGALOVIRUS PNEUMONIA AMONG CHILDREN PRESENTING WITH SEVERE LOWER RESPIRATORY TRACT INFECTION AT DR GEORGE MUKHARI HOSPITAL

O.A. Adewuyi¹, S. Mda¹, T. Kyaw²

¹Paediatrics and Child's Health, University of Limpopo/Dr George Mukhari Hospital, ²Virology and NHL, University of Limpopo/NHLS Laboratory, Pretoria, South Africa

Objectives: Pneumonia is a major cause of morbidity and mortality in children under-5 year age in developing countries. Cytomegalovirus is associated with serious morbidity and mortality in children with pneumonia. The purpose of the study was to determine the incidence of CMV associated pneumonia in children with severe lower respiratory tract infection (LRTI).

Methods: Under-5 year children with severe LRTI were enrolled over 12 months. Criteria for severity were respiratory distress, supplemental oxygen, or assisted ventilation. Anthropometry and HIV status were recorded. Throat swabs were taken for CMV PCR.

Results: 107 children, aged 2 weeks–46 months (mean 5.96 months) participated. The incidence of CMV-associated pneumonia was 40 % (35/87); 67 % among HIV-infected and 28 % among HIV-uninfected children ($p < 0.05$). Of 100 children tested for HIV infection, 30 % were positive. Mean ages of HIV-infected and uninfected children were similar (5.83 ± 5.77 vs. 5.99 ± 5.43 respectively). There was a slight difference in height-for-age Z-scores between HIV-infected (-2.51 ± 3.22) and uninfected (-1.17 ± 3.41) ($p = 0.07$). Incidence of CMV was not associated with age or nutritional status.

There were 18 deaths, 17 % (18/107) mortality; this was higher among HIV-infected children (40 %) than in HIV-uninfected (9 %) ($p < 0.01$) (Table 1). Mortality was higher amongst those with positive CMV PCR (20 %) compared to negative CMV PCR (12 %) ($p < 0.002$) (Table 2). CMV PCR positive participants were likely to receive assisted ventilation (17 %) versus those with negative CMV PCR (11.5 %); ($p < 0.058$).

Conclusion: Incidence and mortality rate of CMV-associated pneumonia is higher in HIV-infected children and these children are likely to require ventilation.

553 – LATE BREAKERS

CARDIAC INJURY IN INFANTS WITH ACUTE GASTROENTERITIS: IS IT ISCHEMIA OR ROTA ASSOCIATED CARDITIS

S.H. Barakat¹, R. Harfoush², S. Hanna¹

¹Pediatrics, ²Department of Microbiology, Faculty of Medicine, University of Alexandria, Alexandria, Egypt

Recent data suggested that rotavirus may have cardiotoxic properties.

Purpose: To determine whether there was evidence of acute myocardial injury during rotavirus gastroenteritis.

Methods: Over 8-weeks period, 50 of 150 infants admitted with acute gastroenteritis were found to have rotavirus (RV) antigen in stool and in their serum using ELISA. Sera from 150 infants were analyzed for cardiac troponin-I (cTnI), creatine phosphokinase (CPK), lactate dehydrogenase (LDH).

Results: Thirty-four infants (22.6 %) had elevated cTnI (0.06–2.5 ng/ml). Infants <1 year, and those with dehydration or acidosis were more prone to have elevated cTnI. Infant with severe dehydration had an estimated 190 fold higher odds of having elevated cTnI compared with those with no dehydration. A borderline significant association was detected between RV positivity and elevated cTnI (odds ratio = 2.1, 95 % CI 0.98–4.6, $p = 0.054$). Multivariate logistic regression analysis, showed that severe dehydration and acidosis are still significantly associated with elevated cTnI levels (adjusted OR, CI = 22.9, 2.19–239 and 20.76, 6.15–70 respectively. cTnI levels normalized within 24–72 h).

Conclusion: Our data suggest that cardiac injury during gastroenteritis in infants is quite frequent but always self-limiting if the underlying perfusion disturbance caused by severe dehydration is corrected.

554 – LATE BREAKERS

NEONATE WITH INTRACTABLE SEIZURES AND METABOLIC ACIDOSIS: AN UNUSUAL PRESENTATION OF TYPE-1 HERPES SIMPLEX-DIAGNOSTIC AND MANAGEMENT CHALLENGES

J.J. Cheriathu, M. Shamseldeen

Paediatrics, GMC Hospital, Ajman, United Arab Emirates

Herpes simplex virus (HSV) infection in the neonatal period is usually caused by type 2 virus following maternal peripartum genital HSV infection. Type 1 HSV usually affects infants after 3 months of age. Neonatal HSV infection can be localized to skin, eye and mouth, involve the central nervous system or manifest as disseminated infection involving multiple organs.

Illustrative case: A full term male baby; birth weight of 3.25 kg, was born vaginally to a primiparous mother with uncomplicated pregnancy and no known history of HSV infection. Intrapartum and postpartum period were uneventful with normal physical examination. At 20 days of life, the neonate presented with lethargy, poor feeding and later developed generalized tonic-clonic seizures. Initial workup showed metabolic acidosis with normal septic screen, glucose, calcium and electrolytes. Neuro-sonogram showed diffuse cerebral edema without gross structural malformation or intracranial hemorrhage. Seizures were not controlled with intravenous phenobarbitone, phenytoin and pyridoxine. On starting intravenous midazolam baby developed poor respiratory efforts and was intubated. Baby was started on cefotaxime and ampicillin after drawing blood for culture. Serum ammonia and lactate levels were mildly elevated. Lumbar puncture attempted after seizure control showed 93 WBCs, 90 % lymphocytes, normal glucose and mildly elevated proteins. With possibility of viral encephalitis; intravenous acyclovir was started. EEG showed PLEDs and CSF HSV-PCR detected Type 1 HSV.

This case illustrates the nonspecific presentation of neonatal HSV infection without maternal history of HSV and complexity in the management. Early initiation of acyclovir reduces HSV associated morbidity and mortality in neonates.

555 – LATE BREAKERS

ANTIBIOTIC PROPHYLAXIS AND VESICoureTERAL REFLUX

S. Brahmi, N. Righi, H. Zerguine

CHU of Batna, Batna, Algeria

For years before and the fear of danger that can cause reflux in the renal parenchyma, practitioners prefer to establish a long-term antibiotic prophylaxis soon discover this malformation.

And without paying attention to the drawbacks of this therapy in the emergence of bacterial resistance to antibiotics and the difficulty of adherence to treatment long enough.

Since the advent of scintigraphy has allowed a better understanding of the mechanisms of reflux nephropathy and before the outbreak of an epidemic of bacterial resistance, the effectiveness of this antibiotic is reconsidered by several international experiences.

Department of Pediatrics at the University Hospital of Batna, a city inside of Algeria, we collected 26 patients with mean age of 3.7 ± 0.6 and sex ratio of 0.86 (14 files/12 boys) with a reflux primitive 73 % of cases and grade 2 and 3 in the majority of cases.

We performed a comparative study between the number of urinary tract infection home for a year and a year without antibiotic cotrimoxazole preventive dose.

We have no significant difference $T = 1.43$, $0.1 < P < 0.2$.

There was no real change in the distribution of germs against a higher resistance to cotrimoxazole was noticed.

Conclusion: Our results are similar to those defending the hypothesis of non-effectiveness of antibiotic prophylaxis of reflux especially low-grade and especially after first pyelonephritis.

556 – LATE BREAKERS

PYELONEPHRITIS, DIAGNOSIS REMAINS DIFFICULT

S. Brahmi, N. Righi, H. Zerguine

CHU of Batna, Batna, Algeria

Pyelonephritis is considered the most serious urinary tract infections because of the possibility of formation of parenchymal scar and therefore likely evolution towards achieving renal function.

In Algeria and in a city before (Batna), rapid diagnosis of this disease entity is very difficult to the unavailability of several elements (biological and radiological) currently considered the most reliable. What motivates as in many countries around the world reflect on a diagnostic score.

In this interest, we performed a prospective study over 2 years in the only pediatric ward of the city (CHU).

The prevalence of urinary tract infections was 3.19 % while the diagnosis of pyelonephritis as service specialists were chosen over examinations is generally beyond the acute phase in 2.25 %.

We collected 209 patients with an average age of 2 ± 0.4 year and a sex ratio of 0.48. And 29 % of them brought uropathy malformations. The clinical presentation was nonspecific outside of high fever ($>38.5^\circ$) very significant in cases of pyelonephritis ($p = 0.00013$), the parasite was glued to cystitis ($p = 0.0112$).

In lack of procalcitonin The hyperleukocytosis NSF was highly significant for the diagnosis of PNA ($p = 0.0000$) followed by CRP ≥ 20 mg/l ($p = 0.00056$) and ESR ($p = 0.0056$).

In our study, the sensitivity of ultrasound in the topographic diagnosis was higher ($p = 0.00347$).

Altogether, our results support the theory of clinical score, biological and radiological because there is not enough evidence available for regular initial topographical orientation.

