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Very Late Onset Infections in the Neonatal Intensive Care Unit

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Abstract

OBJECTIVE—We sought to determine the risk factors, incidence, and mortality of very late onset bacterial infection (blood, urine, or cerebrospinal fluid culture positive occurring after day of life 120) in preterm infants.

STUDY DESIGN—A retrospective observational cohort study of all very low birth weight infants cared for between day of life 120 and 365 in 292 neonatal intensive care units in the United States from 1997 to 2008.

RESULTS—We identified 3918 infants who were hospitalized beyond 120 days of life. Of these, 1027 (26%) were evaluated with at least 1 culture (blood, urine, or cerebrospinal fluid), and 276 (27%) of the evaluated infants had 414 episodes of culture-positive infection. Gram-positive organisms caused most of the infections (48%). The risk of death was higher in infants with positive cultures (odds ratio; 10.5, 95% confidence interval [7.2–15.5]) or negative cultures (4.8,

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[3.5–6.7]) compared to infants that were never evaluated with a culture ($p<0.001$). Mortality was highest with fungal infections (8/24, 33%) followed by Gram-positive cocci (40/142, 28%).

CONCLUSIONS—Important predictive risk factors for early and late onset sepsis (birth weight and gestational age) did not contribute to risk of developing very late onset infection. Evaluation for infection (whether positive or negative) was a significant risk factor for death. GPC and fungal infections were associated with high mortality.

Keywords

Neonate; VLBW; sepsis; late onset

Introduction

Prolonged hospital stays after birth (beyond day of life 120) for extremely preterm infants are common(1, 2). Unlike other intensive care unit (ICU) populations, extremely premature infants routinely require prolonged supportive care (months) before they are ready for safe discharge due to physiologic immaturity(1). Despite vigilance for prevention of nosocomial infections(3, 4), the threat is still present due to the unique need for prolonged hospitalization and the limited ability of the immature newborn immune system to eradicate pathogens(5, 6).

Late-onset sepsis (LOS) has been variably defined as sepsis that occurs after day of life 3 to 7 and before day of life 120(7). While the epidemiology of LOS has been recently reported in both term and preterm infants(7, 8), few reports have described infection occurring among hospitalized infants after day of life 120(9–12). Here, we present a large cohort of very low birth weight (VLBW, <1500 g birth weight) infants to identify the incidence, risk factors, and organism-associated mortality of what we term “very late onset infection” (VLOI; infection occurring on or after day of life 120 through day of life 365).

Materials/ Subjects and Methods

Patients

We examined de-identified data from all blood, urine (suprapubic or in/out catheterization only), and cerebrospinal fluid (CSF) cultures drawn from hospitalized VLBW infants ≥ 120 and ≤ 365 days of age admitted to 292 NICUs in the United States between 1997 and 2008. Evaluations for infection were performed using standard of care practices at each NICU. We reviewed neonatal demographic data including: birth weight (BW), gestational age (GA) at birth, gender, race, 5-minute Apgar score, and inborn or outborn status, presence of a congenital anomaly, necrotizing enterocolitis (NEC); and maternal demographic data including: age group, method of delivery, use of antenatal steroids, and administration of antenatal antibiotics.

Definitions

We defined VLOI as a positive culture (blood, urine, CSF, or a combination of these [mixed]) between 120 and 365 days of life. Multiple positive cultures for the same organism within a 21-day period were considered a single episode of infection. We defined *definite* coagulase-negative *Staphylococcus* (CoNS) infection as 2 positive cultures for CoNS drawn on the same day(13); probable CoNS infection as 2 positive cultures for CoNS within a 4-day period, 3 positive cultures for CoNS within a 7-day period, or 4 positive cultures for CoNS within a 10-day period; and possible CoNS infection as a culture positive for CoNS that did not meet criteria for definite or probable CoNS sepsis. We included definite and probable CoNS infection in the analysis. Among urine cultures, only results from

catheterized urine specimen or suprapubic aspiration were included in the analyses. Infants that were transferred to outside hospitals during the period of interest were coded as alive at discharge and included in the survivors.

We excluded sepsis episodes for organisms considered contaminants including non-speciated *Streptococci* (n = 7), *Bacillus sp.* (n = 2), *Diphtheroids sp.* (n = 1), Gram-positive rods (n = 2, not including *Listeria sp.*), *Lactobacillus sp.* (n = 2), and alpha *Streptococcus* (n=5). If a culture was positive for multiple pathogenic organisms, each organism was counted as a separate episode of infection.

We determined NEC to be present if a diagnosis of NEC was recorded by the infant's physician. Infants with this diagnosis had one or more of the following clinical signs: bilious gastric aspirate or emesis, abdominal distention, blood in stool without evidence of a rectal fissure; and had one or more of the following radiographic findings: pneumatosis intestinalis, hepatobiliary gas or pneumoperitoneum. Either NEC-medical or NEC-surgical may be chosen at the time of data entry; for our analysis we grouped both together.

Statistical Analysis

The unit of observation for demographic factors and mortality was the infant and the unit of observation for infection frequency and cumulative incidence of VLOI was the episode. We calculated the cumulative incidence of VLOI per 1000 hospital days during the entire study period. We examined the differences in mortality between infants that were never evaluated for infection, were evaluated and had negative cultures, and infants with VLOI, using logistic regression and controlling for infant and maternal demographic characteristics. Because risk of infection was strongly associated with length of time that each subject was hospitalized, we assessed maternal and infant risk factors for VLOI by Cox regression (single failure). We also analyzed hazard rates for risk of death from alternative organism groups, where organism-associated mortality was defined by the last organism identified prior to death or discharge for infants with multiple episodes of infection. For both Cox regressions we controlled for infant and maternal demographic characteristics.

STATA 11.2 (College Station, TX) was used to perform the statistical analysis. Significance for all tests was established at $p < 0.05$. Permission to conduct this analysis without written informed consent was provided by the Duke University Institutional Review Board and the Western IRB (for Pediatrix sites) because the analysis was performed on data without patient identifiers.

