Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 7s, https://carcinogenesis.com/

Neonatal Ileal Atresia with Impending Perforation of Meckel's Diverticulum: A Rare Surgical Emergency

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ABSTRACT

Background: Neonatal intestinal obstruction is a life-threatening condition often caused by atresias, volvulus, or Hirschsprung's disease. Among these, ileal atresia is common, but its association with Meckel's diverticulum and impending perforation is extremely rare and can complicate diagnosis and management.

Case Presentation: We report the case of a 10-day-old male neonate presenting with progressive abdominal distension and bilious vomiting since day 8 of life. Initial stabilization was done with IV fluids and antibiotics. Imaging revealed features of distal intestinal obstruction. Emergency exploratory laparotomy revealed Type IIIb ileal atresia and an adjacent inflamed Meckel's diverticulum with impending perforation which was adherent to appendix. Surgical management included resection of the atretic ileum, excision of Meckel's diverticulum, appendectomy, and complete primary ileo-ileal anastomosis. Histopathology confirmed diverticulitis in Meckel's diverticulum and adherent congested appendix. The postoperative course was uneventful, and the baby was discharged in stable condition and doing well in follow up period.

Conclusion: This case highlights a rare but critical neonatal emergency. Coexisting Meckel's diverticulum with impending perforation and ileal atresia necessitate a high index of suspicion and urgent surgical intervention to prevent morbidity and mortality

Keywords: *Neonate, Ileal atresia, Meckel's diverticulum, neonatal intestinal obstruction, Diverticulitis, Exploratory laparotomy, Congenital gastrointestinal anomaly.*

How to Cite: Trishla Jain, santosh B Kurbet, (2025) Neonatal Ileal Atresia with Impending Perforation of Meckel's Diverticulum: A Rare Surgical Emergency, *Journal of Carcinogenesis*, *Vol.24, No.7s*, 314-318

1. INTRODUCTION

Neonatal intestinal obstruction is a critical surgical emergency encountered commonly in neonatal intensive care and pediatric surgical practice. It presents typically within the first few days of life, manifesting as abdominal distension, vomiting often bilious failure to pass meconium, and feeding intolerance and also as antenatal diagnosis of dilated bowel loops. (1,2). The most frequent underlying causes include intestinal atresias, Hirschsprung's disease, meconium ileus, and malrotation with midgut volvulus. Prompt diagnosis and timely surgical intervention are essential to prevent morbidity and mortality in such cases (3).

Among the congenital causes, intestinal atresias constitute a significant proportion, with ileal atresia being the most commonly affected segment of the small intestine. It is believed to arise due to an intrauterine vascular insult, leading to ischemia, necrosis, and eventual resorption of a bowel segment (3,4). The classification of small bowel atresia includes Types I to IV, with Type IIIb, also known as "apple peel" or "Christmas tree" or "Maypole deformity", being particularly rare. This type is characterized by a proximal atresia, absence of a segment of the mesentery, and a distal small bowel coiled around a single feeding vessel. Such cases are often complicated by poor bowel length and require meticulous surgical planning (5,6). Meckel's diverticulum, a remnant of the omphalomesenteric (vitelline) duct, is the most common congenital anomaly of the gastrointestinal tract, found in 1–2% of the population. It is located on the antimesenteric border of the ileum, usually within 60 cm of the ileocecal valve (7,8). While often asymptomatic, it can cause significant complications including gastrointestinal bleeding, intussusception, volvulus, diverticulitis, or perforation especially if ectopic gastric or pancreatic mucosa is present. However, these complications typically manifest in older children or adults,

and rarely in the neonatal period (9)..

The coexistence of ileal atresia and perforated Meckel's diverticulum in a neonate is exceedingly uncommon. Only isolated case reports are available in the literature, and the presentation may mimic or compound other causes of obstruction or peritonitis (3,4,10). We report a rare case of a term male neonate presenting on day 10 of life with signs of intestinal obstruction and peritonitis, in whom exploratory laparotomy revealed Type IIIb ileal atresia with impending perforation of Meckel's diverticulum managed successfully with resection, diverticulectomy and ileoileal anastomosis.

