Acute Abdomen in a Teenager: A Rare Case of Isolated Meckel's Diverticulum Torsion Diagnosed Intraoperatively

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Abstract

Meckel's diverticulum (MD) is a common congenital anomaly, yet complications are rare and typically present as small bowel obstruction, bleeding, or inflammation. Torsion of MD, particularly isolated torsion at its base without the involvement of adjacent bowel, is an exceptionally rare cause of acute abdomen. We describe the case of a 17-year-old male who presented with a 3-day history of progressive lower abdominal pain, nausea, and vomiting. Clinical examination revealed localized tenderness in the right lower quadrant with elevated inflammatory markers. Given the high clinical suspicion of acute appendicitis, diagnostic laparoscopy was carried out and revealed a large, twisted, necrotic MD. A wedge resection followed by anastomosis was subsequently performed. The postoperative course was uneventful, and the patient was discharged home on the third postoperative day. Isolated torsion of MD is a rare but an important differential diagnosis in adolescents present with acute abdominal pain. As this condition is difficult to diagnose on imaging, clinical suspicion and prompt surgical exploration was vital for diagnosis and management.

Keywords: Meckel's diverticulum (MD), Diagnostic laparoscopy, wedge resection, torsion.

Introduction

One of the common congenital anomalies of the gastrointestinal tract is an MD, which is present in approximately 2 % of the general population. This condition occurs from the incomplete obliteration of the vitello-intestinal duct and typically remains clinically silent. MD is associated with common complications that affect around 4% of the population, including small bowel obstruction, diverticulitis, bleeding or perforation.[1-3] Torsion of MD at its base is a rare clinical condition. In this case report, we are reporting a case of torsion in a large MD presented with an acute abdomen in an adolescent patient.

Case Report

A 17-year-old male presented to the pediatric emergency department with a history of abdominal pain for 3 days. The pain was initiated in the right lower quadrant and suprapubic region, it worsened later, and he started having multiple episodes of vomiting, subjective fever, and dysuria. On presentation, the abdominal pain was persistent but non-progressive, with a numeric rating score of 5–6. The patient denied recent upper respiratory symptoms, had not had a bowel movement since symptoms onset, and was uncertain about passing flatus. Upon further inquiry, he reported episodic, self-limiting abdominal pain over the past two years, that occurred approximately once per month.

The patient had no significant medical or past surgical history, was not sexually active, and denied recreational drug use. He consumed alcohol occasionally in social settings. On examination, he appeared well with normal vital signs except for mild tachycardia (heart rate 100 beats per minute). He was alert, oriented, and did not experience acute distress. Examination of the abdomen revealed localized tenderness in the right lower quadrant and suprapubic region, with positive psoas sign and mild guarding. No rebound tenderness, palpable masses, or signs of peritonitis were observed.

Initial laboratory investigations revealed a CRP level of 120 mg/L and leukocytosis (WBC) 18 x10^9/L. Urinalysis revealed mild proteinuria but no significant hematuria or pyuria. Given the elevated inflammatory markers and localized abdominal tenderness, acute appendicitis was suspected. The patient was admitted for surgical evaluation without imaging as per institutional guidelines and underwent diagnostic laparoscopy.

Intraoperatively, a large, twisted, and necrotic MD was identified. The diverticulum was adherent via a fibrous band and exhibited signs of ischemia. A mini laparotomy was performed, as initially there was a suspicion of involvement of a small bowel. Around 10 cm long narrowed based MD with approximately 7cm large, rounded tip, was located about 70 cm away from the ileocecal valve, but without perforation [Figure 1]. The adjacent small bowel was carefully inspected both proximally and distally and ultimately found to be viable and uninvolved. A wedge resection of the MD was carried out, followed by a hand-sewn, single-layer continuous suture anastomosis. The appendix appeared normal and was not removed in accordance with local hospital guidelines.

