CASE REPORT

Complicated small bowel diverticular disease: a case series

Linden Karas,[1] Mohammed Asif,[2] Victor Chun,[3] Farrukh A Khan[2]

[1]Department of Surgery, Cleveland Clinic, Cleveland, Ohio, USA
[2]Mercy Catholic Medical Center, Darby, Pennsylvania, USA
[3]Internal Medicine, University of California San Diego, La Jolla, California, USA

Correspondence to
Dr Mohammed Asif, mohammedasifmd12@gmail.com

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SUMMARY

Small bowel diverticulosis of the jejunum and ileum is an uncommon finding with a prevalence rate of 0.2% to 1.3% at autopsy and 0.3% to 1.9% on small bowel studies. Diagnosis can be difficult because there are no pathognomonic features or clinical symptoms that are specific for small bowel diverticulosis. Though rare, it is critical to keep the possibility of small bowel diverticulosis in mind when evaluating cases of malabsorption, chronic abdominal pain, haemorrhage, perforation and intestinal obstruction, especially in patients with connective tissue disorders, a family history of diverticula and a personal history of colonic diverticulosis. Guidelines for the treatment of complicated small bowel diverticulosis are not clearly defined. However, the consensus in treatment is to do a small bowel resection with primary anastomosis. We report three interesting cases of jejunoileal diverticula that presented in an occult manner and later progressed to more emergent manifestations.

BACKGROUND

Diverticular disease of the colon is a common affliction of the elderly.[1] However, diverticula of the small bowel are extremely uncommon, and though their aetiology has not been completely explained, it is thought that they are often acquired.[2] We present three unique cases of small bowel diverticular disease as they presented with complications of diverticulitis and bleeding. First, a case of small bowel diverticula presented with perforation, causing purulent peritonitis, and the second patient presented with multiple large diverticula that caused recurrent small bowel obstruction. Finally, multiple small bowel diverticula presented with recurrent bleeding. Based on these clinical scenarios, we conducted a literature review to examine the presentation, diagnosis and treatment of small bowel diverticula.

CASE PRESENTATION

Case 1

A 69-year-old African-American male presented to the emergency department with a 1 day history of abdominal pain that began periumbilically and migrated to the right lower quadrant, in the setting of several months of episodic abdominal pain and constipation relieved by laxatives and stool softeners. His medical history was significant for hypertension (HTN), hyperlipidaemia (HLD), chronic kidney disease, retinitis pigmentosa and a normal recent colonoscopy. On presentation, his vital signs were normal, he had a mildly elevated white blood cell count (13.6 x 10^9 cells/L) and a moderately distended abdomen with tenderness in the right lower quadrant, but no peritoneal signs. A CAT (CT) scan of the abdomen revealed a thickening of the terminal ileum, caecum and ascending colon with adjacent inflammatory stranding and a small foci of extraluminal gas (figure 1). He was initially treated expectantly with intravenous antibiotics and serial abdominal examinations and pain control.

Case 2

An 82-year-old female presented with multiple hospitalisations for both partial and complete small bowel obstruction over approximately 6 months' time. Her medical history included chronic obstructive pulmonary disease, diabetes mellitus (DM), stroke, HTN, history of an open cholecystectomy, open appendectomy and two colon resections over 15 years previously (an extended right hemicolectomy for adenocarcinoma and a completion subtotal colectomy with diverting ileostomy for perforated sigmoid diverticulitis with abscess, later reversed with an ileorectal anastomosis). She was successfully managed non-operatively for all small bowel obstruction admissions and was advised to have an elective laparotomy procedure for an evaluation and possible bowel resection.

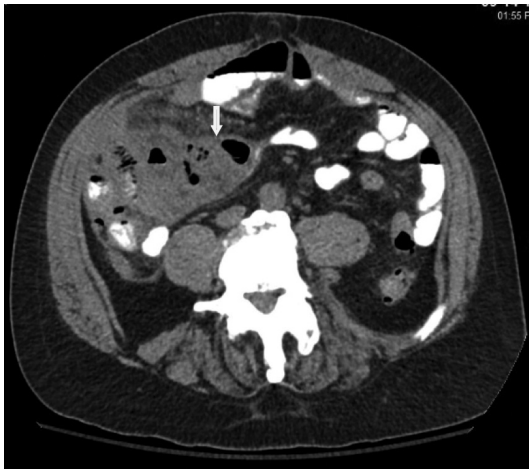

Figure 1 CAT scan showing eccentric mass-like thickening of the terminal ileum, caecum and ascending colon with adjacent inflammatory stranding. A small foci of extraluminal gas (arrow) surrounding the terminal ileum concerning for microperforation of a malignancy involving the terminal ileum, caecum and ascending colon.

