

# Jejunal diverticulitis: imaging to management

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Jejunal diverticulitis is a rare condition and usually occurs in the elderly.<sup>1</sup> It can present with an acute abdomen but is difficult to diagnose clinically because patients generally present with symptoms that mimic other diseases. It is important for clinicians to have awareness about this disease because perforation and other complications can occur if the disease is not recognized promptly.<sup>2</sup> Here, we have reported three cases of jejunal diverticulitis that were diagnosed on computed tomographic (CT) scan. Our patients were medically treated, and they had a favorable outcome. One of the patients had perforated jejunal diverticulitis who underwent laparotomy. Although diverticulosis is a common pathologic condition of the colon, it is relatively rare in the small bowel.<sup>2</sup> Jejunal diverticulitis often presents with nonspecific symptoms or with features that mimic other complex symptoms, including appendicitis, colonic diverticulitis, or Crohn disease.<sup>3</sup> As a result, the diagnosis is made late or often missed, which can be disastrous. Standard upper gastrointestinal contrast studies may be helpful for visualizing this disease, but abdominal CT is the diagnostic tool of choice in making the diagnosis of this disease, determining its extent, and evaluating its complications.<sup>3</sup> We described here three interesting cases of jejunal diverticulitis. We also reviewed the published reports regarding this rare condition.

## CASE 1

A 40-year-old lady presented to the emergency department with a severe periumbilical pain in the left lower quadrant for one day. She had off and on constipation and had been taking antidepressants for the last 10 months. On examination, her left flank was found tender on deep palpation. Bowel sounds were positive. Rest of the examination was unremarkable. Her complete blood cell count revealed a raised white blood cell (WBC) count, i.e., 15 000/ $\mu$ L. Immediate ultrasound revealed a thick wall small bowel segment in the left-mid abdomen with the suspicion of intussusception.

CT abdomen, performed the following day, revealed a large diverticulum arising from the mesenteric border of jejunum, measuring about 2 cm. It had thick enhancing walls with a surrounding significant inflammatory reaction (**Figure 1**). No abscess formation or fluid collection was seen.

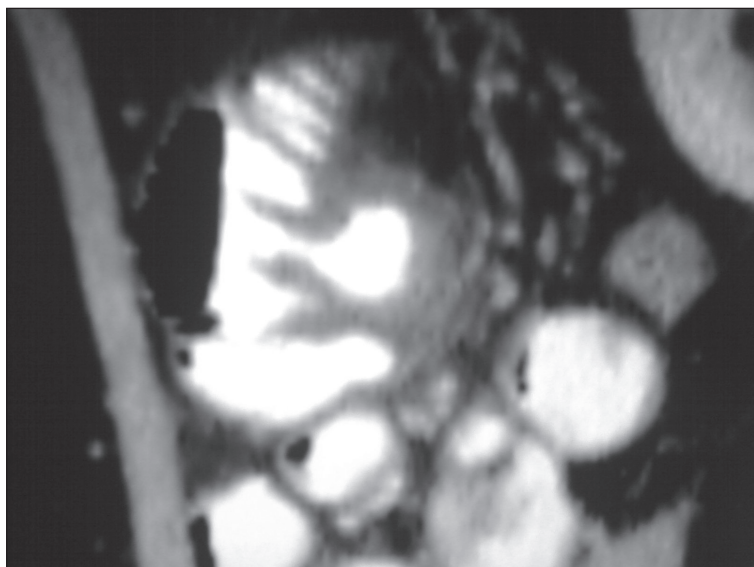
The patient remained hospitalized for three days and received intravenous ceftriaxone in addition to analgesics. She responded well, and symptoms almost completely subsided. Three weeks later, the follow-up CT abdomen demonstrated a decrease in the size of inflamed diverticulum and associated reactive changes. The patient was also symptom free.

## CASE 2

A 70-year-old male presented to the emergency department with a severe pain in the left flank and lower quadrant, high grade fever, and vomiting for 2 days. He also



**Figure 1.** Coronal view of CT abdomen with oral and IV contrast shows a thick-walled large jejunal diverticulum with surrounding strandy reaction and oral contrast tracking into it (arrow). There is also wall thickening of multiple adjacent jejunal loops.



**Figure 2.** Sagittal view of CT abdomen with oral and IV contrast shows a thick-walled large diverticulum with surrounding strandy reaction. Oral contrast is seen tracking into the diverticulum.



**Figure 2.** Intraoperative image shows inflamed jejunal diverticulum on the under surface of manually stretched jejunal loop.

had a laparotomy 18 years ago for a perforated appendix. Since then he had repeated episodes of subacute intestinal obstruction for which he was medically treated.

On examination he was found severely tender in the left flank region. The rest of the examination was unremarkable. His WBC count was 27 000/ $\mu$ L on the day of presentation.

CT abdomen with oral, rectal, and intravenous (IV) contrast revealed a large diverticulum arising from the mesenteric border of jejunum measuring about 2.2 cm (Figure 2). It had thick enhancing walls with peridiverticular reactive changes. No abscess or fluid collection was seen except for a few smaller noninflamed diverticuli in the adjacent jejunal loops.

The patient was put on intravenous Rocephin and Flagyl. His fever subsided after a few days, and the WBC count also decreased to 6000/ $\mu$ L. He had a mild abdominal pain even after 1 month but was fine otherwise. The option of surgery was not considered due to his poor cardiac status.

### CASE 3

A 60-year-old male who presented to the emergency department with a severe diffuse abdominal pain, more marked in the left flank, and a high grade fever for 1 week. His medical history was unremarkable. On examination, his abdomen was diffusely tender, more on the left of the midline. The WBC count was 11 500/ $\mu$ L. Ultrasound revealed slightly thick-walled small bowel loops on the left side of the abdomen with a mild adjacent extraluminal free fluid.