557 – LATE BREAKERS

PATTERN OF FUNGAL COLONIZATION IN CRITICALLY ILL PEDIATRIC PATIENTS IN AIN SHAMS PEDIATRIC ICU

H.M. Ibrahim¹, A.A. Al Sharkawy¹, S. Bendary², S. Abdel Kader¹

¹Pediatric, ²Microbiology, Ain Shams Faculty of Medicine, Cairo, Egypt

Fungal colonization remains an important risk factor for future invasive fungal infections among ICU patients.

Objectives: To determine the pattern of fungal colonization in patients admitted in pediatric ICU, to evaluate biofilm production by acquired candida species and compare their antifungal susceptibility.

Methods: The pattern of fungal colonization, biofilm production and quantification of antifungal activity was studied and identified in fifty critically ill patient admitted to pediatric intensive care of Ain Shams University hospital with mean age of 85 ± 51.67 months. They were swabbed from 3 different sites; oropharyngeal area, axillary folds, and rectal area and urine sample was collected. They were swabbed at the first day and at the third day of PICU admission.

Results: The rate of colonization among studied patients was found to be 74 % at day one with predominance of *C. albicans* (32 % of the studied patients). In Pediatric Intensive Care Unit (day 3); 70 % of patients acquired additional fungal colonization with predominance of nonalbicans candida. In PICU (day 3); nonalbicans candida was isolated from 38 % of patients, candida albicans was found among 10 % of patients. Age below 1 year old, insertion of central venous cannulation, receiving more than three antibiotics and use of carbapenems were the risk factors for fungal colonization ($P < 0.05$). Ability of biofilm formation was detected in 90 % of all candidal strains acquired from PICU.

Conclusion: Critically ill pediatric patients are at risk to be colonized with highly resistant candidal strains with ability of biofilm formation.

558 – LATE BREAKERS

ROLE OF SEMI-QUANTITATIVE PROCALCITONIN TEST-KIT VERSUS CRP TO “RULE OUT” NEONATAL SEPSIS

N. Kolici¹, E. Tushe², G. Dedej², E. Koliçi³, E. Foto⁴

¹Maternity Hospital ‘Koco Gliozheni’, ²UOGH ‘Koço Gliozheni’, ³Nursing Faculty, ⁴Paediatrics, UHC ‘Mother Tereza’, Tirana, Albania

Introduction: Clinical signs and laboratory tests of neonatal sepsis are non-specific and diagnosis is difficult. Early antibiotic therapy is

crucial for treatment success. But incidence of sepsis, in neonate treated for suspected sepsis, is low.

Purpose: To evaluate the effect of procalcitonin PCT in neonatal sepsis diagnose versus other laboratory test (CRP).

Materials and methods: This single-center, prospective, randomized intervention study conducted in a tertiary neonatal intensive care unit, january-June 2012, and is still in process. All neonate with suspected sepsis were randomly assigned either to standard treatment based on conventional laboratory parameters (standard group) or to PCT-guided treatment (PCT group).

Results: 73 newborns were randomly assigned wither to the standard group (n = 34) or the PCT group (n = 39). The two groups were similar for baseline demographics, risk factors for EOS, gestational age, birth weight, Apgar score 1 and 5 min, and early conventional laboratory findings. PCT show to be more sensitive related to other markers, sensitivity was 90.9 % and NPV 96.15 % vs CRP sensitivity 54.54 % and NPV 75 %. On average, PCT-guided decision-making resulted in a shortening of 40 h of antibiotic therapy in GA > 34 weeks newborn. No difference found in antibiotics treatment in neonates with sepsis in two groups. Clinical outcome was better in study group related to secondary sepsis episode.

Conclusion: Use of PCT kit test show to be useful in early sepsis diagnosis. Also seem to be useful in shorten the duration of antibiotic therapy in near-term infants with suspected early-onset sepsis.

559 – LATE BREAKERS

INVESTIGATING THE RATE OF GROUP B *STREPTOCOCCUS* IN BELOW 3 MONTHS YEAR OLD INFANTS WITH SEPSIS CLINICAL SYMPTOMS

G. Maamouri, M. Alami, M. Lotfi, R. Saeedi, K. Ghazvini, M. Saeidi

Mashhad University of Medical Sciences, Mashhad, Iran

Introduction: Group B *Streptococcus* is the main reason of neonatal infection in developed countries and causes a widespread clinical indications. In developing countries such as Iran, its rate of appearance is not determined. With regard to colonization and the relative high epithelia of group B *Streptococcus*, it is likely that the incidence of group B streptococcus in neonatal sepsis is so high. We attempted to use the molecular methods to identify this bacterium and develop the culture environments as well.

Methods: A hundred below 3 months year old infants with sepsis hospitalized in ICU sector of Ghaem hospital for 1 year were studied since (June 2010). After getting consent from the infants' parents, three blood samples of these patients in the sterile container with lid were transferred to the laboratory (two samples for culturing in normal environment and the other for PRC).

Results: 100 below 3 months year old infants with sepsis clinical symptoms were studied. In none of the environments, the B group *Streptococcus* grows. For identifying the group B *Streptococcus*, PCR were positive in 3 % of infants, but other germs have grown in 5 % of normal culture, and 6 % of developed culture environment. Findings have also shown that 64 % of mothers took antibiotic before delivery.

Conclusion: With regard to the high rate of anti-biotic consumption by mothers before delivery, it is necessary to use more sensitive methods like PCR to identify the Group B *Streptococcus*.

560 – LATE BREAKERS

THE EFFECT OF AMINOPHYLLINE ON INDICES OF KIDNEY FUNCTION IN ASPHYXIATED NEONATES

R. Saeidi, G. Maamouri, M. Yaghoobi, H. Esmaeili, M. Saeidi

Mashhad University of Medical Sciences, Mashhad, Iran

Introduction: The kidney is the most damaged organ in asphyxiated infants. Renal vasoconstriction due to adenosine metabolite may lead to a fall in glomerular filtration rate (GFR). This study was designed to determine whether aminophylline an adenosine receptor antagonist, could prevent or ameliorate kidney dysfunction in neonates with perinatal asphyxia.

Materials and methods: Forty term neonates with perinatal asphyxia were randomized to study (n = 19) and control group (n = 21) who received a intravenously a single dose of aminophylline (5 mg/kg) or an equal volume of placebo (5 % dextrose in water) during the first 3 h of life, respectively. Daily urine output, 24 h fluid intake, weight and serum creatinine were recorded during the first 5 days of life.

Results: The incidence of severe kidney dysfunction was not significantly different between two groups. Two infants in treatment group and three in placebo group; p = 0.23, plasma creatinine (pcr) levels were increased in both groups in the 2nd day and reached the maximum in the 3rd day. Then it gradually decreased the fourth and 5th days of life. There was no significant difference in pcr or GFR between study and placebo group in these 5 days (p > 0.05). However, urinary output/input ratio was in the aminophylline group in the first 3 days of life.

Conclusion: Prophylactic administration of Aminophylline in asphyxiated neonates could not change the process of failure in patients but could increase urinary output in first days of life.

561 – LATE BREAKERS

ISCHEMIA MODIFIED ALBUMIN MAY BE A NOVEL MARKER FOR THE DIAGNOSIS AND FOLLOW-UP OF NECROTIZING ENTEROCOLITIS

C. Tayman¹, I. Yakut², O. Oztekin¹, M. Namuslu³, F. Karaca⁴, A. Kosus⁵

¹Department of Neonatology, Denizli T.C. Public Health Hospital, Denizli, ²Department of Pediatrics, Ankara Pediatric & Pediatric Hematology Oncology, Training and Research Hospital, ³Department of Biochemistry, Turgut Ozal University Faculty of Medicine, Ankara, ⁴Department of Pediatric Surgery, Denizli T.C. Public Health Hospital, Denizli, ⁵Department of Obstetric and Gynecology, Turgut Ozal University Faculty of Medicine, Ankara, Turkey

Aim: We investigated the efficacy of serial ischemia modified albumin (IMA) measurements in diagnosis and follow-up of necrotizing enterocolitis (NEC), and to compare its effectiveness with C-reactive protein (CRP), interleukin-6 (IL-6) in NEC.

Methods: Preterm infants, whose gestational age and weight matched to each other, were grouped as control (n = 36) and NEC (n = 37). IMA, CRP, IL-6 levels were measured, on the 3rd day of life for the control group and on the day of diagnosis (1st day), 3rd and 7th days of NEC.

Results: IMA, CRP and IL-6 levels were significantly increased in NEC patients with compared to the control group (P < 0.001) on the

follow-up. IMA levels were significantly higher in infants with stage III NEC than those in infants with stage II NEC at the 1st day, 3rd and 7th days ($P < 0.001$). The area under curve (AUC) for IMA (0.815 at diagnosis, 0.933 at the 3rd day, 0.935 at the 7th day) were significantly higher than CRP and IL-6 at all days for predicting perforation in infants with NEC ($P < 0.001$). Similarly, the AUC for IMA (0.952 at diagnosis, 0.929 at the 3rd day, 0.971 at the 7th day) were significantly higher than CRP and IL-6 at all consequent days of diagnosis for predicting mortality in infants with NEC ($P < 0.001$).

