Neonatal intestinal obstruction in Benin, Nigeria

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ABSTRACT

Background: Intestinal obstruction is a life threatening condition in the newborn, with attendant high mortality rate especially in underserved subregion. This study reports the aetiology, presentation, and outcome of intestinal obstruction management in neonates. **Materials and Methods:** A prospective study of neonatal intestinal obstruction at the University of Benin Teaching Hospital, Benin, Nigeria, between January 2006-June 2008. Data were collated on a structured proforma and analysed for age, sex, weight, presentation, type/date of gestation/delivery, aetiology, clinical presentation, associated anomaly, treatment, and outcome. **Results:** There were 71 neonates, 52 were males and 19 were females (2.7:1). Their age range was between 12 hours and 28 days (mean, 7.9 ± 2.7 days) and they weighed between 1.8 and 5.2 kg (average, 3.2 kg). The causes of intestinal obstruction were: Anorectal anomaly, 28 (39.4%); Hirschsprung's disease, 8 (11.3%)' prematurity, 3 (4.2%); meconeum plug, 2 (2.8%); malrotation, 6 (8.5%); intestinal atresia, 8 (11.3%); necrotising enterocolitis (NEC), 4 (5.6%); obstructed hernia, 4 (5.6%); and spontaneous gut perforation, 3 (4.2%). Also, 27 (38%) children had colostomy, 24 (33.8%) had laparotomy, 9 (12.8%) had anoplasty, while 11 (15.4%) were managed nonoperatively. A total of 41 (57.7%) neonates required incubator, 26 (36.6%) needed total parenteral nutrition, while 15 (21.1%) require d paediatric ventilator. Financial constraint, late presentation, presence of multiple anomalies, aspiration, sepsis, gut perforation, and bowel gangrene were the main contributors to death. Neonates with lower obstructions had a better outcome compared to those having upper intestinal obstruction ($P < 0.0001$). **Conclusion:** Outcomes of intestinal obstruction are still poor in our setting; late presentation, financial constraints, poor parental motivation and lack of basic facilities were the major determinants of mortality.

Key words: Intestinal obstruction, management, neonates

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INTRODUCTION

Intestinal obstruction in neonates is common and unlike in the adults or older children, the majority are due to congenital causes.[1,2] The attendant pathological sequalae, which progresses rapidly to irreversible complications, is poorly tolerated by the newborns. Early presentation, prompt diagnosis, and appropriate treatment have improved outcome in many developed countries.[2,3] However, in many of our subregion centers, late presentation of clinically compromised neonates is rampant. This is compounded by the lack of basic facilities for the proper surgical management of neonates, poor socioeconomic status of many parents, and the cultural beliefs and poor attitudes towards neonates born with surgical pathology.[4,5]

Emergency operation and anaesthesia for neonates in poor clinical states, pose major challenges in sub- Saharan Africa.[4,6] Moreover, associated multiple anomalies, particularly intracardiac anomalies, are rarely diagnosed preoperatively, resulting in many unexplained anaesthetic complications and mortality.[2,6,7]

The aetiology of neonatal intestinal obstruction, its presentation, attendant morbidity, and outcome of the treatment vary significantly between centres.[2,8-11] In this prospective study, we present our experience with neonatal intestinal obstruction at the University of Benin Teaching Hospital.

MATERIALS AND METHODS

This was a prospective study of neonates with intestinal obstruction at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria, between January 2006 and June 2008. UBTH is a referral hospital for neighbouring states. Consecutive cases of neonates who were presented with intestinal obstruction were recruited, after obtaining approval from the hospital's Ethical Approval Committee Board.

The age at presentation, sex, weight, type of delivery (vaginal/caesarean), date at delivery (pre/full-term), type of gestation (multiple/single), aetiology, presence of associated congenital anomaly, treatment, morbidity,

outcome, and follow-up were documented on a structured proforma. During the period, three babies who were discharged against medical advice due to financial constraints were excluded from the study. The data were analysed using SPSS version 11 (SPSS, Chicago, 111). Continuous data were expressed as mean ± SD, while categorical data were analysed using Chi-square test with *P* values < 0.05 regarded as significant.

RESULTS

There were 71 neonates, 52 were males and 19 were females (2.7:1). Their age group ranged between 12 hours and 28 days (mean, 7.9 ± 2.7 days) and they weighed between 1.8 and 5.2 kg (average, 3.2 kg).

Coloanal obstruction accounted for the majority in 57.8% (41) of cases; this was mainly due to anorectal anomaly in 28 (39.4%) neonates, Hirschsprung's disease 8 (11.3%), and meconeum plug 2 (2.8%). Malrotation 6 (8.5%), intestinal atresia 8 (11.3%), necrotising enterocolitis 4 (5.6%), and obstructed hernia 4 (5.6%) were the major causes of upper intestinal obstruction.

