

# Ileal Diverticulitis as a Cause of Right Lower Quadrant Pain: A Case Report and Review of the Literature

Jiten P. Kothadia,<sup>1</sup> Seymour Katz,<sup>2,\*</sup> and Lev Ginzburg<sup>2</sup>

<sup>1</sup>Department of Gastroenterology and Hepatology, Nebraska Medical Center, University of Nebraska, Omaha, United States

<sup>2</sup>Department of Gastroenterology, NYU Langone Medical Center, Great Neck, United States

\*Corresponding author: Seymour Katz, Department of Gastroenterology, NYU Langone Medical Center, 1000 Northern Blvd, Suite 140, NY 11021, Great Neck, United States. Tel: +516-4662340, Fax: +516-8296421, E-mail: seymour.katz@nyumc.org

Received 2015 September 30; Accepted 2015 October 6.

## Abstract

**Introduction:** Small bowel diverticulitis is a rare clinical disease of the small bowel. The incidence of small bowel diverticulitis varies from 0.3 to 2.3% in the general population. Complications of this rare clinical entity are often confused with other causes of acute abdomen such as acute appendicitis, perforated peptic ulcer, inflammatory bowel disease or ischemic bowel disease.

**Case Presentation:** We describe a 65-year-old male with a history of ileal diverticulosis who presented with acute abdomen and was subsequently found to have perforated ileal diverticulitis with abscess formation.

**Conclusions:** The case, differential diagnosis, imaging studies, complications and management of this rare clinical disease are discussed.

**Keywords:** Ileal Diverticulosis, Crohn's Disease, Perforation, Acute Abdomen, Abscess

## 1. Introduction

Small bowel diverticulosis is a rare clinical finding and is mainly asymptomatic. Its incidence varies from 0.3 to 2.3% in the general population (1, 2). Small bowel diverticulosis is commonly seen in an elderly population in their sixth to seventh decade of life (1, 3). It is mainly identified as an incidental finding on enteroclysis, computed tomography (CT) scan or during surgery (4). Small bowel diverticulosis should be considered in the differential in cases of unexplained malabsorption, bacterial overgrowth, or anemia. Small bowel diverticulitis with localized perforation should be included in the differential diagnosis of an elderly patient with acute right lower quadrant abdominal pain with focal peritoneal findings (3). We describe a case and literature review of a patient with small bowel diverticulitis presenting with acute abdomen and diagnosis and management.

## 2. Case Presentation

A 65-year-old man presented to an outside emergency department with a complaint of right lower quadrant (RLQ) abdominal pain of two days duration. His abdominal pain started suddenly and gradually progressed. The patient stated that the pain was a score of "7 out of 10" in severity, continuous, non-radiating with no aggravating or relieving factors. The patient reported eating seafood at a wedding the night before the onset of abdominal pain and it was associated with a loss of appetite. He denied recent travel or any other toxic or infectious exposure.

Four months prior to admission, the patient had a colonoscopy that revealed colonic diverticulosis without evidence of inflammation. The patient had a past history of hypertension, hyperlipidemia, ileal diverticulosis, and coronary artery disease. He denied any previous surgical history. The family history was noncontributory.

On admission, his temperature was 98.7°F (37.1°C); pulse was 98/minutes and blood pressure was 142/96 mmHg. There was localized tenderness and guarding in the right lower quadrant and peri-umbilical region. Abdominal sounds were present. Rectal exam was normal without evidence of occult blood in the stool. His white blood cell count was 15,500/mm<sup>3</sup> with 87.4% neutrophils. Hemoglobin was 17.4 g/dL and hematocrit was 51.2%. The abdominal X-ray in an upright position showed nonspecific, non-obstructive bowel gas pattern and was negative for free air. Computed tomography (CT) scan of the abdomen was misinterpreted as sigmoid diverticulitis. There were no signs of bowel obstruction or pneumo-peritoneum. The patient was managed conservatively with intravenous antibiotics and hydration and was subsequently discharged home on day 7.

