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Original Article

Neonatal Intestinal Obstruction: A 9-year Experience in a Tertiary Care Hospital

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Abstract

Aim: This study aims to study the clinical presentation, etiology, management, and outcome of neonatal intestinal obstruction in the newborn and neonates, over a period of 9 years in the Department of Pediatric Surgery, Rangaraya Medical College.

Materials and Methods: It is a retrospective study of 191 cases over a period of 9 years within 28 days of birth with the diagnosis of neonatal intestinal obstruction, which was managed between 2008 to 2017 in the Department of Pediatric Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh. Cases of anorectal anomalies and Hirschsprung's disease were excluded from the present study.

Results: Male-to-female ratio was 1.5:1. Gestational age was variable from 32 weeks to 40 weeks and birth weight ranged from 1.2 kg to 3.75 kg. Age of presentation was few hours to 28 days. The most common etiology was intestinal atresia 112, followed by malrotation 35, meconium ileus 24, annular pancreas 10, and exomphalos minor with obstruction 6, apart from Meckel's band and cecal web as being other rare causes of obstruction. Mortality rate was around 16% in our study.

Conclusion: Jejunoileal atresia 58.6% was the most common cause of neonatal intestinal obstruction followed by malrotation 18%. Incidence was higher in male babies compared to females. Bilious vomiting, abdominal distension, and failure to pass meconium were the presenting symptoms. Higher mortality rate was noted in preterm and low birth weight babies associated with multiple atresia and perforation peritonitis, especially complicated meconium ileus.

Key words: Intestinal atresia, Malrotation, Meconium ileus

INTRODUCTION

The neonatal period is defined as the first 28 days of life after birth. Neonatal intestinal obstruction occurs in 1 in 1500 live births.[1] Neonatal intestinal obstruction is one of the most common neonatal emergencies.[2] Obstruction of newborn was always almost fatal in the past. Until 1950, there were only 125 successfully treated cases recorded in literature.[3] However, significant advances in neonatal surgery have resulted in improved survival of newborns with congenital malformations that were considered fatal. Common etiologies are intestinal atresia, malrotation, and meconium ileus. Goeller credited with the first description of an ileal atresia in 1684. Meconium ileus was first described by Landsteiner in 1905.

Neonatal intestinal obstruction often manifests itself with a number of cardinal signs including maternal polyhydramnios, especially in proximal atresias, bilious vomiting, abdominal distension, and failure to pass meconium.[4] Although none of the cases, these observations are pathognomonic of obstruction, all are consistent with obstructive phenomenon and should be carefully evaluated.[3,5] Antenatal sonological suspicion of bowel obstruction, especially meconium peritonitis,[3] helps in organized management plan for delivery and treatment of neonates. An accurate history and physical examination corroborated by simple radiological studies usually leads the surgeons to correct diagnosis. Usually, a plain radiograph of abdomen is all that is necessary to make a diagnosis since gas pattern is distinctive and often gives clue to the diagnosis. Signs such as single bubble, double bubble, and triple bubble are very classical of proximal bowel obstructions. Early diagnosis and

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treatment leads to better outcome. Failure to recognize early can lead to aspiration, perforation splinting of diaphragm, gangrene, and enterocolitis adding to the morbidity and mortality.

Aim

This study aims to study the clinical presentation, etiology, management, and outcome of neonatal intestinal obstruction in the newborn and neonates, over a period of 9 years in the Department of Pediatric Surgery, Rangaraya Medical College, Kakinada.

MATERIALS AND METHODS

This retrospective study was conducted at the Pediatric Surgery Department in Rangaraya Medical College, Kakinada, over a period of 9 years from 2008 to 2017. All the newborns who underwent surgery for neonatal intestinal obstruction were included in the study. Anorectal anomalies and Hirschsprung's disease were excluded from the study. Data were collected from hospital records and analyzed for age at presentation, sex predilection gestational age, diagnosis, surgical procedure performed, and their outcome.

