

# Perforation of a Meckel's diverticulum by a foreign body with diverticulitis

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## Abstract

Meckel's diverticulum (MD) is the most common congenital malformation of the gastrointestinal tract. Complications due to MD are uncommon in adults; these include obstruction due to intussusception or adhesive band, ulceration, diverticulitis, perforation, haemorrhage, neoplasm and fistula. Perforation of MD by foreign bodies is rare. We report a case of a 20 year-old male with right iliac fossa pain found to have MD perforation by a toothpick with secondary diverticulitis. This is the second case of its nature in the English literature.

**Keywords:** Meckel Diverticulum, Foreign Bodies, Diverticulitis, Laparotomy

## 1. Introduction

Meckel's diverticulum (MD) is a common congenital malformation of the gastrointestinal tract, found in approximately 2% of the population (Sagar, Kumar, & Shah, 2006). Complications of MD are usually seen in children but are uncommon in adults (Dumper et al., 2006). Perforation of MD by a foreign body is rare, with a reported incidence of 0.5% (Yamaguchi M, 1978). Here we present a case of a 20 year-old male who presented with 24 hours of right iliac fossa pain mimicking acute appendicitis, subsequently found to have perforation of MD by a toothpick with secondary diverticulitis. To our knowledge this is only the second case of its nature in the English literature (Cotirlet et al., 2013).

## 2. Case report

A previously healthy 20 year-old male Chinese student presented to Emergency Department with 24 hours of

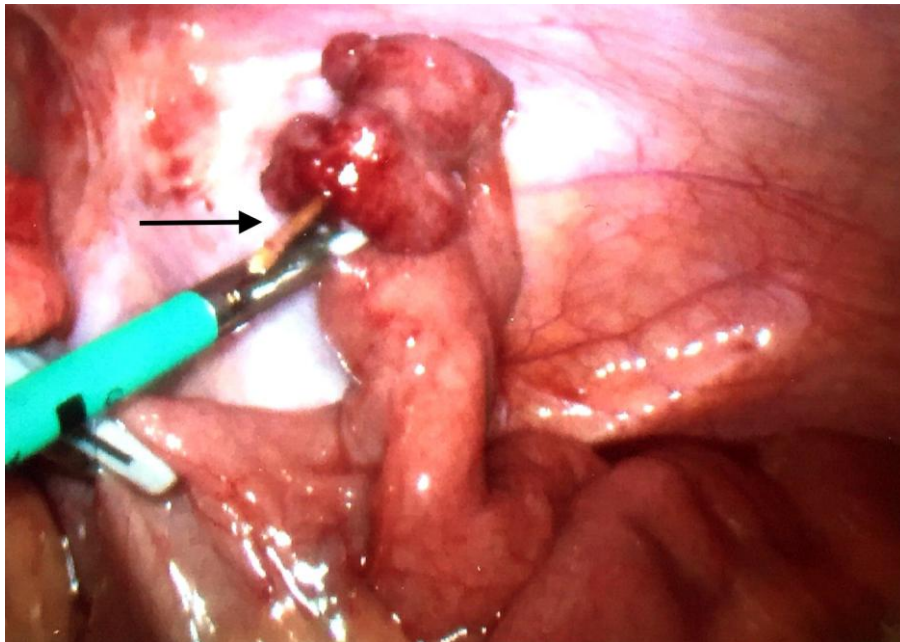
right iliac fossa (RIF) pain. The pain was described as sudden onset, constant and sharp with no radiation. He reported anorexia but denied other bowel related symptoms such as nausea, vomiting or change in bowel habits. There was no report of haematuria, dysuria or frequency of urination. He denied previous medical or surgical history, and he did not take any regular medications. He was a non-smoker.

On examination, the patient's vital signs were: blood pressure of 137/71 mmHg, heart rate 77 bpm, respiratory rate 16 per minute and afebrile. His abdomen was soft and moderately tender in the RIF with no signs of peritonism. No hernias were detected. The patient's full blood count revealed a haemoglobin of 155 g/L, white cell count of  $12.3 \times 10^9/L$  with a neutrophil rise to  $9.16 \times 10^9/L$ . He had normal renal function and liver function tests.

