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Retrospective Analysis of Congenital Neonatal Intestinal Obstruction in a Tertiary Care Hospital in Bangladesh

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Abstract **Original Research Article**

Introduction: Patients with congenital neonatal intestinal obstruction are the main bulk of neonatal surgical departments. The incidence is approximately 1 in 1500-2000 live birth. Commonly caused by anorectal malformation (ARM), intestinal atresia, hirschsprungs disease (HD), meconium ileus, malrotation of gut, volvulus neonatorum, necrotizing enterocolitis (NEC) and rarely bands adhesion. These patients presented with vomiting, gradual abdominal distension and delayed or no passes of meconium. Usually, an abdominal radiograph is all that is necessary to make the diagnosis, since the gas pattern is distinctive and often will be a clue to the site of obstruction. The aim of the study is to detect the type of congenital neonatal intestinal obstruction, initial surgical approaches, and their outcome in our hospital. ***Materials and methods:*** This is a retrospective study conducted at the division of pediatric surgery in Bangladesh Shishu hospital & institute, Dhaka, Bangladesh. The study period was 2 years from January 18 to December 19. All the neonates who underwent surgery for congenital neonatal intestinal obstruction were included. In this study only initial diagnosis, surgical procedure and outcome were included. ***Results:*** Our surgical department operated on a total of 246 neonates with congenital neonatal intestinal obstruction during this study period. Out of them, 139(56.50%) patients were male and 107 (43.50%) were female. The male-female ratio is 1.3:1. Gestational age was varied from 31 weeks to 40 weeks (Mean 36.2 weeks). Birth weight was from 1300 gm to 3800 gm (mean 2100gm). The most common cause of intestinal obstruction was ARM 72(29.27%), followed by hirschsprungs disease 53(21.54%), atresia 41(16.67%), meconium ileus 37(15.04%), malrotation of gut 28(11.38%) and other like bands adhesion, etc 15(6.09%). In case of atresia ileal atresia was common 16(39.02%) then jejunal 13(31.70%) and duodenal 9(21.95%). Only 3(7.31%) colonic atresia was found. Out of 246 patients, 198 (80.48%) were survived. Among 48(19.52%) deaths were highest in atresia 20(41.67%) than others. In our study, a total of 28(11.38%) patients were premature, and 18(7.31%) were low birth weight. ***Conclusion:*** In our study shows that anorectal malformation was the commonest cause of congenital neonatal intestinal obstruction along with hirschsprungs disease and atresia. Antenatal diagnosis with early referral system and post-operative care can reduce mortality and ensure a better outcome in congenital neonatal intestinal obstruction.

Keywords: Congenital neonatal intestinal obstruction, anorectal malformation, hirschsprungs disease, intestinal atresia, meconium ileus, malrotation of the gut.

INTRODUCTION

Patients with congenital neonatal intestinal obstruction are the main bulk of neonatal surgical department [1]. The incidence is approximately 1 in 1500-2000 live birth [2-4]. Intestinal obstruction is commonly caused by anorectal malformation (ARM), Intestinal atresia, hirschsprungs disease (HD), meconium ileus, malrotation of the gut, volvulus neonatorum, necrotizing enterocolitis (NEC) and rarely bands adhesion. Atresia (Ileal) was first described by Goeller in 1684. Hirschsprung describe congenital megacolon in 1886 in the Berlin Society of paediatrics. Meconium ileus was 1st described by Landsteiner in 1905. No single survival case report was published until 1942 with neonatal intestinal obstruction [5]. Congenital neonatal intestinal obstruction patient

presented with vomiting, gradual abdominal distention, and delayed or no passes of meconium. Some parents gave a history of maternal polyhydramnios diagnosed by antenatal USG. After taking proper history and clinical examination diagnosis corroborate radiologically with features of bowel obstruction. Usually, an abdominal radiograph is all that is necessary to make the diagnosis, since the gas pattern is distinctive and often will be a clue to the site of obstruction [6]. Early assessment of the cause of obstruction and diselectrolytemia, management of hypothermia, and proper hydration are important to achieve better outcomes rather than faster and haste to perform operation [7]. The aim of this study is to detect the type of neonatal intestinal obstruction, initial surgical approaches, and outcomes in our hospital.

METHODOLOGY

This is a retrospective study conducted at the division of pediatric surgery in Bangladesh Shishu hospital & institute, Dhaka, Bangladesh. This is a tertiary care hospital in Bangladesh previously named as Dhaka Shishu (Children) hospital. The study period was 2 years from January 18 to December 19. All the neonates who underwent surgery for congenital neonatal intestinal obstruction were included in this study. Inoperable conditions due to severe pneumonia, septic shock, extreme prematurity, and very low birth weight were excluded from this study. Data were collected from our hospital record and analyzed for demographic data, clinical presentation, diagnosis, operation performed and their outcome.

