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# Perforated jejunal diverticulitis in a nonagenarian veteran: A case report



Jordan Grubbs, Sergio Huerta\*

University of Texas Southwestern Medical Center and VA North Texas Health Care System, United States

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## ABSTRACT

**INTRODUCTION:** Jejunal diverticular (JD) disease is an uncommon occurrence that frequently present as a diagnostic dilemma. The correct diagnosis from complications of JD is typically made at laparotomy. Most JD are asymptomatic. Of clinically significant small bowel diverticula, only 15% present with surgical problems including obstruction, gastrointestinal bleed, and perforation.

**PRESENTATION OF CASE:** A 90-year-old man presented to the hospital with abdominal pain. He was clinically stable with local tenderness in the left lower quadrant. Computed tomography demonstrated a dot of free air near the sigmoid and sigmoid diverticula. He continued to have pain and clinically deteriorated following a short period of observation. He underwent an exploratory laparotomy that revealed perforated JD.

**CONCLUSION:** Perforation from JD is exceedingly rare. Due to their infrequent clinical significance, complications from JD are difficult to diagnose and therapeutic options are typically made intraoperatively. Any deviation from the expected positive pathway in the management of a suspected entity should prompt an immediate reassessment as well as definitive therapeutic options.

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## 1. Introduction

Jejunal diverticula are classified as false diverticula as they are herniations of the mucosa and submucosa through the muscular layer of the small bowel [1]. The specific etiology of JD is not clear, but dysmotility disorders of the small bowel have been proposed as the likely pathophysiology leading to this condition [2,3]. They are typically found along the mesenteric wall of small bowel as this side is relatively weak due to the penetration of the vasa recta [4–6]. JD is, therefore, considered an acquired condition. The cumulative risk of developing JD increases with age [1,2]. Postmortem studies have shown an incidence of 0.3–4.5% for JD. Similarly, imaging analyses have demonstrated an incidence of JD in 0.5–2.5% of subjects [4]. Fortunately, the clinical significance of JD requiring surgical intervention is much smaller accounting for only 0.5% of patients affected by this condition [7]. JD are twice more common in men than women and usually present with complications in the 6th and 7th decade of life [1].

The typical silent nature of JD creates a diagnostic challenge in the differential diagnosis of an acute abdomen. While JD rarely perforate, the overall mortality of perforated jejunal diverticula is up

to 40%. Thus, delay in diagnosis might result in substantially high adverse outcomes [4]. We present a patient who had concomitant sigmoid and jejunal diverticula. He was initially managed as sigmoid diverticulitis. However, failure of conservative therapy led to a laparotomy that revealed perforated JD.

## 2. Methods

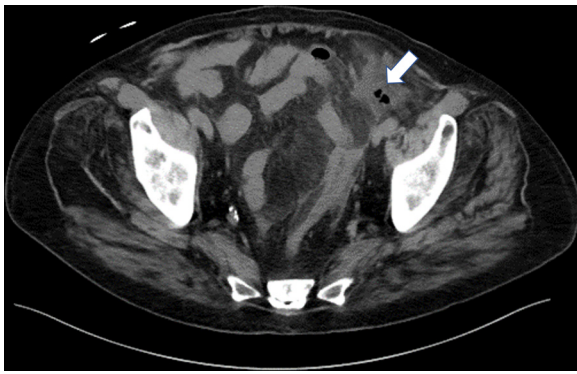
This is a case report of a patient who presented with this disease at the VA North Texas Health Care System (VANTHCS). The medical records were reviewed for this patient in the computer patient record system. Informed consent was obtained from the patient for the publication of this report. This work has been reported according with the SCARE criteria [8].

