

# Acute abdomen due to Meckel's enterolith: Case report and review of the literature

Erdoğan Yenidoğan, Hüseyin Ayhan Kayaoğlu, İsmail Okan, Zeki Özsoy, Servet Tali, Mustafa Şahin

## ABSTRACT

Meckel's diverticulum is a rare condition with an incidence of 1-3% in general population. It is usually asymptomatic and is incidentally detected during laparotomy/laparoscopy. Enterolith formation within Meckel's diverticulum is even rarer. Herein, we present the diagnosis and management of a 50-year old patient with Meckel's diverticulum enterolith and discuss this rare condition based on the literature.

**Keywords:** Meckel's enterolith, diverticulum, abdominal pain

## INTRODUCTION

Meckel's diverticulum is observed in 1-3% of the general population and is the most common congenital anomaly of the gastrointestinal system. It is a true diverticulum containing all layers of the intestine and its own artery. It forms by the incomplete closure of the omphalomesenteric duct (1). It is three times more common in men than in women. They are often asymptomatic and are usually detected incidentally at laparotomy. The most frequent complication in children is bleeding, and in adults intestinal obstruction. Stone formation within the diverticulum is very rare. Our aim is to present a patient with acute abdomen due to Meckel enterolith.

## CASE PRESENTATION

A 50-year-old male patient presented with exacerbation of abdominal pain that he has been experiencing intermittently for the past week. On physical examination he had rebound tenderness and guarding in the right lower quadrant, the remaining system examinations were normal. The white blood cell count was 11,200, and C-reactive protein (CRP) level was 32.1, with no abnormalities in the remaining laboratory examinations. The abdominal CT revealed an approximately 50 mm in diameter lesion in the distal ileum that was consistent with inflamed Meckel's diverticulum and approximately 6 mm in size stone within the diverticulum (Figure 1a, b). On emergent surgery, the appendix was normal and there was an inflamed Meckel's diverticulum 50 cm from the ileocecal valve that was covered with fibrin. An appendectomy and diverticulectomy were performed. Histopathological evaluation showed perforated Meckel's diverticulum, presence of heterotopic gastric mucosa and a stone within the diverticulum. The patient was discharged on postoperative day 3 without any complications.

## DISCUSSION

The anatomy and embryology of Meckel's diverticulum was first put forward by the German anatomist Johann Friedrich Meckel at the beginning of the 19<sup>th</sup> century, and was first described by Hildanus at the end of the 16<sup>th</sup> century. It is usually asymptomatic and usually diagnosed with symptoms related to complications. This anomaly is summarized with the 'rule of 2s'. It is seen in 2% of the general population and is more common under 2 years of age. There is a 2% incidence of complications. It may contain 2 types of ectopic mucosa (gastric and pancreatic). It is located 2 feet (60 cm) away from the ileocecal valve and is 2 inches (5 cm) long (1-3).

Complication rate of Meckel's diverticulum have been identified as 4-25% (2). Meckel's diverticulum may present clinically with blood loss or intermittent abdominal pain (3). Vomiting and loss of appetite are other symptoms that accompany. Akçakaya et al. (4) reported numerous complications such as gangrenous Meckel's diverticulum due to torsion, partial bowel obstruction due to mesodiverticular band, intestinal and Meckel's diverticulum necrosis due to torsion of the diverticula around the fibrotic band, volvulus, massive gastrointestinal bleeding, and diverticulum perforation. A retrospective study showed decrease in the incidence of complications with aging (5). Diverticulum length may increase up to 10 cm. Complications have been shown to have a strong correlation with the length of the diverticulum. In our case, the length of the diverticulum was found to be 5 cm. Bleeding is more frequently seen in children, and is caused by gastric mucosa ulceration. In the chronic progress, the incidence of painless and intermittent bleeding varies between 10% and 38% (6). In adults, the most common complication is obstruction. Obstruction is seen in

Department of General Surgery,  
Gaziosmanpaşa University Faculty  
of Medicine, Tokat, Turkey

## Address for Correspondence

### Zeki Özsoy

Gaziosmanpaşa Üniversitesi Tıp  
Fakültesi, Genel Cerrahi Anabilim  
Dalı, Tokat, Türkiye  
Phone: +90 356 212 95 00  
e-mail: zekiserkanozsoy@  
hotmail.com