Conclusion: Ischemia modified albumin was found to be superior to CRP and IL-6 at both diagnosis and follow-up of NEC.

Long term Outcome (562–564)

562 – LATE BREAKERS

CONGENITAL MIDLINE CERVICAL CLEFT- CASE REPORT, CONTROVERSIES AND REVIEW OF LITERATURE

J.J. Cheriathu, I. D'Souza, M. Shamseldeen

Paediatrics, GMC Hospital, Ajman, United Arab Emirates

Congenital mid-line cervical cleft (CMCC) is a rare congenital defect noted in the anterior neck; first described in 1924 by Bailey. There are around 56 reported cases in English literature. Though the lesion is usually present t birth it may be often overlooked or misdiagnosed. The review of literature shows a mild female preponderance and noted more commonly among Caucasians. Congenital midline cervical cleft (CMCC) is characterized by an atrophic mucosal plaque with a cranial nipple-like skin tag, a short caudal sinus, and may be attached to a subcutaneous fibrous cord of variable length. CMCC can prevent full extension of the neck resulting in micrognathia and torticollis; may predispose to infection, and maybe associated with other clefting defects or cysts. Embryologically, CMCC is hypothesized to be due to impaired mid-line fusion of first or second branchial arches; exteriorization of thyroglossal duct remnant, or due to increased pressure by pericardial structures on the cervical area in the developing embryo. We describe a newborn female born to non-consanguineous parents of Pakistani origin weighing 3.65 kg at birth with CMCC, retrognathia, bifid uvula and recurrent gastro-esophageal reflux resulting in failure to thrive. An extensive review of literature focusing on embryo pathogenesis, histopathology, diagnosis, and treatment of this rare condition are also discussed. Prompt diagnosis and treatment during early infancy leads to a better functional and aesthetic outcome with the least complicated surgical intervention.

563 – LATE BREAKERS

A CASE NOTE REVIEW OF CHILDREN UNDERGOING ANAESTHESIA WITH A DIAGNOSIS OF MUSCULAR DYSTROPHY

N. Dobby¹, A. Manzur², J. Smith¹

¹Anaesthesia, ²Neuromuscular, Great Ormond Street Hospital, London, UK

Objectives: Our aim was to assess the pre, intra and post operative management and review morbidity following anaesthesia and surgery.

Methods: 45 children were highlighted from surgical operating lists with a code of muscular dystrophy during the period of April 2009 until April 2012.

Results: 35.5 % of patients were part time and 40 % full time wheelchair users. The group had a mean weight of 41 kg and 8.8 % were gastrostomy fed. 8.8 % of the patients required non-invasive home ventilation and 28 % of patients required cardiac medication. Pre-operative cardiorespiratory testing was variable.

66.6 % had an intravenous induction and in 80 % anaesthesia was maintained intravenously compared to 33 % who underwent a gas induction and 20 % who received gas as their maintenance anaesthetic agent. There were 13 elective postoperative admissions to PICU and no unplanned admissions. 3 (6.6 %) children died within 10 days of their surgery, of these, 2 children died within 24 h, both had intraoperative cardiac arrhythmias which progressed to PEA. The 3rd child died 9 days after surgery following a respiratory arrest.

Conclusions: A more uniform approach to pre-operative assessment is needed, as it appears that not every child receives the same cardiac or respiratory investigations. It should also be highlighted that negative results do not necessarily rule out cardiorespiratory disease and thus risk. Anaesthetic technique remains varied and is a controversial issue. Preoperative assessment, intra and post operative planning should have an emphasis on cardiac and respiratory optimisation and support.

564 (Abstract withdrawn)

Metabolism Endocrinology and Nutrition (565–572)

565 – LATE BREAKERS

A RARE CASE OF TYROSINEMIA PRESENTING WITH ABDOMINAL DISTENSION WITH SHOCK

J.J. Cheriathu, I.E. D'Souza, M. Shamseldeen

Paediatrics, GMC Hospital, Ajman, United Arab Emirates

Tyrosinemia type I is the most severe disease of the tyrosine catabolic pathway resulting from deficiency in fumarylacetoacetate hydrolase (FAH) leading to elevation of tyrosine in liver, kidney and peripheral nerves. It is characterized by hepatic failure, cirrhosis, renal dysfunction, hepatocarcinoma, and neurologic crisis. The estimated prevalence of type-I tyrosinemia worldwide is <1 in 1,00,000. We present a rare case of tyrosinemia presenting with abdominal distension and shock. A 2 month old female child of 2nd degree consanguineous marriage was born prematurely and was small for gestation (SGA baby). She was noted to have neonatal hyperbilirubinemia in the immediate neonatal period. Weight gain remained poor in spite of adequate feeding and supplementation. Persistent abdominal distension was noted, and was administered anti-flatulence drugs for the same and no improvement was noted. X-ray done showed gaseous distension. Tests for hypothyroidism and for Hirsch sprung disease were normal. Baby noted to have persistent vomiting; ultrasonography done was normal. After 1 month she developed cold clammy extremities with thread pulse, poor urine output, persistent vomiting with significantly distended

abdomen. Investigations revealed *E-coli* positive UTI for which started on appropriate antibiotics. However the condition of the baby deteriorated and baby developed metabolic acidosis which was initially attributed to resistant *E-coli* sepsis. On further investigating, elevated level of alpha fetoprotein (AFP) was noted. The other reports revealed significant coagulopathy and the algorithmic work up revealed tyrosinemia. Tyrosinemia type I should be differentiated from other causes of hepatitis and hepatic failure in infants.

566 – LATE BREAKERS

EFFICACY OF PRE-EXCHANGE ALBUMIN PRIMING IN REDUCING PHOTOTHERAPY DURATION IN NEONATES WITH SEVERE HYPERBILIRUBINEMIA: A RANDOMIZED BLINDED PLACEBO-CONTROLLED TRIAL

N. Dash, P. Kumar, V. Sundaram, S.V. Attri

Department of Pediatrics, PGIMER, Chandigarh, India

Background: Albumin binds to bilirubin in the intravascular space and decreases the level of unbound bilirubin. During BET (blood exchange transfusion), as bilirubin levels fall, bilirubin moves from extravascular to intravascular space due to equilibration between two spaces and is available for removal by exchange. Thus, if albumin level could be increased in the intravascular space, the efficacy of BET may be improved.

Objective: To compare post-BET phototherapy duration in albumin primed versus non-primed neonates undergoing BET for hyperbilirubinemia.

Design: Randomized Blinded Placebo-Controlled Trial.

Setting: Tertiary care referral Neonatal Unit.

Subjects: Term and late preterm neonates with severe hyperbilirubinemia between November 2011 and January 2013.

Interventions: Fifty neonates were randomized to receive 5 ml/kg of either 20 % human albumin (n = 23) or 0.9 % saline (n = 27) 1 h prior to BET. Both groups received standard blue light phototherapy.

Results: Drug infusion resulted in a fall in TSB levels in both the groups [Median (IQR) mg/dl: Albumin 0.7 (0–2) vs Saline 1 (0–4.2); p = 0.35]. Post BET phototherapy duration was similar in albumin and saline groups. [Median (IQR): 29 (24–48) h versus 33 (24–43) h; p = 0.76]. The amount of bilirubin removed during BET was also comparable in both the groups [Median (IQR): Albumin 34 (28–46) mg vs Saline 33 (27–38) mg; p = 0.46]. Serial post BET change in TSB and need for repeat BET were also similar.

Conclusions: Priming with 1 g/kg of 20 % albumin as compared to equivolume saline did not improve the efficacy of BET in terms of decreasing post BET phototherapy duration or mass of bilirubin removed.

567 – LATE BREAKERS

SUBCLINICAL VASCULAR DYSFUNCTIONS AND MYOCARDIAL CHANGES IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

A.A. Eltayeb¹, F.A. Ahmed², D.M. Sayed³, A.M. Osama⁴

¹*Pediatrics, Children University Hospital, Assiut University,*
²*Pediatrics, Children University Hospital,* ³*Clinical Pathology,*
⁴*South Valley Cancer Institute,* ⁴*Biochemistry, Faculty of Medicine,*
Universitas Padjadjaran Assiut University, Assiut, Egypt

Background: Vascular dysfunction, accelerated thickening of arterial intima, and changes in ventricular functions contribute to increased cardiovascular morbidity in type 1 diabetes mellitus.

To investigate the changes of the arteries and myocardium and its relation to early biomarkers of inflammation hsCRP, CD146, vitamin C and D₃ in children with diabetes.

Methods: 30 children with T1DM (11.1 ± 3.8 years) and 30 healthy controls were included with matchable sex and age. Levels of hsCRP and CD146, vitamin C, D₃, HbA1c were measured. QTc interval, left ventricular (LV) functions brachial artery flow-mediated dilation (FMD) responses and carotid intima-media thickness (IMT) were assessed.

Results: Children with diabetes had significantly lower E velocity (P < 0.001), decreased E/A ratio (P < 0.001), increased early DcT (P < 0.001), and prolonged IVRT (P < 0.001) compared with controls. Significant lower FMD response (P < 0.001) and increased IMT (P < 0.001) in cases compared with controls. A significant positive correlation between increased QTc interval and low FMD and increased IMT (P < 0.001). A significant correlation between LV diastolic dysfunction and increased CEC event (P < 0.04) and level of hsCRP (P < 0.001). Increased carotid IMT and low FMD were higher in patients in the lowest tertile of vitamin C than in those in the highest tertile (P < 0.001 and P = 0.014, respectively).