## 3. Case report

A 90-year-old man (Caucasian, BMI = 22.7 kg/m<sup>2</sup>) with a past medical history significant for mild dementia, hypertension and atrial fibrillation presented to the VANTHCS Emergency Department (ED) with progressive worsening abdominal pain, nausea vomiting and diarrhea. While the abdominal pain had been occurring for about three weeks, there was a substantially acute change a few hours prior to presentation to the ED. He had no history of abdominal operations. He was on antihypertensive medications, but no anticoagulants. His social history was negative for tobacco,

\* Corresponding author at: University of Texas Southwestern, 4500 S. Lancaster Road, Dallas, TX 75216, United States.

E-mail addresses: [Jordan.grubbs@phhs.org](mailto:Jordan.grubbs@phhs.org) (J. Grubbs), [Sergio.Huerta@UTSouthwestern.edu](mailto:Sergio.Huerta@UTSouthwestern.edu) (S. Huerta).



**Fig. 1.** Small bowel wall thickening with mesenteric inflammation. Sigmoid diverticula with surrounding inflammation (arrow).

ethanol or drugs. He had undergone a colonoscopy examination a few years prior to admission, which had been reportedly normal.

On physical exam, he was in acute distress complaining of pain. He was also diaphoretic. His vital signs demonstrated a temperature of 96.6° Fahrenheit, heart rate of 117 beats per minute, and a blood pressure of 126/72 mm/Hg. His heart had an irregularly irregular rhythm. His abdomen was soft, but distended. There was tenderness to palpation that localized exclusively to the left lower quadrant.

Laboratory data reveal a hematocrit of 49.1%, hemoglobin of 16.1 g/dL, and a white count of 7.3K/uL. His creatinine was 1.53 mg/dL and a potassium of 3.1 mmol/L. His albumin was 3.8 g/dL. His liver function tests were within normal limits as was the international normalized ratio (INR).

A computed tomography (CT) exam demonstrated inflammation in the mesentery of the small bowel in the left lower quadrant and pneumoperitoneum (Fig. 1). He was admitted to the intensive care unit for intravenous fluids and serial abdominal exams. An indwelling bladder catheter was placed and broad-spectrum antibiotics were initiated with the presumptive diagnosis of diverticulitis.

He initially responded favorably to fluid resuscitation and antibiotic treatment for a few hours. However, the same night, he developed tachycardia, and his abdominal exam changed from localized to diffuse abdominal tenderness. He was then taken to the operating room for an exploratory laparotomy by the senior author (SH), who is a staff general surgeon at the VANTHCS. While exploratory laparoscopy is a good option for the management of this disease, the decision for an exploratory laparotomy was based on the following criteria: (1) The expectation was for the management of perforated sigmoid diverticulitis. Thus, a possible sigmoidectomy with a Hartmann's was the expected form of management for this patient. This approach would have been less ideal in the hands of the staff surgeon for this patient (SH), who typically performs open operations. (2) There was severe abdominal distention, which would have made the placement of trocars to establish pneumoperitoneum a challenging task. (3) The operation was performed in late at night and this was not an ideal time for laparoscopy for a nonagenarian.

At celiotomy, a large amount of fluid was immediately noted following entry into the peritoneal cavity. The sigmoid was substantially redundant, but demonstrated no abnormalities other than uninflamed, non-perforated diverticula. The appendix, cecum and right colon were also normal. Evisceration of the bowel demonstrated a small segment of the jejunum adherent to the left colon next to the sigmoid. He had multiple jejunal diverticula and perforation was found in one of them (Fig. 2). A small bowel resection was performed with a hand-sewn anastomosis.



**Fig. 2.** Intraoperative findings demonstrating jejunal diverticula and perforation (arrow).

He recovered well from the operation and was discharged to a skilled nursing facility on postoperative day number seven. The patient's perspective on the disease process was limited due to his mild dementia. However, his family was extremely appreciative of the outcome. Pathological examination demonstrated no malignancy, multiple jejunal diverticula and a perforated JD without an enterolith.

