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Small Bowel Volvulus Around a Pedunculated Meckel's Diverticulum in A Neonate: A Case Report

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ABSTRACT

Introduction: Neonatal intestinal obstruction is a surgical emergency most commonly caused by midgut volvulus secondary to malrotation. However, rare etiologies may present with similar clinical and radiological features, leading to diagnostic challenges. Meckel's diverticulum, although the most common congenital anomaly of the gastrointestinal tract, is an exceptional cause of neonatal small bowel volvulus.

Case Presentation: Here we present a case of a 20-day-old male neonate patient, who presented with persistent bilious vomiting following an initial symptom-free period. Clinical examination and laboratory findings were unremarkable. Abdominal Doppler ultrasound demonstrated a whirlpool sign suggestive of midgut volvulus related to malrotation. Emergency surgical exploration revealed a small bowel volvulus with two complete turns around a pedunculated Meckel's diverticulum, without associated malrotation. The bowel was viable and a segmental ileal resection including the diverticulum with primary end-to-end anastomosis was performed. The postoperative course was uneventful, with favorable clinical outcome.

Conclusion: Volvulus related to a pedunculated Meckel's diverticulum is an exceptionally rare condition in neonates and may mimic malrotation on imaging. This case highlights an important diagnostic pitfall, as the whirlpool sign is not specific to malrotation. Early surgical exploration remains essential for definitive diagnosis and management, ensuring optimal outcomes.

Keywords: Meckel's diverticulum, Neonatal volvulus, Intestinal obstruction, Case report

1. Introduction

Intestinal obstruction in the neonatal period is a surgical emergency that requires prompt diagnosis and management[1]. While midgut volvulus secondary to intestinal malrotation is a well-recognized cause of bilious vomiting in neonates[2,3], rare etiologies may present with similar clinical and radiological features, leading to diagnostic challenges. Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract[4,5], but its presentation as a cause of neonatal small bowel volvulus is exceptional[6].

2. Case Presentation

The patient was a 20-day-old male neonate with a history of *in vitro* fertilization pregnancy, which was well monitored and

carried to term. Delivery was performed by cesarean section in a medicalized setting due to maternal infectious risk. Birth weight was 3.2 kg.

After birth, the neonate required a 10-day stay in the Neonatal Intensive Care Unit (NICU) for neonatal respiratory distress related to meconium aspiration, associated with maternofetal infection (C-reactive protein at 260 mg/L).

At 11th day of life, the neonate developed bilious vomiting occurring 4-5 times per day, associated with decreased bowel movements but preserved general condition. He was evaluated multiple times in the private sector, where initial radiological investigations were reported as normal, which contributed to a delay in diagnosis before admission to our department.

At the time of admission, the clinical examination was reassuring. The neonate was hemodynamically stable, with no signs of abdominal distension or peritoneal irritation. Laboratory investigations were unremarkable.

Abdominal Doppler ultrasound revealed a whirlpool sign, raising suspicion of volvulus related to suggestive of intestinal malrotation (Figure 1).

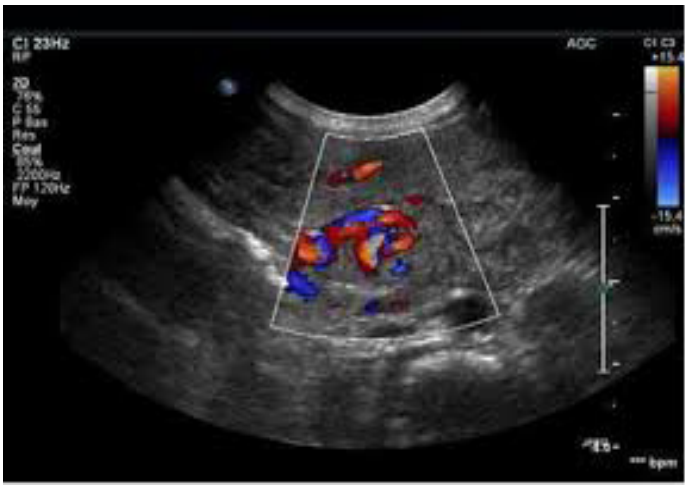

Figure 1: Abdominal Doppler ultrasound showing a whirlpool sign suggestive of intestinal volvulus.

In view of the persistent bilious vomiting and suggestive imaging findings, surgical exploration was indicated. Intraoperative findings revealed a small bowel volvulus with two complete turns around a pedunculated Meckel's diverticulum (Figure 2).