Two weeks later the patient was then re-admitted to our medical center for persistent right lower quadrant abdominal pain with localized signs of peritonitis without intestinal obstruction. A CT scan demonstrated gas and a fluid containing collection measuring 2.7 × 3.1 cm, located in the right lower quadrant mesentery, adjacent to a small bowel loop. Several additional foci of extraluminal gas were seen

adjacent to the involved bowel loop. Sigmoid diverticulosis without diverticulitis was noted. These findings were consistent with a perforated ileal diverticulitis with adjacent right lower quadrant abscess (Figures 1 and 2). The patient was hemodynamically stable and managed conservatively during the hospital stay with bowel rest, intravenous antibiotics and hydration with an intention to avoid the need for ileostomy by allowing the area to heal with antibiotic therapy. The patient was subsequently discharged home to be scheduled for elective surgery once stable. The diagnosis of perforated ileal diverticulitis was confirmed during surgery.

**Figure 1.** Axial Contrast CT Scan Image



Shows a gas and fluid containing collection measuring 2.7 × 3.1 cm, located in the right lower quadrant mesentery, adjacent to a small bowel loop (arrows)

**Figure 2.** Coronal CT Scan Image



Shows focal inflammation of the ileum with localized perforation of the diverticula (arrows).

### 3. Discussion

Small bowel diverticulosis is a rare disease with a variable clinical presentation and it is often noticed as an incidental finding on imaging studies or during surgery (4, 5). The incidence at autopsy ranges from 0.3 to 2.3% (1, 2). The majority of patients with small bowel diverticulosis are asymptomatic (3). The majority of the small bowel diverticula are located in the jejunum (75% - 80%) and the ileum (15% - 20%), with 5% being found in both locations (6). 75% - 80% of the small bowel diverticula are located in the jejunum; 15% - 20% in the ileum and 5% in both locations (7, 8). The size of diverticula ranges from a few millimeters to 10 cm in a reported case series (8). The diverticula are usually multiple and they tend to be larger and more in number in the proximal jejunum and decrease in size and number in the distal small bowel (1). The exception to this finding is in the terminal ileum where diverticula are mainly multiple (1). Small bowel diverticulosis is more commonly seen in an elderly population in their sixth to seventh decade of life with a male predominance (1, 3, 9). Colonic diverticulosis is a coexisting finding in 61% of patients with small bowel diverticulosis (3).

Unlike Meckel's diverticulum, small bowel diverticula are pseudo-diverticula that are formed secondary to increased segmental pressure inside the lumen (3, 7). They mainly consist of mucosal, submucosal, and serosal layers, and do not contain a muscular layer. Small bowel diverticula are located along the mesenteric border, and are mainly hidden within the leaves of the mesentery (3). The etiology of this rare clinical entity is still unclear, but it believed to be secondary to abnormal peristalsis, intraluminal pressure differences, and intestinal dyskinesia (3, 9, 10).

Acute small bowel diverticulitis has an incidence ranging from 2.3% - 6.4% of all cases with history of small bowel diverticulosis (1). There are no pathognomonic signs and symptoms that specifically indicate small bowel diverticulitis. Physical examination on such patients may reveal severe tenderness in the right lower quadrant with peritoneal signs, fever and leukocytosis in the range of 14,000 - 21,000 (3, 11). Perforated small bowel diverticulitis may mimic other causes of acute abdomen such as acute appendicitis, perforated peptic ulcer, inflammatory bowel disease or ischemic bowel disease. The typical presentations of small bowel diverticulosis without diverticulitis are associated with secondary bacterial overgrowth and include chronic intermittent abdominal pain with varying severity, flatulence, diarrhea or constipation (7, 10). Complications from small bowel diverticulosis range from 8% - 30% in the general population (11). These include pseudo-obstruction, volvulus, intussusception, dyskinesia, blind loop syndrome, malabsorption, bacterial overgrowth, occult bleeding and chronic diverticulitis complicated by formation of an enterolith (9, 12). Other rare complications of the small bowel diverticulitis include pylephlebitis and pyogenic liver abscess. Pylephlebitis is very rare complication of an intra-abdominal infection

with diverticulitis as most common cause (13). It is defined as a suppurative and inflamed thrombosis of the portal vein (13). Progression of the pylephlebitis leads to the formation of liver abscess. Navarro et al. (14) described a case of pyogenic liver abscesses secondary to portal vein sepsis caused by perforation of ileal diverticulum.

