Evaluation of epidemiologic indices of neonate's diseases in the Pediatric Surgery Ward of the Ahvaz Jundishapur University hospitals during the period 1993–1996 and 2002–2005

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Introduction and aim **The neonatal period is a critical time for infants, and 2/3 of first-year mortality occurs during this period. In developing countries, surgical diseases are the most important cause of neonatal mortality. Mortality was reduced in the past decade due to the availability of well-trained pediatric surgeons and the development of sophisticated instruments. The aim of this study was to show neonatal mortality and other indices in the period when there were no pediatric surgeons compared with the period when pediatric surgeons were available.**

Patients and methods **This retrospective study was conducted in the Imam Khomeini and Abuzar Hospital during the period 1993–1996 and 2002–2005. All neonates admitted in the surgical wards of the Imam Khomeini and Abuzar Hospital were included in this study. Only cases of those patients who died before data accumulation was completed or discharged against medical advice were excluded from our study. In the first period, no pediatric surgeon was available and all surgeries were performed by general surgeons. In the second period, pediatric surgeons were available. Data were statistically analyzed and χ^2-test was used to compare noncategorical data. A *P* value of less than 0.05 was considered to be significant. This study was approved by the ethics committee of the hospital, and no intervention was used.**

Results **In our study, 88 cases (males = 60.2%, female = 39.8%) in the first period and 452 cases (males = 61.7%, females = 38.3%) in the second period were included. The mean age at admission time in the first and second period was 6 days for both groups. The mean weights in the first and second period were 2886 ± 766 g and 2915 ± 658 g, respectively. The mean lengths of hospital stay in the first and second period were 5 days and 10.5 days, respectively. In the first period, 68 cases (37.3%) were admitted in the first 7 days of life and 54 cases (61.4%) had a birth weight of 2500–3500 g. Of the 88 cases, 40 cases died (45.5%). In the second period, 353 cases (78.1%) were admitted in the first 7 days of life and 278 cases (61.5%) had a birth weight of 2500–3500 g. Of the 452 cases, 101 cases died (22.3%).**

Conclusion **In our study, the most common surgical diseases in both the periods were imperforate anus, esophageal atresia with or without tracheoesophageal fistula (TEF), Hirschsprung's disease, and jejunoileal atresia; these were similar to results found in other studies.** ***Ann Pediatr Surg*** **7:7–9 © 2011 Annals of Pediatric Surgery**

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Introduction

Neonatal period is a critical time for infants, and 2/3 of first-year mortality occurs during this period. In developing countries, surgical diseases are the most important cause of neonatal mortality. Mortality was reduced in the past decade due to the availability of well-trained pediatric surgeons and the development of sophisticated instruments. Inguinal hernia is one of the most common surgical problems of infancy and childhood. It occurs in 0.8–4.4% of children [1]; however, in premature infants, the incidence may increase to 30%, depending on the age of the gestation [2]. The aim of this study was to evaluate the mortality and survival rates of most common surgical anomalies in our institute in the period when there were no pediatric surgeons compared with the period when there were well-trained pediatric surgical staffs.

Patients and methods

This is a retrospective study, in which files of all neonates admitted in the Imam Khomeni Hospital and Abuzar Pediatric Center during the period 1993–1996 (period 1) and 2002–2005 (period 2) were studied. Patients discharged before treatment or who expired before data accumulation was completed were excluded from our study. In the first period of study, no pediatric surgeon was available. In the second period of study, pediatric surgeons worked in the university hospital as academic staff. Data were statistically analyzed using SPSS Software version. 13 (Chicago, Illinois, USA) and χ^2-test was used to compare noncategorical data. A *P* value of less than 0.05 was considered to be significant. This study was approved by the hospital ethics committee.

Results

In our study, 88 cases (males = 60.2%, females = 39.8%) in the first period and 452 cases (males = 61.7%, females = 38.3%) in the second period were included. The mean age at admission time in the first and second period was 6 days for both groups. The mean weights for the first

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and second period were 2886 ± 766 g and 2915 ± 658 g, respectively. The mean lengths of hospital stay for the first and second period were 5 days and 10.5 days, respectively. In the first period, 68 cases (37.3%) were admitted in the first 7 days of life and 54 cases (61.4%) had a birth weight of 2500–3500 g. Of the 88 cases, 40 cases died (45.5%). In the second period, 353 cases (78.1%) were admitted in the first 7 days of life and 278 cases (61.5%) had a birth weight of 2500–3500 g. Of the 452 cases, 101 cases died (22.3%). Mortality rate was significantly lower in the second period of study compared with the first period (P value $= 0.000006$) (Tables 1–3).

