Incidence and Short term Outcome of Management of Neonatal Intestinal Obstruction (NIO)

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Abstract

Introduction: Neonatal intestinal obstruction (NIO) is a challenging and common emergency situation in pediatric surgery. In order to successfully manage it one should make a timely diagnosis and apply standard treatment. Management of neonatal intestinal obstructions have improved in many developed countries, but still show high morbidity and mortality in developing countries. This study was done to evaluate the incidence and short term outcome of neonatal intestinal obstruction at the department of pediatric surgery, Zagazig university hospitals in Egypt.

Materials and Methods: This retrospective study included 84 patients who presented with intestinal obstruction during their first month of life to the emergency departments of Zagazig university hospitals in Egypt from Jan 2008 to Jan 2011 and were managed surgically.

Results: Of these 84 patients 50 were males and 34 were female. The mean age at presentation was 3.5 (2-10) days for duodenal atresia, 2.5 (3-5) days for jejunoileal atresia, 2 (1-10) days for meconium ileus with perforation, 2 (1-5) days for patients with volvulus, 7 (5-20) days for colonic atresia, 20 (10-30) days for Hirschsprung disease, 25 (5-30) days for patients with obstructed congenital inguinal hernia and 2 (1-4) days for anorectal malformations. Surgery was done for all patients after resuscitation. Death occurred in 10 patients (12%). In 3 patients with jejunoileal atresia anastomotic leakage occurred, they underwent re-operation but died. In 3 patients with duodenal atresia death occurred postoperatively from sepsis and DIC. Two patients with high anorectal malformations died 2 days after operation from associated cardiac anomalies and 2 patients with colonic atresia died post operatively from sepsis and electrolyte imbalance.

Conclusion: The most common cause of intestinal obstruction in neonates in our study was anorectal malformations and obstructed congenital inguinal hernia. Mortality and morbidity is still high compared with statistics from developed countries due to late presentation to pediatric surgeon and there is no specific neonatal surgical intensive care unit beside the pediatric surgery department in our center.

Keywords

- Intestinal obstruction
- Neonates
- Outcomes

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Introduction

Neonatal intestinal obstruction (NIO) is a challenging and common emergency situation in pediatric surgery. In order to successfully manage it one should make a timely diagnosis and apply standard treatment.[1] Diagnosis of this condition like most other diseases is carried out by taking a complete history and performing a thorough physical examinations with the aid of paraclinics (radiographic and histopatholgical studies).[2] Sever complications of obstruction could be prevented and managed by applying standard resuscitation and urgent admission to a specialized unit.[3] Different classifications of obstruction include: intraluminal (meconium ileus or meconium plug syndrome), functional (Hirschsprung), complete or incomplete.[4] Proximal obstruction is usually followed by vomiting and mild abdominal distention, whereas distal bowel obstruction is usually followed by a more severe abdominal distention.[5] In order for a neonate with intestinal obstruction to achieve a healthy survival, involvement of a multidisciplinary team involving different medical specialties, nursing, and rehabilitative care is required.[6] Early surgical intervention is paramount to save the neonate and to avoid a poor outcome, unless a surgical neonatal ICU (NICU) is available, outcome is inevitably poor.[7]

Material and Methods

This retrospective study was carried out at the department of pediatric surgery, Zagazig university hospital, Egypt. It included 84 neonates with intestinal obstruction who were treated surgically from Jan 2008 to Jan 2011. Patient data were retrieved from their records. Cases suspected of intestinal obstruction who died before any definitive diagnosis was made or before operative treatment; were excluded. Also we excluded patients which were discharged against medical advice. We included only neonates with intestinal obstruction who underwent surgical operations at our unit. Statistical data was analyzed using (SPSS15.0 version). Results were expressed as means, ranges and percentages.

Results

From the 84 patients 50 were male and 34 were females; in which 10 patients (11.9%) had duodenal atresia, 7 patients (8.3%) had jejunoileal atresia, 5 patients (5.9%) had meconium ileus with perforation, 5 patients (5.9%) had volvulus, 5 patients (5.9%) had colonic atresia, 15 patients (17.8%) had Hirschsprung disease, 17 patients (20.2%) had obstructed congenital hernia and 20 patients (23.8%) had anorectal malformations. The mean age at presentation to surgeon for each different diagnosis is summarized in **Table 1**

Twenty five patients (29.7%) had a prenatal diagnosis of polyhydramnios and presented early to the surgeon. Mean weight of patients with different causes of NIO is summarized in **Figure1**.