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Case 3

An 80-year-old female with a medical history of degenerative joint disorder (taking naproxen), DM, HTN and HLD presented to the emergency room complaining of dizziness on standing and bright red blood per rectum for 1 day. She had never previously undergone a colonoscopy. Initial vital signs were stable, haemoglobin was 9.6 and her abdominal examination result was benign. She continued to have bloody bowel movements and her haemoglobin decreased to 5.2. CT angiogram demonstrated active bleeding in the proximal jejunum, but interventional radiology was unable to embolise any active bleeding. The patient received 4 units of blood resulting in a haemoglobin of 10.3, and a push enteroscopy revealed multiple non-bleeding diverticula in the proximal jejunum. Unfortunately, intermittent bleeding continued and the decision was made to take her to the operating room for exploration.

INVESTIGATIONS

Case 1

1. Initial CT scan of the abdomen and pelvis revealed thickening of the terminal ileum, caecum and ascending colon with adjacent inflammatory stranding and a small foci of extraluminal gas (figure 1).
2. A repeat CT scan of the abdomen and pelvis showed worsening inflammation and a larger area of extraluminal gas suggesting a perforated small bowel diverticulitis.

Case 2

1. Multiple CT scans revealed several adherent loops of small bowel along the anterior abdominal wall that increased in size with subsequent admissions and became associated with mesenteric lymphadenopathy, taking on the appearance of a mass on imaging.

Case 3

1. CT angiogram demonstrated active bleeding in the proximal jejunum.
2. A push enteroscopy revealed multiple non-bleeding diverticula in the proximal jejunum.

DIFFERENTIAL DIAGNOSIS

Cases 1, 2 and 3

1. Small bowel diverticular disease
2. Inflammatory bowel disease
3. Small bowel cancer
4. Angiodysplasia of the small bowel

TREATMENT

Case 1

The patient was initially treated expectantly with intravenous antibiotics, but his condition worsened in the next 24 hours and a repeat CT demonstrated worsening inflammation and a larger area of extraluminal gas suggesting a perforated small bowel diverticulitis. The patient was taken urgently to the operating room for a diagnostic laparoscopy that revealed diffusely thickened and dilated loops of small bowel and purulent peritonitis. The laparoscopy was converted to an open laparotomy and several loops of mid to distal ileum were found to be firmly matted together around an abscess. Proximal to this area were a few large diverticula without signs of inflammation or perforation (figure 2). The severely inflamed small bowel surrounding the abscess was resected en bloc and a side-to-side stapled anastomosis was created. The other incidental diverticula were not removed.

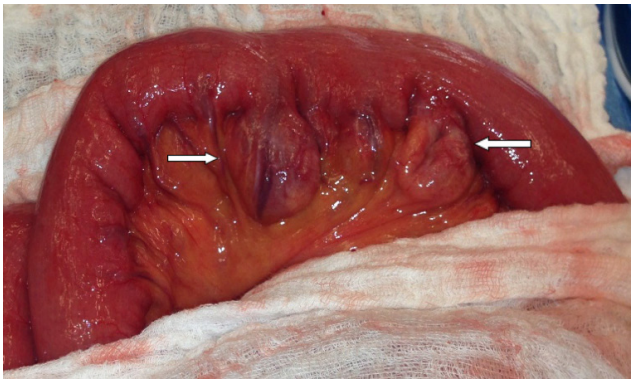

Figure 2 Healthy proximal jejunum with uninflamed diverticula (arrows).

Case 2

After resolution of her fourth small bowel obstruction non-operatively, she was taken for elective exploratory laparotomy. At the time of surgery, a mass of thickened jejunoileal small bowel loops and their corresponding thickened mesentery were isolated and excised. A stapled side-to-side healthy small bowel anastomosis was created without tension and with excellent blood supply.

Case 3

A diagnostic laparoscopy was performed and 60 cm of blood-filled jejunal diverticula were identified (figure 4), just distal to the ligament of Treitz. A small supra-umbilical midline laparotomy incision was made and the bowel was externalised and resected. A stapled side-to-side anastomosis was constructed.

OUTCOME AND FOLLOW-UP

Case 1

The patient's postoperative course was unremarkable and he was discharged home. Final pathology demonstrated a segment of small bowel with diverticulosis, acute diverticulitis, perienteric abscess and acute serositis suggestive of perforation.

Case 2

The patient's postoperative course was uneventful and she was discharged home. The pathology report described multiple jejunoileal diverticula with active acute diverticulitis and reactive mesenteric lymph nodes; no malignancy was detected (figure 3).