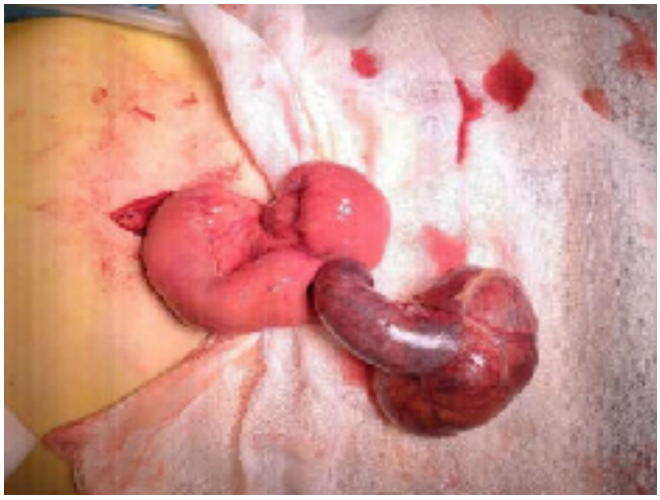

Figure 1: Narrow-based necrotic Meckel's diverticulum approximately 10cm long with 7 cm rounded tip and normal small bowl.

Postoperatively, the patient tolerated recovery quite well and was discharged home on day three after surgery in a stable condition. The abnormally large tip was suspicious, but histopathology revealed necrotic tissue without any ectopic tissue or malignancy. Review of the patient´s medical record, in the absence of formal long-term follow-up, revealed no reported complications or readmissions up to 5 months postoperatively.

Discussion

Torsion of MD at its base is a rare complication. Torsions of MD are described in two types: one in which the ileum twists around the attachment of the diverticulum, classified as axial torsion, and the other type is when

the torsion occurs at the base/neck, in which the diverticulum itself twists at the base. This type of torsion is extremely rare.[4] The rotation in this later type occurs along the diverticulum's axis at its base without the involvement of the attached small bowel loop or mesentery.[5] The same occurred in our case, and resulted in compromise of the vascular supply and necrosis without bowel obstruction. Narrowed neck elongated variants of MD are associated with a high risk of torsion.[4,6]

Lower abdominal pain is a frequently presenting symptom in a torsion of MD. When torsion of MD occurs, it becomes gangrenous and eventually perforates and can be presented with peritonitis and sepsis. Due to the mobile nature of mesentery, pain could be present anywhere in the abdomen and could result in misdiagnosis.[5] In our patient, the primary suspicion was acute appendicitis because of the pain in the right lower quadrant.

There are several imaging methods but have a low diagnostic value. CT scan can show small bowel loops full of gas, however, it is difficult to differentiate MD from normal bowel loops.[7,8] The most appropriate imaging technique that can be very helpful in the diagnosis of this condition is a technetium-99 m, which is absorbed by the heterotopic mucus of the stomach.[7] Bleeding complications can be diagnosed by imaging modality; however, non-bleeding complications are still difficult to diagnose by imaging studies.[9] In our case, we only relied on clinical findings and blood tests and considered the need for diagnostic laparoscopy due to the suspicion of acute appendicitis. Prompt surgical intervention was prioritized to avoid delay in management and is consistent with our local institutional guidelines.

The common surgical options are diverticulectomy or wedge/segmental resection of small bowel including the MD, and the reasoning for which procedure to be performed depends significantly on the integrity of the proximal ileum and base of the MD and the presence of any ectopic tissue.[10] In our case, the decision to convert from laparoscopy to mini-laparotomy was made to allow thorough assessment of the bowel in light of the suspected involvement, which was later ruled out. Therefore, we performed wedge resection and anastomoses as the small bowel was vital.

Conclusion

Torsion of MD at its base is a rare complication but an important differential diagnosis in adolescents present with acute pain in the abdomen. Due to the nonspecific nature of its clinical presentation, it can mimic more common conditions such as acute appendicitis, leading to potential delay in diagnosis. This case highlights that early diagnostics laparoscopy remains a crucial step in diagnosing and managing this condition, because it is difficult to confirm diagnosis on imaging.

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