RESULTS

Clinical Characteristics

From 2007 through 2008, the Pediatrix Medical Group cared for 3918 VLBW infants who were hospitalized including and beyond 120 days of life. Mean BW and GA at birth for VLBW infants hospitalized during the study period were 740 g (5th and 95th%tiles: 476, 1156) and 25.4 weeks (23, 29), respectively (Table 1). Of these infants, 1027/3918 (26%) were evaluated with at least 1 culture, and 276/1027 (27%) of the evaluated infants had 414 episodes of infection (Figure 1). The incidence density of VLOI (all sources) was 3.3 episodes/1000 days during the study period. Of the 3918 infants in our cohort (only VLBWs that were hospitalized including and beyond 120 days of life), 1352 (35%) were diagnosed on admission to the NICU with a congenital anomaly (appendix I), and 583 (15%) had a diagnosis of necrotizing enterocolitis [medical (253/583, 43%) or surgical (330/583, 57%)].

Risk Factors for Acquiring Infection

Significant risk factors for infection using multivariable analysis included antenatal antibiotics (hazard ratio (HR) [95% confidence interval] = 1.39 [1.05–1.84], $p=0.02$), late-onset sepsis (HR = 2.75 [2.00, 3.78], $p<0.001$), or necrotizing enterocolitis (HR = 2.16 [1.65, 2.82], $p<0.001$) (Table 2). Important predictive risk factors for early onset sepsis (EOS) and LOS (e.g. BW and GA) did not contribute to risk of developing VLOI.

Infection Frequency and Source, Microbiologic Etiology, and Associated Mortality

VLOI was most commonly caused by GPC (198/414 episodes, 48% [including CoNS 46/414, 11%]) and GNR (166/414, 40%), with fungus occurring less often (42/414, 10%) (Table 3). *Enterococcus* (67/414, 16%), *Klebsiella* (51/414, 12%), and CoNS (46/414, 11%) were the most common individual organisms isolated. *Candida sp.* were identified in the majority of fungal infections (41/42). Eight episodes of infection were caused by organisms classified as “other” and had no associated mortality. Only 1% (6/414) of infection episodes were mixed source (2 blood/urine and 4 blood/csf) infections.

Overall mortality in our sample was 6.4%. Among patients with infections, the mortality was (66/276, 24%). Organism-category mortality was highest with *Candida sp.* (8/24 patients, 33%), followed by GPC (40/142, 28% [including CoNS 6/28, 21%]), and GNR (20/114, 18%). Nine infants had 2 pathogenic organisms isolated from the last culture [2 infants died (GPC-unspecified and *Enterobacter* and GPC-unspecified and CoNS), 7 infants did not die]. Individual pathogen mortality was as follows: *Staphylococcus aureus* (14/32, 44%), *Pseudomonas* (3/8, 38%), *Candida sp.* (8/24, 33%), GPC-other (11/33, 33%), *Citrobacter* (1/3, 33%), CoNS (6/28, 21%), *Enterococcus* (9/47, 19%), *Enterobacter* (4/21, 19%), *E. coli* (3/21, 14%), *Klebsiella* (6/37, 16%), GNR-other (1/7, 14%), and *Serratia* (2/15, 13%).

The majority of VLOI episodes were localized to the bloodstream (351/414, 85%). VLOI (blood) was most commonly caused by GPC [178/351, 51%; includes CoNS (44/351, 13%)], followed by GNR (127/351, 36%) and *Candida sp.* (38/351, 11%). The most common organisms associated with VLOI (blood) were *Enterococcus* (56/351, 16%), CoNS (44/351, 13%), and *Klebsiella* (43/351, 12%). Overall mortality by last organism (blood) was 61/244, 25%. *Candida sp.* had the highest associated mortality (8/22, 36%), followed by GPC [36/128, 28%; includes CoNS (6/26, 23%)], and GNR (17/89, 19%).

Urinary tract infection (UTI) accounted for 11% (46/414) of VLOI. VLOI (urine) were most often caused by GNR (34/46, 74%), followed by GPC (8/46, 17%) and *Candida sp.* (4/46, 9%). The most common organisms isolated in urine were *Escherichia coli* (14/46, 30%), *Klebsiella* (8/46, 17%), *Enterococcus* (6/46, 13%), and *Candida sp.* (4/46, 9%). Overall mortality by last organism (urine) was 4/29, 14%.

Meningitis (11/414, 3%) was relatively rare compared to bacteremia and UTI and was most often caused by GPC [8/11, 73%; includes CoNS (1/11, 9%)] followed by GNR (3/11, 27%) with overall mortality by last organism of 2/8, 25% all by GPC (2/7, 29% [1 case each of *Enterococcus* and *Staphylococcus aureus*]).

Risk Factors for Death

Compared with infants who were not evaluated with a culture, infants with positive or negative cultures had a higher risk of death, (OR = 10.553, [7.2–15.5–15.50], $p<0.001$) and (OR = 4.8, [83, [3.548–6.770], $p<0.001$), respectively. Among patients evaluated with a culture, Black race (hazard ratio (HR) [95% confidence interval] = 1.47, [1.08, 1.99], $p=0.02$) and male gender (HR = 1.34, [1.01, 1.77], $p=0.04$) were associated with an

increased risk of death. Infection with GPC was associated with an increased risk of death (HR = 1.85, [1.03, 3.32], $p=0.039$), relative to infection with GNR. No difference was observed between risk of death among those not infected (HR=1.14, [0.69, 1.87], $p=0.61$) versus GNR, infected with CoNS (1.12, [0.44, 2.86], $p=0.81$) versus GNR, or infection with yeast (HR = 2.11, [0.89, 4.99], $p=0.09$) versus GNR.

DISCUSSION

The rate of VLOI (3.3/1000 hospital days among VLBW infants) is significantly less than EOS among VLBW infants (15.4/1000 live births) but roughly equivalent to LOS (1.9-5.4/1000 hospital days)(7, 14). Improved survival of the most premature infants increases the possibility for prolonged hospitalization and thus late infection. Therefore, knowledge of modifiable and non-modifiable risk factors for VLOI, as well as better understanding of the likely pathogens, their respective risk for mortality, and source of infection is important for the neonatal clinician caring for these infants.

Mortality among VLBW infants with LOS (*blood culture positive only*) due to GPC and GNR infection is 11% and 36%, respectively(7). For infants with VLOI (blood), we observed lower mortality with GNR (19%) and higher mortality for GPC (28%, including CoNS). This is in contrast to previous reports of increased mortality associated with GNR infections(7, 15). However, in our cohort of infants with VLOI (blood) a high proportion of GPC infections were caused by *Staphylococcus aureus* (40/178, 22%) and *Enterococcus* sp. (56/178, 31%). Both of these organisms are more pathogenic than the CoNS that predominates (48% of cases) among preterm infants with LOS and may account for the disparity in mortality(7). The higher overall mortality (25%) observed in our cohort of infants with VLOI (blood) as compared to LOS (18%) might also be explained by the fact that many of the infants that are hospitalized had congenital anomalies. *Candida* sp. represented the 4th most common isolated pathogen among preterm infants in our cohort. The mortality we observed with *Candida* infection was in agreement with previous studies in preterm infants at younger postnatal ages and highlights the consistent risk of infection and death this organism poses to the hospitalized preterm infant(16, 17).

