ORIGINAL ARTICLE

Neonatal Intestinal Obstruction an Analysis of Hospital Data at Pediatric Surgery Department Sheikh Zayed Hospital, Rahim Yar Khan

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ABSTRACT

Aim: To identify the incidence, etiology and outcome of intestinal obstruction in neonates at Pediatric Surgery Department Sheikh Zayed Hospital Rahim Yar Khan.
Setting: Department of Pediatric Surgery Sheikh Zayed Medical College, Rahim Yar Khan
Duration with dates: One year (12months) from July -2012 to June-2013
Sample size: Total 140 cases of neonatal intestinal obstruction were included in the study.
Study Design: Analytical type
Methods: All neonates presenting in emergency or outpatient department due to intestinal obstruction were included in the study. Here neonates were defined as an infant's from birth to 30 days of life. A comprehensive performa including age, sex, clinical presentation, final diagnosis, treatment mode and outcome was prepared and compiled by the ward registrar.
Results: Out of 140 neonates, 98 (70%) were male and 42 (30%) were female. Maximum number of patients presented in first week of life, 86 (61.42%). Fourteen patients (10%) and 8 patients (5.71%) presented in second and third week of life respectively. Only 32 patients (22.86%) presented in 4th week of life. Absolute constipation and distension abdomen were the commonest symptoms of presentation. Other symptoms were vomiting, frothing from mouth, bleeding per rectum and loss of thrive. Most common cause of admission was imperforate anus 29(20.71%). Other causes were Hirschsprung's disease 16(11.43%), Meconeum ileus 12(8.57%), Small bowel atresia 11(7.86%), Malrotation gut 10(7.14%), Necrotizing enterocollitis 10(7.14%), Duodenal atresia 8(5.71%), Tracheoesophageal fistula 8(5.71%), Obstructed inguinal hernia 8(5.71%), Adhesion obstruction 6(4.28%), Meconeum plug syndrome 6(4.28%), Gastroschiasis/omphalocele 5(3.57%), Band obstruction 4(2.86%), Cecal volvulus 2(1.37%), Cloacal exstrophy 2(1.37%), Rectal atresia 1(0.685%), **Conclusion:** The antenatal history, initial presentation, physical examination, and plain radiographs frequently can establish the diagnosis. Management of intestinal obstruction will almost always be surgical, apart from some notable exceptions.
Keywords: Imperforate anus, Neonatal intestinal obstruction, Morbidity.

INTRODUCTION

Obstruction of an infant's gastrointestinal tract can occur anywhere from the esophagus to the anus.Neonatal bowel obstruction or neonatal intestinal obstruction (NIO) is the most common surgical emergency in the neonatal period[1].

The majority of neonatal intestinal obstruction present soon after birth in the first few days. This obstruction may occur due to a variety of conditions and has an excellent outcome based on timely diagnosis and appropriate intervention[2].

The pathological process which lead to bowel obstruction at birth can be divided into three groups; an intrinsic structural abnormality of the bowel; an atresia secondary to occlusion of the vessel in utro; and a functional obstruction caused by inflammation or defective innervation[3].

The incidence of NIO is approximately 1 in 5,000 live births.[4] Many cases still die undiagnosed and untreated. The desired goal of healthy survival of neonatal intestinal obstruction requires a coordinated interaction of medical, nursing and rehabilitative specialties in an organized team. Early surgical intervention is paramount and may mean all the difference between intestinal salvage and crippling short gut syndrome. The typical case of neonatal bowel obstruction is generally straightforward, and the outcome is potentially excellent. Only very preterm babies and those of extremely low birth weight may succumb.

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The initial presenting signs and symptoms of neonatal intestinal obstruction are varied and include frothy oral secretions, poor feeding, bilious or non bilious vomiting, abdominal distension and absent or delayed passage of meconeum. The timing and nature of each presenting finding can provide very useful information about the etiology of intestinal obstruction.