Total 246 neonates with congenital neonatal intestinal obstruction were operated in our surgical department during this period. After clinical examination and admission of all patients were treated with intravenous fluid, antibiotics, and nasogastric tube suction with free drainage ensure. After correction of dehydration and electrolyte imbalance, abdominal radiography was performed to categorize the type of obstruction. Some patient needs ultrasonography and contrast x-ray. Laparotomy was done in all the cases and type of surgical intervention was carried out as per the cause such as biopsy and colostomy for hirschsprungs disease, resection anastomosis for atresia, colostomy for high variety ARM, double barrel ileostomy or Bishop-Koop ileostomy for meconium ileus, Ladd's procedure for malrotation of gut, duodenoduodenostomy for duodenal atresia or annular pancreas, adhesiolysis for congenital bands and adhesion. In the postoperative period, patients were managed with intravenous fluid, antibiotics, nasogastric tube suction and if needed nutritional support was also given. Histopathological reports and per operative findings are important for the diagnosis of Hirschsprung's disease and further management. In this study only initial diagnosis, surgical procedure and outcome were included.

RESULTS

Out of 246 patients, 139(56.50%) were male and 107(43.50%) were female. The male-female ratio is 1.3:1. Gestational age was varied from 31 weeks to 40 weeks (Mean 36.2 weeks). Birth weight was from 1300 gm to 3800 gm (mean 2100gm). The most common cause of congenital neonatal intestinal obstruction was anorectal malformation 72(29.27%), followed by hirschsprungs disease 53(21.54%), atresia 41(16.67%), meconium ileus 37(15.04%), malrotation of gut 28(11.38%) and other like bands adhesion, etc 15(6.09%). In case of atresia ileal atresia is common 16(39.02%) then jejunal 13(31.70%) and duodenal 9(21.95%). Only 3(7.31%) colonic atresia was found. Most of the neonates presented within 1st week of age except for malrotation of the gut and hirschsprungs disease. The patient of ARM was present with no anal orifice in most cases with gradual abdominal distension. Some patients who came to us after 2-3 days developed vomiting which was occasionally bilious. In hirschsprungs disease patients, gave a history of delayed passes of meconium or assisted defecation but they developed gradual abdominal distension and occasional bilious vomiting. The patient with atresia developed vomiting earlier than gradual abdominal distension. In the case of patients with meconium ileus, bilious vomiting and no passes of meconium were the chief complaints. On examination, findings were empty rectum or mucus stained. But their abdomen was not so distended as hirschsprungs disease. Down syndrome, the cardiac anomaly was present in a few ARM patients. Hypothyroidism was excluded from the suspected hirschsprungs disease. Out of 246 patients, 198 (80.48%) were survived. Among 48(19.52%) death highest in atresia was 20(41.67%) than others. The ultimate cause of death was sepsis, anastomotic leakage, and aspiration pneumonia. The patient who had NEC, volvulus or perforation were more vulnerable in our study. In our study, a total of 28(11.38%) patient was premature, and 18(7.31%) were low birth weight.

Table-1: Etiological pattern of Neonatal intestinal obstruction

Type of obstruction	Frequency	Percentage
ARM	72	29.27
HD	53	21.54
Atresia	41	16.67
Meconium ileus	37	15.04
Malrotation of gut	28	11.38
Others	15	6.09
Total	246	100

Table-2: Gender distributions

Sex	ARM	HD	Atresia	Meconium ileus	Malrotation of gut	Others
Male	40	27	24	20	15	6
Female	32	26	17	17	13	9

Table-3: Type of HD (53)

Variables	Frequency	Percentage
Long segment	23	43.40%
Short segment	29	54.72%
TCA	1	1.89%

Table-4: Type of atresia (41)

Variables	Frequency	Percentage
Ileal	16	39.02%
Jejunal	13	31.70%
Duodenal	9	21.95%
Colonic	3	7.32%

Table-5: Mortality (48)

Variables	Frequency	Percentage
ARM	6	12.5%
HD	9	18.75%
Atresia	20	41.67%
Meconium ileus	7	14.58%
Malrotation of gut	3	6.25%
Others	3	6.25%

Table-6: Complications (64)

Variables	Frequency	Percentage
Sepsis	38	59.38%
Anastomotic leakage	4	6.25%
Aspiration pneumonia	7	10.94%
Wound infection	12	18.75%
Others	3	4.69%
Total	64	100%