Urine and CSF were less common sources of VLOI compared to blood. Although associated pathogens were very similar, we observed lower mortality in our cohort with UTI in comparison to a previous report on UTI in VLBWs(18). The lower overall mortality observed in our cohort of infants with VLOI UTI might be explained by the fact that infants surviving to day of life 120 are larger and more mature at the time of the UTI compared with the cohort of infants with UTI (median birth weight <1000g) as described by Philips et al. Meningitis was rare, most often with GPC, and was associated with similar mortality as reported previously for VLBWs earlier in the hospitalization(19).

Most strikingly, the evaluation for infection, regardless of whether a culture yielded a causative organism, was associated with a significant increase in the risk of death as compared to their hospitalized counterparts. Although considered the gold standard for sepsis, blood cultures in infants are not 100% sensitive due to low blood volumes and frequent contamination from prior antibiotic administration(20). This finding may also be because these infants were simply more medically complex and ill, perhaps for noninfectious reasons, and more medically complex infants experience more evaluations.

Maternal factors such as age, treatment with antenatal steroids, as well as the method of delivery, inborn or outborn status, GA, and 5-minute Apgar score were not significant predictors of infection or death. Important risk factors for LOS, such as BW and GA, were not significant predictors of VLOI(7). This finding might be explained by the fact that, by

day of life 120, an infant's risk of infection is less related to factors present at birth and more related to factors that have caused the infant to be hospitalized for ≥ 120 days. Along those lines, the presence of NEC (medical or surgical), LOS, or a congenital anomaly was independently associated with an increased risk of developing VLOI in our multivariate regression analyses. Perhaps most obvious is the risk related to prolonged hospitalization itself and the potential exposure to nosocomial pathogens.

The microbiological etiology we observed for VLOI is unique in comparison to EOS and LOS pathogens. *Enterococcus sp.* was the most commonly identified GPC (16% [56/351]) in our cohort of VLBW infants with VLOI (blood), compared to CoNS (~15%) and GBS (~12%) in EOS and CoNS (~48%) and *S. aureus* (~8%) in LOS(7, 14). An increase in *Enterococcus sp.* isolation from infants over the last decade has been reported(21, 22) and is particularly concerning because vancomycin-resistant *Enterococcus* has the ability to spread quickly in the NICU(23). Lower rates of central line requirements in those infants greater than 120 days old may be a possible explanation for the shift from CoNS dominance seen in LOS. Mortality related to VLOI with *S. aureus* was significantly greater than previously described in LOS episodes(24) and may reflect changing epidemiology with emergence of new resistant strains(25). Differences in GNR pathogens are also notable because *Klebsiella sp* (34%, 43/127) and *Enterobacter sp* (22%, 28/127) were the most commonly identified GNR in this cohort of infants with VLOI (blood) compared to *E. coli* in both EOS (41%) and LOS (28%)(7, 14).

This is the largest reported cohort of infants with VLOI and includes positives from blood, urine, and CSF. This dataset allows for description of the incidence as well as identification of risk factors for the development and source of infection, common pathogens, and pathogen-specific mortality. The strength of these data is the large number of cases over an extended period of time from multiple centers nationwide. Weaknesses include lack of data to explain the reason for prolonged hospitalization past the physiologic due date in about two-thirds of the cohort, the presence of central venous catheters, prior exposure of the infants to empirical antibiotics or postnatal steroids(7). Data on viral infections also was not available for consideration in this evaluation. There is selection bias because infants that remain hospitalized > 40 weeks post-menstrual age are often those infants who developed significant complications related to prematurity or require extensive care due to illness, placing them more at risk for the development of systemic infection. Regardless of the reason for prolonged hospitalization, however, knowledge of potential pathogens and mortality is clinically important.

Continuation of methods with documented success in reducing nosocomial infection such as appropriate maintenance of vascular access, if present, and strict staff hygiene measures are recommended. Knowledge of the differences in VLOI pathogens and associated virulence as compared to LOS may prompt use of different empiric antimicrobial therapy or second line agents (including antifungal coverage) if there is clinical deterioration.

Conclusion

Evaluation for or the development of VLOI is a serious risk factor for death for those infants hospitalized beyond 120 days after birth. GPC (*Enterococcus sp.* and CoNS) are the most commonly isolated pathogens in this population. GPC and fungal infections were associated with high mortality.

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Figure 1.
Flow chart of infants remaining hospitalized at ≥ 120 and ≤ 356 days of life.

Table 1

Demographics of patient groups.

	Positive culture (n=276)	Negative culture (n=751)	No evaluation (n=2891)
Birth weight (g), %			
<750	54	56	61
750–999	33	31	28
≥1000	13	13	11
Gestational age (weeks), %			
<25	34	33	38
25–28	47	48	50
28	19	19	12
Female (%)	34	36	44
5 minute APGAR Score (%)			
0–3	11	8	9
4–6	25	31	32
7–10	64	61	60
Survival (%)	76	87	97
Maternal age (yrs), %			
11–19	16	17	15
20–29	48	48	48
30–39	32	34	34
≥40	3	2	4
Caesarian section (%)	65	69	69
Antenatal steroids (yes), %	69	70	70
Antenatal antibiotics (yes), %	48	41	44
Race/ethnicity, %			
White	34	37	45
Black	39	33	26
Hispanic	24	26	23
Other	3	5	6
Outborn, %	29	31	25

Table 2

Risk factors for VLOI. Significant factors for development of VLOI included receipt of antenatal antibiotics and black race.