All patients underwent surgery after adequate resuscitation. In all patients with jejunoileal atresia primary repair was done. Diamond duodenduodenostomy was done in 6 patients with duodenal atresia, duodenotomy and web excision was done for 1 patient and duodenojejunostomy was done for 3 patients with long gap duodenal atresia. Endorectal pull through was done for 10 patients with Hirschsprung disease and the remaining 5 patients were subjected to colostomy before the definitive repair. In 3 patients with meconium ileus and perforation, peritoneal irrigation along with

Table 1: Types of neonatal intestinal obstruction and age at presentation

Types of intestinal obstruction	Number of patients	Age at presentation to surgeon				
		0-7 days	8-14 days	15-21 days	22-30 days	Mean (days)
Duodenal atresia	10	7	3	0	0	3.5 (2-10)
Jejunoileal atresia	7	7	0	0	0	2.5 (3-5)
Colonic atresia	5	2	3	0	0	7 (5-20)
Hirschsprung disease	15	0	3	7	5	20 (10-30)
Obstructed inguinal hernia	17	0	5	10	2	25 (5-30)
Meconium ileus with perforation	5	2	8	0	0	2 (1-10)
Volvulus	5	2	0	0	0	2 (1-5)
Anorectal malformations	20	20	0	0	0	2 (1-4)

primary repair was carried out and in the remaining 2, proximal colostomy and repair of perforation was done. Five patients had colonic atresia: 2 type I (mucosal web), 1 type II (fibrous cord) and 2 type III (mesenteric defect); the colonic atresia was located in right colon in 3 patients and in left colon in 2 patients. Colostomy was done for all patients with colonic atresia and bowel anastomosis was performed later when they were 3 to 4 months old. For all patients with volvulus, Lads' procedure was done. Anal cut back was done for 5 patients with low anorectal malformations and one stage anorectoplasty was done for 5 patients with high anorectal malformations. Colostomy and delayed repair was done for the remaining 10 patients with high anorectal malformations.

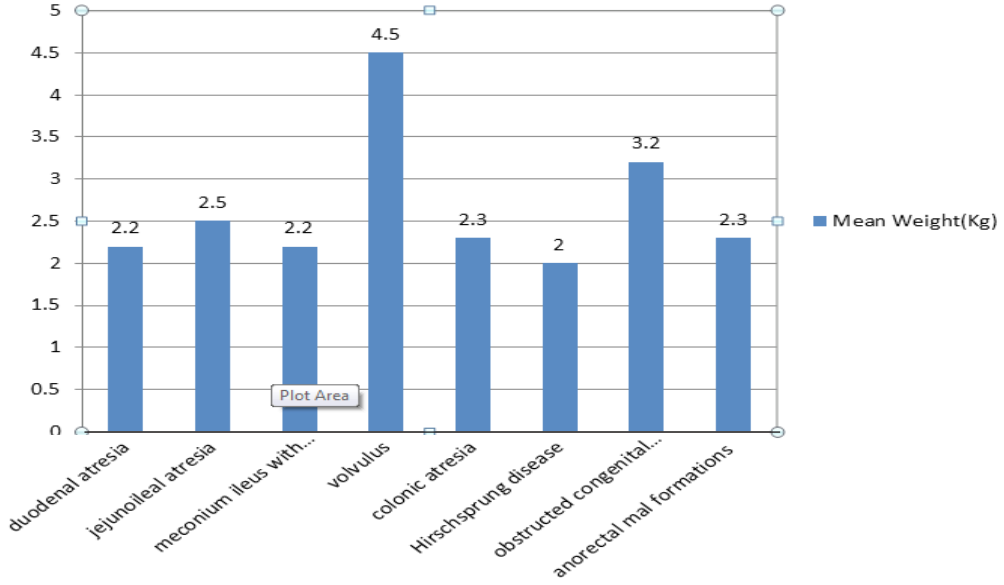

Figure 1: Mean weight of patients with different causes of NIO

Herniotomy was done for all patients with obstructed congenital inguinal hernia. Mean hospital stay was 7days and ranged from 2 to 20 days. Patients were followed for at least 4 months postoperatively. Ten patients died (12%), of which 3 were cases with jejunoileal atresia who developed a leakage and despite reoperation died. Three patients with duodenal atresia died postoperatively from sepsis and DIC, and 2 patients with high anorectal malformations died 2 days after the operation from associated cardiac anomalies. Two patients with colonic atresia died from sepsis and electrolyte imbalance after the operation. Incidence of different diagnosis, mortality and mean hospital stay in patients with NIO is shown in **Table 2**

