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## A case report: Cecal volvulus caused by Meckel's diverticulum



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## ABSTRACT

**INTRODUCTION:** Meckel's diverticulum is the most common congenital anomaly of the small intestine. Common complications related to Meckel's diverticulum include hemorrhage, intestinal obstruction and inflammation. Acute large bowel obstruction is a rare complication of Meckel's diverticulum and in the presented case it is caused by volvulus.

**PRESENTATION OF CASE:** We report a 39 year old female who presented with the diagnosis of a large bowel obstruction occurring as a result of cecal volvulus caused by adhesions of a perforated diverticulum.

**DISCUSSION:** The reported case presents one of the rare complications of MD, which is volvulus. The case described above presented with signs and symptoms suggestive of acute intestinal obstruction and radiological findings suggestive of cecal volvulus. The patient was taken to the operation room for exploration and we discovered the presence of a perforated MD. The main treatment of such case is to perform diverticulectomy in all symptomatic patients.

**CONCLUSION:** MD is mostly identified intraoperatively. Knowledge of the pathophysiologies by which MD can cause complications such as volvulus is important in order to plan management.

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## 1. Introduction

Meckel's diverticulum is the most common congenital condition of gastrointestinal tract. Normally, a diverticulum is present in fetal life as the vitello-intestinal duct remnant, which usually disappears later on the 7th week of gestational period.<sup>1</sup> MD occurs in about 2% of the population, with a male-to-female ratio of 2:1. It is located within two feet from the ileocecal valve, and it can be 2 in. in length and may vary based on clinical practice.<sup>2–4</sup>

Most cases of MD are difficult to diagnose and are found incidentally during a surgical procedure for another reason.<sup>5</sup> However, sometimes the presenting symptoms may guide the physician to this suspected pathology. Hemorrhage, small bowel obstruction, and diverticulitis are frequent complications. The most common complication of MD is bowel obstruction.<sup>6</sup> We describe a case of an adult female patient who presented with clinical picture of acute bowel obstruction due to MD.

## 2. Case report

A 39 year old female patient known for hypothyroidism on thyroxine presented to King Abdulaziz University Hospital, Emergency Department, with a complaint of abdominal pain for 3 days. The

pain was colicky in nature. It started around the umbilicus and persisted for 2 days. Then, it shifted to the right iliac fossa on the day of her ER visit. It was associated with vomiting, greenish in color, three times on the same day of presentation, in addition to history of constipation for 2 days. There was no history of fever, diarrhea, bleeding per rectum, or urinary symptoms. She had no previous history of abdominal surgery. Clinical examination revealed that vital signs were within normal limits. The oral mucosa appeared dry, suggestive of dehydration. The abdomen was mildly distended. During palpation, the abdomen was soft and lax, with guarding in the right iliac fossa. There was tenderness over the RLQ and umbilical area. No masses were felt, and bowel sounds were exaggerated. Routine laboratory investigations were within normal limits: WBC 8.7 k/ $\mu$ L, HB 15 g/dl, PLT 240, NA<sup>+</sup> 129 mmol/L, K<sup>+</sup> 4.1 mmol/L, Urea 4.1 mmol/L, and Creatinine 41  $\mu$ mol/L. Urine analysis was unremarkable.

Erect abdominal X-ray was performed, and it revealed multiple air fluid levels with dilated small bowel loops and no free air. She was diagnosed with mechanical intestinal obstruction. She was kept NPO on intravenous fluid resuscitation, nasogastric tube was inserted, and urine output was measured.

In order to identify the cause of the bowel obstruction, a CT scan of abdomen and pelvis was performed as well, and it revealed multiple dilated loops of small bowel, reaching the maximum diameter of 4 cm with few air fluid levels. The distal large bowel loops had collapsed. There was a transitional point in the right iliac fossa, with whirling of the mesenteric vessels. The cecum was significantly dilated, suggestive of cecal volvulus. There was a diffuse wall thickening and an enchantment of the cecal wall with possible pneumatosis. A short segment of adjacent small bowel loops

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**Fig. 1.** CT scan of the abdomen and pelvis with oral contrast revealed multiple dilated loops of small bowel. The distal large bowel loops were compressed. There is transitional zone. The cecum was significantly dilated suggestive of cecal volvulus.

showed fecalization. The appendix was not clearly visualized. Mild surrounding inflammatory changes were seen with minimal free fluid in the abdomen and pelvis. The rest of the study was unremarkable (Fig. 1).