Conclusion: Children with DM rarely have insight on the significance of DM, and their diet is difficult to control. Early regular evaluation of patients with diabetes for alterations in vascular endothelial dysfunction may help in early detection and prevention. Vitamin C supplementation may improve the prognosis.

568 – LATE BREAKERS

A NEW FORMULA FOR PREMATURE INFANTS: EFFECTS ON GROWTH AND NUTRITIONAL STATUS

I. Barberi¹, L. Marseglia², C. Fiamingo¹, A. Arco¹, G. Pagano¹

¹*University of Messina,* ²*Pediatric and Surgery Sciences, University of Messina, Messina, Italy*

Nutritional management influences immediate survival as well as subsequent growth and development of low birth weight (LBW) and very low birth weight (VLBW) infants. Preterm infant formula (PTF) is used when there is an inadequate supply of mother's milk or mother is unable to breastfeed and donor breast milk is unavailable.

Objectives and methods: The purpose of this prospective multicenter study was to evaluate short-term effects on nutritional status (auxological and biochemical parameters) in a population of 97 preterm infants with a birth weight between 500 and 2,000 g, and a gestational age of 25–34 weeks postmenstrual age, who received a new preterm infant formula when comparing with 75 fortified human milk fed infants.

Results: No significant differences were observed between FHM and formula fed infants in terms of growth, feeding tolerance and biochemical profiles.

Conclusions: We conclude that Nutribèn Pre is a valid, effective and safe alternative for the nutrition of preterm infants.

569 – LATE BREAKERS

THYROID FUNCTION IN UMBILICAL CORD AND IN CRITICALLY ILL NEWBORN

K. Piperkova¹, A. Sofijanov²

¹Department of Neonatology, ²Department of Intensive Care, University Children's Hospital Skopje, Skopje, FYROM: The Former Yugoslav Republic of Macedonia

The tested thyroid hormones, by using highly sensitive and specific RIA test, in serum from the umbilical cord in the newborn which suffer during birth (N = 66), showed the following: the perinatal factors evaluated through a lower Apgar score do not change the thyroid function in newborn in relation to the control group. Only under conditions of prenatal infections with various postnatal development we determined a state of “low T3” for sick newborn in relation to the healthy. The basic characteristic of the changes in thyroid status in newborn with severe non-thyroidal illness (N = 32), with a positive outcome, in relation to the control group (N = 28), is a result state of “low T3–T4” with significantly reduced free fraction of FT3 and FT4 ($p < 0.001$), increased fractions of rT3 ($0.001 < p < 0.05$), and without changes in TBG and TSH. A statistical comparison of the mean values (*t* test) of the sick with positive outcome in a relation to the decreased showed an even larger depression of the active thyroid hormone in the decreased, especially of T4 ($p < 0.001$), but also of TSH ($p < 0.01$), in spite of the decreased values of thyroid hormones. This certainly shows an inefficient feedback mechanism in critically sick before death. It is evident that a relationship exists between the degree of illness and depression of the active thyroid hormones, especially T4 as a predictor of possible mortality.

570 – LATE BREAKERS

MONITORING THE PARAMETERS RESPONSIBLE FOR PREGESTATIONAL OR GESTATIONAL DIABETES AND ITS IMPACT ON THE NEWBORN

M. Siminel¹, M. Pîrîu², A. Duican³

¹Philantropia Hospital, Clinic of Neonatology, Level 2 NICU, University of Medicine and Pharmacy Craiova, ²Neonatology, ³Emergency Hospital Craiova, Craiova, Romania

Objective: In this study we propose to highlight the impact of gestational diabetes on the risk of prematurity, respiratory distress syndrome and major complications of prematurity.

Methods: This retrospective study is based on analysis of data collected from Philantropia Hospital–Department of Neonatology, during January 2012–March 2013. The followed parameters in preterm infants included: gestational age, birth weight, maternal age, multiple births, prenatal therapy with steroids, postnatal stabilizing, metabolic status: glucose, serum calcium in the newborn.

Results: Data analysis revealed the importance of monitoring metabolic status (glycosylated hemoglobin, serum glucose) in mothers at risk of premature birth, so that from 2,172 infants born in this period, 185 were premature. A number of 10 children at term and 25 preterm were born from mothers with gestational diabetes or pregestational, neonatal complication rate was similar: hypoglycemia, hypocalcemia, RDS, hyperbilirubinemia, metabolic seizures.

Conclusion: Study regarding the problems of 25 preterm and 10 term babies born from diabetic mothers, indicate that prematurity is the only

significant factor influencing the outcome. A direct relationship has been demonstrated between prematurity and increased incidence of metabolic disorders, respiratory distress syndrome and hyperbilirubinemia in these infants, however, with proper prenatal care, neonates of diabetic mothers do not seem to represent a high risk to develop major complications of prematurity compared to neonates from non diabetic mothers.

571 – LATE BREAKERS

HIGH BLOOD PRESSURE AND METABOLIC SYNDROME IN OBESE CHILDREN

A.M. Pelin¹, M. Dobre², V. Stefanescu³

¹Pharmaceutical Sciences, ²Functional Sciences, ³Morphological Sciences, Faculty of Medicine and Pharmacy, Dunarea de Jos University, Galati, Romania

Background and aims: High blood pressure (HBP) and obesity are increasingly frequent in children. This study aims to determine HBP prevalence and its importance among the components of metabolic syndrome in obese children.

Methods: Anthropometric and blood pressure measurements were carried out on 3103 schoolchildren between October 2011 and June 2012. Out of the 262 children identified as obese, 120 (aged 7–18) accepted to participate in this study. Metabolic syndrome was diagnosed according to FID 2005 and 2009 criteria, by measuring levels of triglycerides, cholesterol, HDL, LDL, blood sugar, insulin and oral glucose tolerance.

Results: Observations found 8.44 % of the analyzed population to be obese. Out of the obese study lot, 31.67 % of subjects had HBP and 55.8 % were diagnosed with metabolic syndrome. An increase in abdominal circumference was found in 69.17 % of obese children. Systolic arterial pressure values in the 99th percentile were paired with BMI values above the 96th percentile in 18.2 % of cases. Both blood pressure components increase significantly with age. Diastolic arterial pressure indirectly correlates with blood sugar levels. Male subjects were found to be most exposed to systolic blood pressure values in the 95th percentile (32.2 % males vs. 22.9 % females). According to their relative weight in metabolic syndrome diagnosis, the clinical criteria considered were: triglycerides above the 95th percentile, blood pressure above the 95th percentile, blood sugar levels above 100 mg/dL.

Conclusions: Cardiovascular risk factors seem to aggregate in metabolic syndrome sufferers. The second most important metabolic syndrome marker in children, HBP, increases significantly with age.

572 – LATE BREAKERS

EVALUATION OF THE EFFECTS OF HYPERGLYCEMIA ON DEVELOPING BRAIN IN PRETERM NEONATES

C. Tayman¹, U. Yiş², I. Hirfanoglu³, O. Oztekin⁴, G. Göktaş⁵, B.C. Bilgin⁶

¹Department of Neonatology, Denizli T.C. Public Health Hospital, Denizli, ²Child Neurology, Dokuz Eylul University Faculty of Medicine, Izmir, ³Neonatology, Gazi University Medical Faculty, Ankara, ⁴Neonatology, Denizli T.C. Public Health Hospital, Denizli, ⁵Histology- Embryology, Gazi University Medical Faculty, Ankara, ⁶Surgery, Kafkas University Faculty of Medicine, Kars, Turkey

Aim: Hyperglycaemia is common in very low birth weight premature neonates and associated with increased risk of

intraventricular haemorrhage, increased mortality and morbidity. However, available data about the effects of severe hyperglycemia on developing brain seems to be limited in the early life. Therefore, we evaluated the effects of moderate and severe hyperglycemia on developing rat brain.

Method: Thirty newborn Sprague–Dawley rats were randomly divided into three groups as control, mild hyperglycemia (30 % dextrose) and severe hyperglycemia (50 % dextrose). Pups in the hyperglycemia groups were administered subcutaneous sterile dextrose solution at a dose of 4 ml/kg daily from the 2nd day to the 11th day of life. Blood glucose levels were measured every day in all study groups by Glucostix®. Rat brain tissues were removed at the end of the study. Histopathological and immunohistochemical (TUNEL and caspase) examinations were performed.

Results: Weight of the brain tissues in rats with hyperglycemia groups were significantly lower than the control group ($P < 0.05$). Weight of the brain tissues in rats with moderate hyperglycemia were lower than severe hyperglycemia ($P < 0.05$). In the histopathologic and immunochemical evaluation, severity of brain damage and apoptosis were significantly higher in the severe hyperglycemia group, especially at the level of the hippocampus ($P < 0.05$).