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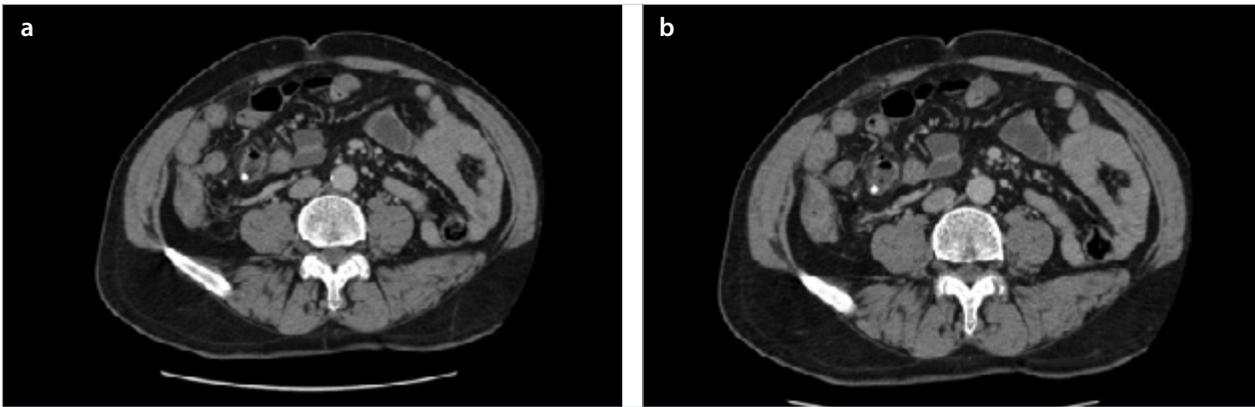


Figure 1a, b. Inflamed Meckel's diverticulum in the distal ileum and 6 mm in size stone within the diverticulum

26-53%, and is caused by intussusception, inflammation, omphalomesenteric band, adhesions or adenocarcinoma. Another common complication of Meckel's diverticulum is diverticulitis with an incidence of 12% and 30%. Diverticulitis is usually due to blockage of the narrow neck of the diverticulum by foreign bodies or fecalith (7).

Literature data showed that the incidence of stone within Meckel's diverticulum is between 0.3 to 10%, although less common in children (3, 8). So far, nearly 50 cases have been reported on Meckel enterolith. Although rare, stone in the diverticulum can lead to intestinal obstruction by protruding into the lumen in a similar manner as gallstone ileus. Pantongrag-Brown et al. (3) reported a case series of 8 patients, and have concluded that Meckel enterolith was related to stasis and alkaline small bowel mucosa, and that foreign bodies create a favorable environment for the precipitation of the calcium salts after stasis. In the same study, it was stated that bile salts cause smooth muscle dyskinesia in wide-necked diverticula that in return increases the formation of stones together with increased bacterial translocation. Chronic inflammation or postoperative adhesions have been shown to cause stasis and increase the formation of stones. Stone-induced small bowel obstruction caused by the passage of Meckel enterolith into the lumen is quite rare, with only five published cases. Stone formation can be also seen when the diverticulum is lined with gastric mucosa. In our case, gastric mucosa have been identified.

Preoperative diagnosis of Meckel enterolith by radiology is rare. Meckel enterolith is radioopaque in approximately one third of patients and thus can be determined. There are no specific diagnostic tools. Preoperative diagnostic methods such as computed tomography, small bowel contrast radiography, angiography, technetium-99m pertechnetate (Tc-99m) scintigraphy and ultrasonography can be used. Higginson and Hall (9) showed that Meckel enterolith can be detected by computed tomography at a high rate. In our case, preoperative computed tomography detected a stone within the diverticula. However, gallstone ileus, appendicolith and teratomas should be kept in mind in the differential diagnosis of Meckel enterolith on computed tomography. Tc-99m pertechnetate is retained by gastric mucosal cells, and Meckel's diverticulum scintigraphy using this agent is an extremely useful test to detect the Meckel's diverticulum containing ectopic gastric mucosa. In the literature, the incidences of ectopic gastric mucosa in Meckel's diverticulum, ectopic pancreatic tissue and jejunal

mucosa were reported as 23-50%, 5-16%, and 2%, respectively (10). In our case, in contrast to cases of Meckel enterolith, ectopic gastric mucosa was observed by histopathologic examination.

There is still no consensus on the surgical treatment of Meckel's diverticulum. Although treatment options vary, small bowel resection and anastomosis is indicated in case of diverticulum inflammation, perforation, necrosis, intussusceptions, and presence of multiple jejunal enterolith. Wedge resection and primary intestinal repair can be applied in asymptomatic and incidental cases, while it is also advocated that additional surgical intervention increase morbidity and mortality rates and that the diverticula should not be touched (2).

Park et al. (11) have evaluated Meckel's diverticulum detected incidentally during laparotomy in a survey done on 1476 patients. It has been reported that being over fifty years of age, male gender, being longer than 2 cm, and presence of ectopic or abnormal structures in the diverticulum were associated with symptomatic diverticula, while the width and width-length ratio of the diverticulum were unrelated factors. When evaluated as a selective approach, the authors suggested resection of incidental Meckel's diverticulum if it is associated with the presence of one of these four features associated with symptomatic Meckel's diverticulum. It was also emphasized that simple diverticulectomy would be enough in the absence of a mass, and surgical margins should be paid attention to in the presence of a palpable mass in the base of Meckel's diverticulum.

## CONCLUSION

Meckel's diverticulum is often seen but formation of stones in the diverticulum is very rare. Although stone formation is more often in diverticula lined with small bowel mucosa, it may still occur in diverticulum with gastric mucosa. Although Meckel's diverticulum may be radiologically diagnosed, laparotomy is both diagnostic and therapeutic.

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