Jejunal Diverticulosis: Two Case Reports of Life-Threatening Complications

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Abstract

Background: Small bowel diverticulosis is an incidental finding in 1% to 7% of the general population. Jejunal diverticula occur less frequently; reported in 0.2% to 1.3% on autopsy. Most cases are asymptomatic; however a subgroup may present with life-threatening complications including perforation, hemorrhage, diverticulitis, mesenteric abscess or obstruction.

Methods: We describe two cases of jejunal diverticulosis with severe complications requiring surgical intervention. We include a review of the literature relating to this disease, including epidemiology, presentation, diagnosis, complications, and management.

Case 1: The first case describes a 57-year-old male presenting with an unstable gastro-intestinal hemorrhage; with unidentifiable source on endoscopy. Exploratory laparotomy revealed that the life-threatening gastrointestinal hemorrhage was originating from jejunal diverticula. A small bowel resection incorporating the jejunal diverticulum achieved hemostasis. Several days later when the patient had stabilized a stapled with end-to-side stapled anastomosis was performed with a successful outcome.

Case 2: The second case is a 77-year-old female presenting with an acute abdomen and a perforated viscus on computed tomography; however, the source of perforation could not be identified radiologically. Emergency diagnostic laparoscopy revealed perforated jejunal diverticulitis with an associated abscess. A small midline laparotomy incision with extracorporeal small bowel resection and end-to-side stapled anastomosis was performed.

Conclusion: Jejunal diverticular disease is most often an incidental finding at laparoscopy or laparotomy. However a small percentage may present with life-threatening complications that are difficult to diagnose clinically. Although uncommon in the general population; jejunal diverticulum complication should be kept in the differential diagnoses for patients presenting with abdominal pain, an acute abdomen, gastrointestinal hemorrhage in which the most common pathologies have been excluded.

Keywords: Jejunal diverticulosis; Jejunal perforation; Jejunal bleeding

Introduction

Jejunal diverticular disease is an uncommon entity most often found incidentally when performing laparoscopy or laparotomy for unrelated conditions. In patients with symptomatic jejunal diverticular disease, definitive diagnosis may only be established after life threatening complications have occurred. Diagnosis may be missed or delayed due to vague presentation, lack of clinical familiarity or suspicion of the disease, or attribution of symptoms to co-existent colonic diverticulosis. In the present study, we describe two cases of jejunal diverticular disease presenting with critical complications. In addition, we present a review of the available literature on this subject, detailing the epidemiology, presentation, diagnosis, complications, and management of this disease.

Results

Case 1

A 52-year-old male presented to a level III hospital by ambulance with a one-day history of significant bleeding Per Rectum (PR). Background history included a right renal transplant twenty-one years prior for IgA nephropathy, currently suffering end stage kidney disease requiring dialysis, hypertension, gout, laparoscopic cholecystectomy, right leg ulcer, and an intellectual disability. On

the day of presentation, the patient had suffered two episodes of large volume PR bleeding. On assessment in the Emergency Department (ED) he was in hypovolemic shock with blood pressure of 90/45 mmHg and heart rate 120 beats per minute. On check bloods, hemoglobin was 5.7 g/dL. White cell count, platelets and coagulation screen were normal. Inflammatory markers and liver function tests were within normal limits. He was not on any anticoagulant medication. On examination, bowel sounds were active, and the patient's abdomen was soft and non-tender. He had ongoing exsanguinating fresh blood per rectum in the ED. An attempt was made to stabilize the patient and he was transferred to the intensive care unit for critical care support and vasopressor administration. The massive transfusion protocol was activated, and the patient received thirteen units of red blood cells, four units of fresh frozen plasma, four pools of platelets, two grams of fibrinogen, two hundred grams of albumin, as well as vitamin K administration and regular tranexamic acid. An emergent upper GI endoscopy and colonoscopy did not reveal an obvious source. He remained hemodynamically unstable and was transferred to a tertiary care hospital.