Conclusion: In this study, particularly brain damaging effects of severe hyperglycemia were obviously seen in the developing brains of the pups. It might infer that severe hyperglycemia can damage the developing brain especially in preterm infants.

Neuro Critical Care (573)

573 – LATE BREAKERS

N-ACETYLCYSTEINE-AMID (NACA), A POTENTIAL NEUROPROTECTIVE SUBSTANCE, REDUCES THE RISE OF BLOOD PRESSURE AFTER PERINATAL ASPHYXIA IN NEWBORN PIGLETS

T. Benterud¹, R. Solberg¹, O.D. Saugstad¹, S. Norgren²

¹Pediatric Research institute, Oslo University Hospital - Rikshospitalet, Oslo, Norway, ²Karolinska Institute and University Hospital, Stockholm, Sweden

Introduction: NACA, a novel anti-oxidant, has indicated some promising results regarding organ protection after hypoxia.

Patients and methods:

Study design: Fifty-four newborn piglets, age 12–36 h, were included. Blood pressure, EEG and ECG were measured continuously. Randomised parallel-group design; one control group ($n = 6$) and 4 experimental groups ($n = 12$). Piglets were exposed to global hypoxia (BE -15 or -20 mmol/l, i.e. moderate/severe asphyxia) with or without NACA-treatment. Observed for 9.5 h.

Statistics: The statistical analysis was performed by using SPSS. An independent samples t test was used, a p value < 0.05 was considered significant.

Results: In piglets exposed to moderate asphyxia and treatment with NACA the mean rise in MABP was significantly lower, 26 ± 10 ($\pm$ SD) from end hypoxia to 37 ± 7 after 30 min reoxygenation (Δ MABP = 11 ± 5.7), than for the group not exposed to NACA; MABP 34 ± 22 at end hypoxia and 54 ± 25 after 30 min reoxygenation (Δ MABP = 20 ± 8), $p < 0.01$.

Significant difference between piglets exposed to severe asphyxia and treatment with NACA; MABP 33 ± 17 from end hypoxia to 38 ± 10 after 30 min reoxygenation (Δ MABP = 5 ± 12), and the group without NACA; MABP 31 ± 22 at end hypoxia and 48 ± 25 after 30 min reoxygenation (Δ MABP = 17 ± 8), ($p < 0.01$).

There were no differences in heart rate, $p\text{CO}_2$, $p\text{O}_2$, BE, temperature, pH, Lactate or cleaved Caspase 3, between the groups treated with or without NACA.

Conclusion: The pigs in the NACA-groups had a slower rise of blood pressure after hypoxia. Whether this reflects an effect of NACA or underlying compensatory mechanisms is unknown.

Further studies will address possible neuroprotective effects of NACA treatment following birth.

Nursing Science Group (574–575)

574 – LATE BREAKERS

CARING FOR THE NEWBORN WITH AN ANORECTAL MALFORMATIONS

D. Yildiz, D. Suluhan

Gülhane Military Medical Academy Nursing School, Ankara, Turkey

Anorectal malformations comprise a wide spectrum of diseases, which can affect boys and girls, and involve the distal anus and rectum as well as the urinary and genital tracts. In routine ultrasounds of a 29-year-old primigravida woman at 36 weeks, Anorectal malformation was identified. At 38 weeks gestation, an appropriate-for-gestational-age, 1,940 g, male was delivered by elective cesarean section at a tertiary level center. Associated malformations such as cardiac or genitourinary abnormalities were identified. Postnatal management included maintenance of feeding, fluids and electrolytes, stoma care, prevention of hypothermia, prevention of sepsis, and maintenance of cardiorespiratory stability. A primary or staged closure approach was used to repair the defect. Primary nurse was in a position to address the ongoing fears and concerns of these parents using a multidisciplinary and individualized approach. Although the initial instability of the infant temporarily precluded holding him, for example, primary nurse encouraged parents to hold their infant as soon as stability was achieved. The nurse promoted her inclusion in infant care needs such as stoma care. Regular family meetings with members of the multidisciplinary team provided parents an opportunity to ask questions and had their fears and concerns addressed. This case study has provided a guide of nursing care of the infant with an anorectal malformation and a guide for postnatal, and postoperative management. Nurses can be pivotal in meeting the needs of infants and families as they confront the challenges of recovery from this congenital anomaly.

575 – LATE BREAKERS

RESEARCH PRIORITIES OF PICU AND NICU NURSES ACROSS EUROPE: A DELPHI STUDY

J. Wielenga¹, L. Tume², A. van den Hoogen³, J. Latour⁴

¹IC Neonatology, Emma Children's Hospital/Academic Medical Center, Amsterdam, The Netherlands, ²Alder Hey Children's NHS Foundation Trust, Liverpool, UK, ³UMC Utrecht: WKZ, Utrecht, ⁴Sophia Children's Hospital/Erasmus MC, Rotterdam, The Netherlands

Background: With the new ESPNIC section structure to promote professional development it is timely to establish a European

PICU/NICU nursing research agenda to focus on priority areas. No studies have explored European PICU/NICU nursing research priorities. **Aims:** To establish research priorities for PICU and NICU nursing across Europe.

Methods: A 3-round electronic Delphi approach was performed in 2012–2013. Questionnaires were developed separately for PICU and NICU nursing experts groups and were translated into seven different languages.

Results: The PICU eDelphi started with 90 nursing experts and 60 (67 %) completed all three rounds. In the NICU eDelphi the first round started with 75 nursing experts, the three rounds were completed by 55 (73 %) nurses. Nine priority PICU research domains were identified, in order of priority these are: Clinical nursing care practices, Pain and sedation, Quality and safety, Respiratory and mechanical ventilation, Child and family centred care, Ethics, Professional issues, Haemodynamic and resuscitation and Trauma and neurocritical care. In the NICU eDelphi, eight priority research domains were identified in order of priority these are: Pain and Stress, Family Centred Care, Clinical Nursing Care Practices, Quality and Safety, Ethics, Respiratory & Ventilation, Infection and Inflammation and Professional Issues.

Conclusions: The results provide input for a roadmap for future ESPNIC nursing research actions to improve clinical practice and patient care.

Paediatric and Neonatal Intensive Care Nursing (576–581)

576 – LATE BREAKERS

ARE VENA PORTA DOPPLER AND HEPATIC VEINS DOPPLER VELOCITY FEATURES USE FOR DIAGNOSING AND/OR FOLLOWING OF NEC?

M.A. Akin, A. Yikilmaz, T. Gunes, D. Sarici, L. Korkmaz, M.A. Ozturk, S. Kurtoglu

Department of Pediatrics, Division of Neonatology, Erciyes Univ. School of Medicine, Kayseri, Turkey

Necrotizing enterocolitis is the most important gastrointestinal emergency in NICU. Bowel ischemia-hypo perfusion is one of the main etiological factors. There is some studies focused on arterial Doppler features of the splanchnic arteries. But clinical uses of these studies are restricted. We aimed that detection of the Doppler velocity features of the hepatic veins (HV) and hepatic portal vein (HPV) in diagnosing and follow-up of the NEC.

Enrolled subjects divided two groups as NEC+ and NEC-. Group NEC+ was consisted of 24 preterms with suspected/diagnosed with NEC. Group NEC- was consisted of 25 matched healthy preterms. Daily serial Doppler examinations were performed within the 24 h after the onset of the NEC' clinical findings and continued until the initial day of the feeding. For the calculation of the hepatic blood flow ratio used maximal-velocity of the HPV and mean-maximal-velocity of the HVs (RoBF: HPV/HV).

Maximal velocity of the HVs in both groups was similar. PBF and RoBF levels were significantly lower than controls in NEC+ group. During NEC course, in recovered patients these measurements increased day by day. Cut-off level of the RoBF for NEC diagnosing was detected as 0.66. During NEC management mean RoBF level was detected as 0.77 ± 0.17 at the initial day of the feeding.

Doppler velocity of the HPV and HVs, and their ratio via liver should be use for diagnosing NEC. Daily measurements of the PBF and RoBF in newborns suspected/diagnosed with NEC may be beneficial for NEC following and decide to when their start to feeding.

577 – LATE BREAKERS

EFFECT OF LOW-DOSE ORAL ERYTHROMYCIN ON MILK TOLERANCE IN PRETERM INFANTS

H. Babaei

Kermanshah University of Medical Sciences, Kermanshah, Iran

Background: Milk intolerance due to gastrointestinal dysmotility is a common problem in preterm infants. Erythromycin have prokinetic effect on gastrointestinal motility. The purpose of this study was to assess the effectiveness of low-dose oral erythromycin as prophylaxis in preterm infants on milk tolerance.

Methods: This clinical trial was conducted on 70 preterm infants with a gestational age between 28 to 34 weeks who were admitted to the neonatal intensive care unit of Imam Reza (AS) hospital in Kermanshah, Iran. Thirty-five infants in the control group were received breast milk alone and 35 infants in treatment group received 2.5 mg/kg every 6 h oral erythromycin for 10 days in addition to breast milk. The time taken to reach full enteral feeding, duration of hospitalization, daily vomiting episodes and residual volume of gastric lavage were compared between the two groups.