	Univariable Analysis Hazard Ratio (95%CI)	Multivariable Analysis Hazard Ratio (95%CI)
Birth weight (g)		
<750	1.00 (REF)	
751–999	1.28 (0.98, 1.66)	
≥1000	1.18 (0.81, 1.73)	
Gestational age (weeks)		
<25	1.00 (REF)	
25–28	1.08 (0.83, 1.41)	
28	1.27 (0.89, 1.81)	
Gender		
Female	1.00 (REF)	
Male	1.25 (0.97, 1.61)	
5 minute APGAR Score		
7–10	1.00 (REF)	
4–6	0.83 (0.63, 1.11)	
0–3	1.11 (0.74, 1.69)	
Maternal age (years)		
20–29	1.00 (REF)	
11–19	0.95 (0.67, 1.35)	
30–39	0.89 (0.68, 1.16)	
≥40	0.86 (0.43, 1.75)	
Birth method		
Vaginal birth	1.00 (REF)	
Caesarean section	0.84 (0.66, 1.09)	
Antenatal steroids		
No	1.00 (REF)	
Yes	0.95 (0.73, 1.24)	
Antenatal antibiotics		
No	1.00 (REF)	1.00 (REF)
Yes	1.43 (1.12, 1.81)*	1.39 (1.05, 1.84)*
Race/ethnicity		
White	1.00 (REF)	
Black	1.45 (1.09, 1.91)*	
Hispanic	1.24 (0.90, 1.71)	
Other	0.65 (0.31, 1.37)	
Birth location		
Outborn	1.00 (REF)	
Inborn	0.99 (0.75, 1.29)	
Congenital anomaly at birth		

		Univariable Analysis Hazard Ratio (95%CI)	Multivariable Analysis Hazard Ratio (95%CI)
Early onset sepsis	No	1.00 (REF)	
	Yes	1.35 (1.06, 1.72) *	
Late onset sepsis	No	1.00 (REF)	
	Yes	2.13 (1.08, 4.23) *	
Necrotizing enterocolitis	No	1.00 (REF)	1.00 (REF)
	Yes	3.12 (2.31, 4.22) *	2.75 (2.00, 3.78) *
	No	1.00 (REF)	1.00 (REF)
	Yes	2.47 (1.92, 3.18) *	2.16 (1.65, 2.82) *

*
p<0.05

Table 3

VLOI pathogens (all sources), incidence density, and pathogen-related mortality. GPC-Gram-positive cocci, CoNS-coagulase negative *Staphylococcus*, GNR-Gram-negative rods.

Organism	Episodes	Incidence density/1000 days	Mortality* (%)
Gram-positive cocci	198	1.6	28
CoNS	46	0.4	21
<i>Enterococcus</i> sp.	67	0.5	19
GPC (other)	40	0.3	33
<i>Staphylococcus aureus</i>	43	0.3	44
<i>Group B streptococcus</i>	1	<0.1	0
<i>Streptococcus pneumoniae</i>	1	<0.1	0
Gram-negative rods	166	1.3	18
<i>Acinetobacter</i> sp.	2	<0.1	0
<i>Citrobacter</i> sp.	4	<0.1	33
<i>Enterobacter</i> sp.	33	0.3	19
<i>Escherichia coli</i>	33	0.3	14
GNR (other)	8	<0.1	14
<i>Klebsiella</i> sp.	51	0.4	16
<i>Proteus</i> sp.	5	<0.1	0
<i>Pseudomonas</i> sp.	10	<0.1	38
<i>Serratia</i> sp.	20	0.2	13
Fungus	42	0.3	33
<i>Candida</i> sp.	41	0.3	33
<i>Malassezia</i>	1	<0.1	0

* last organism or organism group

Not shown: Eight episodes of infection due to organisms classified as "other" in the MD's note; all had no associated mortality.

Appendix I

List of anomalies by patient frequency diagnosed at birth

frequency (# of patients)	Anomaly
125	Hydronephrosis - congenital
57	congenital CMV infection
43	Hypothyroidism - congenital
40	dysmorphology
31	congenital adrenal hyperplasia
31	multiple fractures
31	Perforated Bowel - perinatal
31	Pulmonary Valve Stenosis
27	inborn error of metabolism
26	porencephalic cyst
25	hemoglobinopathy
25	microcephaly
22	cystic fibrosis
22	hydrocephalus
22	SVT
15	cardiomyopathy
15	contractures
15	pyloric stenosis
12	right ventricular hypertrophy
12	stridor-congenital laryngeal
11	cleft lip and palate
11	endocarditis
11	herpes-congenital
11	malrotation
10	ambiguous genitalia
9	chromosomal abnormality
9	Urinary System Abnormalities - Unspecified
8	abdominal mass
8	cataracts
8	ileal atresia
7	CMV infection
7	heart disease
7	stenosis of larynx
7	trisomy 21
6	cranial synostosis
6	Intestinal Obstruction - small
6	Kidney - Other Anomalies
6	volvulus
5	galactosemia

frequency (# of patients)	Anomaly
5	gastroschisis
5	Hemoglobin S Trait
5	Hydrocephalus - congenital
5	hydrops fetalis-non immune
5	intracranial calcifications
5	jejunal atresia
5	talipes equinovarus
4	Bowel obstruction - congenital
4	cardiomegaly-congenital
4	Cataract - Congenital
4	congenital abnormality
4	esophageal atresia
4	Hemoglobin Barts
4	Musculoskeletal Anomalies
4	Skin - anomalies
4	syphilis-congenital
4	thalassemia
3	Beckwith-Wiedemann syndrome
3	brain malformation
3	club feet
3	Coarctation of aorta
3	duodenal atresia
3	Esophageal - other anomalies
3	Hirschsprungs disease
3	HIV infection-maternal
3	Intestinal Obstruction - large
3	Microcolon
3	oligohydramnios
3	phenylketonuria
3	tetralogy of Fallot
3	tracheoesophageal fistula, esophageal atresia
2	absent septum pellucidum
2	biliary atresia
2	congenital heart disease
2	duplicated collecting system
2	ectopic kidney
2	HIV infection
2	HIV infection-maternal, congenital CMV infection
2	Hyperthyroidism - newborn
2	macrocephaly
2	multiple congenital anomalies
2	myotonic dystrophy