The patient was taken to the operating room. Explanatory laparotomy was performed under general anesthesia. Meckel's diverticulum was found to be perforated and adherent to the right lower abdominal wall (Fig. 2). The cecum with its mesentery was twisted around the MD, causing mechanical obstruction. Normal looking appendix was seen. A limited resection of involved part of ileum with the MD was performed with subsequent primary anastomosis, in addition to appendectomy.

### 3. Discussion

Meckel's diverticulum (MD) was first described by Fabricius Hildanus in 1598. It was named after Johann Friedrich Meckel, a German anatomist who described the features of MD.<sup>7</sup> Meckel's diverticulum occurs in about 2% of the population.<sup>1</sup> It is a true congenital diverticulum as it consists of all the three layers of the bowel wall and is usually found on the anti-mesenteric border of the ileum. The average distance of the Meckel's diverticulum from the ileocaecal valve is 67 cm in adult population.<sup>8</sup>

MD may contain abnormal gastric mucosa and pancreatic tissues. It can either be asymptomatic or mimic common abdominal disorders such as appendicitis, peptic ulcer disease and Crohn's disease.<sup>1</sup> The majority of Meckel's diverticuli are asymptomatic and are incidentally discovered intraoperatively. However, they have been known to cause complications, including diverticulitis,



**Fig. 2.** Upon exploratory laparotomy, Meckel's diverticulum was found to be perforated and adherent to the right lower.

intussusception, severe gastrointestinal hemorrhage, perforation, peptic ulceration and intestinal obstruction. Yet, the most common complication of MD in adults is bowel obstruction.<sup>9–11</sup>

There are many mechanisms for bowel obstruction arising from a Meckel's diverticulum. Obstruction can be caused by trapping of a bowel loop by a mesodiverticular band, intussusception, a volvulus of the diverticulum around a mesodiverticular band, or an extension into a hernia sac called Littre's hernia.<sup>12</sup>

The case described above presented with signs and symptoms suggestive of acute intestinal obstruction and radiological findings suggestive of cecal volvulus. However, this was later discovered to be perforated MD. This patient had partial intestinal obstruction caused by adhesions of the diverticulum with the abdominal wall, causing cecal volvulus as discovered intraoperatively.

CT scan, Technetium-99m pertechnetate scan, abdominal ultrasound, and barium studies are all useful in the diagnosis of MD.<sup>13</sup> After diagnosing MD, the mainstay treatment would be diverticulectomy in all symptomatic cases. Resection should always include the diverticulum or the segment of the bowel affected by the pathology.<sup>14</sup>

For asymptomatic MD, evidence does not support elective resection of Meckel's diverticulum. In a systemic review, Zani et al. stated that "a large number of MD resections would need to be performed to prevent 1 death from MD". Hence, avoiding surgery in

case of asymptomatic MD reduces the risk of postoperative complications caused by unnecessary surgical intervention.<sup>15</sup>

#### 4. Conclusion

Although, MD is the most common congenital condition of the GI tract, the clinical diagnosis of MD is difficult to make. CT scan can help identify the cause of bowel obstruction, but it may miss the diagnosis of MD. Hence, MD is mostly identified during the operation. Appropriate knowledge of various pathophysiologies by which a Meckel's diverticulum can cause complication must be kept in mind for a better management without recurrences.

#### Conflict of interest

There is no conflict of interest.

#### Funding

The study sponsors had no such involvement.

#### Ethical approval

Written informed consent was obtained from the patient. He was informed that this case will be written for publication as a case report with the accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Author contributions

Dr. Aref's contribution includes writing the manuscript and collecting the relevant data and pictures. Dr. Altaf is the treating Physician of this case. He participated in writing and editing the manuscript of this report.

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