A total of 191 neonatal intestinal obstructions were operated in our department during the study period. All patients were managed initially with intravenous fluids, antibiotics nasogastric decompression, and warmth care. After initial resuscitation and correction of fluid and electrolyte imbalance, radiological [Figure 1] and sonological investigations were performed.

Contrast studied [Figure 2] was performed in few cases after proper hydration. Ultrasound abdomen was helpful in diagnosing malrotation and complicated meconium ileus.

Exploratory laparotomy was done in all the cases. Type of surgical procedure was carried out as per the etiology, i.e., resection anastomosis for jejunoileal atresia [Figure 3], Ladd's procedure for malrotation [Figure 4], and duodenoduodenostomy for duodenal atresia, release of bands for Meckel's diverticulum with bands. For

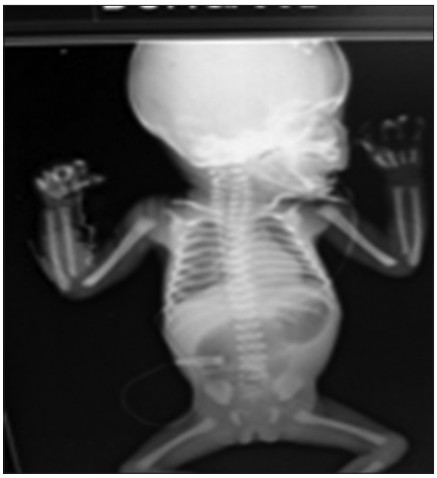

Figure 1: Plain X-ray

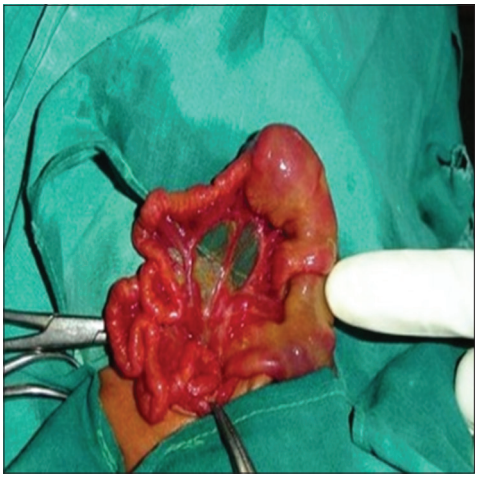

Figure 3: Jejunal atresia

Figure 2: Contrast X-ray

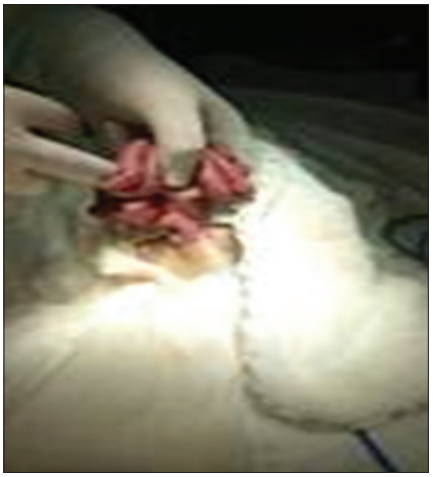

Figure 4: Malrotation

meconium ileus, enterotomy with flushing or ileostomy was performed. Reduction of bowel with or without resection anastomosis with umbilicoplasty was done for exomphalos minor [Figure 5].

RESULTS

Of 191 cases, 115 cases were male and 76 cases were female [Table 1].

Male-to-female ratio was 1.5:1 Gestational age was variable from 32 weeks to 40 weeks and birth weight was 1.2–3.75 kg.

The most common cause of intestinal obstruction was jejunoileal atresia followed by malrotation and meconium ileus. There were some rare causes such as cecal web, colonic atresia, congenital bands, and pyloric atresia. Ileal atresia was more common than jejunal atresia.

Age of babies at presentation is shown in Table 2.

Mortality rate was around 16% [Table 3].