DISCUSSION

It has been established that neonatal intestinal obstruction is a significant cause of emergency presentation in the newborn period requiring urgent surgical intervention [8-10]. Slow onset of the symptoms and signs of obstruction at the initial stage may cause a delay in presentation with consequent poor outcome. Our study is conducted in a tertiary care hospital in Bangladesh and carried out over two years. Patterns of intestinal obstruction are varying in different studies. In our study, most of the neonates had symptoms from birth and presented within the 1st week of birth which was similar to other study [11]. The male preponderance was similar to various reports from worldwide, which suggest that intestinal obstruction is more common in boys than in girls [12-15]. Anorectal malformation was included in our study but many studies exclude anorectal malformation. Due to anorectal malformation, many attendances could not notice the anal canal but were admitted to the hospital with the features of neonatal intestinal obstruction. So, anorectal malformation was the more common cause of neonatal intestinal obstruction in our study than in other study [16]. Hirschsprungs disease was the second most cause of our study. In the case of hirschsprungs disease history of delayed passes of meconium and assisted defecation along with gradual abdominal distension and vomiting helps to establish the diagnosis. Radiological findings of gas distended bowel loops with multiple air-fluid levels are primary indications for laparotomy. The colostomy is the temporary diversion of the bowel to overcome the obstruction. A tissue biopsy will help to identify the level of pathological demarcation and confirmation of diagnosis. Some study shows that hirschsprungs disease is a more common cause of neonatal intestinal obstruction [13, 17]. Whereas our study shows it was less than ARM. The presentation was delayed in hirschsprung disease and malrotation because of variability in the onset of symptoms and lack of specificity. Early presentation leading to early detection is an important determinant in better outcome of surgery but in hirschsprungs disease prognosis was good even in late presenters as decompression was done repeatedly by doing enema. Some study shows intestinal atresia was the most common cause of intestinal obstruction [5]. Atresia is due to failure of

recanalization or due to intrauterine vascular catastrophes due to volvulus, duplication and intrauterine intussusception resulting in atresia of different types. Forty to fifty percent of patients in a large series had evidence of either intrauterine bowel necrosis or peritonitis. Duodenal atresia results from congenital failure of recanalization that normally occurs during 9-11 weeks of gestational age. It is frequently associated with other congenital anomalies, such as additional intestinal atresia, congenital heart disease, or as a part of the VACTERL association; the most often mentioned anomaly is Mongolian idiocy. Antenatal atresia can be diagnosed by polyhydramnios and ultrasonography. Atresia of the colon is much less frequent than of the small bowel. In our study, intestinal atresia was found the third most common cause of congenital neonatal intestinal obstruction. Among them Ileal atresia were common then jejunal, duodenal and colonic atresia. The mortality from atresia of the ileum is much higher than from atresia of the duodenum, owing to a greater incidence of early perforation5. Meconium ileus was another commonest cause of congenital neonatal intestinal obstruction. In this study, it was almost similar to atresia. But it was quite higher than other studies conducted by Verma A *et al*., [5]. Associated anomaly like perforation contributes to a bad prognosis. Other causes of congenital neonatal intestinal obstruction were malrotation of the gut. It is caused by the failure of the physiological rotation of the gut. The incidence of our study was similar to other studies. The mortality associated with neonatal intestinal obstruction ranges between 21% and 45% in developing countries, unlike less than 15% in Europe [18, 19]. Postoperative mortality in our study was 19.51% which was in between reported international publications. Hanif *et al*., in their experience in DMCH, observed postoperative mortality of 15.4% and Islam *et al*., reported 20.8% mortality in RMCH which is close to our series [19, 20]. In our study, the most common cause of mortality was sepsis followed by anastomotic leakage. Sepsis was mainly due to late presentation leading to perforation or in cases of meconium ileus leading to peritonitis [20]. Preterm babies are especially prone to get sepsis and other complications such as anastomotic leakage, apnea and electrolyte imbalance. Sepsis contributed significantly to mortality in this report, as in other reports [21]. Prevention of postoperative sepsis and complications like anastomotic dehiscence and wound dehiscence which require repeat surgery is necessary for improved survival. With advanced surgical techniques, better pediatric anesthesia support and improved neonatal intensive care, the survival of newborns after surgery has increased tremendously in recent years. Patients who were having some risk factors like prematurity, low birth weight, late presentation, and associated severe congenital anomalies were more prone to have a bad prognosis even after surgery. Not much can be done about prematurity and associated anomalies; but delay in diagnosis and treatment, which is a considerable factor is subject to correction. The type of surgical condition as well as the surgery performed also affects the outcome for patients.

CONCLUSIONS & RECOMMENDATION

Our study shows that anorectal malformation was the commonest cause of congenital neonatal intestinal obstruction along with hirschsprungs disease and atresia. Antenatal diagnosis with early referral system and post-operative care can reduce mortality and ensure a better outcome in congenital neonatal intestinal obstruction.

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