On transfer he was admitted directly to the Intensive Care Unit (ICU). There was Multidisciplinary input from Intensivists, Colorectal Surgeon and Interventional Radiologist. He was on significant amount of inotropic support despite on-going transfusions. CT angiography/mesenteric angiography +/- embolization would have been our preferred treatment modality but the consensus of all involved was that he was critically unstable. He was taking to theatre. An on-table Esophago-Gastro-Duodenoscopy (EGD) revealed a normal esophagus, stomach, D1 and D2, and an on-table colonoscopy showed no colonic pathology but did identify large fresh blood via the ileocecal valve in keeping with a small bowel source (Figure 1). Emergency laparotomy revealed extensive jejunal diverticular disease. The segment of small bowel containing diverticula was temporarily isolated using nylon ribbon ties, to localize the bleeding source. This segment of bowel became blood filled. Direct visualization of diverticula in the isolated section of small bowel refilling with blood confirmed the location of hemorrhaging vessels. 110 cm of small bowel was subsequently resected (Figure 2), with proximal and distal ends left in-situ within the abdomen. The patient was considered too unstable to perform a primary anastomosis. Over the following hours in the ICU the patient stabilized, with no further bleeding and decreased need for inotropic support that was discontinued at 24 h. A relook laparotomy on post-operative day three showed that the remaining small bowel was viable, with no evidence of further active bleeding. An additional 15 cm of jejunum containing diverticula was resected and end-to-side stapled anastomosis was performed, with closure of the mesenteric
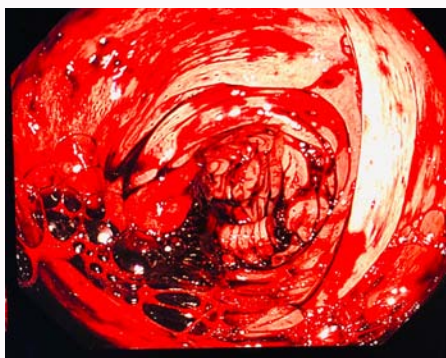

Figure 1: Colonoscopy: blood passing through the ileo-cecal valve.

Figure 2: Resected small bowel specimen showing multiple diverticula on mesenteric border.
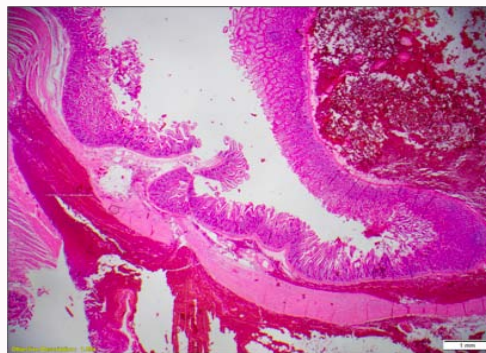

Figure 3: Jejunal diverticulum showing herniation of small intestinal mucosa and submucosa through the muscular wall with attenuation of muscularis propria (see arrows) and surrounding hemorrhage. Magnification 1.25x.

defect. The patient was transferred back to ICU for critical care management and close observation. The patient recovered well with an unremarkable postoperative course, and subsequent successful discharge home. Histology revealed invaginations of mucosa and submucosa, confirming pseudo-diverticula of the jejunum. Within the diverticulosis there was evidence of recent hemorrhage (Figure 3). There was no active diverticulitis or evidence of vasculitis, and tissue was negative for evidence of malignancy. Patient remains clinically well 3 years later.

Case 2

A 77-year-old female presented with one-week history of progressive lower abdominal pain associated with one day history of diarrhea, anorexia and nausea. The pain had increased in severity in the preceding 24 h necessitating attendance at the ED. Her past medical history included chronic pancreatitis, gastritis, hiatus hernia, colonic polyps and internal hemorrhoids, hyperlipidemia, arthritis, as well as vaginal prolapse. The patient was previously investigated for intermittent lower abdominal pain with Computed Tomography scan of the Thorax, Abdomen and Pelvis (CT-TAP) and colonoscopy one year prior to presentation. This showed no concerning pathology.