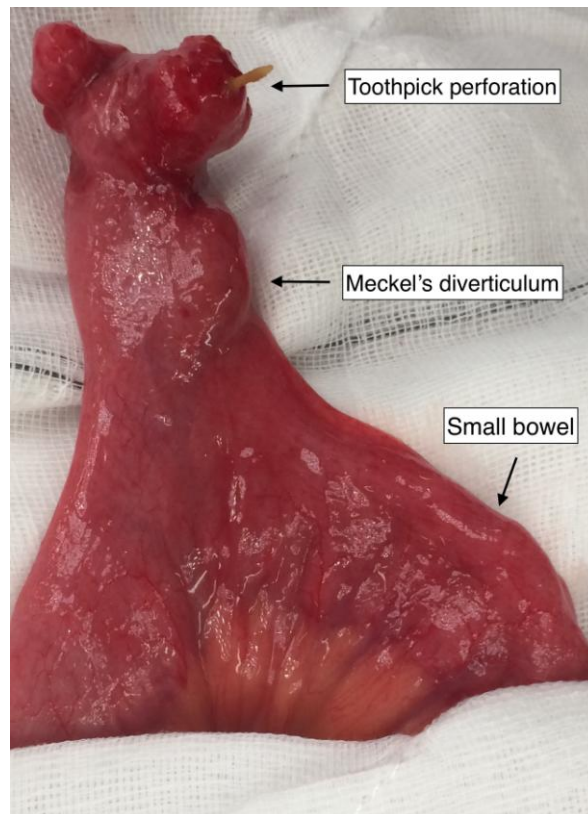
The clinical picture was suspicious for acute appendicitis and laparoscopic

appendicectomy was planned. On laparoscopy, inflamed Meckel's diverticulum perforated by a toothpick was visualised, with localised contamination close to the deep ring (Figure 1). The appendix was normal in appearance. Limited midline laparotomy was performed and small bowel bearing the

diverticulum was delivered (Figure 2). The perforated Meckel's diverticulum with 5cm of nearby small bowel was resected. Side-to-side anastomosis was constructed using a 3.5x50mm gastro-intestinal anastomosis GIA stapler (Covidien) and the stapler line was oversewn with 3/0 absorbable monofilament suture material.



**Figure 1: Laparoscopy image of inflamed Meckel's diverticulum perforated by a toothpick (arrow).**



**Figure 2: Perforated Meckel's diverticulum delivered through laparotomy.**

Histopathology report revealed a small bowel measuring 95mm in length and 30mm in diameter with a central diverticulum measuring 35 x 25 x 20mm. Microscopically, there was active inflammation within the lumen of the diverticulum and the wall showed transmural acute inflammatory cell infiltration. There were no signs of dysplasia or

malignancy. These features were consistent with Meckel's diverticulum with diverticulitis.

The patient's history was reviewed post-operatively and he did not recall ingestion of any foreign body.

The patient had an unremarkable post-operative course and was recovering well two weeks post discharge.

### 3. Discussion

Meckel's diverticulum (MD) was first described in published literature in 1809 by German anatomist Johann Friedrich Meckel, and it is the most common congenital malformation of the gastrointestinal tract, present in about 2–4% of the population (Sagar et al., 2006). It is the remnant of the congenital vitello-intestinal duct, which is usually located on the anti-mesenteric border of the ileum, within about 60cm of the terminal ileum.

Complications due to MD are uncommon in adults, incidence ranges from 4-16% (Sagar et al., 2006). The most frequent complications in adults are obstruction due to intussusception or adhesive band, ulceration, diverticulitis, perforation, haemorrhage, neoplasm and fistula (Dumper et al., 2006; Sagar et al., 2006). Symptomatic MD is seen much more commonly in children aged 2-8 years, with haemorrhage being the most common presentation (Dumper et al., 2006).

Perforation of MD by foreign bodies is rare, Yamaguchi et al (Yamaguchi M, 1978) has reported incidence of MD complication secondary to foreign body to be 0.5%. Fish bones, marbles, gallstones, toothpicks and even bullets have been reported in less than 2% of patients with symptomatic MD (Dumper et al., 2006; Yahchouchy, Marano, Etienne, & Fingerhut, 2001).

Li and Ender (Li & Ender, 2002) conducted a review of the literature examining injuries caused by ingested toothpicks. They found that majority of the injuries happened in men (88%), with an average age of 52 years. Abdominal pain was the presenting complaint in 70% of the patients. Toothpicks caused injury most frequently at the duodenum, followed by the sigmoid colon. Interestingly, only 12% of patients remembered swallowing the toothpick, but many more patients (21%) recalled eating something with a toothpick without swallowing the toothpick (Li & Ender, 2002).

The treatment of choice for asymptomatic MD. Though traditionally symptomatic MD is surgical resection, older studies were in favour of surgical either by diverticulectomy or segmental resection (Cullen et al., 1994), more recent bowel resection and anastomosis (Sagar et al., 2006). There has been ongoing debate about excision of incidentally found studies favour watchful waiting for asymptomatic MD (Zani, Eaton, Rees, & Pierro, 2008).

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