2. CASE PRESENTATION

Patient Background and Clinical Features

A 10-day-old full-term male neonate, weighing 2800 grams, presented to the Neonatal Intensive Care Unit (NICU) at KLES Dr. Prabhakar Kore Hospital, Belagavi, with progressive abdominal distension and failure to pass stools since the 8th day of life. The baby was born to a 28-year-old multigravida (G4P3L3A1) mother via uncomplicated vaginal delivery at 38 weeks of gestation. There was no antenatal history suggestive of fetal distress or polyhydramnios. The neonate cried immediately after birth. On examination, the neonate was moderately active and afebrile, with a heart rate of 138/min, respiratory rate of 42/min, and SpO_2 of 98% on room air. The abdomen was tense and distended, with shiny skin, visible veins, with tympanic resonance on percussion with reduced bowel sounds. No skin changes or palpable masses were observed. Digital rectal examination showed an empty rectum. The remainder of the systemic examination was unremarkable.

Investigations

Initial abdominal X-ray revealed multiple air-fluid levels with absent rectal gas shadow, suggestive of distal small bowel obstruction**.**

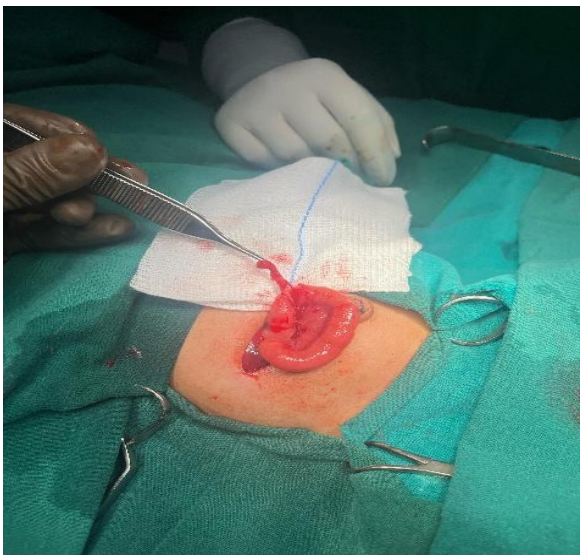

Figure 1: Intraoperative Image – Atretic distal ileum and impending Meckel's Diverticulum perforation

Ultrasonography showed dilated bowel loops with the presence of free peritoneal fluid, indicating possible perforation. Laboratory tests revealed hemoglobin of 17.2 g/dL, total leukocyte count of 13,000/mm^3, platelet count of 1.1 lakh/mm^3, and elevated C-reactive protein (CRP) at 99.2 mg/L. Serum electrolytes and renal function tests were within normal limits. Peritoneal fluid culture grew Klebsiella pneumoniae, and blood culture was positive for Candida kruzi, received appropriate antibiotics and antifungal agents for stipulated period.

Surgical Intervention

Following stabilization with intravenous fluids, nasogastric decompression, and broad-spectrum antibiotics (Piperacillin-Tazobactam, Amikacin, Metronidazole), the patient was taken up for emergency exploratory laparotomy on day 11 of life. Intraoperatively, a Type IIIb ileal atresia was noted approximately 10 cm from the ileocecal junction, along with a Meckel's diverticulum with impending perforation.

On tracing the intestines proximally at less dilated ileal part inflamed Meckel's diverticulum was also observed, and the appendix appeared congested and adherent to Meckel's diverticulum. Surgical management included resection of the atretic

ileal segment, excision of Meckel's diverticulum, appendectomy and end to end ileoileal anastomosis.

Postoperative recovery was uneventful. The neonate was started on naso-gastric feeding tube feeds by postoperative day 3 and the baby passed stools by 8th post operative day. He was discharged in stable condition on postoperative day 12.