On admission her blood pressure was 104/60 mmHg, heart rate 90 beats per minute, respiratory rate 24 breaths per minute; blood oxygen saturation 96% on room air, and she was febrile with a temperature of 38.4 degrees Celsius (101.1 degrees Fahrenheit).

Figure 4: Jejunal diverticula present on the mesenteric border.

Figure 5: Perforated jejunal diverticula. Bowel contents expressed via the perforation in the small bowel at arrow.

On examination her abdomen was distended, with tenderness on palpation in the mid-abdomen. Preliminary laboratory investigations demonstrated an elevated white cell count of 22 × 10^9/L, CRP 300 mg/L, hemoglobin 11.5 g/dL, with normal renal and liver function tests. Computed tomography scan of the abdomen and pelvis revealed extensive inflammatory change with free fluid in the pelvis, as well as extraluminal gas and a fluid collection measuring 3.0 cm × 2.3 cm between small bowel loops, consistent with an interloop abscess secondary to recent bowel perforation. The etiology for the perforation was not obvious on radiological imaging. The differential diagnosis included perforated appendicitis with abscess formation, perforated inflammatory bowel disease, perforated tumor, or possibly perforated small bowel secondary to a foreign body.

The patient was commenced on intravenous fluid support and antibiotic therapy including metronidazole, ceftriaxone and a stat dose of gentamicin. Informed consent was obtained, and she underwent an emergency diagnostic laparoscopy. Laparoscopy revealed small bowel inflammation with perforation, a normal appendix, and normal large bowel. A small open midline incision was performed to facilitate external visualization of the small bowel. This identified an inflammatory mass secondary to perforated jejunal diverticulum, depicted in Figure 4, 5. A sample of pelvic fluid was aspirated and sent for culture and sensitivity. The inflammatory mass and associated jejunal diverticular disease was successfully resected and the remaining small bowel appeared healthy. Primary end-to-side stapled anastomosis was performed, leaving 40 cm of jejunum remaining proximal to the anastomotic site. The sampled pelvic fluid grew *E. coli*, *K. pneumoniae* and *S. bovis*, sensitive to co-amoxiclav. As this patient was allergic to penicillin, she instead completed a seven-day course of metronidazole and ceftriaxone, following discussion with microbiology. Postoperative course was otherwise unremarkable, and the patient was successfully discharged home

on postoperative day eleven. Histology revealed a perforated jejunal diverticulum with associated abscess formation, with food material in the mesentery in keeping with perforation. There was no evidence of dysplasia, Crohn's disease, malignancy or a foreign body. Special infectious stains performed showed a rare fungal spore, deemed to be likely an incidental finding. Overall, findings were reported to be most in keeping with complicated jejunal diverticular disease.

Discussion

Diverticula by definition are protrusions or outpouchings from the tubular structure of the gastro-intestinal tract; with true diverticula containing all three layers of the wall, such as Meckel's diverticula, and false diverticula containing only the mucosal or submucosal layers, as seen in colonic diverticulosis [1]. Small bowel diverticula may be congenital or acquired, with the most well-known congenital small bowel diverticulum being Meckel's diverticulum, occurring in approximately 2% of the general population, with symptomatic presentation usually occurring in the young [2]. Small bowel pseudo-diverticula are a rare clinical entity, with exact prevalence in the general population unknown, but reported to be up to 7% [3]. The etiology of small bowel diverticula is not known but is hypothesized to be the result of irregular contractions of the small bowel leading to increased segmental pressures, and consequent outward herniation of segments with weaker bowel wall strength [4,5]. This is supported by evidence that up to 88% of patients with small bowel diverticula demonstrate dysmotility on manometric studies [4,6]. Within the small bowel, diverticula are most commonly located in the duodenum, occurring in this location in 79% of cases [7]. Prevalence of pseudo-diverticula in the jejunum is variably reported; however, the most commonly reported statistic in literature is 0.2% to 1.3% at autopsy [8] and up to 2% on radiological studies [9].