CT abdomen and pelvis with oral, rectal, and IV contrast was done immediately, which revealed multiple large jejunal diverticuli. There was a significant surrounding inflammatory reaction along a large diverticulum with the formation of small abscesses and mild ascites. Free intraperitoneal extraluminal specks of air were also observed suggesting bowel perforation.

Urgent laparotomy was done, which revealed large perforated jejunal diverticuli with a few abscesses (Figure 3). The diverticulum was resected along with the short segment of the adjacent small bowel. Later on, the culture of the drained pus revealed a growth of *Escherichia coli* and *Klebsiella*.

### DISCUSSION

Jejunal diverticulosis refers to the clinical entity characterized by the presence of multiple sac-like mucosal herniations through weak points in the intestinal wall.<sup>4</sup> Small intestinal diverticula are far less common than colonic diverticula. The cause of this condition is not known. It is believed to develop as a result of abnormalities in peristalsis, intestinal dyskinesia, and high-segmental intraluminal pressures.<sup>5</sup> These pulsion-type false diverticula occur along the mesenteric border of the intestine, where blood vessels pierce the muscularis layer of the bowel wall, causing weak areas to develop.

Autopsy studies reveal an incidence between 1.3% and 4.6%, whereas radiologic studies show an incidence

between 0.02% and 2.3%.<sup>6</sup> The majority of the cases are asymptomatic or are associated with nonspecific gastrointestinal symptoms.<sup>7</sup> They rarely occur in patients below the age of 40.<sup>8</sup> It is more common in older patients; 80% to 90% of the affected individuals are more than 40 years old.<sup>4</sup> The study of jejunal diverticulosis is important because it is associated with a variety of complications, including stasis and bacterial overgrowth, diarrhea, malabsorption, intestinal pseudo-obstruction, gastrointestinal bleeding, diverticulitis, and, rarely, free perforation with peritonitis.

It is important for clinicians to have a heightened awareness of jejunal diverticulitis because perforation and other complications can occur if the disease is not recognized promptly in symptomatic patients. The disease often presents with non-specific symptoms or with features that mimic other complex symptoms including appendicitis, colonic diverticulitis, or Crohn disease. Therefore, preoperative diagnosis of jejunal diverticulitis is rarely made. Indeed, before CT was commonly used in the assessment of acute abdomen; 90% of small-bowel diverticulitis were diagnosed at laparotomy.<sup>2</sup> Jejunal diverticulitis occurs with a frequency of 2.3% in patients with known diverticulosis.<sup>9</sup> The etiology is thought to be secondary to the luminal obstruction leading to bacterial stasis and a localized inflammatory reaction. Complications and the mode of presentation include acute inflammation, perforation with peritonitis, mechanical obstruction, fistula formation, and abscess formation.<sup>10</sup>

Ultrasound is usually used as the first-line investigation tool for abdominal pain due to its low cost, lack of radiation, and inability to clinically diagnose or suspect diverticulitis. CT is eventually requested when there is a negative initial investigation, and the peritoneal signs persist. It is the most useful tool for clinching the diagnosis and should ideally be performed with oral and rectal contrast (to differentiate the origin of diverticuli from the large or small bowel when they are in proximity). Diverticula appear on CT as distinct round or ovoid, fluid, contrast, or air-containing structures outside the expected lumen of the small bowel, with a smooth wall and no recognizable small bowel folds. They are often seen to communicate directly with an adjacent loop of small bowel.<sup>11</sup> CT findings in jejunal diverticulitis include a thick enhancing wall of diverticulum arising from the mesenteric border with a surrounding

inflammatory reaction in peritoneum. Nonspecific signs include an inflammatory mass containing gas and feces-like material, and edema in the surrounding tissue such as intraperitoneal fat or fascial layers, resulting in indistinctness, haziness, or increased attenuation in the surrounding peridiverticular fat.<sup>12</sup> An associated finding may include the arrowhead sign that has been described in both appendicitis and diverticulitis. It is caused by contrast tapering in shape of an inverted pyramid toward the edematous orifice of an appendix or diverticulum, creating an arrowhead-shaped collection of contrast.<sup>13</sup> Focal wall thickening is a common finding in patients with diverticulitis. Wall thickening may be eccentric, involving only that segment of the wall adjacent to the inflamed diverticulum or the region of pericolic stranding, or it may be circumferential around the entire wall. Mesenteric inflammation may proceed to small fluid collections. Extraluminal air may be seen in the adjacent pericolic fat resulting from a contained or microperforation of the diverticulum, or it may also be seen in an abscess. Diffuse pneumoperitoneum is a rare finding, and peritonitis can be inferred from diffuse peritoneal haziness, enhancement, and leakage of bowel contents and/or contrast.

If there is localized peritonitis and the patient remains stable, a trial of nonsurgical management with intravenous antibiotics is opted for. If it progresses to localized intraperitoneal collections, other supportive measures such as percutaneous CT-guided aspiration may be suitable, which avoids the need for surgery. However, the current treatment of choice for perforated jejunal diverticula causing generalized peritonitis is prompt laparotomy with segmental intestinal resection and primary anastomosis. If diverticula are extensive, resection may have to be limited to include only the segment containing the perforated diverticulum and to leave a segment of small bowel that still contains non-perforated diverticula to avoid short-bowel syndrome.<sup>14</sup> Simple diverticulectomy with oversew is not recommended because it has been linked to postoperative leakage, sepsis, and death.<sup>15</sup>

In conclusion, jejunal diverticulitis is an uncommon and thus frequently overlooked cause of acute abdomen in elderly patients. CT is a very helpful tool in making its diagnosis and evaluating its extent and complications. Management by conservative measures may be considered in the absence of perforation.

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