Case 3

The surgery and recovery were uncomplicated and the patient was discharged home. Pathological examination of the resected jejunum demonstrated small intestinal diverticulosis with focal acute serositis.

DISCUSSION

After observing the unusual presentations of small bowel diverticulosis in three patients in our institution, we embarked on a literature review of the subject. We conducted a comprehensive review of the PubMed database searching for case reports and case series that reported complications of small bowel diverticula. The complications, their presentations and methods of imaging and diagnosis are presented in table 1.

Small bowel diverticulosis of the jejunum and ileum is an uncommon finding with a prevalence rate of 0.2% to 1.3% at autopsy and 0.3% to 1.9% on small bowel studies.[1 2] This uncommon pathology may by associated with other disorders

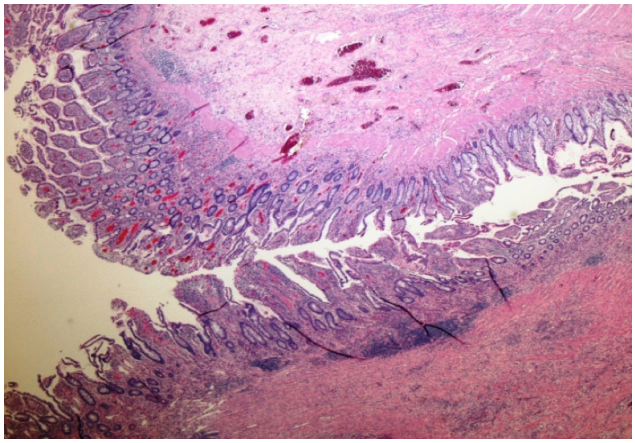

Figure 3 Diverticulosis and acute diverticulitis (H&E, original magnification ×20).

such as Marfan's disease, cystic fibrosis or autosomal dominant polycystic kidney disease.[2 3] Most cases are asymptomatic, but acute complications have been reported in 6.5%–10.4% of patients including diverticulitis, bleeding, enterolith formation, intestinal obstruction, volvulus and perforation.[4–6] Most of our knowledge regarding small bowel diverticula comes from case reports of complications and autopsy findings. Sometimes, diverticula are discovered during the work-up of chronic abdominal pain or malabsorption due to bacterial overgrowth and blind loop syndrome within the diverticula.[7]

These multiple false diverticula occur along the mesenteric border and are difficult to identify because they are hidden within the mesenteric fat (figure 4).[7] They are prone to haemorrhage because they enter at the same site as the blood supply to the small bowel.[8] Patients often have concomitant colonic diverticula (35%–75% of patients), as was the case in all three of our patients.[4] The presence of both small and large bowel diverticula can complicate localisation of haemorrhage or perforation in the emergency setting.

The pathogenesis behind small bowel diverticula is not completely understood; they can be acquired or congenital. One theory suggests that diverticula develop from small muscle or myenteric plexus dysfunction, leading to abnormal bowel movements and an increase in intraluminal pressure.[7 9] In the literature, it has been reported that small bowel diverticular disease is more common in males. It usually occurs in the sixth and seventh decades of life, and two-thirds of patients have multiple diverticula with the number decreasing to solitary diverticula in the distal small bowel.[1 3 5]

Diagnosis can be difficult because there are no pathognomonic features or clinical symptoms that are specific for small bowel diverticulosis. Reports have found ultrasound, CT, capsule endoscopy and enteroclysis to be useful diagnostic tools, while

Table 1

Authors	No of patients	Presentation signs/symptoms	Imaging and diagnosis	Complications
Nonose *et al*[5]	1	Abdominal pain Nausea Vomiting Obstipation Peritonitis	XR—*free air* US—*free air, thickened small bowel* Exploratory laparotomy	Perforation
Natarajan *et al*[6]	1	Abdominal pain Dyspepsia Vomiting Fevers Chills Rigors	XR—*free air* US and CT a/p—*small bowel diverticula with free air*	Perforation
Yaqub *et al*[1]	1	Rectal bleeding Syncope	CT a/p angiogram—*bleeding jejunal diverticulum* Exploratory laparotomy	Recurrent bleeding
Mantas *et al*[8]	1	Abdominal pain	CT a/p—*sigmoid diverticulosis* Enteroclysis—*many small bowel diverticula* Exploratory laparotomy	Diffuse peritonitis Perforation
Koch and Schoon[10]	3	Abdominal pain Nausea Vomiting Flatulence Weight loss	Autopsy Enteroclysis—*jejunal diverticulosis* Diagnostic laparoscopy	Bacterial overgrowth
Sayed *et al*[2]	1	Abdominal pain Abdominal distension Anorexia Weight loss	XR—*right-sided faecal loading* Exploratory laparotomy—*jejunal diverticulum*	Diffuse purulent peritonitis
Kumar *et al*[3]	1	Weight loss Vomiting Diarrhoea	EGD—*postbulbar duodenal diverticulum*	Bacterial overgrowth
Graña *et al*[4]	5	Abdominal pain Fever Vomiting	US and CT a/p—*small bowel diverticula, small bowel wall thickening with hyperechoic small irregular projections* Exploratory laparotomy	Perforation

