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Case Report

A Very Rare Case of Acute Abdomen in Preterm Neonate: Due to Perforated Meckel Diverticulum

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Abstract

Meckel's diverticulum is the most common vitelline duct abnormality. True incidence is unknown because the majority of patients are asymptomatic. There have been only a few cases of perforated Meckel's diverticulum described in preterm neonates. Our patient presented with respiratory distress after birth. After the initiation of feeding he experienced abdominal distention and episodes of apnea. As the symptoms worsened abdominal radiography revealed a pneumoperitoneum. The patient was taken into surgery where a perforated Meckel diverticulum was discovered. This finding was confirmed by histopathological examination. The fact that MD perforation is a rare condition makes the preoperative diagnosis quite difficult. However it is important that it is included in the differential diagnosis of cases with the aforementioned symptoms. An immediate surgical intervention after a pneumoperitoneum is discovered could lead to a good postoperative outcome.

Kew Words: covid-19; pregnancy; anxiety; depression

Introduction

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract with a complication rate of approximately 4%. Bowel obstruction, gastrointestinal bleeding, acute inflammation, and umbilical abnormalities are the most common presentations of MD in childhood, whereas symptomatic MD in the neonate is quite rare. We report a case of Meckel's diverticulum (MD) perforation in a preterm neonate and a review of literature.

Case Report

A newborn male with a gestational age of 31+1w and weighing 1680gr was delivered by emergency caesarean section due to myometrial activity and initiation of labor. Immediately after birth he presented intermittent grunting, nasal flap lift, labored breathing and thus required NCPAP. He was initially put on intravenous hydration, parenteral nutrition and antibiotic treatment. Signs of respiratory distress and wheezing gradually receded. Feeding started at day one. The same morning he presented an episode of apnea but recovered with stimuli. At night a large regurgitation caused reduction of the quantity of milk. At day 2 NCPAP was removed but he presented abdominal distension so feeding was further reduced. At night (start of day 3) worsening of abdominal distension with tenderness and episodes of apnea occurred. Abdominal radiography revealed a pneumoperitoneum (Figure.1). Feeding was immediately ceased and the patient was transferred to the operation room. He underwent exploratory laparotomy whose findings were free gas and fluid in the abdominal cavity. A perforated Meckel diverticulum (MD) (Figure.2) was discovered and a segmental excision of a short part of the ileum (including the MD) and primary end-to-end (ileo-ileal) anastomosis was performed. Histological examination confirmed the presence of Meckel diverticulum with small intestine mucosa and signs of acute inflammation at the tip (site of perforation). Postoperatively the patient was extubated on the first day but remained on NCAP until the 4th postoperative day. He was gradually fed from the 7th postoperative day with good tolerance. He was discharged after a month in good condition.

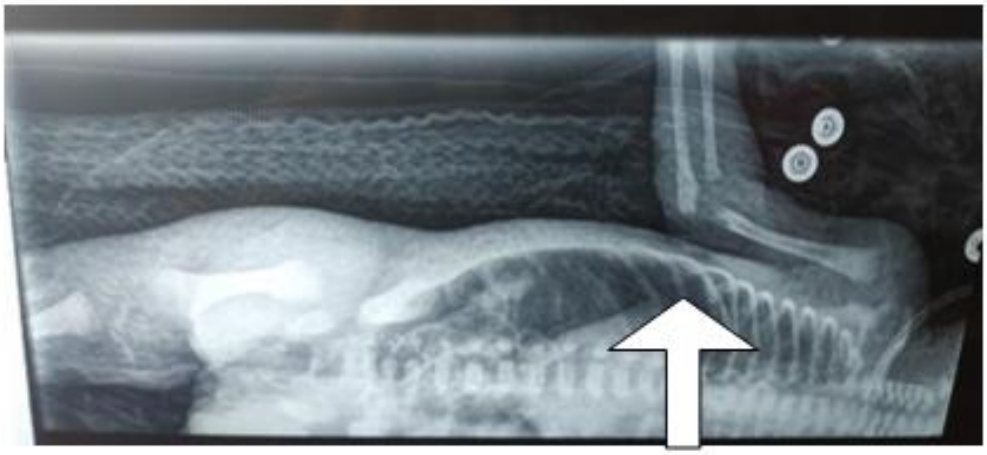

Figure 1: Radiographs of chest and abdomen revealed pneumoperitoneum.