frequency (# of patients)	Anomaly
2	Sickle-cell anemia
2	skeletal dysplasia
2	tethered cord
2	toxoplasmosis, obstructive uropathy
2	tracheoesophageal fistula
1	trisomy 21, Hypothyroidism - congenital
1	cranial synostosis, hemoglobinopathy, hydronephrosis
1	tracheoesophageal fistula, esophageal atresia; Hydronephrosis -congenital. Malrotation
1	Microcolon, Intussusception - congenital
1	multiple congenital anomalies, inborn error of metabolism
1	syphilis-congenital, jejunal atresia
1	Kidney - Dysplastic, Pulmonary atresia, tetralogy of Fallot
1	atrial flutter, chromosomal abnormality, SVT, SVT, tetralogy of Fallot
1	Choledocal Cyst, Hypothyroidism - congenital, imperforate anus, VATER anomalad, vertebral anomalies
1	obstructive uropathy, intracranial calcifications
1	trisomy 18, oligohydramnios
1	5p-syndrome, Corpus Callosum - Hypoplasia, Kidney - Other Anomalies, Musculoskeletal Anomalies
1	abdominal mass, ambiguous genitalia, cardiomegaly-congenital, cataracts, multiple congenital anomalies, oligohydramnios
1	abdominal mass, Beckwith-Wiedemann syndrome, chromosomal abnormality, Hydronephrosis - congenital, omphalocele
1	abdominal mass, duplicated collecting system, HIV infection-maternal, pyloric stenosis
1	abdominal mass, endocarditis, multiple fractures
1	abdominal mass, Hypothyroidism - congenital, Perforated Bowel - perinatal
1	Abdominal Wall Anomalies
1	absent septum pellucidum, cystic fibrosis, Hirschsprungs disease
1	absent septum pellucidum, hydrocephalus, optic atrophy
1	agenesis of corpus callosum
1	ambiguous genitalia, brain malformation, Hydronephrosis - congenital
1	anophthalmia, dysmorphology, Hydrocephalus - congenital
1	anorectal fistula
1	aqueductal stenosis
1	Arnold-Chiari Syndrome, Hydrocephalus - congenital, meningomyelocele
1	arteriovenous malformation
1	atrial flutter
1	atrioventricular canal, cardiomyopathy, trisomy 21
1	atrioventricular canal, Hypothyroidism - congenital, trisomy 21
1	Biliary cirrhosis
1	Bowel obstruction - congenital, congenital abnormality, congenital heart disease
1	Bowel obstruction - congenital, congenital CMV infection, malrotation, Microcolon
1	Bowel obstruction - congenital, congenital CMV infection, microcephaly
1	Bowel obstruction - congenital, ileal atresia, ileal atresia, Perforated Bowel - perinatal
1	Bowel obstruction - congenital, Intestine - other abnormalities, microcephaly

frequency (# of patients)	Anomaly
1	Bowel obstruction - congenital, oligohydramnios, volvulus
1	Bowel obstruction - congenital, phenylketonuria, volvulus
1	brain malformation, congenital abnormality, imperforate anus, Kidney - Dysplastic
1	cardiomegaly-congenital, congenital CMV infection, Hydronephrosis - congenital, PAPVR (Partial anomalous pulmonary venous return), skeletal dysplasia
1	cardiomegaly-congenital, cystic fibrosis, pyloric stenosis
1	cardiomegaly-congenital, Hemoglobin Barts, Hydronephrosis - congenital
1	cardiomegaly-congenital, right ventricular hypertrophy, Turner syndrome
1	cardiomyopathy, Bowel obstruction - congenital
1	cardiomyopathy, brain malformation
1	cardiomyopathy, cataracts, hemoglobinopathy, hydronephrosis
1	cardiomyopathy, Coarctation of aorta, dysmorphology, Hydronephrosis - congenital
1	cardiomyopathy, hydrops fetalis, Pulmonary Valve Stenosis
1	Cataract - Congenital, anophthalmia
1	Cataract - Congenital, chromosomal abnormality, congenital abnormality, Kidney - Other Anomalies, Kidney - Other Anomalies
1	Cataract - Congenital, esophageal atresia, Hydronephrosis - congenital, microcephaly, tracheoesophageal fistula
1	Cataract - Congenital, esophageal atresia, Hydronephrosis - congenital, microcephaly, tracheoesophageal fistula
1	Cataract - Congenital, Esophageal - other anomalies, Hydronephrosis - congenital
1	cataracts, chromosomal abnormality, club feet, myotonic dystrophy
1	cataracts, cystic fibrosis, herpes-congenital
1	Cerebral Cyst - Congenital
1	choanal atresia
1	Choledocal Cyst
1	Chordee, congenital
1	chromosomal abnormality, congenital heart disease
1	chromosomal abnormality, dwarfism syndrome
1	chromosomal abnormality, esophageal atresia, esophageal atresia, Ribs and Sternum - other abnormalities, tracheoesophageal fistula, tracheoesophageal fistula, VATER anomalad
1	chromosomal abnormality, holoprosencephaly, Hydrocephalus - congenital, renal agenesis
1	chromosomal abnormality, Hydronephrosis - congenital, Hypothyroidism - congenital
1	chromosomal abnormality, laryngeal web
1	chromosomal abnormality, multicystic kidney, Pulmonary Valve Stenosis
1	chromosomal abnormality, multiple fractures
1	chromosomal abnormality, SVT
1	cleft lip and palate, dysmorphology, hemoglobinopathy
1	club feet, congenital abnormality, imperforate anus, Kidney - Other Anomalies, VATER anomalad
1	club feet, Hydrocephalus - congenital, hypoparathyroidism, vertebral anomalies
1	CMV infection, dysmorphology, porencephalic cyst
1	Coarctation of aorta, brain malformation
1	Coarctation of aorta, contractures, oligohydramnios
1	Coarctation of aorta, duodenal atresia, multiple fractures
1	coloboma, CHARGE Association

