Ruptured Meckel Diverticulum after an Elective Laparoscopic Surgery: A Case Report

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Abstract

Significance: Laparoscopic surgery is a relatively safe and preferred procedure for cholecystectomy. One center in the Philippines reported a 4.9% morbidity rate with no report on bleeding or perforation of bowel. However, the major problem for this procedure is related to CO2-induced pneumoperitoneum caused by increased in intraabdominal pressure. Meckel's diverticulum, the most common congenital defects of the gastrointestinal tract is present in the ileum where several cases reported perforation after trauma caused by increased in intraabdominal pressure. Spontaneous perforation of Meckel's diverticulum is rare. To our knowledge, this is the first case reported of spontaneous rupture of Meckel's diverticulum after an elective laparoscopic surgery.

Clinical presentation: We report a 55-year-old male who underwent elective laparoscopic cholecystectomy and during the surgery, he had hypotension which recovered after ephedrine was given. On the first post-operative day, he had several episodes of hematochezia and hypotension. There were no complaints of abdominal pain or peritoneal signs.

Management: Abdominal CT- scan showed pneumoperitoneum and dilated jejunal segments. Laparotomy showed a perforated Meckel's diverticulum. Segmental ileal resection and side to side anastomosis was performed.

Recommendation: Any condition that may increase the intraabdominal pressure like in laparoscopic surgery may contribute to bowel perforation. This case report would like to emphasize that the presence of pneumoperitoneum in the presence of gastrointestinal bleeding after laparoscopic surgery should warrant further investigation to exclude a possible perforated bowel to prevent delay in the management. Furthermore, Meckel's diverticulum should be included in the differential diagnosis in adult patients with hematochezia and pneumoperitoneum.

Keywords: Meckel's diverticulum, laparoscopic surgery, perforation, increased intraabdominal pressure

I. **Introduction:**

Meckel diverticulum is the most common congenital defect of the gastrointestinal tract due to incomplete obliteration of the vitelline duct resulting to the formation of a diverticulum (1). In general, it follows the rule of 2's, it is seen in 2% of the population, within 2 feet of the ileocecal valve, 2 inches in length, with 2 types of heterotopic mucosa and usually presents before the age of two (2). It is usually clinically silent but has lifetime complication risk of between 3.7-6.4% (3-5). The symptoms related to Meckel's diverticulum are bleeding caused by peptic ulceration, intussusception, diverticulitis with or without perforation, chronic peptic ulceration and intestinal obstruction (6). Although obstruction and inflammation are more common presentations, bleeding and perforation account for 11.8% and 7.3% respectively (7).

Laparoscopic surgery is now the preferred procedure for cholelithiasis because of decreased hospital stay and morbidity to patients. Although it is a relatively safe procedure, it still poses some risk to the patient that are not only limited to vascular or biliary injury. It causes increased in intraabdominal pressure secondary to CO2 insufflation which may cause different pathophysiologic changes (8).

An increased in intraabdominal pressure has been reported which was caused by a blunt trauma that eventually lead to perforation of Meckel diverticulum (9). We present this unusual cause of gastrointestinal bleeding with subsequent diverticular perforation after an elective laparoscopic cholecystectomy in a previously asymptomatic adult patient. To our knowledge, this is the first case reported of a spontaneous rupture of Meckel's diverticulum after laparoscopic cholecystectomy.

CASE:

This is a case of a 55-year-old, male who is apparently well. He was admitted for an elective laparoscopic cholecystectomy for cholelithiasis. He denies previous episodes of abdominal pain or gastrointestinal bleeding. He underwent the surgery which lasted for 1 hour with 1 episode of hypotension during the operation which eventually recovered after 1 dose of ephedrine. Postoperatively, the patient remained stable with no abdominal pain. However, on the first post-operative day, the patient had several episodes of hematochezia necessitating transfusion with several units of PRBC. He was tachycardic with episodes of hypotension responsive to fluid correction. He has pale conjunctivae, abdomen was slightly distended with hyperactive bowel sound, tympanitic, soft and non-tender. The consideration then was lower gastrointestinal bleeding probably secondary to bleeding diverticulum, rule out vascular injury and perforated bowel as post-operative complications. Abdominal CT scan was requested and showed pneumoperitoneum, abdomino-pelvic ascites and hyperdense fluid in the pelvic cavity which is of concern for hemoperitoneum (Figure 1).