Pathology of the gastrointestinal tract is a significant cause of morbidity and mortality in the neonatal period[5]. The antenatal history, initial presentation, physical examination, and plain radiographs frequently can establish the diagnosis. The choice of additional diagnostic imaging, such as an upper or lower gastrointestinal series or ultrasound, should be based on the results of the initial workup. The basic principle of treating neonatal intestinal obstruction is to relieve the mechanical obstruction, whether the cause is due to luminal or extra luminal obstruction. Infants may be presented not only to the neonatologist, general pediatrician or pediatric surgeon but also to the obstetrician and general practitioner. Because of this fact, it is important to be aware of these diseases, their clinical features and diagnostic and therapeutic approach to them.

PATIENTS AND METHODS

This analytical type study was carried out in pediatric surgery department, Sheikh Zayed Medical College/ Hospital Rahim Yar Khan which is a tertiary care hospital and drains large number of patients from southern Punjab, upper Sindh and Baluchistan from July 2012 to June 2013. Total 140 neonates of intestinal obstruction were included in the study. Sampling technique was non probability convenience sampling. All neonates fulfilling the criteria of intestinal obstruction were included in the study. Infants more than 30 days and patients operated elsewhere due to obstruction and referred due to surgery complications were excluded from the study.

One hundred and forty patients fulfilling the inclusion criteria were included in the study. A comprehensive proforma including demographics, clinical presentation, diagnosis, treatment mode and outcome was prepared. All data was collected and then analyzed by SPSS version 16. Data was collected prospectively and included patient's demographics, clinical presentation, diagnosis, treatment mode and outcome. Statistical analysis was carried out using SPSS version 16. Chi-square analysis was used to compare proportions between different groups. Student's t-test was used to evaluate differences between sample means. P-value of less than 0.05 was considered statistically significant.

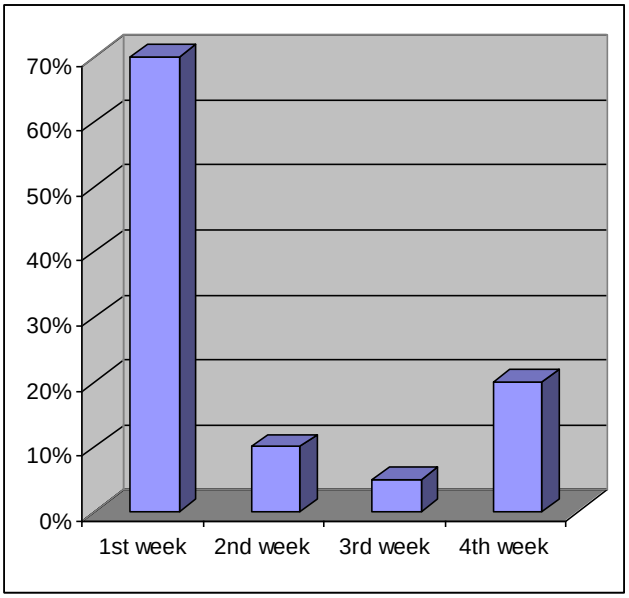
RESULTS

The patients in this study were predominantly male. Out of 140 neonates 98(70%) were male and 42(30%) were females (Table 1).

Table 1: Sex of patients

Gender	n	%age
Male	98	70
Female	42	30

Age of patients



Presentation of neonates in first, second, third and fourth week was as under (Table 2).

Table 2: Age of patients

	n	%age
1st week	86	61.42
2nd week	14	10
3rd week	08	5.72
4th week	32	22.86

Intestinal obstruction in the newborn infant may be due to a variety of conditions, including Imperforate anus, Hirschsprung disease, Meconeum ileus, Small bowel atresia, Malrotation gut, Necrotizing enterocollitis, Duodenal atresia, Tracheoesophageal fistula, Obstructed inguinal hernia, Adhesion obstruction, Meconeum plug syndrome, Abdominal wall defects, Band obstruction, Cecal volvulus, Cloacalexestrophy, Rectal atresia, Duplication cyst abdomen and Vacteral anomaly (Table 3).