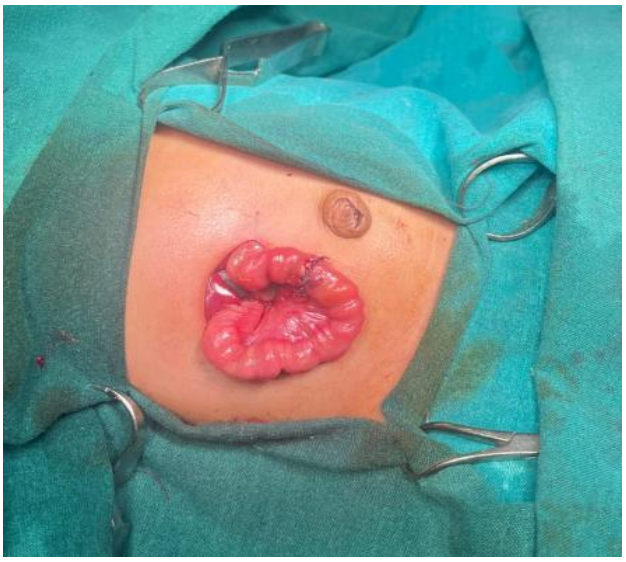

Figure 2: Intraoperative image showing the anastomosis of resected ileal ends

Postoperative Outcome

The neonate tolerated the procedure well. Oral feeds were initiated and accepted without difficulty. She gained weight (discharge weight: 2820 g) and remained clinically stable. The baby was discharged on exclusive breastfeeding with advice for regular pediatric surgery follow-up.

Histopathological examination confirmed diverticulitis in Meckel's diverticulum without ectopic gastric mucosa and a congested but non-inflamed appendix. The baby is doing well in follow up period at 6 months of life (Fig 3)

Figure 3: Follow-up Image of the infant at 6 months of age

3. DISCUSSION

Neonatal intestinal obstruction is a surgical emergency that demands prompt recognition and intervention. Among its various etiologies, intestinal atresias account for a significant proportion, with ileal atresia being the most common form (9). Ileal atresia typically results from an intrauterine vascular insult leading to ischemic necrosis, reabsorption of the affected bowel segment, and subsequent discontinuity of the intestinal tract (3,11). Grosfeld's classification describes four types of small bowel atresia, with Type IIIb or "apple peel" atresia being one of the rarest forms. It is characterized by proximal jejunal atresia, absence of a significant portion of the mesentery, and distal small bowel coiled around a single vascular arcade. Type IIIb is often associated with poor prognosis due to the shortened bowel length and complex vascular anatomy (2,3,5).

The present case is notable not only for the presence of Type IIIb ileal atresia but also for the coexistence of a impending perforation of Meckel's diverticulum an extremely rare finding in the neonatal period(4).Meckel's diverticulum, a remnant of the vitelline duct, is typically asymptomatic and discovered incidentally. When symptomatic, it usually presents later in childhood with complications such as painless rectal bleeding, intussusception, or volvulus. Diverticulitis or perforation of Meckel's in the neonatal period is rare and often mimics or complicates the presentation of intestinal obstruction, with a similar case explained in literature(4). In our case, the inflamed and perforated Meckel's diverticulum likely contributed to peritonitis, compounding the clinical severity of the atresia.

Diagnosis in such complex presentations is often challenging. Plain abdominal radiographs may suggest obstruction, but the presence of pneumoperitoneum may not be evident. Abdominal xrays and Ultrasonography can be useful to detect dilated bowel loops and free fluid, although definitive diagnosis is typically achieved intraoperatively. The elevated CRP and positive cultures in this case supported the presence of systemic and intra-abdominal infection, necessitating early surgical exploration.

Surgical management of such cases must be individualized. In the presence of perforation and sepsis, a primary anastomosis is often deferred in favor of a staged approach. In our patient, resection of the affected ileal segment along with the inflamed Meckel's diverticulum, appendectomy, and primary anastomosis was done. Histopathology confirmed the diagnosis of Meckel's diverticulitis and ruled out ectopic mucosa, which is commonly implicated in bleeding complications.