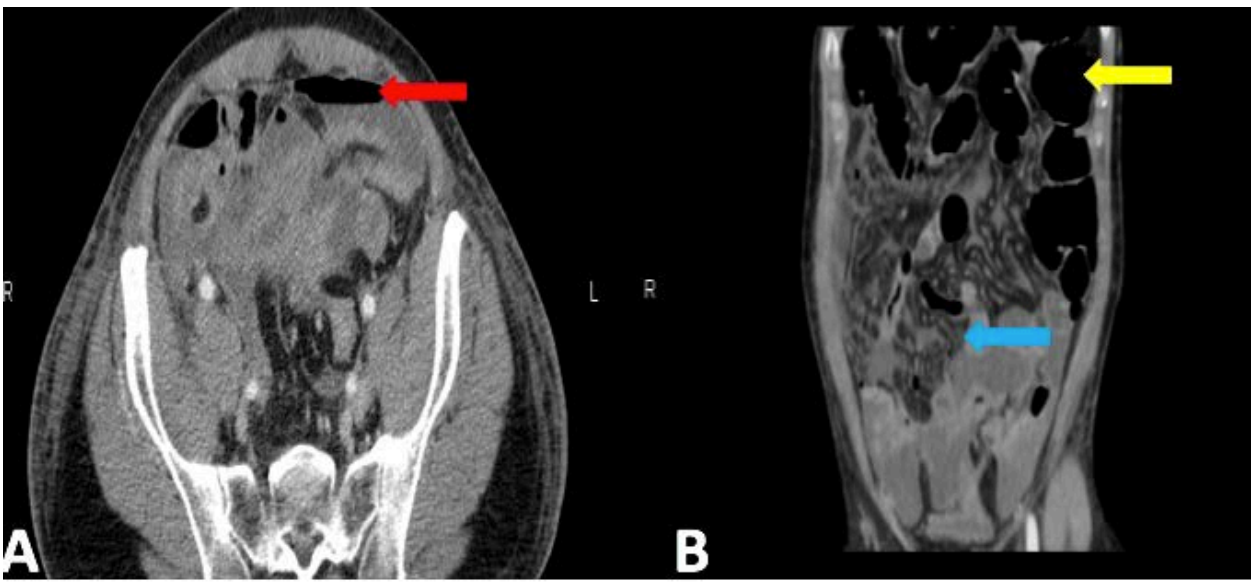

Figure 1: Abdominal CT-scan showing pneumoperitoneum (red arrow) with ascites (blue arrow) and dilated jejunum (yellow arrow)›.

The patient underwent the surgery with findings of 1.5 cm ileal perforation noted 1.5 feet from the ileocecal junction with fecaloid and purulent peritonitis. Blood clots noted at the left lower quadrant, mesentery and pelvis totaling approximately 200ml. The gallbladder fossa has intact hemolok clips and no signs of bleeding. Histopathology result revealed a ruptured Meckel diverticulum with 50% containing heterotopic epithelium and rare oxyntic glands at the base of the perforated lesion (Figure 2). The patient remained stable post-operatively and was discharged with no recurrence of bleeding.