frequency (# of patients)	Anomaly
1	congenital abnormality, dysmorphology, esophageal atresia, Musculoskeletal Anomalies, VATER anomalad
1	congenital abnormality, dysmorphology, Hydronephrosis - congenital, Pulmonary Valve Stenosis, TAPVR (Total Anomalous Pulmonary Venous Return)
1	congenital abnormality, microcephaly, right ventricular hypertrophy
1	congenital abnormality, omphalocele, transposition of the great vessels
1	congenital adrenal hyperplasia, ambiguous genitalia
1	congenital adrenal hyperplasia, Coarctation of aorta
1	congenital CMV infection, cardiomyopathy
1	congenital CMV infection, diaphragmatic hernia, Kidney - Other Anomalies
1	congenital CMV infection, esophageal atresia, Perforated Bowel - perinatal
1	congenital CMV infection, herpes-congenital, Perforated Bowel - perinatal
1	congenital CMV infection, Hydrocephalus - congenital, Musculoskeletal Anomalies
1	congenital CMV infection, Hydronephrosis - congenital, Urinary System Abnormalities - Unspecified, Urinary System Abnormalities - Unspecified
1	congenital CMV infection, ileal atresia, Microcolon
1	congenital CMV infection, Kidney - Other Anomalies, right ventricular hypertrophy
1	congenital heart disease, dysmorphology, hypoplastic left heart syndrome, lobar emphysema, Scoliosis - congenital, Urinary System Abnormalities - Unspecified
1	congenital heart disease, imperforate anus, trisomy 21
1	congenital heart disease, interrupted aortic arch, multiple congenital anomalies, Skin - anomalies, truncus arteriosus
1	congenital lung cyst
1	congenital CMV infection, Cataract - Congenital
1	contractures, cardiomyopathy
1	contractures, club feet
1	contractures, dysmorphology, hydronephrosis, pyloric stenosis
1	contractures, ectopic kidney, Hirschsprungs disease
1	contractures, herpes-congenital, multiple fractures
1	Cor Triatriatum
1	Corpus Callosum - Hypoplasia
1	cranial synostosis, congenital adrenal hyperplasia
1	cryptorchidism
1	cystic adenomatoid malformation
1	cystic fibrosis, ambiguous genitalia
1	cystic fibrosis, cystic fibrosis, gastroschisis, hydronephrosis
1	cystic fibrosis, diaphragmatic hernia, hydronephrosis
1	cystic fibrosis, hydronephrosis, jejunal atresia
1	cystic fibrosis, Pulmonary Valve Stenosis, SVT
1	cystic fibrosis, right ventricular hypertrophy, scoliosis
1	cystic hygroma, duodenal atresia, esophageal atresia, Pulmonary Valve Stenosis, tracheoesophageal fistula
1	diaphragmatic hernia
1	double outlet right ventricle, Genetic, Genetic, polycystic kidney
1	duodenal atresia, cardiomyopathy
1	duodenal atresia, gastroschisis, multiple congenital anomalies, tracheoesophageal fistula, tracheoesophageal fistula

frequency (# of patients)	Anomaly
1	duodenal atresia, Hydronephrosis - congenital, Hypothyroidism - congenital, malrotation, stridor-congenital laryngeal, trisomy 21
1	duplicated collecting system, esophageal atresia, tracheoesophageal fistula, tricuspid atresia, VATER anomalad
1	dwarfism syndrome, Coarctation of aorta
1	dysmorphology, ambiguous genitalia
1	dysmorphology, Beckwith-Wiedemann syndrome
1	dysmorphology, cleft lip and palate
1	dysmorphology, Coarctation of aorta
1	dysmorphology, congenital abnormality
1	dysmorphology, congenital adrenal hyperplasia
1	dysmorphology, esophageal atresia
1	dysmorphology, gastroschisis
1	dysmorphology, heart disease
1	dysmorphology, hemoglobinopathy, Hydrocephalus - congenital, hydronephrosis, hydronephrosis, tethered cord
1	dysmorphology, herpes-congenital, Pulmonary atresia
1	dysmorphology, Hirschsprungs disease
1	dysmorphology, HIV infection-maternal
1	dysmorphology, HIV infection-maternal
1	dysmorphology, holoprosencephaly, pyloric stenosis
1	dysmorphology, Hydrocephalus - congenital
1	dysmorphology, Hydronephrosis - congenital
1	dysmorphology, hydrops fetalis-non immune, multiple fractures
1	dysmorphology, Hypothyroidism - congenital
1	dysmorphology, Hypothyroidism - congenital
1	dysmorphology, Hypothyroidism - congenital
1	dysmorphology, Kidney - Other Anomalies
1	dysmorphology, Kidney - Other Anomalies
1	dysmorphology, Kidney - Other Anomalies
1	dysmorphology, multiple fractures
1	dysmorphology, omphalocele
1	dysmorphology, polycystic kidney, polycystic kidney, trisomy 21
1	dysmorphology, suspected chromosomal anomaly
1	dysmorphology, syphilis-congenital
1	endocardial cushion defect
1	endocarditis, contractures
1	endocarditis, endocarditis, Perforated Bowel - perinatal, SVT
1	esophageal atresia, Bowel obstruction - congenital
1	esophageal atresia, imperforate anus, malrotation, renal agenesis, tethered cord, tracheoesophageal fistula, VATER anomalad, vertebral anomalies
1	esophageal atresia, PAPVR (Partial anomalous pulmonary venous return), tracheoesophageal fistula, tracheoesophageal fistula
1	esophageal atresia, Perforated Bowel - perinatal, right ventricular hypertrophy, tracheoesophageal fistula
1	exstrophy of the urinary bladder, herpes-congenital, hydronephrosis

frequency (# of patients)	Anomaly
1	factor VIII deficiency
1	gastroschisis, bowel atresia
1	gastroschisis, Perforated Bowel - perinatal, SVT
1	Head and Neck - anomalies of
1	Head and Neck - anomalies of, bowel atresia
1	Heart block - congenital, hydrops fetalis-non immune, Pulmonary Valve Stenosis
1	heart disease, cystic fibrosis
1	heart disease, hydronephrosis, SVT
1	Hemoglobin Barts, congenital CMV infection
1	hemoglobinopathy, congenital adrenal hyperplasia
1	hemoglobinopathy, congenital CMV infection
1	hemoglobinopathy, congenital CMV infection
1	hemoglobinopathy, congenital lung cyst
1	hemoglobinopathy, contractures
1	hemoglobinopathy, hydronephrosis, pyloric stenosis
1	Hirschsprungs disease, hydrocephalus, trisomy 21
1	Hirschsprungs disease, hydrops fetalis-non immune, Pulmonary Valve Stenosis
1	HIV infection-maternal, galactosemia
1	holoprosencephaly
1	Hydrocephalus - congenital, congenital CMV infection
1	Hydrocephalus - congenital, Hypothyroidism - congenital, laryngeal atresia, microphthalmia, Ribs and Sternum - other abnormalites
1	hydrocephalus, ambiguous genitalia
1	hydrocephalus, brain malformation
1	hydrocephalus, cardiomegaly-congenital
1	hydrocephalus, congenital CMV infection
1	hydrocephalus, Dandy-Walker malformation
1	hydrocephalus, endocarditis
1	hydrocephalus, herpes-congenital
1	Hydronephrosis - congenital, abdominal mass
1	Hydronephrosis - congenital, ambiguous genitalia
1	Hydronephrosis - congenital, arthrogryposis multiplex; gastroschisis, bowel atresia!
1	Hydronephrosis - congenital, Cardiomegaly - congenital
1	Hydronephrosis - congenital, cardiomegaly-congenital
1	Hydronephrosis - congenital, congenital CMV infection
1	Hydronephrosis - congenital, contractures
1	Hydronephrosis - congenital, Head and Neck - anomalies of
1	Hydronephrosis - congenital, Hydroureter - congenital, Hypothyroidism - congenital
1	Hydronephrosis - congenital, Hydroureter - congenital, Hypothyroidism - congenital, Kidney - Other Anomalies, Perforated Bowel - perinatal
1	Hydronephrosis - congenital, inborn error of metabolism, Urinary System Abnormalites - Unspecified
1	Hydronephrosis - congenital, Intestinal Obstruction - small, Kidney - Other Anomalies
1	Hydronephrosis - congenital, Kidney - Other Anomalies, Kidney - Other Anomalies, obstructive uropathy