Results: There was no significant differences between the two groups regard to the sex distribution, birth weight, gestational age and age feeds offered. Did not Significant difference between the two groups in the time to reach full enteral feeding ($P = 0.058$). The number episodes of gastric residue was significantly higher in the control group than in the treatment group (5.11 ± 2.92 versus 2.23 ± 1.88 , $P 0.003$). No infant in the two groups developed necrotizing enterocolitis, cardiac arrhythmias, and hypertrophic pyloric stenosis.

Conclusion: Prophylactic use of low-dose oral erythromycin in preterm infants does not reduce time to reach full enteral feeding.

578 – LATE BREAKERS

EFFECT OF WHITE PLASTIC COVER AROUND THE PHOTOTHERAPY UNIT ON HYPERBILIRUBINEMIA IN FULL TERM NEONATES

H. Babaei

Department of Pediatrics, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

Objective: Jaundice is a common problem in neonatal period. Phototherapy is the most common treatment for neonatal jaundice. The purpose of this study was to determine the effect of adding white plastic cover around the phototherapy unit on hyperbilirubinemia in full term neonates with jaundice.

Methods: In this randomized controlled trial, over 12 months (Oct 2009–Oct 2010), 182 term neonates with uncomplicated jaundice, admitted at neonatal unit of Imam Reza Hospital (AS) in Kermanshah province of Iran, were selected. They were randomized in two groups. Control group received conventional phototherapy without cover around the apparatus and covered group received conventional phototherapy with plastic cover around the unit. After enrolment, total serum bilirubin was measured every 12 h at two groups. Phototherapy was continued until the total serum bilirubin decreased to 12.5 mg/dl or lesser.

Results: There were no significant differences between two groups for gestational age, birth weight, postnatal age, weight (at admission time), serum level of hemoglobin, hematocrit and reticulocyte count.

Total serum bilirubin in covered group, during the first 48 h of treatment, significantly were declined than control group (P value = 0.003). The cover around the phototherapy devices not only did not increase the side effects of phototherapy, but also had a positive impact in reducing duration of Jaundice (P value < 0.0001) and duration of hospitalization (P value < 0.0001).

Conclusions: The study results showed that using white plastic cover around the phototherapy unit can increase the therapeutic effect of phototherapy.

579 – LATE BREAKERS

DIAGNOSTICAL VALUE OF PROCALCITONIN OF NEONATAL HYPERBILIRUBINEMIA IN VAGUE ETIOLOGY

N.T. Boboeva

Neonatology, Samarkand Medical Institute, Samarkand, Uzbekistan

In all cases hyperbilirubinemia lasted more than 14 days. Newborns with prolonged neonatal hyperbilirubinemia were divided into following groups: newborns with prolonged neonatal hyperbilirubinemia 31, 37 % newborns from anamnez perinatal infection of intrauterine origin were examined but bacteriologically not confirmed, 22 % newborns with cerebral ischemia and 10 % newborns born from mothers with hypothyroidism.

Identification of the level of procalcitonin in plasma or serum was holded in the way of immuno chromatographical method. At the end of observation it was fixed, the value of PCT-test of newborns of prolonged neonatal hyperbilirubinemia in all studied groups 38.15 ± 1.07 week at age of 14 and more days of life made up 50 out of 100 children <0.5 ng/ml and were not dependant from gestational, postnatal age.

In four children the value of PCT-test in 14–18 days of life estimated 0.5 ng/ml. Out of them one of child, born from a mothers with complicated history and with factors of risk developing bacterial infection, in the 4th day of life PCT-test composed 2 ng/ml. In the dynamics of neonatal period it was not observed bacterial infection, and the level of PCT- test in the 6th day of life decreased up to 0.5 ng/ml. The level of procalcitonin plasma allows to present definite amount of characteristics defining hidden inflammatory process of newborns with prolonged neonatal hyperbilirubinemia in different background.

The value of PCT-test in plasma or serum more than 0.5 ng/ml shows the amount hidden inflammatory process in children with prolonged neonatal hyperbilirubinemia.

580 – LATE BREAKERS

NOSOCOMIAL PATHOGENS IN NEONATAL INTENSIVE CARE UNIT

S. Michael

Hospital Infection Control, The Org. of Teaching Hospitals Institute, Alexandria, Egypt

Introduction: It is unrealistic to hope for a germ free NICU, but it is possible to reduce the likelihood of hygiene. The NICU hygiene is affected drastically by the medical staff and the internal environment. This study will describe some of interactions between the laboratory and the improper housekeeping procedures.

Methods: The present study was conducted in NICU Damanhour Teaching Hospital. Where the cleanliness and sanitation was evaluated by bacteriological examination of the umbilical stump and the internal environment of the wards represented by floor, air, baby balance, baby heater, air condition device and baby care units.

Results: The study revealed the failure of the routine housekeeping process. The study suggested three categories to control and prevent NICU Nosocomial infections. Also suggested a new technical for cleaning and sanitation of baby incubators by using stabilized hydrogen peroxide instead of formaline gas or other toxic disinfectants this process takes 45 min only instead of 48 h in case of formaline so we can save more lives by our limited no. of incubators, also this technical succeeded 100 % in removing all pathogenic microorganism.

Conclusion: The study revealed failure of routine housekeeping process, and suggests three methods to control and prevent NICU nosocomial infections, it also proposed a new technique, for cleaning Wards and baby incubators, and decreased the motility and morbidity rates among neonates.

581 (Abstract withdrawn)

Pharmacology (582–584)

582 – LATE BREAKERS

STUDENT'S PERCEPTIVE OF THE SOCIAL IMPLICATIONS AND HEALTH EFFECTS OF ALCOHOL CONSUMPTION

J.J. Cheriathu¹, L.J. John², J. Muttappallymyalil³, J. Sreedharan³, S. Al Sharbatti⁴, E. D'Souza¹

¹*Paediatrics, GMC Hospital,* ²*Pharmacology,* ³*Research Division,* ⁴*Community Medicine, Gulf Medical University, Ajman, Ajman, United Arab Emirates*

Objectives: Alcohol consumption is an important epidemiological problem among the adolescents affecting their health and social life. Perceptions regarding the social implications and level of health risks with alcohol consumption were assessed among school students in Ajman, UAE.

Materials and methods: A sample of 411 school students was surveyed on their perceptions of social implications and health related risks with alcohol consumption. A pre-tested, close-ended, self-administered questionnaire was filled in after consenting. The data was analyzed using SPSS version 19; Chi square test was applied to determine association between variables.

Results: Male students constituted 55.7 % of the total and the age ranged between 15 and 17 years. 'Alcohol consumption is harmful', was indicated by 91.2 %. Moderate–severe level of health with alcohol consumption was attributed by 91.7 %. Majority of the female students reported moderate–severe health risk with alcohol consumption than the males (96.3 and 87.7 %; $p < 0.01$). 81.3 %believed alcohol consumption is associated with social problems. The common perceived social implications were frequent quarrel or arguments, accidents, problems with police, parents, friends, and poor academic performance. Female students highly perceived 'decline in academic performance, problems with parents and friends, and accidents as major social implications with alcohol consumption ($p < 0.05$). There was no association between student's age, parents' qualification with level of alcohol related-health risks attributed.

Conclusion: Majority of the students was aware of the negative impact of alcohol use on health and social life. Media and schools can play integral role in imparting awareness regarding the social implications and health effects of alcohol consumption.

583 – LATE BREAKERS

PROPYLENE GLYCOL INTAKE FROM MEDICATIONS USED ON PAEDIATRIC INTENSIVE CARE

C. Patel¹, R. Isaac², C. Langley¹

¹Aston School of Pharmacy, Aston University, ²Pharmacy/PICU, Birmingham Children's Hospital, Birmingham, UK

Background: There are increasing reports of propylene glycol (PG) toxicity, which is used in many medications as a solvent for water-insoluble drugs. Polypharmacy may increase PG exposure in vulnerable PICU patients who may accumulate PG due to compromised liver and renal function.

The study aim was to quantify PG intake in PICU patients and attitudes of clinicians towards PG.

Methods: A snapshot of 50 patients medication intake was collected. Other data collected included age, weight, diagnosis, lactate levels and renal function. Manufacturers were contacted for PG content and then converted to mg/kg. Excipients in formulations that compete with the PG metabolism pathway were recorded. The Intensivists opinions on PG intake was sought via e-survey.

Results: The 50 patients were prescribed 62 drugs and 83 formulations, 43/83 (52 %) were parenteral formulations. Sixteen formulations contained PG, 2/16 were parenteral, 6/16 unlicensed preparations. Thirty-eight patients received drugs with PG. PG intake ranged from 0.002 mg/kg/day to 250 mg/kg/day, with 29/38 receiving formulations with concomitant pathway competing excipients. The total amount could not be quantified in two cases due to lack of availability of information from the manufacturer. Four commonly used formulations contributed to higher intakes of PG. Only 1/16 intensivists was aware of PG content in drugs, 16/16 would actively change therapy if intake was above European Medicines Agency recommendations.

Conclusions: Certain formulations used on PICU can considerably increase PG exposure to patients. These should be highlighted to the clinician to make an informed decision regarding risks versus benefits in continuing that drug or formulation.

