

## PRIMARY ENTEROLITH AND JEJUNAL DIVERTICULA CAUSING SMALL BOWEL OBSTRUCTION- A CASE REPORT

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### ABSTRACT

Small bowel obstruction secondary to gallstone ileus accounts for about 0.3% to 0.5 % of all patients with gallstone disease. Formation of primary intestinal stones causing obstruction and requiring laparotomy is very rare, and the presence of the diverticula adjacent to the stone precipitating in the stone formation is a rare phenomenon. A rare case of primary enterolith and jejunal diverticula is presented here. An older women presented with small bowel obstruction found to have dual pathology; operated for removal of stone and had uneventful recovery.

**Key Words:** Primary enterolith, Jejunal Diverticula, Small bowel obstruction

### INTRODUCTION

Gallstone ileus, most commonly caused by fistulation of the gallstone through duodenum or stomach, accounts for 0.3% to 0.5 % of all cases with known gallstone disease(1). The syndromes, which are well known to cause gallstone ileus, are either Bouveret's syndrome (i.e. seen in 0.5%) or Mirizzi's syndrome (i.e. reported in 1%). De novo formation of an enterolith is a rare phenomenon(2). One of precipitating factors could be small bowel diverticula which can act as a nidus.

### CASE REPORT

An elderly female patient aged 83 years was brought to the Accident and Emergency department with a history of severe colicky abdominal pain and bilious vomiting for 24 hours. The patient mentioned having intermittent lower abdominal crampy pain and a reduced appetite for the last three weeks. She was a known case of diabetes, hypertension, back pain and gastroesophageal reflux disease (GORD), for which she was on various medications. She had a laparoscopic cholecystectomy 30 years ago and an open appendicectomy 60 years ago.

On examination, she was dehydrated. Her other general physical findings were within normal limits. Her cardiovascular and respiratory examination was unremarkable. Her abdomen was soft with mild distension and tenderness in the lower abdomen with guarding. She had normal bowel sounds on auscultation. Her blood tests were within normal limits, C-reactive protein level was mildly elevated white cell count was 13,000. Urea and creatinine were slightly elevated at 10.8mmol/L and 96µmol/L respectively. A Computed Tomography (CT) scan of abdomen with contrast was performed to detect the cause of small bowel obstruction (Figure 1a and 1b).

The CT scan demonstrated a few scattered small bowel diverticula especially in the jejunum. It also showed fluid-filled dilated small bowel loops, more prominent in the lower abdomen where there

was some mesenteric fat stranding. Within the mid ileum an intraluminal gas surrounding the structures was seen, resulting in the mechanical small bowel obstruction, and this was found to be a primary enterolith. Scattered colonic diverticula were seen on the CT, but no sign of acute diverticulitis was observed.



**Figure 1a. Coronal view of computerised tomography of abdomen showing enterolith causing obstruction**



**Figure 1b. Sagittal view of computerised tomography of abdomen showing small bowel obstruction**

The patient was admitted and initially treated conservatively with intravenous fluids, adequate pain management and a nasogastric (NG) intubation and nil by mouth. The NG tube drained bilious fluid of around 1.5L in the first 24 hours. However, the patient's symptoms failed to settle with conservative management as large amounts of bilious fluid continued to be draining through the NG tube. The patient was discussed, consented and prepared for a laparotomy, enterotomy and removal of enterolith. Her preoperative morbidity risk was 48.8%, with a mortality risk of around 2.9%.

With a lower midline incision, laparotomy was performed. Laparotomy findings were consistent with CT scan findings, and multiple diverticula on the mesenteric border of the jejunum were confirmed. More importantly, a 4 cm enterolith was palpable at the mid-ileum, causing small bowel obstruction. The bowel proximal to enterolith was dilated and thickened. There were minimal omental adhesions to the site of the obstruction and to the caecum and the lateral abdominal wall, which were divided. Transverse enterotomy was performed in the mid ileum over the mass and the enterolith was extracted (Figure 2a, 2b, 2c and 2d). The enterotomy was closed in 2 layers with 3.0 PDS (interrupted and then burying continuous sutures). The remaining bowel lumen was inspected to ensure no strictures or other pathology.

The patient was managed in the surgical high dependency unit post-operatively for a day, then stepped down to the ward. The patient made an uneventful recovery apart from the ileus for short period of time.



**Figure 2a. Intraoperative handling of enterolith**



**Figure 2b. Enterotomy for enterolith delivery**



**Figure 2c. Dimensions of delivered enterolith**



**Figure 2d. Jejunal diverticula found preoperatively**

## DISCUSSION

A diverticulum is a weakness or out pouching of wall of any portion of the gastrointestinal tract involving all layers. Diverticulosis (the presence of diverticula) typically affects the large intestine. These classically form where the mucosa and submucosa herniate into the muscle layer at junctions where mesenteric vessels penetrate the muscularis layer exposing an area of weakness. Small intestine diverticular disease is relatively less common as compared to the diverticular disease in the colon(3). These diverticula are believed to develop as a result of abnormalities in intestinal peristalsis, intestinal dyskinesia and high intraluminal pressure. Unlike Meckel's diverticula, small intestinal diverticula are acquired and they become more common with advancing age.

Diverticula of the small intestine are usually asymptomatic with the exception of Meckel's diverticula. However, they sometimes do have major complications. These include repeated

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episodes of diverticulitis, gastrointestinal haemorrhage or obstruction, perforation, pancreatic or biliary (in the case of duodenal diverticula) disease, localised abscess, volvulus and bacterial overgrowth(4).

The duodenum is the most frequent site of small bowel diverticulosis, followed by the jejunum and the ileum, with an incidence of 60–70%, 20–25% and 5–10%, respectively(5). Most duodenal diverticula are found in patients aged >50 years whereas jejuno-ileal diverticula seem more prevalent in male patients aged 60-70 years(2).

Enteroliths are hard solid masses of mixed constitution formed in the gastrointestinal tract. Chomelin J, a French physician, first described these back in the early 18<sup>th</sup> century as a peculiar case of stone formation in a duodenal diverticulum discovered at autopsy. Enteroliths are classified into true (formed within the gastrointestinal tract) and false (formed outside the gastrointestinal tract e.g. gallstone ileus)(6). Stasis within the bowel is believed to be the most important factor contributing to their growth. Hypomotility of the bowel and an acidic pH shift due to chyme produce a microenvironment within a diverticulum, allowing conjugation and aggregation of bile salts to form stones. Enteroliths can also be formed due to other causes including Meckel's diverticulum, intussusception, gastrointestinal strictures, small bowel anastomosis, inflammatory bowel disease or even certain metabolic conditions. Small stones typically would pass down but large ones may cause obstruction.

This is called 'enterolith ileus' and is similar to gallstone ileus (4,6–8). This phenomenon has only occasionally been reported in the surgical, gastroenterology or radiology literature, given that many clinicians/ surgeons are still unaware of this condition resulting in delayed diagnosis. Therefore, it is of utmost importance to consider this in patients presenting with intestinal obstruction.

## CONCLUSION

Jejunal diverticula leading to primary enterolith ileus is an extraordinary and rare diagnosis, which is usually indistinguishable from other causes of mechanical small bowel obstruction. However, acquiring knowledge about the complications of small bowel diverticula can assist in diagnosis. Enterolith ileus could be expected in the elderly population where common causes of intestinal obstruction have already been ruled out. It requires surgical management as enterolith ileus rarely responds to conservative management.

## ETHICAL CONSIDERATION

The patient consented for this case report

## CONFLICT OF INTEREST

Authors declare no conflict of interest

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