Table 3: Etiology of admission (n=140)

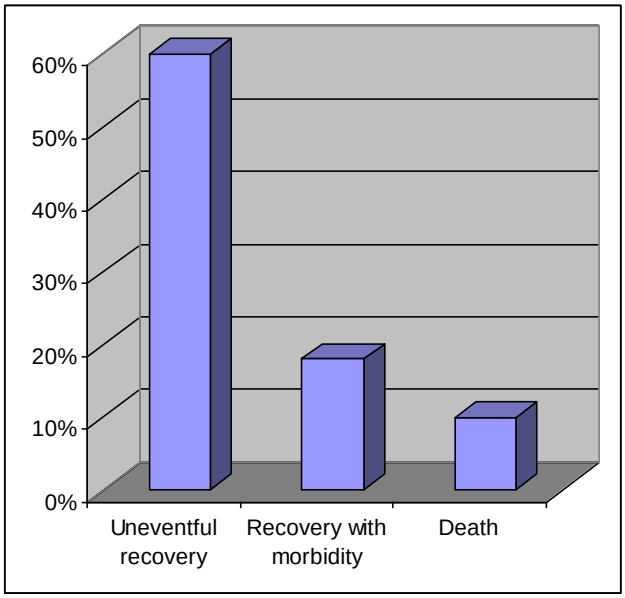
Etiology	n	%age
Imperforate anus	29	20.71
Hirschsprung's disease	16	11.43
Meconeum ileus	12	8.57
Small bowel atresia	11	7.86
Malrotation gut	10	7.14
Necrotizing enterocollitis	10	7.14
Duodenal atresia	8	5.71
Tracheoesophageal fistula	8	5.71
Obstructed inguinal hernia	8	5.71
Band obstruction/ adhesion obstruction	6	4.286
Meconeum plug syndrome	6	4.286
Gastroschiasis/omphalocele	5	3.57
Pyloric web/diaphragm	4	2.86
Cecal volvulus	2	1.37
CloacalExestrophy	2	1.37
Rectal atresia	1	0.685
Duplication cyst abdomen	1	0.685
Vacteral anomaly	1	0.685

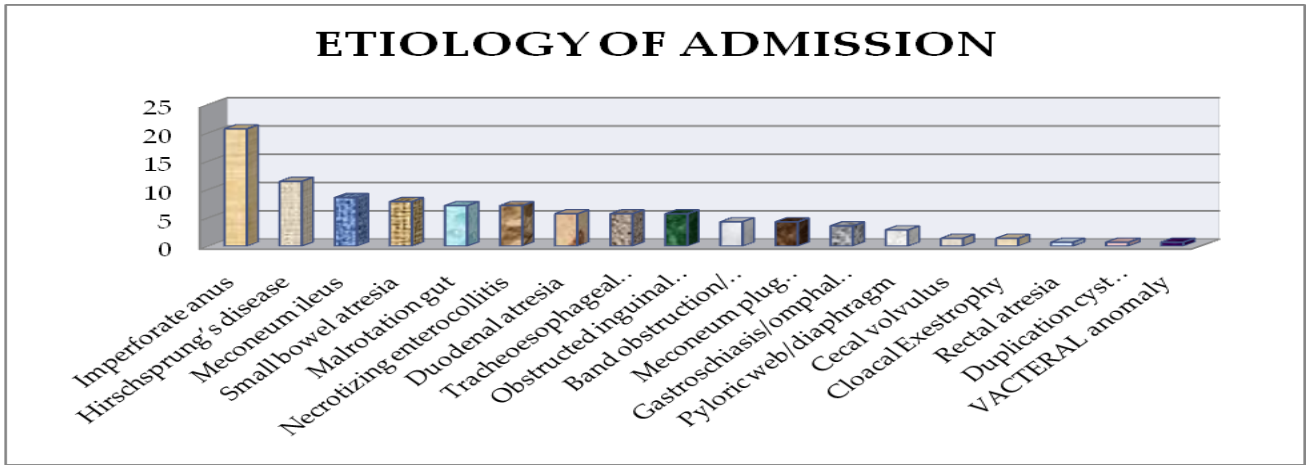
After surgical management results were as under (Table 4).