Imaging studies that aid in the diagnosis of small bowel diverticulitis include small bowel enteroclysis, ultrasound and CT scanning (3, 11). An upright abdominal X-ray may demonstrate distension of the small bowel with air-fluid levels and pneumoperitoneum, but free air may not be visible in cases of micro-perforation. Small bowel enteroclysis is more accurate, but it is contraindicated in emergency conditions such as diverticulitis and perforation (15). Ultrasound is an inexpensive test that shows thickening of the small intestinal wall with hyperechoic tissue around the diverticula, suggesting inflamed fat and extraluminal fluid collections with air bubbles (1). CT scan of the abdomen is the best tool for identifying small bowel diverticulitis and the associated complications, such as abscess formation and perforation. CT scan findings in patients with small bowel diverticulitis may show a mass lesion containing extraluminal air bubbles and/or air fluid levels along with a dilated small bowel loop with a thickened bowel wall (1). Additionally, a hyperdense appearance of the mesenteric fat suggests inflammation and uncomplicated diverticula in adjacent small bowel are frequently seen (1). CT scan of the abdomen in our patient showed gas and fluid containing collection measuring  $2.7 \times 3.1$  cm, located in the right lower quadrant mesentery adjacent to a small bowel loop along with several additional foci of extraluminal gas (Figures 1 and 2). Other conditions causing similar finding on CT scan include focal Crohn's disease, acute appendicitis with abscess formation, perforation of cecal mass, right-sided diverticulum, or neoplasm or perforation by foreign body, traumatic hematoma and small bowel ulceration secondary to non-steroidal anti-inflammatory drugs (NSAIDs) (1, 2, 5).

Complications of small bowel diverticulitis that require surgical intervention include perforation, acute gastrointestinal bleeding, fistula formation and adhesions causing small bowel obstruction (3, 9, 11). These complications carry a high mortality of 21% - 40% often due to a delay in diagnosis (1, 2). The majority of the patients with uncomplicated diverticulitis can be managed with a conservative approach (16, 17). Novak et al. (16) and Park et al. (17) described non-surgical management with intravenous antibiotics along with CT-guided percutaneous drainage for a patient with perforated diverticulitis with localized abscess. Early surgical treatment is a desired approach for the patients with confirmed small bowel diverticulitis with serious complications as a delayed diagnosis of this clinical entity carries a high morbidity and mortality. Treatment of perforated small bowel diverticulitis with generalized peritonitis is resection of the involved small bowel with primary anastomosis when the patient becomes more stable (3, 10). The factors affecting the extent

of resection mainly depend upon the patient's perioperative condition and the length of the affected bowel (10).

Small bowel diverticulosis is rare clinical diseases. The majority of patients are asymptomatic with nonspecific symptoms. Small bowel diverticulitis can mimic other conditions causing acute abdomen such as focal Crohn's disease, acute appendicitis, foreign body perforation, perforated neoplasm, traumatic hematoma and small bowel ulceration secondary to non-steroidal anti-inflammatory drugs (NSAIDs) which may result in delayed diagnosis and is associated with high morbidity and mortality. CT scan of the abdomen is the best tool for identifying small bowel diverticulitis and the associated complications. Small bowel diverticulitis and its complications should be considered in the differential diagnosis in patients that present with acute right lower quadrant abdominal pain, altered bowel habits and focal peritoneal signs. Complications from a delayed diagnosis of this clinical entity carry high morbidity and mortality.

## Footnote

**Authors' Contribution:** Jiten P. Kothadia: concept and design, acquisition of available literature, and drafting of the review article. He declares no conflict of interest. Seymour Katz: critical revision of the manuscript for important intellectual content. He declares no conflict of interest. Lev Ginzburg: manuscript proofreading and critical revision of the manuscript for important intellectual content. He declares no conflict of interest.

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