DISCUSSION

Neonatal intestinal obstructions are common surgical emergencies in neonates <28 days after birth. In our series, intestinal atresia was the most common cause of neonatal intestinal obstruction[3] followed by malrotation and meconium ileus. There was male preponderance, 1.5:1 which agrees with the reports from other studies.[6,7] Atresias are due to failure of recanalization or due to intrauterine vascular catastrophe. Duodenal atresia results from failure of recanalization that normally occurs during 9–11 weeks of gestational age. It is usually associated with other congenital anomalies such as additional intestinal atresia, congenital heart disease, or as a part of vertebral defects, anal atresia, cardiac defects, tracheo-esophageal fistula, renal anomalies, and limb abnormalities association. Duodenal and pyloric atresia present with maternal polyhydramnios. Pyloric atresia is associated with trisomy 21.

Malrotation of gut was the second most common etiology of neonatal obstruction in our study; it is caused by a failure of normal bowel rotation. Volvulus is the most dreaded complication of malrotation causing entire midgut gangrene. One case in our series presented with entire midgut volvulus and gangrene due to late presentation.

Figure 5: Exomphalos

Table 1: Etiological spectrum in males and females

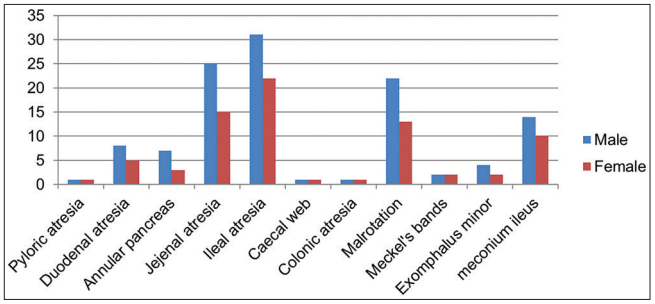

Table 2: Age incidence

Age incidence				
Diagnosis	**0–3 days**	**4–7 days**	**8–28 days**	**Total**
Pyloric atresia	2	0	0	2
Duodenal atresia	11	2	0	13
Annular pancreas	8	2	0	10
Jejunal atresia	8	25	7	40
Ileal atresia	10	35	8	53
Cecal web	0	1	1	2
Colonic atresia	0	0	2	2
Malrotation	5	12	18	35
Meckel's band	1	1	2	4
Exomphalos minor	4	2	0	6
Meconium ileus	12	10	2	24
Total	61	90	40	191

Table 3: Showing mortality pattern

Neonatal intestinal obstruction - Common causes and mortality		
Type	**No.**	**Mortality**
Pyloric atresia	2	1
Duodenal atresia	13	3
Annular pancreas	10	2
Jejunal atresia	40	6
Ileal atresia	53	6
Cecal web	2	0
Colonic atresia	2	0
Malrotation	35	3
Meckel's band	4	0
Exomphalos minor	6	2
Meconium ileus	24	8
Total	191	31

The mortality associated with neonatal intestinal obstruction ranges from 21% to 45% in developing countries, unlike <15% in Europe.[8,9] Post-operative mortality was 16% which was in between reported international publications, Hanif *et al*.

In our study, the most common cause of mortality was sepsis followed by anastomotic leak. Sepsis was mainly due to prematurity, late presentation, and complicated cases such as bowel perforation, bowel ischemia, and meconium peritonitis.

With advanced surgical technique, early diagnosis, improved pediatric anesthesia and improved neonatal intensive care, survival of newborn after surgery has increased tremendously in recent years.

As our villages are not well equipped to detect intestinal obstructions early, cases were referred late which might have led to poor outcome. Lack of proper transport facility is another limiting factor for early referrals.

Patients who were having risk factors such as prematurity, low birth weight, and associated congenital anomalies were more prone to have bad prognosis even after surgery. Issues such as motivation for surgical treatment and low socioeconomic factors are a few limiting factors against good outcome.

CONCLUSION

In our retrospective study, the incidence of intestinal atresia was the most common cause of neonatal intestinal obstruction followed by malrotation and meconium ileus. Incidence is higher in male patients. Antenatal diagnosis with early referral, improved surgical skills and technique, adequate staff, and proper post-operative care can improve the outcome of surgical neonates. Higher mortality was noted in cases presenting late, prematurity, and associated complications.

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