CAUDAL ANALGESIA FOR POSTOPERATIVE PAIN RELIEF IN CHILDREN

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ABSTRACT

Postoperative pain relief in 40 children undergoing elective infraumbilical surgery was assessed after caudal epidural administration of either lignocaine or bupivacaine in the doses of 0.5 mL/kg body weight of a 1 per cent solution and 0.5 mL/kg body weight of a 0.25 per cent solution respectively. Pain free period was assessed by subjective pain scales. The pain free period was significantly prolonged in children who were given bupivacaine (14.75 ± 2.75 hours) as compared to lignocaine (7.25 ± 3.25 hours).

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KEY WORDS : Analgesia epidural; Anaesthesia; Bupivacaine; Lignocaine; Pain postoperative.

Introduction

The treatment of acute postoperative pain in children and infants has been far from adequate [1]. Inadequate methods available for assessment of pain in the preverbal child and increased risks with parenteral narcotics are the two primary obstacles in the proper management of postoperative pain in children [2,3].

Infants have been, unfortunately, managed differently than adults because it has been assumed that they do not feel pain or that they do not remember it [4]. Positron emission tomography has shown that the higher centres for conscious perception of pain are active thus confirming that infants do feel pain [5]. Harmful physiologic effects may arise as a result of untreated pain.

The use of narcotics, non-narcotics and of behavioural treatment requires constant skilled supervision [6,7]. Techniques involving continuous intravenous infusion and patient controlled analgesia need complicated infrastructure [8,9]. Epidural narcotics are fraught with the danger of respiratory depression [10]. Low concentrations of local anaesthetic agents in the caudal epidural space provide prolonged pain relief in children [11,12].

The aim of this study was to assess the efficacy of caudal epidural block for postoperative pain in children undergoing elective infraumbilical sur-

gery and to compare the pain free periods after administration of lignocaine hydrochloride and bupivacaine hydrochloride.

Material and Methods

The study was conducted at the Paediatric Surgery Centre of the Command Hospital Southern Command, Pune during the period Jan 94 - Apr 94. Permission of the Hospital Ethics Committee and the informed consent from the parents of the children were obtained.

Forty children were selected randomly. They were all in ASA physical status Class I for elective infraumbilical surgery. The mean age was 5.5 ± 2.5 years and mean weight was 13.5 ± 4.7 kg. There were 32 boys and 8 girls. These children were divided into two groups of 20 each. Group I received lignocaine 1 per cent solution in a dose of 0.5 mL/kg body weight and Group II received bupivacaine 0.25 per cent solution in a dose of 0.5 mL/kg body weight.

The surgical procedures for which this technique of analgesia was used are given in Table 1. No analgesic was included in the premedication.

The block was performed in the left lateral position just after intubation and before the start of surgery. The sacrococcygeal membrane was identified with the help of the posterior superior iliac

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TABLE 1

Surgical conditions for which caudal analgesia was administered (n=40)

Surgical condition	No. of children
Circumcision	11
Herniorrhaphy	14
Hypospadias correction	12
Orchidopexy	2
Biopsy	1

Fig. 1: Showing the equilateral triangle with posterior superior iliac spines forming the base and the sacrococcygeal membrane at the apex.

Fig. 2: Calculated volume of anaesthetic agent being injected into the epidural space through a 23G disposable needle.

spines forming the base of an equilateral triangle and the sacrococcygeal membrane at the bicornuate spine of the fifth sacral vertebra forming the apex (Fig 1). A 23G disposable needle was used to pierce the sacrococcygeal membrane at an angle of

45° and enter the caudal epidural space before injection (Fig 2).

All the children were assessed for pain relief in the postoperative period. The assessment was done by a subjective pain scale which is depicted in Table 2. The main criteria for assessing pain relief were the cry, sleep, feeding pattern, behaviour, and use of supplemental analgesia. The nursing staff were responsible for assessment in the postoperative wards. The parents' cooperation and observation was also utilized for calculating the pain free period. The cry due to pain and hunger was differentiated by the experienced nursing staff.

TABLE 2

Postoperative pain assessment

Parameter	Scores		
	0	1	2
Cry	Nil	Moderate (may be for reason other than pain)	Excessive
Sleep	Normal	Disturbed or interrupted	Nil
Feeds	Accepted	Half-hearted	Refuses
Behaviour	Same as preop	Irritated	Visibly disturbed
Self reporting	No pain	Equivocal	Severe pain
Supplemental analgesic	Nil	Only sedation	Opioids

Results

The quality of analgesia obtained was analyzed in both the groups and there was not much of a difference in the 'fair' and 'good' grading (Table 3). The pain free period was prolonged (14.75 ± 2.75 hours) in the bupivacaine group as compared to the lignocaine group (7.25 ± 3.25 hours).

TABLE 3

Grading and duration of pain free period in children who were administered lignocaine (Group I) and bupivacaine (Group II)

Group	Poor	Fair	Good	Pain-free duration (hrs)
Group I n=20	1 (5%)	8 (40%)	11 (55%)	7.25 ± 3.25
Group II n=20	1 (5%)	2 (10%)	17 (85%)	14.75 ± 2.75

The described complications of intravascular injection, intrathecal injection and neurologic damage would have been disturbing but fortunately we did not encounter any complications in this study.

Discussion

Epidural narcotics are associated with respiratory depression in children even at minimal concentrations [10]. Experienced workers suggest avoiding them except in babies who are to be mechanically ventilated. The recent technique of continuous intravenous infusion of opioid requires delicate apparatus and dedicated paramedical staff [8]. Costly infusion pumps are required for patient controlled analgesia apart from the complete cooperation of the patient and an intelligent understanding of the procedure on the part of the child [9].

Recent studies indicate the caudal analgesia is the ideal choice for postoperative pain relief at low concentrations and the timing of the caudal block placement in relation to surgery does not affect the duration of analgesia in paediatric ambulatory patients [13-16].

In children identification of the sacrococcygeal membrane is easy because of the prominent anatomical landmarks. Only a 23G disposable needle and a syringe are required to perform the block. Accidental intrathecal or intravascular injection will be evident if cerebrospinal fluid or blood is drawn through the needle.

Various methods have been employed for assessing the intensity of postoperative pain in children [17,18] and we had to evolve our own behavioural scale for grading of pain relief. The quality of analgesia was very good in both the groups. The condition of the children in the evening after surgery was satisfying for the parents, the nursing staff and the treating doctors. The paediatric surgeons involved in the correction of hypospadias were particularly benefitted because the undisturbed immediate postoperative period indirectly aided the success of the corrective procedure. Thus caudal epidural analgesia is a simple technique which can be performed in any hospital with mini-

mum equipment with gratifying postoperative pain relief in children. The results are so effective that, at times, even the parents do not realize that their children have been operated upon that morning!

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