#### 4. Discussion

Owing to the rarity of a perforated JD in the general population, clinical suspicion has to be high in order to prevent a delay in diagnosis and treatment [9]. Because operating in nonagenarians carries a particularly high risk in morbidity and mortality (especially in veteran patients), the decision to proceed with operative intervention should be considered in the background of a strong differential diagnosis. Nonagenarians do not respond to acute insults as well as younger patients in terms of a physiological response (i.e. tachycardia) or hematologic data (i.e. White Blood Cell Count) [10,11]. The therapeutic window for treatment in the very old is small and delay can result in substantially high adverse outcomes [11].

Reliability on diagnostic modalities can also be challenging. Computed tomography for perforated JD typically demonstrates extraluminal air with a thickened bowel wall and inflammation of surrounding tissues such as the colon [4]. Differentiation between perforated colonic diverticula and a perforated viscus from other sources is not always entirely clear. In the case presented in this report, JD was adjacent to the sigmoid colon and colonic diverticula were noted on the same CT scan. Given the patient's initial hemodynamic stability and focal tenderness on physical exam, a diagnosis of sigmoid diverticulitis was entertained. Appropriate management was immediately implemented according to the treatment algorithm based on Hinchey's classification [12]. Admission to the surgical intensive care unit was also undertaken such that serial abdominal exams could be performed. All the changes of the small bowel appeared to be initially related to the perforation of sigmoid diverticulitis (Fig. 1).

While the approach for colonic diverticula has been well established [12], the management for perforated JD has no clear guidelines and it is based on isolated reports such as the one in the current manuscript. For instance, conservative management with intravenous antibiotics and drainage has been proposed [7]. While the case reported by Levack et al. was successfully managed conservatively, the diagnosis of perforated JD was suggested by CT and never confirmed. In that case, there was no evidence of pneu-

moperitoneum on the initial study and bowel thickening was the only evidence of the disease. A few case reports have documented successful management with observation and laparoscopic lavage in cases of micro-perforation [13,14].

Other reports indicate that conservative management has a high failure rate and likely to lead to high morbidity and mortality [15]. The recommended approach for perforated JD is segmental resection and anastomosis [9,16–18].

Another issue that might not initially demonstrate peritonitis in cases of perforated JD has to do with the pattern of perforation of this entity. Perforation of JD usually occurs along the mesenteric border of intestine. Thus, the mesentery is often able to initially wall-off the perforation. However, gastrointestinal secretions and peristalsis might result in failure of this soft seal and lead to an acute abdomen. Consequently, unlike sigmoid diverticula, JD is unlikely to respond well to conservative management. Additionally, perforation of the small bowel needs to exclude malignancy, which can be made at the time of laparotomy.

It is also important to consider the specific cohort of patients being treated with a suspected perforated viscous. Young healthy patients tolerate observation better than other patients as clinical parameters such as tachycardia and leukocytosis along with the physical exam assist in the overall clinical picture. Older patients might not be able to mount the same white count response to sepsis or might be on beta-blockers, which might mask the physiologic responsive tachycardia to sepsis. Thus, older veteran patients will decompensate rapidly if appropriate therapeutic interventions are not undertaken [10,11]. For very old patients with perforated JD, surgical intervention should be undertaken early if the diagnosis is known [19]. A small period of observation and resuscitation is adequate provided that serial abdominal exams are performed in cases of suspected colonic diverticula. However, any deviation from the expected positive pathway in the management of a suspected entity should prompt an immediate reassessment as well as definitive therapeutic options.

### Conflicts of interest

None of the authors have any interest to disclose.

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### Ethical approval

Informed consent was obtained from the patient and it is available upon request.

### Consent

Informed consent was obtained from the patient and it is available upon request.

### Author contribution

Jordan Grubbs, M.D. → drafting, revising of the manuscript and participated in the care of the patient.

Sergio Huerta, MD → drafting, revising of the manuscript and participated in the care of the patient.

### Guarantor

Sergio Huerta, MD.

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