A total of 42 (59.2%) neonates presented in the unit within the first week of life, 21 (29.6%), 5 (7%), and 3 (4.2%) during the second, third, and fourth weeks, respectively [Figure 1]. Clinical presentations [Table 1] included abdominal distension in 69 (97.2%) neonates [Figures 2a and b], failure to pass meconeum in 65 (91.5%), respiratory compromise in 51 (71.5%), vomiting in 43 (60.6%), and fluid/electrolytes derangement in 42 (59.2%). Also, 23 (32.4%) neonates presented with aspiration, while 8 (11.3%) with oedema/hyperaemia of anterior abdominal wall due to gut perforation.

Multiple congenital anomalies including tracheoesophageal fistula, omphalocele, and multiple intestinal atresias were diagnosed preoperatively in 3 (4.2%) children each with anorectal anomaly. Two babies with anorectal anomaly and one with duodenal atresia had associated intracardiac anomaly, which was discovered at autopsy.

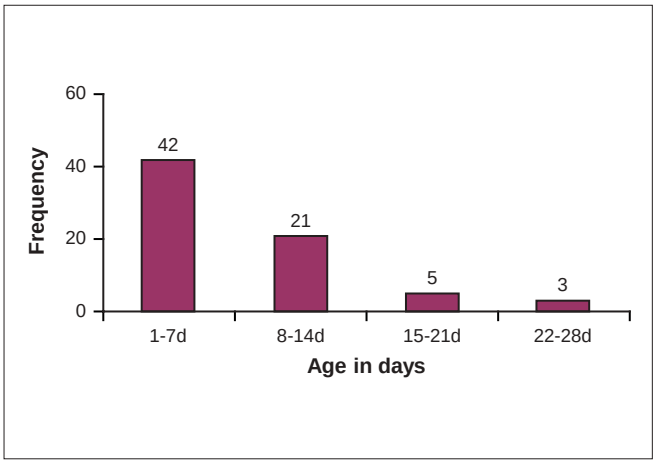


Figure 1: Age at Presentation in days

Many patients presented within the first week of birth, but then there was significant delay with resultant sepsis, fluid/electrolytes derangement, nutritional problem,and respiratory complications. In 8 (11.3%) children, the obstruction was complicated by gut perforation at presentation. Of the 71 neonates, only 2 (2.8%) had meconeum plug and they were clinically stable. The final outcome for the remaining 69 (97.2%) neonates was significantly influenced by the compromised clinical status at presentation ($P < 0.0001$).

The combination of clinical and radiological assessments was required for diagnosis of intestinal obstruction in the majority of cases. The classical plain radiological features of multiple air-fluid levels, bowel distension, absent rectal gas, gasless lower abdomen, or double gas bubbles at the epigastrum were diagnostic and suggestive of the sites of obstruction in 39 (54.9%) neonates. In most cases, except in the 28 (39.4%) neonates with anorectal anomaly who had cross Table lateral decubitus X-rays, the aetiology and exact location of obstruction were only known intraoperatively. All the cases of malrotation were diagnosed at operation, while those with Hirschsprung's disease required histopathological confirmation. Haematocrit results appeared to be within normal range in all the neonates, but urea and electrolytes were deranged in 42 (59.2%) neonates which required preoperative correction.

In addition, 27 (38%) children had colostomy, 24 (33.8%) had laparotomy, 9 (12.8%) had anoplasty, while 11 (15.4%) were managed nonoperatively [Table 2]. The frequency of the aetiologies of intestinal obstruction, postoperative morbidities, and outcome are as shown in Table 2.

Table 1: Clinical features and their relative frequency on arrival in neonates (n = 71)

Clinical features	Frequency	Percentage
Abdominal distension	69	97.2
Failure to pass meconeum	65	91.5
Respiratory embarrassment	51	71.5
Vomiting	43	60.6
Fluid/electrolytes derangement	42	59.2
Aspiration	23	32.4
Hyperaemia/edema of anterior abdominal wall	8	11.3
Multiple congenital anomalies	3	4.2



Figure 2a: Preoperative photograph of a five-day-old female neonate with intestinal obstruction secondary to type 1 ileal atresia. Note gross abdominal distension



Figure 2b: Intraoperative photograph of same baby in 2a. Note type 1 ileal atresia. Baby survived following resection with end to side ileo-ileal anastomosis

Table 2: The aetiology, frequency, morbidity treatment, and outcome of neonatal intestinal obstruction