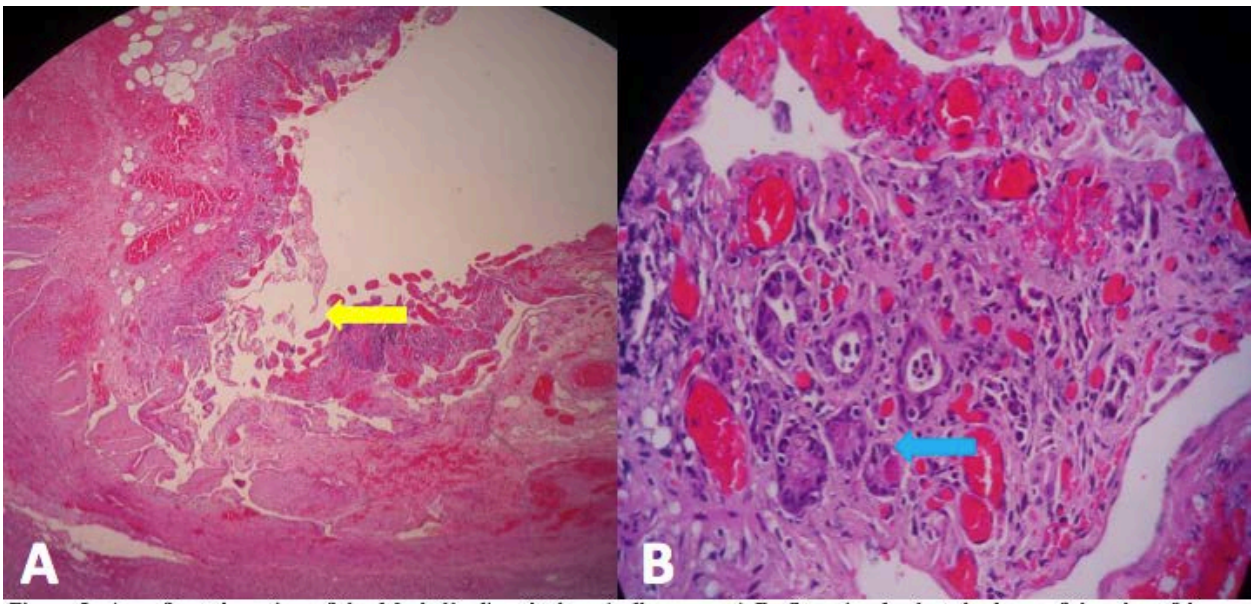

Figure 2: A perforated portion of the Meckel's diverticulum (yellow arrow) B. Oxyntic gland at the base of the ulcer (blue arrow).

DISCUSSION:

Laparoscopic cholecystectomy is the preferred treatment for cholelithiasis. Although, it is a safe procedure, fatal complications post-operatively have been reported. Complications after laparoscopic cholecystectomy can be divided into biliary which is more common and non-biliary cause which includes bleeding and bowel injury. One center in the Philippines reported a 4.9% morbidity rate with no report on bleeding or perforation of bowel (10). Complications after laparoscopic cholecystectomy such as bleeding and bowel perforation are rare with incidence of 0.1% and 0.06% respectively (11).

There have been no published reports on spontaneous rupture of diverticulum or Meckel's diverticulum following a laparoscopic procedure. Although several case reports have been published relating to perforation of Meckel diverticulum following a blunt trauma which they have attributed to the increased intraabdominal pressure caused by crush injury (5,12,13).

Meckel diverticulum follows the rule of 2 in general. This rule clearly showed that it is predominantly seen among males and 2 feet from the ileocecal valve. Complications are also more common among male patients (5, 14-16). However, deviation from the rule of 2 may give some prognostic value. The Meckel diverticulum of our patient is only 1.8 cm long which in the study of Park with 1476 patients shows that it has low risk for developing complication since most symptomatic Meckel's diverticulum are seen with length of >2 cm (17).

Complications usually occurs in the presence of an ectopic gastric mucosa which was also seen in the base of the ulcer of the Meckel diverticulum of our patient (18). A study of 600 patients by Yamaguchi showed that ectopic tissue was present in 93% of patients which has ectopic gastric mucosa (7). Another study was done which also showed presence of an ectopic gastric mucosa in an ulcerated Meckel diverticulum (2).

An epidemiologic study done by Cullen et.al showed the clinical features that are associated with an increased risk of becoming symptomatic and these include age of <50 years, male sex, diverticulum length of >2 cm, presence of histologically abnormal tissue. Based on

available data, our patient had fulfilled 2 criteria hence, our patient had 25% chance of being symptomatic Among these risk factors, the presence of histologically abnormal tissue is the most important (5). Although our patient only had 25% risk to be symptomatic, the presence of an ectopic gastric gland would have a big impact for the development of GI bleeding and subsequently perforation. There are different causes of perforation, it can be due to progression of diverticulitis, ulceration secondary to ectopic gastric mucosa or traumatic. Our patient did not complain of abdominal pain, fever or leukocytosis which may point out to an initial inflammatory process, rare oxyntic glands were noted at the base of the ulcer which may suggest that ulcerative perforation as the cause. What may have predisposed our patient to perforation may be explained by several mechanisms. There seem to be a relation between Meckel diverticulum and peptic ulcer disease due to the presence of oxyntic gland as seen in our patient. However, usual risk factors for perforated peptic ulcer disease like non-steroidal anti-inflammatory drugs (NSAIDs), steroids, smoking and Helicobacter pylori are not seen in our patient (19).

There are also case reports on blunt trauma causing perforated Meckel diverticulum which they have attributed to increased intraabdominal pressure causing closed-loop obstruction especially in susceptible areas like the terminal ileum or the Meckel diverticulum was crushed between the foot of the center forward and the vertebrae (9,12,13). Although, closed-loop obstruction was not apparent in the CT scan of our patient, the dilated jejunum may also give us a clue of some degree of obstruction at the ileum where the Meckel's diverticulum is located. Our patient had episode of hypotension during the procedure, an increase in abdominal pressure during air insufflation may cause compression of the great vessels resulting to hypotension which may also cause compression of bowels like the ileum to the vertebrae resulting to perforation.

With this case report, we want to emphasize that the presence of pneumoperitoneum in the presence of gastrointestinal bleeding after laparoscopic surgery should warrant further investigation to exclude a possible perforated bowel to prevent delay in the management. Furthermore, Meckel diverticulum should be included in the differential diagnosis in adult patients with gastrointestinal bleeding and pneumoperitoneum.

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