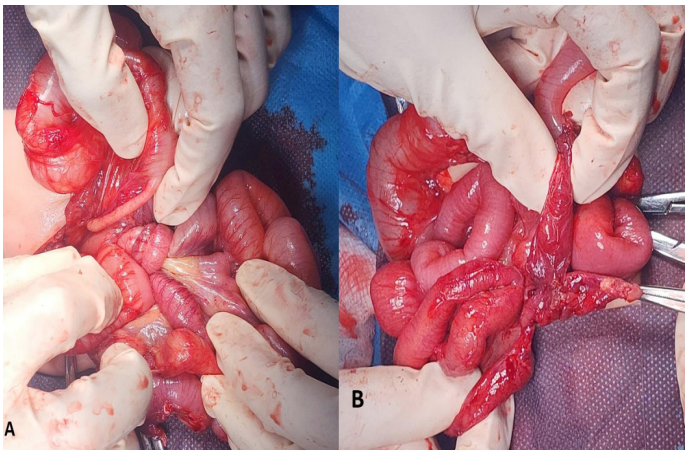

Figure 2A and 2B: Intraoperative view showing small bowel volvulus twisted around a pedunculated Meckel's diverticulum.

The small bowel loops were dilated but remained viable, with no evidence of ischemia or necrosis and no intestinal malrotation was identified. A segmental resection of the affected ileal segment, including the Meckel's diverticulum, was performed (Figure 3).

Figure 3: Resected specimen showing a pedunculated Meckel's diverticulum after segmental ileal resection.

This was followed by an end-to-end primary anastomosis with satisfactory operative results (Figure 4).

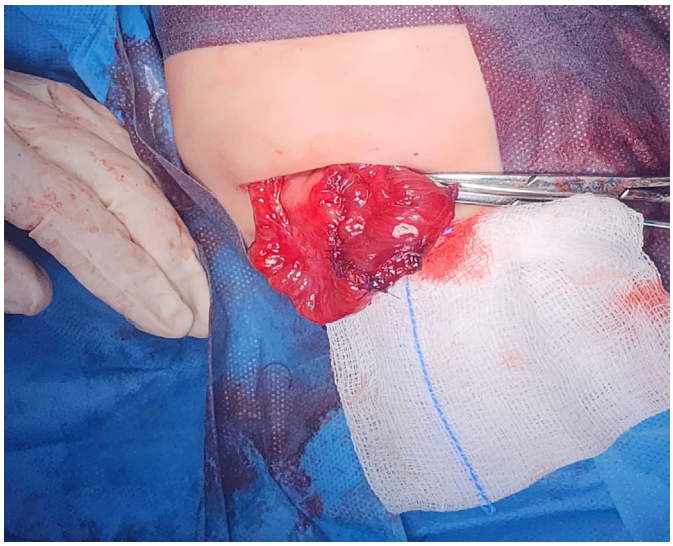

Figure 4: Final intraoperative view showing completed end-to-end small bowel anastomosis.

The postoperative course was uneventful, with progressive resumption of enteral feeding and favorable clinical outcome.

3. Discussion

Meckel's diverticulum results from incomplete involution of the omphalomesenteric duct and has an estimated prevalence of approximately 2% in the general population[4]. Despite its frequency, it remains asymptomatic in the majority of cases, particularly during the neonatal period[5].

In children, symptomatic Meckel's diverticulum most commonly presents with gastrointestinal bleeding, inflammation or intestinal obstruction[5,7,8]. In neonates, however, obstruction is the predominant mode of presentation when complications arise[9]. Mechanisms of obstruction include intussusception, volvulus around fibrous bands, Littre's hernia and, more rarely, axial torsion involving the diverticulum[6,11].

Volvulus associated with Meckel's diverticulum is uncommon and typically occurs in the presence of mesodiverticular bands or persistent vitelline duct remnants that act as fixation points[6]. In contrast, volvulus around a pedunculated Meckel's diverticulum, as observed in our case, represents an exceptionally rare mechanism[11].

Recent reports have highlighted the variability and severity of neonatal presentations of Meckel's diverticulum, including perforation and intestinal obstruction[10].

Clinically, bilious vomiting in a neonate must always be considered a sign of intestinal obstruction until proven otherwise[1]. Midgut volvulus due to malrotation remains the most critical diagnosis to exclude due to the risk of rapid progression to bowel ischemia[2,3].

Radiological evaluation plays a central role in the diagnostic approach. The whirlpool sign on Doppler ultrasound, first described by Shimanuki, et al.[8], is widely regarded as highly suggestive of midgut volvulus. However, this sign is not pathognomonic and may also be observed in other causes of volvulus. This represents an important diagnostic pitfall. Previous studies have emphasized that imaging findings alone may not reliably differentiate between various etiologies of neonatal volvulus[3].

Surgical exploration therefore remains the gold standard for both diagnosis and treatment in suspected neonatal volvulus[1].

From a surgical standpoint, treatment involves resection of the affected intestinal segment containing the Meckel's diverticulum, followed by primary anastomosis[7].

4. Conclusion

This case underscores the importance of considering rare etiologies such as Meckel's diverticulum in the differential diagnosis of neonatal small bowel volvulus. Although imaging findings may suggest malrotation-related volvulus, definitive diagnosis is often made intraoperatively. A high index of suspicion and timely surgical intervention are crucial to ensure favorable outcomes in neonatal intestinal obstruction.

5. References

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