Discussion

Mortality rate was higher in the first period of study than a study carried out in Ethiopia (30%), and in the second period, the mortality rate was less [3]. Mortality in our study in the second period was similar to studies carried out in Nigeria [4] (21.1%) and Iraq (22%) [5]. The most common surgical pathology in both periods was imperforate anus and this is similar to studies carried out in Ethiopia, Nigeria, and Iraq [1–3]. Imperforate anus, esophageal atresia with or without associated TEF, and jejunoileal atresia were the most common anomalies in the first period. Imperforate anus, esophageal atresia with our without associated TEF, and Hirschsprung's disease were found to be the most common anomalies in the second period of study. These findings are similar to that of Tefera *et al*'s [3] study. In our study, the second most common anomaly in both periods was esophageal atresia with or without associated TEF with a rate of 13.6% and 15% in the first and second period, respectively.

In our study, mortality rates were 75% and 58.8 in the first and second period, respectively. Tefera *et al.* [3] reported 91.7% mortality for esophageal atresia. In Peyvasteh *et al.* [6] the mortality rate was 29.16% (21 patients died, 2 patients were excluded, and 51 cases were included) from 74 cases with esophageal atresia. Hirschsprung's disease was the fourth most common anomaly during the first period and the third most common anomaly during the second period of study. In the study carried out in Nigeria, 7.3% of cases had Hirschsprung's disease [4]. In a previous study by the same researcher, the male to female ratio in Hirschsprung's disease was 2 : 1, and 61.6% of patients were diagnosed in the first 48 h of the neonatal period [7]. In this study, the male to female ratio for Hirschsprung's disease was 3.54 : 1. The rates of mortality among cases with congenital diaphragmatic hernia were 66.7% in the first period and 26.3% in the second period of study. The rate of mortality was higher in the first period and similar in the second period, compared with a study carried out in Taiwan [8]. The rate of colonic atresia was less than that of Nasir *et al*'s [5] study. In our study, a meconium ileus was found in 2.3% of patients in the first period and in 2.4% of patients in

Table 1 Most common anomaly during two periods of study (in descending order)[a]

First period (n, %)	Second period (n, %)
Imperforate anus (22, 25%)	Imperforate anus (106, 23.5%)
EA with or without TEF (12, 13.6%)	EA with or without TEF (68, 15%)
Jejunoileal atresia (9, 10.2%)	Hirschsprung's disease (50, 11.1%)
Hirschsprung's disease (8, 9.1%)	Jejunoileal atresia (47, 9.9%)
Omphalocele (6, 6.8%)	Intestinal obstruction (31, 7.7%)
Intestinal obstruction (6, 6.81%)	Omphalocele (22, 4.9%)
Inguinal hernia (4, 4.5%)	Congenital diaphragmatic hernia (19, 4.2)
Inguinal hernia (4, 4.5%)	Hypertrophic pyloric stenosis (19, 4.2%)
Hypertrophic pyloric stenosis (4, 4.5%)	Meconium ileus (11, 2.4%)
Congenital diaphragmatic hernia (3, 3.4%)	Duodenal atresia (11, 2.4%)
Gastroschisis (2, 2.72%)	Bladder extrophy (10, 2.21%)
Meconium ileus (2, 2.3)	Inguinal hernia (10, 2.21%)
Duodenal atresia (2, 2.3%)	Umbilical cord hernia (10, 2.21%)
Malrotation (2, 2.27%)	Gastroschisis (7, 1.54%)
Hydronephrosis (1, 1.136%)	Ovarian cyst (6, 1.32%)
Ovarian cyst (1, 1.136%)	Abdominal mass (6, 1.32%)
	Hydronephrosis (5, 1.10%)
	Breast abscess (3, 0.66%)
	Malrotation (3, 0.66%)
	Midgut volvulus (2, 0.44%)
	Colonic atresia (2, 0.4)
	Hypospadias (2, 0.44%)
	Pneumothorax (1, 0.22%)
	Pyloric atresia (1, 0.2%)
Total (88, 100%)	Total (452, 100%)

EA, esophageal atresia.
[a]The table shows that imperforate anus is the most common anomaly in both periods.

Table 3 Mortality rate among patients in two periods of the study (P value = 0.000006, d.f. = 1, $\chi^2 = 20.39$)[a]

Mortality rate	Total	N (%)
First period	88	40 (45.5%)
Second period	452	101 (22.3%)

[a]Mortality rate was significantly lower in the second period of the study compared with the first period of the study (P value = 0.000006).