584 – LATE BREAKERS

THE EFFECTS OF ANTICONVULSANT MEDICATION IN CHILDREN

M. Dobre¹, V. Stefanescu², A.M. Pelin³, A. Nechita⁴

¹Functional Sciences, ²Morphological Sciences, ³Pharmaceutical Sciences, ⁴Clinical Department, Faculty of Medicine and Pharmacy, Dunarea de Jos University, Galati, Romania

Background and aims: A large number of children receive medication containing valproic acid (VPA) or carbamazepine (CBZ). The purpose of this study is to assess the vulnerability of the paediatric population to the known side effects of these types of anticonvulsants.

Methods: The study was conducted on a group of 48 children below 18 years of age, under medication with VPA and/or CBZ as active substances. Haematological and biochemical investigations were performed.

Results: One-third of subjects (11/VPA, 4/CBZ) were found to have anaemia, while 8 patients had clotting abnormalities (7/VPA, 2/CBZ). More than a half of the study lot showed sodium and chloride ion imbalances, resulting in 22 cases of induced acidosis (16/VPA, 6/CBZ). BUN/creatinine ratios were also high for many of the children: 23/VPA, 4/CBZ, as were liver enzyme levels, for 8 children. In seven of the investigated subjects (5/VPA, 2/CBZ), ammonium ions were present in excess, suggesting an increased NH_4^+ production to compensate for metabolic acidosis—a theory upheld by statistical correlation ($p = 0.022$). It can be assumed that an increase in ammonium ion concentration could be considered a warning signal for severe upcoming impairment of renal and hepatic functions.

Conclusions: Anticonvulsant therapy needs to be carefully monitored, especially in children, who are more susceptible to homeostasis changes associated with anaemia, clotting disorders and impaired hydro electrolyte and hepatic balances.

Respiratory Failure (585–588)

585 – LATE BREAKERS

THE NEW “BERLIN DEFINITION” OF ACUTE RESPIRATORY DISTRESS SYNDROME: CLINICAL EVALUATION IN INFANTS AND EXPERT CONSENSUS

D. De Luca¹, M. Piastra², G. Chidini³, P. Tissieres⁴, E. Calderini³, S. Essouri⁴, A. Medina de Villanueva⁵, A. Vivanco Allende⁵, R. De Sanctis², M. Pons⁶, L. Perez⁶, M. Hermon⁷, G. Conti², M. Antonelli⁸, M. Kneyber⁹

¹Pediatric Intensive Care Unit, Dept of Anesthesiology and Intensive Care and Laboratory of Clinical Molecular Biology, ²Pediatric Intensive Care Unit, Dept of Anesthesiology and Intensive Care, University Hospital ‘A.Gemelli’, Catholic University of the Sacred Heart, Roma, ³PICU, Dept of Critical Care and Anesthesia, Fondazione IRCCS Ca’ Granda, Ospedale Maggiore Policlinico, University of Milan, Milan, Italy, ⁴PICU, Dept of Pediatrics, CHU Kremlin-Bicetre, Université Paris Sud, Paris, France, ⁵PICU, Dept of Pediatrics, Hospital Universitario de Asturias, Oviedo, ⁶PICU, Dept of Pediatrics, Hospital San Juan de Deus, Barcelona, Spain, ⁷Division of Neonatology and Pediatric Intensive Care, University Children’s Hospital, Medical University of Vienna, Wien, Austria, ⁸General ICU, University Hospital ‘A.Gemelli’, Catholic University of the Sacred Heart, Roma, Italy, ⁹Pediatric Intensive Care Unit, Dept of Pediatrics, Beatrix Children’s Hospital, University Medical Center Groningen, the University of Groningen, Groningen, The Netherlands

Background: European Society for Intensive Care Medicine has recently issued a new ARDS definition through international consensus and empirical evaluation. The so called “Berlin definition” (BD) has some intrinsic characteristics that could make it suitable for the early pediatric age.

Methods: We designed a collaborative project within the ESPNIC Respiratory Section to merge dataset of several PICU to evaluate BD on large population of infants with ARDS. Then, illustrative vignettes have been created to help interpreting chest X-rays in infants together with a list of ARDS risk factors. Formal consensus

was reached on these two tools, similarly to what has been done for BD in adults.

Results: 221 infants with ARDS coming from 7 European PICU were enrolled. Study algorithm is shown in Fig. 1.

Fig. 1

Mortality ($p = 0.04$), composite outcome ECMO/mortality ($p = 0.009$), survival time ($p = 0.002$) and PICU stay ($p = 0.002$) were different across the BD severity classes, while they were similar using the old ARDS definition. ROC analysis shows better productivity using BD than the old definition (for mortality AUC 0.6; $p = 0.04$; for ECMO/mortality: 0.62; $p = 0.013$). Illustrative radiographs and ARDS risk factors were blindly evaluated by some Respiratory Section members: there was a significant concordance between raters (for radiographs ICC = 0.6; $p < 0.008$; for risk factors: ICC = 0.919; $p < 0.001$).

Conclusions: BD is suitable and reliable for infants. We developed a consensus about clinical tools to use BD at the bedside.

586 – LATE BREAKERS

NASAL OBSTRUCTION IN CHRONIC RHINO SINUSITIS.

M. Maniuc, D. Chirtoca, P. Ababii

Department of Otorhinolaryngology, Clinical Republican Hospital for Children, Chisinau, Moldova

Objectives: Nasal obstruction is one of the main symptoms in chronic rhino sinusitis. The aim of the study is evaluation of nasal obstruction by acoustic rhinometry (AR) in children with chronic rhino sinusitis.

Methods: The study included 101 patients (2–15 years old) and 60 healthy children (control group). The children of the first group

received a conservative treatment (anti-bacterial and vessel-constrictive treatment). Children of the second group received a conservative treatment, including the daily nasal lavage with anti-septic solution. We have investigated the nasal permeability by means of AR, using the rhino-meter RHIN 2000.

Results: In children with chronic rhino sinusitis, before the decongestion, the volume of the nasal cavity V is decreased, compared to the one of healthy children (group I: 2.69 ± 0.164 ; group II: 2.89 ± 0.260 ; healthy children— 3.77 ± 0.301). Also, we are attesting a decrease of the MCA, especially of the MCA 2. The examination of children after the decongestion demonstrates the increase of the volume data and of MCA; while in children with rhino sinusitis these parameters, anyway, do not reach the values of healthy children. The evaluation of the dynamics of modification of AR data on the 5th and on the 10th day of treatment shows the occurrence of the authentic differences between the corresponding indicators in children of group I and group II.

Conclusions: The mini-invasive nature, the simplicity and rapidness of the AR have a special value while applying this method in children.

587 – LATE BREAKERS

NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA) IN EIGHT PRETERM INFANTS

I. Maroszyńska, M. Niedźwiecka, K. Fortecka-Piastreniewicz, I. Plewińska

Department of Intensive Care and Congenital Malformations of the Neonates and Infants, Polish Mother's Memorial Hospital, Lodz, Poland

Neurally Adjusted Ventilatory Assist (NAVA) is a ventilation mode which uses electrical activity of a diaphragm to control ventilation. NAVA may be used both as an invasive and non-invasive ventilation and it helps to provide ventilation suited to a patient's needs and to wean a patient from mechanical ventilation gradually, in the way controlled by the patient himself. The authors present eight preterm infants ventilated using invasive and noninvasive NAVA. The mean corrected gestational age was 28 weeks (minimum 25, maximum 31) and the mean birth weight was 1,162 g (minimum 740 g, maximum 1,500 g). Four neonates were diagnosed with congenital infection. Six preterm infants were successfully ventilated and weaned using NAVA and NIV NAVA and in two cases ventilation mode had to be changed because of multiple central apneas. NAVA may be a useful ventilatory tool that helps to achieve gradual transition from invasive mechanical ventilation, through non-invasive ventilatory support to spontaneous breathing.

588 – LATE BREAKERS

USE OF MICRO STREAM CAPNOGRAPHY IN HIGH FREQUENCY PERCUSSION VENTILATION

B. van Delft

NICU, UZ Brussels, Jette, Belgium

Objectives: Compare end-tidal CO_2 (ETCO_2) with arterial CO_2 (PaCO_2) measurement during high frequency percussive ventilation (HFPV) in newborn infants and to assess the validity of ETCO_2 measurement in guiding the ventilation strategy.

Methods: The results of blood gas measurements corresponding ETCO₂ measurements were recorded. A correlation coefficient between ETCO₂ and PaCO₂ was calculated and a Bland Altman graph was generated to assess the level of agreement. Significance was defined for two-tailed values of $p < 0.05$. Analyses were performed in separate groups according to endotracheal tube (ETT) size 2.0–2.5–3.0 and 3.5 mm.