Table 2: Incidence of different diagnosis, mortality and Mean hospital stay in patients with NIO

Types of intestinal obstruction	No	Incidence	Mean hospital stay	Mortality
Duodenal atresia	10	11.9%	5 (5±2)	3
Jejunoileal atresia	7	8.3%	7 (7±3)	3
Colonic atresia	5	5.9%	4 (5±3)	2
Hirschsprung disease	15	17.8%	6 (8±2)	0
Obstructed inguinal hernia	17	20.2%	2 (2±1)	0
Meconium ileus with perforation	5	5.9%	3 (3±1)	0
Volvulus	5	5.9%	5 (4±3)	0
Anorectal malformations	20	23.8%	5 (7±3)	2

Discussion

Neonatal intestinal obstruction has a very high morbidity and mortality; it can result in severe dehydration, hypoglycemia, electrolyte imbalance and irreversible ischemia to the intestine in a very short time.[8] Early diagnosis and management is vital.[9] The age at presentation to surgeon in our study is higher than age at presentation in most other studies.[10] We tried to state the age at presentation to the surgeon as opposed to presentation to the hospital,

which is usually initially to the neonatologist who later invite the surgeons commonly on a later date after their initial evaluation and commencement of resuscitation. The average interval between presentation to neonatologist and presentation to the surgeons were 2.2 days for duodenal atresia and jejunoileal atresia, this interval reflects the time to assess, investigate and diagnose before inviting the surgeon to manage these patients.[11] In our study the three most common causes of neonatal intestinal obstruction were anorectal malformations (23.8%) followed by obstructed congenital inguinal hernia (20.2%) and Hirschsprung disease (17.8%). These results differ from many published series: Ozturk et al[12] reported that, the most common cause of neonatal intestinal obstruction in their study was Hirschsprung disease which represents 25% of cases, and the 2nd most common cause was obstructed congenital inguinal hernia 23.3%, followed by anorectal malformations in 17% of patients and jejunoileal atresia in 13% of cases. In our study 20 patients (23.8%) had associated congenital anomalies which is much less than the study by Ezomike et al.[13] in which associated congenital anomalies was seen in 70% of the study population. In another series by Burjonrappa et al.[14] associated anomalies occurred in 76% of cases; especially annular pancreas. In our study prenatal diagnosis with the presentation of polyhydramnios was seen in 25 patients (29.7%) which led to early presentation to the surgeon, in other studies in more developed countries rate of prenatal diagnosis was 86.6%.[15] The majority of neonates in our study were delivered vaginally as opposed to the study by Wax et al[16] where 60% of the deliveries were by cesarean section. Mortality rate was 12% in our study which was better than the mortality rate in other developing countries such as Nigeria in which Ezomike et al.[13], reported a 41% mortality rate; but in developed countries the mortality rate ranged between 1-7 %.[17] The high mortality rate was attributed to late presentation to surgeon, deficient neonatal surgical intensive care unit and deficient prenatal diagnosis. In our study re-operation was performed on 3 patients (3.5%) with jejunoileal atresia due to leaks from anastomosis, in other studies the re-operation rate was 17.4% from anastomotic leakage and anastomotic stricture.[18] Hospital stay in our study ranged from 2 to 20 days, the average duration for hospital stay was longer in patients with jejunoileal atresia than in patients with duodenal atresia which is in concordance to previous studies.[19] Average follow up duration was 4 months which is short compared with developed countries. Long term follow up can result in detection of delayed morbidities and mortalities such as those related to prolonged parenteral nutrition and short bowel syndrome.[20]

The small number of patients limits the number in each type and sub-type of neonatal intestinal obstruction, making test of significance misleading and poor follow-up after discharge precludes study of long term outcome as observed in some other publications.[21]

We concluded that the two most common causes of neonatal intestinal obstruction was anorectal malformations and obstructed congenital inguinal hernia. Mortality and morbidity is still high compared with reports from developed countries due to late presentation to pediatric surgeon and lack of neonatal surgical intensive care units in our country.

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