Table 4: Outcome after menegement

Outcome	n	%age
Uneventful recovery	98	70
Recovery with morbidity	29	20.72
Death	13	9.28

Outcome after management





DISCUSSION

Neonatal intestinal obstruction is the most common surgical emergency in a newborn[6]. Although, large numbers of newborns are operated in our country, limited published literature is available on advances in diagnosis, and management of this problem with outcome analysis in newborns. In this study an effort is done to find the incidence of neonatal obstruction along with outcome.

In our study neonatal intestinal obstruction (NIO) was commonly seen in males 98(70%) while females were effected only 42(30%). In another study conducted in Nigeria males were 42(66.67%) and females were only 21(33.33%)[7]. Similarly in another study, out of 71 neonates 52(72.22%) were males and 19(26.76%) were females[8]. According to Ameh EA, male female ratio was 3:1[14].

In our study 86(61.42%) neonates presented in first week of life. While in other studies conducted at Nigeria mean age of presentation for intestinal obstruction was 7.9±2.7 days[8] and about 44(71.4%)[7] neonates presented in first week of life. Median age at presentation was four days (range 5 hours to 28 days) in a study conducted at Ahmadu Bello University[14]. Maximum number of neonates

presented in first week of life in many other studies, this was because of imperforate anus and intestinal atresia's which presented in first few days. Thirty two (22.86%) children presented in 4th week of life. These children were mostly suffering from acquired disorders. Imperforate anus was the commonest cause of intestinal obstruction in our study. Twenty nine (20.76%) neonates were suffering from high variety imperforate anus in which sigmoid colostomy was made as an emergency procedure followed by PSARP and colostomy reversal. In many other studies anorectal malformation is the leading cause of neonatal intestinal obstruction 39.40%[8], 57.1%[7], 27.8%[13].

Second commonest cause of neonatal intestinal obstruction was Hirschsprung disease 16(11.43%). While the incidence found in other studies was 8(11.3%)[8]. Meconeum was unable to pass through the aperistaltic segment and leads to a functional obstruction with secondary proximal dilatation. Pathological confirmation of Hirschsprung disease was obtained by rectal biopsy which showed absence of ganglion cells and overgrowth of presynaptic-neurofibrils. Colostomy from dilated ganglionic segment, followed by modified Duhamel procedure with the help of proximate linear cutter was the treatment option.

Meconium Ileus (MI) is defined as small bowel obstruction in the newborn period caused by inspissated meconium within the terminal ileum[10,11]**.** It was the third commonest cause of intestinal obstruction 13(9.28%) in my study. Meconeum ileus was characterized by extremely viscid, protein-rich inspissated meconium causing terminal ileal obstruction, and accounts for approximately 20% of neonatal intestinal obstructions[12]. There are well recognized association between meconeum ileus and cystic fibrosis but in our study no case of cystic fibrosis was diagnosed. In another study, out of 36 cases of neonatal intestinal obstruction, meconeum ileus was observed in 4(11.1%)[13]. Patients with uncomplicated meconium ileus may be successfully treated with hypertonic enemas performed while adequate intravenous fluid is maintained. Immediate surgery is indicated for infants with complicated meconium ileus or where conservative treatment fails.

Small bowel atresia was seen in 11(7.86%) cases.Jejuno-ileum was the commonest site of intestinal obstruction in our study as well as in another study conducted in Nigeria[21]. Jejuno-ileal atresias have been categorized into type I (mucosal web), type II (atretic fibrous cord), type IIIa (V-shaped mesenteric defect), type IIIb ('apple peel atresia'), and type IV[23]. The management of neonates with intestinal atresia has improved in recent decades due to refinements in neonatal intensive care, operative technique, use of total parenteral nutrition (TPN), and neonatal anesthesia. Incidence of intestinal atresia in another study was 8(11.3%)[8].