Results: 380 end-tidal and arterial CO₂ pairs were analyzed from 22 ventilated neonates. The correlation coefficient between ETCO₂ and PaCO₂ varied depending on the ETT size from 0.59 for size 2.0 mm to 0.64 for size 3.5 mm. The ETCO₂ value was lower than the corresponding PaCO₂ value in 52.6 % of the cases. The mean bias was –11.81 mmHg for all the ETT size, this was statistically significantly different from zero ($p < 0.001$). The mean bias for each ETT size varied from –17.73 for tube size 2.0 mm, –13.29 for size 2.5 mm, –9.89 for size 3.0 mm and –7.36 for tube size 3.5 mm. During the study period we observed, a clear relation in the trends over time between ETCO₂ and PaCO₂.

Conclusions: Despite the moderately strong correlation between ETCO₂ and PaCO₂, the use of capnography could improve the observation of the ventilated premature infant and was able to detect low and high CO₂ warning levels, and thus, reduce adverse effects of mechanical ventilation.

Resuscitation and Emergency Medicine (589–592)

589 – LATE BREAKERS

THERAPEUTIC HYPOTHERMIA AFTER CARDIOPULMONARY ARREST IN PAEDIATRICS: A PROSPECTIVE SERIES

M. Piastra¹, O. Genovese¹, D.G. Biasucci², D. De Luca¹, A. Pizzi¹, R. Trotta¹, R. De Sanctis¹, F. Tosi¹, F. Vitale¹, D. Pietrini¹, G. Conti¹

¹Pediatric Intensive Care Unit, ²Emergency Department, 'A. Gemelli' Teaching Hospital Catholic University of The Sacred Heart, Milano, Italy

Despite compelling evidence showing that therapeutic hypothermia (TH) improves outcome in neonatal hypoxic-ischaemic encephalopathy and in adults after ventricular fibrillation, there are lacking evidence in paediatric patients with return of spontaneous circulation (ROSC) after cardiac arrest (CA). This prospective study aims to assess efficacy and safety of TH after paediatric CA.

This study was conducted in post-ROSC patients admitted to our PICU from January 2012 to April 2013. According to our protocol, using a servo-controlled cooling device, target temperature (32°–34 °C) was gained quickly and maintained with minor fluctuations (0.2–0.5 °C/h) for 24/36 h.

Nine patients were included, mean age was 14 months (IQR 1.6–177). RCP duration was 34 ± 17 min and the gap between RCP and the start of hypothermia was 3.7 ± 1.6 h. Length of mechanical ventilation was 96 h (IQR 72–276), PICU stay was 10 days (IQR 3.5–20). VIS score was 11.3 ± 8.8 . Five patients survived with Glasgow Outcome Scale 2.4 ± 1.4 . A significant inverse correlation was found between survival and VIS₂₄ ($r -0.74$, $p 0.024$) and PRISM-III₂₄ ($r -0.72$, $p 0.023$). At 3 months follow-up, Paediatric Cerebral Performance Category score was ≤ 2 in four patients.

Due to lacking evidence and protocols, TH after paediatric CA is not widely used. This study supports TH in children with ROSC but further studies are needed.

590 – LATE BREAKERS

PAEDIATRIC INTENSIVE CARE TRANSPORT IN VICTORIA: WHAT HAS CHANGED OVER THE LAST TEN YEARS?

A. Cooke, F. Oberender

Paediatric Intensive Care, Royal Children's Hospital, Melbourne, VIC, Australia

Objectives: The Victorian Paediatric Emergency Transport Service (PETS) provides advice on management and performs retrieval of critically ill children throughout Victoria, Tasmania and Southern New South Wales. This study aimed to evaluate changes in referrals and retrievals over the past 10 years.

Methods: Data was extracted from the PETS database for 2002–2011, inclusive. Severity of illness was categorised by the level of organ-support required during retrieval and the data obtained analysed for proportions and trends over time (z-test).

Results: There were 7,281 referrals to PETS resulting in 6,377 transfers (88 %) of which 3,338 (46 %) were performed by the PETS team, 35 % by air. There was a highly significant increase in the number of referrals and PETS transfers per year ($p < 0.01$). There was a small but significant increase in the proportion of referrals from regional hospitals and children transferred with non-invasive ventilation ($p < 0.01$). The rate of PETS referrals is significantly higher in

Patients (sex)	Age (months)	I–O	CPR length	Gap before TH	Prism-III ₂₄	MV (h)	VIS ₂₄	PICU (days)	Outcomes (GOS)	POPC 3m
1F	0.25	I	45	6	38	288	30	16	4	1
2M	1.2	I	35	1	32	144	15	26	4	1
3M	2.0	I	20	4	24	96	10	10	3	2
4M	2.1	I	10	5	45	456	32	24	3	3
5F	14	O	45	3	49	36	50	3	1	6
6M	175	O	20	3	22	72	20	5	4	1
7F	168	O	25	2	45	96	35	4	1	6
8M	180	O	65	5	44	264	30	11	1	6
9F	192	I	45	5	48	72	40	3	1	6

Legend: *I* in hospital, *O* out-of-hospital, *CPR* cardiopulmonary resuscitation, *TH* therapeutic hypothermia, *MV* mechanical ventilation, *VIS* vasopressor intropic score, *GOS* Glasgow outcome scale, *POPC* pediatric overall performance category scale

non-metropolitan communities (1.1/1,000 children) compared with metropolitan communities (0.37/1,000 children, $p < 0.01$, z-test).

Conclusions: Over the last 10 years there has been a marked increase in the overall activity of PETS. However, the proportion of children referred for critical illness requiring invasive mechanical ventilation and/or circulatory support has not changed suggesting that the increased activity is not due to a change in referral patterns.

591 – LATE BREAKERS

COLLABORATION BETWEEN PEDIATRIC INTENSIVE CARE AND A BURN UNIT FOR MANAGING CRITICALLY ILL INFANTS: A 2-YR COLLABORATIVE EXPERIENCE

R. De Sanctis¹, A. De Bellis², P. Palombo², G. Conti¹, F. Tosi¹, F. Vitale¹, R. Trotta¹, M. Piastra¹

¹Catholic University School of Medicine, ²S. Eugenio Hospital, Rome, Italy

This is a retrospective analysis of 160 pediatric burns of which 132 admitted to a Pediatric-Burn-Unit and 28 to the PICU during 2 years. Median age was 16 months (IQR 12.2–19), M/F ratio 1.6, median burned area (BA) 12.5 % (IQR 9.7–20).

12 (46 %) PICU-admitted patients had BA >15 %, 13 (50 %) had face burns, 4 had flame burns (15.3 %) and 14 (53.8 %) were intubated. Overall, 11 (42 %) patients had a PICU stay >7 days and a MV time >24 h (median 7 days, IQR 4–18). Median PICU-stay was 4.5 days (IQR 2–13) for entire PICU population and 13 days (IQR 8–26) for ventilated patients. Correlation between BA and PICU-stay was demonstrated ($r = 0.64$, $p = 0.0004$).

Patients requiring PICU stay >7 days, correlation was found between PICU-stay and MV need ($r = 0.98$, $p = 0.0001$). Seven patients showed evidence of ALI/ARDS and five underwent severe sepsis/septic shock.

Patients admitted to burn unit had median age 22 months (IQR 15–31), median stay 6 days (IQR 3–11), median BA 6.75 % (IQR 4–13).

Despite children represented 25 % of total burned patients in recent literature, few data are available on intensive care of children with severe burns, but a worse outcome was suggested for children admitted to adult facilities.

This 2-years experience illustrates potential advantages of a cooperation between a burn unit and a tertiary referral PICU in the management of infants with severe burns.

592 – LATE BREAKERS

OUTCOME OF CARDIAC ARREST IN PEDIATRIC INTENSIVE CARE UNIT IN ASSIUT CHILDREN UNIVERSITY HOSPITAL

A.A. Eltayeb¹, E.M. Monazae², K.I. Elsayeh³

¹Pediatrics, Children University Hospital, Assiut University,

²Community Health, Assiut University, ³Children University Hospital, Assiut, Egypt

Introduction: Cardiac arrest is a clinical event that can occur suddenly, often without premonitory signs. Outcome of CPR is dependent on many factors, the site of event, quality of CPR, whether the event was witnessed, time to basic life support, time to advanced life support and initial rhythm.

Purpose: To determine the outcome of cardiopulmonary resuscitation in PICU and factors associated with unfavorable outcome.

Methods: retrospective study of children with cardiac arrest and required CPR in PICU over a period from January to December 2010. Two outcome variables were measured (ROSC) and survival to discharge from PICU.

Results: 700 PICU admission, a total of 172 (24.6 %) patients developed cardiac arrest that required CPR. ROSC was achieved in 78 cases (45.3 %), 25 patients (14.5 %) survived to discharge and 94 patients (54.7 %) did not respond to resuscitations. Success and survival were significantly higher in cases resuscitated for ≤ 20 min than >20 min (100 and 33.3 % vs. 32.4 and 10.1 % respectively). Success and survival were better for mechanical ventilation than those were not (48.1 and 17.8 % vs. 37.2 and 4.7 % respectively). Defibrillation was successful in 10 cases (25 %) and survival was in 1 case (0.5 %) and out of survivors 80 % had good neurological outcome.

Conclusion: The frequency of cardiac arrest needed CPR was recorded in 24.6 %. Improving the quality of CPR is an important factor to improve the outcome by implementing training programs. Studies using neurophysiological methods to predict the neurological outcome are needed.