frequency (# of patients)	Anomaly
1	hydronephrosis, abdominal mass
1	hydronephrosis, agenesis of corpus callosum
1	hydronephrosis, cataracts
1	hydronephrosis, coloboma
1	hydronephrosis, congenital abnormality
1	hydronephrosis, congenital adrenal hyperplasia
1	hydronephrosis, congenital CMV infection
1	hydronephrosis, congenital CMV infection
1	hydronephrosis, congenital lung cyst
1	hydronephrosis, Congenital Nephrosis
1	hydronephrosis, contractures
1	hydronephrosis, Cornelia de Lange syndrome
1	hydronephrosis, cystic fibrosis
1	hydronephrosis, cystic fibrosis
1	hydronephrosis, endocarditis
1	hydronephrosis, galactosemia
1	hydronephrosis, gastroschisis
1	hydronephrosis, hemoglobinopathy
1	hydronephrosis, hemoglobinopathy
1	hydronephrosis, hemoglobinopathy
1	hydronephrosis, Hirschsprungs disease
1	hydronephrosis, hydrocephalus
1	hydronephrosis, meningocele, multiple fractures
1	hydronephrosis, multiple fractures, skeletal dysplasia
1	hydronephrosis, multiple fractures, Urinary System Abnormalities - Unspecified
1	hydronephrosis, obstructive uropathy, prune belly syndrome
1	hydrops fetalis-non immune, endocarditis
1	hydrops fetalis-non immune, heart disease
1	Hyperparathyroidism
1	Hyperthyroidism - newborn
1	hypoparathyroidism, Hydronephrosis - congenital
1	hypopituitarism, Genetic
1	Hypothyroidism - congenital, Bowel obstruction - congenital
1	Hypothyroidism - congenital, Cataract - Congenital
1	Hypothyroidism - congenital, congenital adrenal hyperplasia
1	Hypothyroidism - congenital, congenital CMV infection
1	Hypothyroidism - congenital, endocarditis
1	Hypothyroidism - congenital, Hydrocephalus - congenital
1	Hypothyroidism - congenital, Hydrocephalus - congenital
1	Hypothyroidism - congenital, Hydronephrosis - congenital
1	Hypothyroidism - congenital, Hydronephrosis - congenital
1	Hypothyroidism - congenital, Hydronephrosis - congenital

frequency (# of patients)	Anomaly
1	Hypothyroidism - congenital, Hydronephrosis - congenital
1	Hypothyroidism - congenital, hydrops fetalis-non immune
1	Hypothyroidism - congenital, inborn error of metabolism, Intestinal Obstruction - small
1	ileal atresia, cardiomyopathy
1	ileal atresia, cystic fibrosis
1	inborn error of metabolism, congenital CMV infection
1	inborn error of metabolism, cystic fibrosis
1	inborn error of metabolism, herpes-congenital
1	inborn error of metabolism, hydronephrosis
1	inborn error of metabolism, hydronephrosis
1	inborn error of metabolism, Hydronephrosis - congenital
1	inborn error of metabolism, Hyperthyroidism - newborn
1	inborn error of metabolism, Hyperthyroidism - newborn
1	inborn error of metabolism, Hypothyroidism - congenital
1	intestinal atresia, gastroschisis
1	Intestinal Obstruction - small, Abdominal Wall Anomalies
1	Intestinal Obstruction - small, contractures
1	Intestinal Obstruction - small, Diaphragm - abnormalities
1	Intestinal Obstruction - small, gastroschisis
1	Intestinal Obstruction - small, Hydronephrosis - congenital
1	intracranial calcifications, abdominal mass
1	jejunal atresia, Coarctation of aorta
1	jejunal atresia, hydrops fetalis-non immune
1	Kidney - Dysplastic
1	Kidney - Dysplastic, inborn error of metabolism
1	Kidney - Other Anomalies, Hydronephrosis - congenital
1	Kidney - Other Anomalies, Hypothyroidism - congenital
1	Kidney - Other Anomalies, Hypothyroidism - congenital
1	Klinefelter syndrome
1	laryngeal atresia
1	Larynx - Anomalies of, malrotation, stenosis of larynx
1	lobar emphysema
1	Lung - Agenesis, congenital CMV infection
1	lupus erythematosus
1	macrocephaly, hydronephrosis
1	malrotation, congenital adrenal hyperplasia
1	malrotation, congenital CMV infection
1	malrotation, Hypothyroidism - congenital
1	malrotation, inborn error of metabolism
1	malrotation, right ventricular hypertrophy, volvulus
1	microcephaly, Bowel obstruction - congenital
1	microcephaly, cardiomyopathy

frequency (# of patients)	Anomaly
1	microcephaly, cardiomyopathy
1	microcephaly, congenital CMV infection
1	microcephaly, cryptorchidism
1	microcephaly, cystic fibrosis
1	microcephaly, fetal alcohol syndrome
1	microcephaly, galactosemia
1	microcephaly, Hypothyroidism - congenital
1	microcephaly, Hypothyroidism - congenital
1	microcephaly, lupus erythematosus
1	Microcolon, Intestinal Obstruction - large
1	Mitral Stenosis - congenital, multiple congenital anomalies, tetralogy of Fallot
1	multicystic kidney
1	multiple congenital anomalies, agenesis of corpus callosum
1	multiple congenital anomalies, brain malformation
1	multiple fractures, abdominal mass
1	multiple fractures, cardiomyopathy
1	multiple fractures, club feet
1	multiple fractures, congenital CMV infection
1	multiple fractures, hemoglobinopathy
1	multiple fractures, hydronephrosis
1	multiple fractures, hydronephrosis
1	multiple fractures, Hydronephrosis - congenital
1	multiple fractures, Hypothyroidism - congenital
1	multiple fractures, Hypothyroidism - congenital
1	multiple fractures, malrotation
1	multiple fractures, microcephaly
1	multiple fractures, multicystic kidney
1	multiple fractures, multiple congenital anomalies
1	Muscular Dystrophy - congenital, Hypotonia - congenital
1	Musculoskeletal Anomalies, hydronephrosis
1	Nystagmus - congenital
1	obstruction-large bowel-congenital, cystic fibrosis
1	obstructive uropathy, cardiomegaly-congenital
1	oligohydramnios, Hypothyroidism - congenital
1	omphalocele, Beckwith-Wiedemann syndrome; hydronephrosis. congenital CMV infection!
1	omphalocele, congenital CMV infection
1	omphalocele, SVT, Urinary System Abnormalities - Unspecified
1	optic atrophy
1	osteogenesis imperfecta
1	osteogenesis imperfecta, microcephaly
1	Perforated Bowel - perinatal, Cataract - Congenital
1	Perforated Bowel - perinatal, Intestine - other abnormalities