In comparison, its colonic counterpart is known to have a prevalence of up to 80% with increasing age [10]. Both colonic and jejunal diverticulosis are observed with increased incidence in advancing age. However, the relative incidence among the sexes differs for these two pathologies. Jejunal diverticulosis appears to be more common in men irrespective of age, while colonic diverticulosis, although more common in younger males [11], has a predilection for females in those over seventy [12]. More than half of patients with small bowel diverticula also have colonic diverticula [13]. This finding is clinically significant, as the misattribution of symptoms to colonic diverticular disease may mask potentially life-threatening small bowel diverticular disease, as illustrated in a case study from the United States [14].

The rare prevalence and often vague presentation of symptomatic small bowel diverticular disease can contribute to a delayed diagnosis. A triad of presenting symptoms associated with small bowel diverticula has previously been described in literature, comprising abdominal discomfort, increasing flatulence after meals and epigastric pain [4,11,15]. These symptoms are vague and non-specific, and may arise as a result of numerous alternative disease processes - most commonly gallbladder pathology, peptic ulcer disease and hiatal hernias [16]. Other modes of presentation may include iron deficiency anemia or symptoms of malabsorption. As such, diagnosis may not be made until the patient presents acutely with life-threatening complications, including perforation, hemorrhage, obstruction, diverticulitis, and mesenteric abscess, as occurred with both of our patients described above [5]. Vague symptoms of flatulent dyspepsia may be erroneously dismissed as irritable bowel syndrome if routine investigations such

as endoscopy, abdominal ultrasound, and CT of the abdomen yield no diagnosis. In up to 30% of cases of small bowel diverticular disease, first presentation is with a complication of the disease [4].

There are varied reports on the presentation of gastro-intestinal hemorrhage in relation to small bowel diverticula. Some authors suggest that gastrointestinal bleeding arising from small bowel diverticula occurs only in conjunction with acute diverticulitis [4,17]. However, in the case described above, we note no evidence of acute diverticulitis. Similar presentations of massive hemorrhage in the absence of acute diverticulitis are described in case reports [18-20]. It is further more important to note that bleeding as a result of jejunal diverticula may present as either melena or hematochezia, depending on the onset and degree of bleeding. Management options for jejunal bleeding, as alternatives to emergent surgical intervention as described in our case, include embolization of vessels with micro-coils, or endoscopic management as recently described by Abbasi et al. [21]. Both methods, however, require either radiological or direct visualization of actively bleeding vessels. Small bowel visualization using endoscopy is limited, although advances in push enteroscopy and the design of enteroscopes may enhance this potential. Nevertheless, these investigative measures are dependent on highly specialist practitioners and equipment, and may not be widely available, particularly in the emergent out-of-hours setting. Embolization using angiography is further limited in those with poor renal function, as was the case for our patient. Furthermore, up to 12% of cases treated with embolization go on to require operative intervention [22]. Emergent surgical intervention remains the most definitive management in the case of an acute small bowel diverticular hemorrhage where endoscopy cannot locate the source of bleeding. Intraoperative management can be aided by isolating the suspected bleeding segment of bowel as described in our first case, in order to confirm the location of bleeding vessels.

In the setting of perforated small bowel diverticular disease, operative intervention remains the mainstay of treatment, as described in the case of our second patient. Only one study has shown successful conservative management with intravenous antibiotic treatment [23]. This is in contrast to perforated colonic diverticular disease, where studies have shown 85% of cases can be managed without operative intervention if there is no evidence of generalized peritonitis [24].

Conclusion

Jejunal diverticular disease is frequently indistinct in its presentation, and definitive surgery *via* laparoscopy or laparotomy may be required to obtain a diagnosis and to proceed with therapeutic intervention. Although uncommon in the general population, this should be considered among the differential diagnoses for patients presenting with undiagnosed abdominal pain, an acute abdomen, or significant bleeding per rectum in which upper endoscopy and colonoscopy do not reveal a source. Clinicians should remain astute to small bowel diverticulosis and associated complications being masked by concomitant large bowel diverticulitis. Most surgeons have sufficient expertise in their armamentarium to deal with complicated jejunal pathology once recognized.

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