Axial torsion of a giant Meckel’s diverticulum

Chibueze Onyemkpa, Benjamin Kuhns, Thomas Murickan, Crystal Drayer, Kosisochi Obinwanne

ABSTRACT

Introduction: Meckel’s diverticulum (MD) is an outpouching in the terminal ileum formed due to the persistence of the omphalomesenteric duct. Usually asymptomatic, only about 5% of the cases develop complications such as hemorrhage and perforation. Axial torsion, which occurs when the diverticulum twists around its base, is the rarest complication reported. We report the case of axial torsion of MD which was managed laparoscopically.

Case Report: We discuss the case of a 49-year-old male who presented with 12 hours of sudden right lower quadrant pain, and decreased appetite. As part of his workup, radiographic imaging showed a complex cystic mass in the right lower quadrant but was unable to establish the diagnosis. Due to persistent symptoms, he was emergently taken for a diagnostic laparoscopy which revealed a torsion of a giant MD. The diverticulum was laparoscopically resected and the patient did well postoperatively with resolution of his symptoms.

Conclusion: Torsion is a rare complication of MD. Preoperative diagnosis is challenging and usually necessitates surgical intervention for both confirmation and management. We present a unique case of torsion of a giant diverticulum that was approached and managed using minimally invasive techniques.

Keywords: Axial torsion, Meckel’s diverticulum, Meckel’s diverticulum torsion

INTRODUCTION

Meckel’s diverticulum (MD) is the most common gastrointestinal (GI) congenital abnormality [1]. They occur in about 2% of the population, and have a postulated complication rate of about 4% [1, 2]. Complications that have been described in literature range from lower GI bleeds to small bowel obstructions, and perforations [1]. However, axial torsion is one of the rarest of these complications [3]. Axial torsion poses a preoperative diagnostic dilemma hence confirmation is usually intraoperative. Here we describe one of such cases managed with laparoscopic diverticulectomy.

CASE REPORT

The patient is a 49-year-old male former smoker with a past medical history significant for hemochromatosis, a prior right inguinal hernia repair, and vasectomy. He presented with a sudden onset of abdominal pain 12 hours prior to surgical evaluation. He also reported associated loss of appetite. His pain was initially periumbilical but subsequently migrated to the right lower quadrant. He denied any other associated symptoms. Pertinent physical examination was significant for right lower quadrant tenderness at McBurney’s point, negative Psoas
and Rovsing’s signs, and no peritoneal signs. Laboratory findings were normal with a white blood cell (WBC) of 11,000/μL—no neutrophilia or bandemia, and a lactic acid level of 1.9.

A computed tomography (CT) scan of the abdomen and pelvis, without contrast, revealed a complex cystic mass in the right lower quadrant measuring 7.3 × 5.9 × 5.4 cm (Figure 1). With the origin of the mass still unknown, a repeat CT scan of the abdomen and pelvis with oral and intravenous (IV) contrast was obtained to further elucidate the origin of the mass (Figure 2). This re-demonstrated the complex encapsulated collection in the right lower quadrant with areas of internal hemorrhage, adjacent free fluid, and surrounding inflammation. The lesion was noted to be closely adherent to the terminal ileum; however, communication with the lumen of the small bowel could not be ascertained since there was no flow of oral contrast into the mass. In addition, a normal appearing appendix was identified distinct from the mass. Still uncertain of the diagnosis, and with persistent symptoms, the patient was taken for a diagnostic laparoscopy.

Intraoperatively, a twisted, narrow-stalked, giant MD with hemorrhagic areas was identified (Figures 3 and 4). The diverticulum was detorsed, and the long stalk noted to be viable. A stapled diverticulectomy therefore performed. The appendix was identified and was grossly normal with no evidence of disease. Pathologic examination of the specimen revealed benign small bowel mucosa with intramucosal hemorrhage, blunting of villi, and areas of mild inflammation consistent with MD. Postoperatively, the patient recovered with complete resolution of his symptoms, and was discharged home on postoperative day one.

**DISCUSSION**

Meckel’s diverticulum develops from the failure of complete obliteration of the omphalomesenteric duct, and is located on the antimesenteric border of the ileum about 100 cm from the ileocecal valve [4]. The wall of the MD consists all layers of the intestinal wall and is, therefore, a true diverticulum. In addition, its mucosa
is histologically similar to that of the ileum; however, there is a predisposition to the presence of ectopic tissue [2]. Gastric tissue has been documented as the most common ectopic tissue identified in MD [2]. The histologic examination of the case described above was consistent with benign small bowel mucosa in addition to other features suggestive of an ischemic process from the torsion. Also, MDs typically measure less than 5 cm and bigger diverticula are referred to as ‘giant’ diverticula [1]. These large diverticula are relatively uncommon and usually associated with more severe complications [5].

In literature, a male predominance is well documented for both the presence of a diverticulum and the development of symptoms [4, 6]. There are also postulations of a higher incidence of complications with increasing age but these have remained controversial as different studies have yielded conflicting results [7, 8]. Overall, only 4.2–6.4% of the patients with MD become symptomatic [7, 8]. In these individuals, the most common presentations are GI bleeds and small bowel obstructions children and adults, respectively [9]. Rarer complications such as umbilical fistula, Littre’s hernia, and small bowel volvulus have also been documented [4].

Axial torsion, which occurs from twisting around the stalk of the MD, is one of the rarest complications [10–13]. Although precise pathophysiology is unknown, some risk factors have been reported. One of the purported risk factors is a large MD as seen in the case presented above especially with cases with narrow-based stalks [13, 14]. Other risk factors include the presence of a mass in the diverticulum, and the presence of adhesions between the diverticulum and surrounding structures [2]. These adhesions create an axis around which the diverticulum undergoes torsion. In the case above, stones were also noted in the diverticulum. This suggests some degree of chronic stasis in the diverticulum which could have contributed to accumulation and increase in the size of the diverticulum, and risk of torsion.

With torsion, abdominal pain is a principal symptom and can be either poorly localized or located in different parts of the abdomen [1, 15]. This variability in position, as well as poor localization, of the pain usually contributes to confound the diagnosis [1, 15]. Most of the cases usually present with right lower quadrant; hence, acute appendicitis is the most common differential diagnosis [16]. Other differentials such as enteric cysts, intra-abdominal abscesses, and cystic neoplasms were also entertained in the index patient. If left untreated, the ischemic diverticulum progresses to gangrene and perforation with a deterioration in the patient’s clinical picture.

Radiologic imaging is more useful in ruling out other differentials as they do not reliably confirm a torsion of a MD [1]. Typically, CT scan images identify MD as a blind-ending pouch on the antimesenteric side of the distal ileum [1]. This feature is however lost with torsion where a cystic lesion is identified [1, 15]. Due to this diagnostic dilemma, surgical exploration is often required to confirm a diagnosis. Once confirmed, management is surgical and includes diverticulectomy or segmental small bowel resection. Surgical options for complicated MD are largely determined by the integrity of diverticulum base and adjacent bowel, the size of the base, the presence and location of ectopic tissue within diverticulum [9]. In the index patient, we opted for a diagnostic laparoscopy to confirm the diagnosis and a laparoscopic diverticulectomy was performed. A diverticulectomy was chosen because the stalk of the diverticulum was long, narrow, and viable.

**CONCLUSION**

Torsion of a Meckel’s diverticulum is a rare complication that is frequently misdiagnosed preoperatively. Usually, it requires a high index of suspicion and surgical management. Laparoscopic resection is a viable option and should be pursued if the expertise is available.

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