frequency (# of patients)	Anomaly
1	Perforated Bowel - perinatal, Intussusception - congenital
1	Perforated Bowel - perinatal, jejunal atresia
1	Perforated Bowel - perinatal, multiple fractures
1	phenylketonuria, congenital CMV infection
1	phenylketonuria, hydronephrosis
1	polycystic kidney
1	Polycystic lung
1	porencephalic cyst, Aortic Valvular Stenosis
1	porencephalic cyst, cleft lip and palate
1	porencephalic cyst, galactosemia
1	porencephalic cyst, gastroschisis
1	porencephalic cyst, hemoglobinopathy
1	porencephalic cyst, hydrocephalus
1	porencephalic cyst, hydronephrosis
1	porencephalic cyst, hydronephrosis
1	porencephalic cyst, Hydronephrosis - congenital
1	porencephalic cyst, Hydronephrosis - congenital
1	porencephalic cyst, myotonic dystrophy
1	porencephalic cyst, Perforated Bowel - perinatal
1	Prader-Willi Syndrome, Hydronephrosis - congenital
1	Pulmonary Valve Stenosis, cardiomyopathy; hydrops fetalis. congenital CMV infection!
1	Pulmonary Valve Stenosis, CHARGE Association
1	Pulmonary Valve Stenosis, cleft lip and palate
1	Pulmonary Valve Stenosis, congenital CMV infection
1	Pulmonary Valve Stenosis, contractures
1	Pulmonary Valve Stenosis, galactosemia
1	Pulmonary Valve Stenosis, HIV infection
1	Pulmonary Valve Stenosis, hydrocephalus
1	Pulmonary Valve Stenosis, hydrocephalus
1	Pulmonary Valve Stenosis, hydronephrosis
1	Pulmonary Valve Stenosis, hydrops fetalis
1	Pulmonary Valve Stenosis, Hypothyroidism - congenital
1	Pulmonary Valve Stenosis, inborn error of metabolism
1	Pulmonary Valve Stenosis, Perforated Bowel - perinatal
1	pyloric stenosis, congenital CMV infection
1	pyloric stenosis, hemoglobinopathy
1	pyloric stenosis, hydronephrosis
1	pyloric stenosis, Hydronephrosis - congenital
1	pyloric stenosis, Hydronephrosis - congenital
1	pyloric stenosis, Hypotonia - congenital
1	pyloric stenosis, myopathy
1	renal agenesis

frequency (# of patients)	Anomaly
1	rib anomalies
1	rib anomalies, club feet
1	Ribs and Sternum - other abnormalites
1	Ribs and Sternum - other abnormalites, Kidney - Other Anomalies
1	right ventricular hypertrophy, ambiguous genitalia
1	right ventricular hypertrophy, cystic fibrosis
1	right ventricular hypertrophy, endocarditis
1	right ventricular hypertrophy, hydronephrosis
1	right ventricular hypertrophy, Hyperthyroidism - newborn
1	right ventricular hypertrophy, macrocephaly
1	right ventricular hypertrophy, porencephalic cyst
1	right ventricular hypertrophy, Pulmonary Valve Stenosis
1	right ventricular hypertrophy, Sclerema neonatorum, scoliosis
1	Sclerema neonatorum
1	Sclerema neonatorum, Hydronephrosis - congenital
1	scoliosis
1	Skin - anomalies, Hemoglobin S Trait
1	Skin - anomalies, Hydronephrosis - congenital
1	Skin - anomalies, inborn error of metabolism
1	stenosis of larynx, hydrocephalus
1	stenosis of larynx, Hypothyroidism - congenital
1	stenosis of larynx, Larynx - Anomalies of
1	stenosis of larynx, phenylketonuria
1	stenosis of larynx, Pulmonary Valve Stenosis
1	Stridor - Congenital Laryngeal
1	Stridor - Congenital Laryngeal, Kidney - Other Anomalies
1	stridor-congenital laryngeal, Hypothyroidism - congenital
1	SVT, cystic fibrosis
1	SVT, Hemoglobin Barts
1	SVT, hydronephrosis
1	SVT, Hydronephrosis - congenital
1	SVT, Perforated Bowel - perinatal
1	SVT, stenosis of larynx
1	talipes equinovarus, Hypothyroidism - congenital
1	talipes equinovarus, Skin - anomalies
1	tethered cord, hydronephrosis
1	toxoplasmosis, hydrocephalus
1	Trachea - Anomalies of
1	tracheoesophageal fistula, double outlet right ventricle
1	transposition of the great vessels, contractures
1	trisomy 13, imperforate anus
1	trisomy 18, Hydronephrosis - congenital

frequency (# of patients)	Anomaly
1	trisomy 21, atrioventricular canal
1	trisomy 21, contractures
1	trisomy 21, dysmorphology
1	trisomy 21, Hydrocephalus - congenital
1	Turner syndrome
1	ureterocele, Hydronephrosis - congenital
1	urethral atresia, right ventricular hypertrophy
1	Urinary System Abnormalities - Unspecified, congenital CMV infection
1	Urinary System Abnormalities - Unspecified, Hydronephrosis - congenital
1	Urinary System Abnormalities - Unspecified, Hydronephrosis - congenital
1	VATER anomaly, Musculoskeletal Anomalies
1	VATER anomaly, tracheoesophageal fistula
1	vertebral anomalies
1	vertebral anomalies, multiple congenital anomalies
1	Wolff-Parkinson-White syndrome
1	Wolff-Parkinson-White syndrome, Pulmonary Valve Stenosis