Aetiology	Frequency	Percent	Morbidity	Treatment	Survived	Died
Anorectal anomaly	28	39.4	Respiratory difficulty 16, sepsis 8, associated anomaly 5	Colostomy19, anoplasty 9	25	3
Hirschprung's Dx	8	11.3	Sepsis 2	Colostomy	8	0
Intestinal atresia	8	11.3	Fluid/electrolytes 4, sepsis 2, burst abdomen 3, inanition 8, associated anomaly 1	Laparotomy, bowel resection and pri. Anastomosis	3	5
Malrotation, and congenital bands	6	8.5	Fluid/electrolytes 6, sepsis 2, burst abdomen 1, inanition 6	Ladd's procedure 6, plus bowel resected and anastomosis 2	3	3
Neonatal sepsis	5	7.0	Fluid/electrolytes 5, sepsis 5, inanition 1	Fluid/use of broad spectrum antibiotics	3	2
Necrotising enterocolitis	4	5.6	Fluid, electrolytes, sepsis, hypothermia 4	Antibiotics 4, plus ileostomy 2	0	4
Obstructed inguinal hernias	4	5.6	Dehydration 2, aspiration 1.	Laparotomy 3, herniotomy 1	4	0
Spontaneous intestinal perforation	3	4.2	Fluid, electrolytes, sepsis 3, inanition 1	Laparotomy 2, conservative 1	2	I
Prematurity	3	4.2	Stable 2, dehydration 1	Conservative 3	3	0
Meconeum plug	2	2.8	All stable	Rectal saline wash out	2	0

Postoperative complications included failure to feed leading to inanition in 16 (22.5%) neonates, endotoxic shock in 6 (8.5%), burst abdomen in 4 (5.6%), and whole small bowel gangrene in 3 (4.2%). A total of 41 (57.7%) neonates required incubator, 26 (36.6%) needed total parenteral nutrition, while 15 (21.1%) had respiratory insufficiency which required ventilation support. Financial constraint was a problem in 17 (23.9%) children as their parents were poor rural dwellers including the parents of 21 (29.6%) neonates who were disappointingly motivated with poor response to counseling.

There were a total of 18 (25.4%) deaths, including 3 (10.7%) with anorectal anomaly, 5 (62.5%) with intestinal atresia, and 4 (100%) with NEC [Table 2]. The outcome of upper intestinal obstruction was better than the lower obstruction ($P < 0.0001$). Financial constraint, late presentation, presence of multiple anomalies, aspiration, and sepsis were the main contributors to death.

DISCUSSION

In this study, anorectal malformation was the most common cause of intestinal obstruction in neonates unlike Hirschsprung's disease in an earlier report from the same centre.[12] The outcome of upper gastrointestinal obstruction was generally poorer than those of lower obstruction in this study.[2,13-15] This may be attributed to vomiting with attendant risk of aspiration, sepsis, and rapid onset of fluid/electrolytes derangement compared to lower obstructions in which these set in late, and in a much milder degree.

As in other studies in this subregion,[4-7] the mode, type and place of delivery did not adversely influence the outcome of neonates with intestinal obstruction. Although, babies delivered by rural women presented much later than those who were delivered within the hospital, the difference in overall survival rate was not significant.[5]

Late presentation compounded by lack of facilities, financial constraints, and poor parents' motivation, were the major challenges in this study as in other African settings.[3,4] Although, many neonates presented within the first week of life, the delay was significant when compared to the developed countries, where very early presentation and adequate intervention is the rule.[2,9,16,17]

Aspiration during vomiting, splinting of the diaphragma by abdominal distension (which impedes breathing), and the high propensity to sepsis are the factors which impact negatively to the outcome of neonatal intestinal obstruction.[2-11,18]

Intestinal perforation and/or gangrene with resultant peritonitis were associated with severe preoperative morbidity and postoperative complications such as wound infection, endotoxic shock, burst abdomen, nutritional problems, and a high mortality rates. These groups of patients required mandatory emergency life saving operations; unfortunately in this study, in an environment which lacks facilities needed to operate and handle postoperative problems of such neonates resulting in a high mortality rate.[1,4-7,12,18-22] The presence of associated congenital anomalies is reported to increase mortality rates in neonatal intestinal obstruction.[1,23] We experienced a similar trend in the present study; the majority of the associated anomalies occurred in anorectal malformations, confirming previous reports.[24,25]

In conclusion, the aetiology, mode of presentation, morbidity, and outcome of treatment of intestinal obstruction in neonates in this study were not significantly different from other reports in the subregion. Neonates with multiple anomalies, upper intestinal obstruction, and in whom intestinal obstruction were complicated by severe abdominal distension, aspiration, sepsis, gut perforation and bowel gangrene had poorer outcome. Late presentation, financial constraint, lack of basic facilities, and poor parental motivation were the major determinants of management outcome of neonatal intestinal obstruction in this subregion.

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