The coexistence of ileal atresia and symptomatic Meckel's diverticulum is extremely rare, with only a handful of such cases documented in the literature. It is unclear whether the diverticulum was a coincidental finding or whether the distal obstruction predisposed the segment to inflammation and eventual perforation. This case reinforces the importance of thorough intraoperative evaluation of the distal bowel in all cases of atresia, especially when secondary complications like perforation or meconium peritonitis are suspected.

Postoperative care in such neonates requires multidisciplinary management, including nutritional support and infection control. The outcome in this case was favourable due to early diagnosis, pick up the possible associated anomalies, timely surgery, and vigilant NICU care. The child is currently thriving well with optimal growth and nutritional status at 6 months of follow up period.

4. CONCLUSION

This case highlights a rare neonatal presentation of ileal atresia with impending perforation of Meckel's diverticulum. Early diagnosis, prompt surgical intervention, and multidisciplinary postoperative care are critical for survival. Thorough intraoperative inspection for associated anomalies is essential to ensure complete management and a good outcome.

REFERENCES

[1] Singh S, Srivastav S, Agarwal N, Nagpure A, Khan TR. Neonatal Intestinal Obstruction: Etiology, Management, and Outcomes in a Tertiary Care Center. Cureus. 2024;16(6):e62971. doi:10.7759/cureus.62971

[2] Ibrahim IA, Ali Mohamed AK. Ileal atresia with intraluminal Meckel's diverticulum. J Pediatr Surg Case Rep. 2023;89:103705. doi:10.1016/j.epsc.2023.103705

[3] Liaqat N, Mahomed A, Nayyar SI, Akhtar N, Ali S, Haider N. Perforated Meckel's diverticulum in neonates: a report of six cases and systematic review of the literature. Ann Pediatr Surg. 2022;18(1):14. doi:10.1186/s43159-022-00141-7

[4] Ghazwani SM, Khan SA, Hakami AYO, Alamer A, Medkhali BA. Perforated Meckel's Diverticulum and Adhesive Intestinal Obstruction in a Preterm Neonate: A Case Report. Cureus. 2024;16(3):e56208. doi:10.7759/cureus.56208

[5] Aguayo P, Fraser JD, St. Peter SD, Ostlie DJ. Perforated Meckel's diverticulum in a micropremature infant and review of the literature. Pediatr Surg Int. 2009;25(6):539–41. doi:10.1007/s00383-009-2376-4

[6] Frooghi M, Bahador A, Golchini A, Haghighat M, Ataollahi M, Javaherizadeh H. Perforated Meckel's

Diverticulum in a 3-day-old Neonate: A Case Report. Middle East J Dig Dis. 2016;8(4):323–5. doi:10.15171/mejdd.2016.33

[7] Chan KWE, Lee KH, Wong HYV, Tsui SYB, Wong YS, Pang KYK, et al. Laparoscopic excision of Meckel's diverticulum in children: What is the current evidence? World J Gastroenterol. 2014;20(41):15158–62. doi:10.3748/wjg.v20.i41.15158

[8] Masuko T, Tanaka Y, Kawashima H, Amano H. Diagnostic laparoscopy for neonatal perforated Meckel's diverticulum. J Minim Access Surg. 2016;12(1):71–2. doi:10.4103/0972-9941.165393

[9] Rellinger EJ, Hua ST, Jackson GP. Anomalies of Intestinal Rotation: Laparoscopic Ladd's Procedure. The SAGES Manual of Pediatric Minimally Invasive Surgery. 2016;381–91. doi:10.1007/978-3-319-39479-1_31

[10] Shalaby RY, Soliman SM, Fawy M, Samaha A. Laparoscopic management of Meckel's diverticulum in children. J Pediatr Surg. 2005;40(3):562–7. doi:10.1016/j.jpedsurg.2004.11.038

[11] Lee WG, Wong-Michalak ST, Judelson RC, Shue EH, Pelayo JC, Kim ES. Perforated Meckel's diverticulum as an uncommon cause of pneumoperitoneum in the newborn: A case report. J Pediatr Surg Case Rep. 2024;105:102820. doi:10.1016/j.epsc.2024.102820.