CT a/p, CAT scan of abdomen and pelvis; EGD, esophagogastroduodenoscopy; US, ultrasound; XR, plain film X-ray.

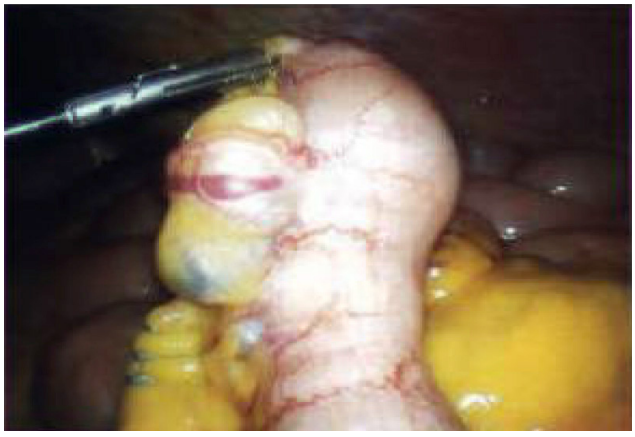

Figure 4 Multiple jejunal diverticula with evidence of active bleeding.

angiography can be used to localise bleeding.[4 8 10] However, often small bowel diverticula are not recognised until surgery or on pathology specimens.

Guidelines for the treatment of complicated small bowel diverticulosis are not clearly defined. Prophylactic resection of uncomplicated small bowel diverticulosis is not recommended.[8] A number of reports have shown success with segmental enterectomy with primary anastomosis for the treatment of complicated small bowel diverticulosis, as we did in the three cases above.[1 5 8]

We report three interesting cases of jejunoileal diverticuli that presented in an occult manner and later progressed to more emergent manifestations. The first began with relapsing remitting low-grade abdominal pain and progressed to perforation causing purulent peritonitis. Diagnosis was obscured by subtle clinical findings on admission and difficulty imaging the diverticula on the CT scan. The second case presented with recurrent small bowel obstructions that became increasingly frequent and refractory to medical management when the diverticulum perforated. In this case, diagnosis was obscured by the presence of significant adhesive disease and a complicated surgical history. Finally, we presented the case of intermittent, unremitting bleeding from small bowel diverticula that was not treatable with minimally invasive angioembolisation or endoscopy.

There is no ideal imaging modality for diagnosing small bowel diverticula, and they are often not discovered until complications arise. Further, the clinical findings can be protean, particularly if the patient has not had any previous surgery. In many situations, prompt surgical intervention is required to prevent further life-threatening complications. The consensus in treatment is to do a small bowel resection with primary anastomosis, as we did in the cases above. Though rare, it is critical to keep the possibility of small bowel diverticulosis in mind when evaluating cases of malabsorption, chronic abdominal pain, haemorrhage, perforation and intestinal obstruction, especially in patients with connective tissue disorders, a family history of diverticula and a personal history of colonic diverticulosis.

Learning points

- Small bowel diverticulosis of the jejunum and ileum is an uncommon finding, but is more common in men, the elderly and those with colonic diverticula.
- Diagnosis can be difficult because there are no pathognomonic features or clinical symptoms that are specific for small bowel diverticulosis. Ultrasound, CT, conventional and capsule endoscopy, and enteroclysis can assist with this difficult diagnosis.
- It is critical to keep the possibility of small bowel diverticulosis in mind when evaluating cases of malabsorption, chronic abdominal pain, haemorrhage, perforation and intestinal obstruction, especially in patients with connective tissue disorders, a family history of diverticula and a personal history of colonic diverticulosis.
- Prompt surgical intervention is required to prevent life-threatening complications and the consensus in treatment is to do a small bowel resection with primary anastomosis.

Contributors LK participated in conception and design, acquisition of data, analysis and interpretation of data, writing and reviewing of manuscript. MA participated in conception and design, acquisition of data, analysis and interpretation of data, writing and reviewing of manuscript. VC participated in data collection, writing and reviewing of manuscript. FAK took part in writing and reviewing of manuscript.

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