Malrotation gut was seen in ten patients (7.14%) while in another study it was 6(8.5%)[8]. Intestinal malrotation in the newborn is usually diagnosed after signs of intestinal obstruction, such as bilious emesis, and corrected with the Ladd procedure[15]. Although most cases of intestinal malrotation in infancy can be treated successfully, in some circumstances, patients' symptoms may not be detected early enough for effective treatment, and therefore may result in catastrophic midgut volvulus and death[22].

Necrotizing enterocollitis was seen in ten cases (7.14%). Necrotizing enterocollitis is a serious, acquired abnormality of the bowel which appears to be caused by mucosal hypoxia and ischemia in association with bacterial invasion of the gut wall by necrotizing and gas forming organisms. Abdominal x-ray is the most important method of diagnosis of NEC[19]. In another study conducted by osifo, incidence of NEC was 4(5.6%)[8].

Duodenal atresia was seen in 8(5.71%) cases. Diagnosis was achieved in most instances by plain abdominal radiographs, which demonstrated the characteristic "double-bubble" sign. In another study conducted by Nasir GA, duodenal atresia was observed in 5(13.9%)[13] cases. Duodeno-duodenostomy (diamond shape anastomosis) was the main stay of treatment. Tracheoesophageal fistula was seen in 8(5.71%) cases. Post natal diagnosis of esophageal atresia is confirmed by the failure to pass a firm nasogastric tube into the stomach.

Inguinal hernia is the most common indication for surgery in pediatric age group. An infant with inguinal hernia is at greater risk because of complications associated with incarceration. Obstructed inguinal hernia in our study was 8(5.71%). Apparently incarceration is a preventable problem that is why priority should be given to the treatment of inguinal hernia in infants less than one year of age especially those 1-3 month old as their risk of incarceration is heigher[18].

Adhesion obstruction was seen in 6(4.28%). This bowel obstruction in neonates was caused by adhesions from earlier laparotomy. In a series reported by Janiket al[16], adhesive small bowel obstruction was ranked seventh as a cause for pediatric intestinal obstruction. Festen also reported a 2.2% incidence of adhesive obstruction after 1476 laparotomies in children[17].

Meconeum plug syndrome was seen in 6(4.28%) cases. It should always be considered in the differential diagnosis of low small bowel or colonic

obstruction in the newborn infant, as prompt diagnosis and adequate medical treatment will in most cases completely resolve the problem and avoid an unnecessary surgical procedure. Incidence in another study was 2(2.8%)[8].

Meckle's band obstruction seen in 4(2.85%) patients, Meckel's diverticulum has several known complications including diverticulitis and perforation. The presence of mesodiverticular band or a band from the diverticulum to the anterior abdominal wall is also described and can cause obstruction or rotation of the small bowel leading to volvulus[20]. Cecal volvulus and cloacalexstrophy was seen in 2(1.37%) cases. One case of rectal atresia, duplication cyst abdomen and VACTERAL anomaly was found.

Overall mortality in our study was 13(9.27%) while in other studies it was 21.1%[14], 22%[13] and 28.6%[7]. Sepsis, repeated surgery, anastomotic disruption, aspiration, bowel gangrene and multiple associated anomalies were the significant factors that contributed to mortality in NIO.

CONCLUSION

The antenatal history, initial presentation, physical examination, and plain radiographs frequently can establish the diagnosis. The basic principle of treating neonatal intestinal obstruction is to relieve the mechanical obstruction, whether the cause is due to luminal or extraluminal obstruction. Management of intestinal obstruction will almost always be surgical, apart from some notable exceptions. With the advent of pediatric and neonatal intensive care and multidisciplinary care, the morbidity and mortality of cases of intestinal obstruction is gradually decreasing.

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