Table 2 Surgical pathology and mortality in the two periods of study

	First period				Second period			
	Male	Female			Male	Female		
	n (%)	n (%)	Overall mortality	Mean weight	n (%)	n (%)	Overall mortality	Mean weight
Disease								
Imperforate anus	14 (63.6)	8 (36.4)	6/22 (27.3%)	2904	64 (60.4)	42 (39.6)	14/106 (13.2%)	2926
Esophageal atresia	4 (33.3)	8 (66.7)	9/12 (75%)	2590	35 (51.5)	33 (48.5)	40/68 (58.82%)	2605
Jejunoileal atresia	4 (44.5)	5 (55.5)	6/9 (66.7%)	2611	25 (53.2)	22 (46.8)	15/47 (31.9%)	2732
Hirschsprung's disease	6 (75)	2 (25)	2/8 (25%)	3145	39 (78)	11 (22)	2/50 (4%)	2967
Pyloric stenosis	4 (100)	0 (0)	0/4 (0%)	3775	18 (94.7)	19 (5.3)	0/19 (0%)	3265
Omphalocele	6 (100)	0 (0)	4/6 (66.7%)	2925	14 (63.6)	8 (36.4)	5/22 (22.72%)	3075
Inguinal hernia	3 (75)	1 (25)	0/4 (0%)	3812	10 (100)	0 (0)	0/10 (0%)	3770
Diaphragmatic hernia	1 (33.3)	2 (66.7)	2/3 (66.7%)	2866	8 (42)	11 (58)	5/19 (26.31%)	2873
Gastroschisis	1 (50)	1 (50)	2/2 (100%)	2475	4 (57)	3 (43)	6/7 (85.71)	2416
Umbilical cord hernia	0 (0)	0 (0)	–		7 (70)	3 (30)	0/10 (0%)	3100

the second period of study, which was less than Nasir *et al*'s [5] study that showed 11.1%. In our study, in both periods, mortality rate from gastroschisis was higher than omphalocele, which differs from Salihu *et al*'s study [9]. In the past, omphalocele was clearly the most common type of newborn abdominal wall defect; however, the global incidence of gastroschisis seems to be increasing as noted from reports of some studies [10–12]. In our study, in both periods, male was the predominant sex in inguinal hernia and this is similar to other studies [13,14].

References

1 Herba A. Pediatric hernias. Available at *http://emedicine.medscape.com*.
2 Alexander F. Inguinal hernia and hydrocele. In: Wyllie R, Hyams JS (editors). *Pediatric Gastrointestinal and Liver Disease*. Philadelphia: Saunders, USA; 2006. pp. 723–726.
3 Tefera E, Teka T, Derbew M. Neonatal gastrointestinal surgical emergencies: a 5-year review in a teaching hospital Addis Ababa, Ethiopia. *Ethiop Med J* 2007; **45**:251–256.
4 Ameh EA, Chirdan LB. Neonatal intestinal obstruction in Zaria, Nigeria. *East Afr Med J* 2000; **77**:510–513.
5 Nasir GA, Rahma S, Kadim AH. Neonatal intestinal obstruction. *East Mediterr Health J* 2000; **6**:187–193.
6 Peyvasteh M, Askarpour S, Shoushtari MHS. A study of esophageal strictures after surgical repair of esophageal atresia. *Pak J Med Sci* 2006; **22**:269–272.
7 Askarpour S, Samimi K. Epidemiologic and clinical specifications of patients with Hirschsprung's disease in Khouzestan province Iran. *J Surg Pak (Int)* 2008; **13**:75–78.
8 Chu SM, Hsieh WS, Lin JN, Yang PH, Fu RH, Kuo CY. Treatment and outcome of congenital diaphragmatic hernia. *J Formos Med Assoc* 2000; **99**:844–847.
9 Salihu HM, Aliyu ZY, Pierre Louis BJ, Obuseh FA, Druschel CM, Kirby RS. Omphalocele and gastroschisis: Black-white disparity in infant survival. *Birth Defects Res Clin Mol Teratol* 2004; **70**:586–591.
10 Cooney DR. Defects of the abdominal wall. In: O'Neill J, Rowe M, Grosfeld J, Fonkalsrud EW, Coran AG, editors. *Pediatric surgery*. 5th ed. St Louis, MO: Mosby; 1998. pp. 1045–1069.
11 Hougland KT, Hanna AM, Meyers R, Null D. Increasing prevalence of gastroschisis in Utah. *J Pediatr Surg* 2005; **40**:535–540.
12 Martinez Frias ML, Salvador J, Prieto L, Zaplana J. Epidemiological study of gastroschisis and omphalocele in Spain. *Teratology* 1984; **29**: 377–382.
13 Inguinal hernia. Available at *http://digestive.niddk.nih.gov*.
14 Ghoroubi J, Imanzadeh F, Askarpour S, Sayyari AA, Ahadi MMS, Javaherizadeh H. Ten years study of inguinal hernia in children. *J Surg Pak* 2008; **13**:173–174.