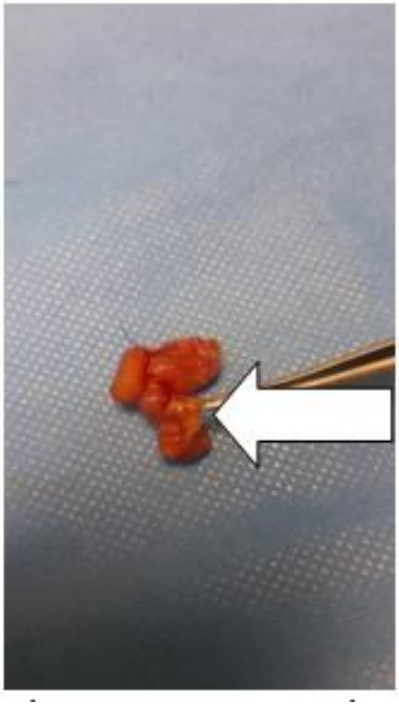

Figure 2: Intraoperative finding: perforated Meckel Diverticulum. Segmental excision.

Discussion

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract and is a remnant of the vitelline (omphalomesenteric) duct. [1] It results from failure of the proximal duct to obliterate (abnormal regression of the vitelline duct). Incidence in most studies is reported to be around 2% of the general population, however true incidence is unknown because the majority of patients are asymptomatic. Overall, about 4% of patients with Meckel's diverticulum become symptomatic. Symptomatic MD may present with intestinal obstruction, local or generalized peritonitis (inflammation- perforation), or gastrointestinal bleeding. Approximately 60% of symptomatic MD occurs during childhood, mostly after 3 years of age, with a male-to-female ratio of 2:1. Despite being the most common congenital anomaly of the gastrointestinal tract, symptomatic manifestation in the neonatal period is rare.

The timing of presentation is also of interest as the majority of patients presented within the first week of life. Some presented immediately after birth suggesting a peri or very early post-natal onset of pathology.

Te etiology of perforated MD is unclear, and many theories have been put forth.

Only 8 case reports of perforated Meckel's diverticulum have been described in preterm neonates (Table. 1). [2,3,4,5]

Reference	Gestational Age, wk	Complications during delivery	Presentation/ Age at diagnosis of Meckel Perforation	Heterotopic mucosa	Surgical technique
Coppes et al (1991)	32	Severe respiratory distress	Scrotal pneumatocele, abdominal distension/3d	None	Resection and anastomosis
Ford and Woolley(1992)	37	Severe respiratory distress (TOF)	Abdominal distension/1d	Pancreatic	Resection and stoma formation
Chang et al (2006)	33	Mild respiratory distress	Abdominal distension/2d	None	Resection and anastomosis
Aguayo et al (2009)	28	Severe respiratory distress	Bilious vomiting/6d	None	Resection and anastomosis
Smolkin et al (2013)	28	Severe respiratory distress	Abdominal distension/10d	None	Resection and anastomosis
Bertozzi et al (2013)	34	Maternal perforated appendicitis	Bilious vomiting/5d	None	Resection and anastomosis
Borgi et al (2014)	29	Severe respiratory distress	Abdominal distension/1d	None	Resection and anastomosis
McKelvie et al (2019)	30	Severe respiratory distress	Incidental/3d	Gastric	Resection and anastomosis
Presented case	31	Respiratory distress	Abdominal distention/3d	None	Resection and anastomosis

Table 1: Reports of spontaneous Meckel perforation in preterm neonates. [3]

In all these cases the preterm neonates presented with respiratory distress (mild or severe) at birth. Regarding the gastrointestinal system, in most neonates abdominal distention was present in the first days, whereas the other patients presented with bilious vomiting or food intolerance6. Radiological examination revealed pneumoperitoneum in all the reported cases, which led to the decision of exploratory laparotomy [7]. The differential diagnosis of pneumoperitoneum in neonates includes NEC, perforated appendicitis, perforated MD or idiopathic intestinal perforation. In these reported cases after the perforated MD was recognized, a segmental resection was performed. In 6 cases including ours a primary end-to-end anastomosis was performed, while in the other 3 cases a stoma was formatted [8]. The choice of procedure is based on the contamination of the abdomen and the condition of the remaining small bowel and colon. Histological findings included heterotopic mucosa only in 2 cases (pancreatic and gastric).

In conclusion MD perforation should be considered in the differential diagnosis of a preterm neonate with respiratory distress after birth and early abdominal distension. Perforation is usually established by the presence of pneumoperitoneum. The fact that MD perforation is a rare condition makes the preoperative diagnosis quite difficult. However an immediate surgical intervention is essential in order to ensure an uneventful recovery. Segmental small bowel resection with primary anastomosis, if the clinical condition of the patient permits it, is an effective surgical approach with good outcomes for patients with MD.

Learning points:

- Perforation of a Meckel diverticulum in a preterm neonate is very rare.
- Perforated MD is not common and the differential diagnoses of pneumoperitoneum in neonates include NEC, perforated appendicitis, or idiopathic intestinal perforation
- Our case demonstrates the importance of considering MD perforation in a preterm baby with immediate respiratory distress after birth and early abdominal distension
- Although the preoperative diagnosis can be difficult given its rarity, so it is necessary to maintain a high suspicion especially in the neonatal period because an early surgical approach is essential to achieve a successful outcome

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