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Case Report: A 31-Year-Old Man with Relapsing Complicated Diverticulitis after Initial Conservative Treatment

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BACKGROUND: There is controversy regarding the surgical approach for severe complications of diverticular disease. The classical approach has been a Hartmann's procedure, but laparoscopic lavage and drainage has been suggested as an alternative. We present a patient who initially responded to conservative management of complicated diverticulitis, but had a recurrence that was managed surgically.

CASE PRESENTATION: A 31-year-old man presented with Hinchey Stage I diverticulitis and was discharged from the hospital after medical management. Six days later, he returned to the hospital with radiographic evidence of a pericolonic abscess. The patient was taken to the operating room for laparoscopic drainage with placement of a drain in the abscess cavity. He required reoperation with sigmoid colon resection, primary anastomosis, and diverting ileostomy.

DISCUSSION: Despite requiring reoperation, the authors believe that initial conservative management possibly prevented progression to generalized feculent peritonitis. If this had occurred, the patient may have required Hartmann's procedure, which is associated with more complications than primary anastomosis with protective ileostomy.

CONCLUSION: The patient had recurrence of complicated diverticular disease that was initially managed conservatively and then with laparoscopic drainage, followed by primary anastomosis with protective ileostomy. Given individual patient factors, the authors believe that he was managed optimally. There is currently controversy between the use of laparoscopic lavage and drainage versus Hartmann's procedure for the management of complicated colonic diverticular disease and more investigation is required on the subject.

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Keywords: *Diverticulitis, Diverticulosis, Hartmann's procedure, laparoscopic lavage and drainage, Hinchey Classification.*

BACKGROUND

The prevalence of diverticular disease has been increasing in the United States and resulting health care costs were estimated at $3.15 billion in 2005.[1] Diverticular disease is divided into uncomplicated diverticulitis and diverticulitis complicated by abscess, phlegmon, or perforation.[2] The Hinchey classification system, as shown in **Table 1**, describes various states of complicated diverticulitis and is useful for guiding management.[3]

Diverticular abscesses less than 3 cm in diameter are generally managed with antibiotics, intravenous (IV) fluids, and bowel rest, while those greater than 3 cm can be managed with computed tomography (CT)-guided drainage.[4, 5] Surgical management of generalized peritonitis secondary to complicated diverticulitis is generally preferred over conservative management.[6] However, there is controversy regarding the surgical approach of choice. Classically, the Hartmann's procedure (HP) has been the favored method.[7] HP has a morbidity of 25-50%, mortality of 10-20%, and a 56% rate of colostomy closure.[7, 8, 9] Laparoscopic lavage and drainage (LLD) has been suggested as a more favorable surgical approach to HP, with one prospective case series showing that LLD had a morbidity of 4%, mortality of 3%, and postoperative intervention rate of 2% in patients with Hinchey Stage III diverticulitis.[10] Data from a prospective cohort study showed that patients with Hinchey Stage III/IV diverticulitis who underwent LLD had significantly shorter hospital stay and increased colostomy closure rate than those who underwent HP.[11] Results from the first randomized clinical trial comparing LLD with open HP showed shorter intraoperative time, shorter time spent in the recovery unit, and shorter hospital stay in patients who underwent LLD, but not significant differences in mortality, morbidity, reoperations, or complications.[12] In brief, LLD is performed by first aspirating free fluid in the peritoneum, then exploring diseased colon and washing purulent cavities with a total of >4 L of iodine saline solution.[11] HP is performed by mobilizing the affected colon, resecting the diseased segment, and creating an end-colostomy with reversal at a later point.[11]

Table 1

Hinchey Score	Description
I	Pericolic abscess or phlegmon
II	Pelvic/abdominal/retroperitoneal abscess
III	Generalized purulent peritonitis
IV	Generalized fecal peritonitis

Table 1. The Hinchey classification of diverticulitis.[3]

We present a patient with Hinchey I sigmoid diverticulitis who initially responded to conservative treatment, but returned with recurrence (Hinchey II), and was subsequently managed operatively with laparoscopic drain placement, followed by sigmoid resection and primary anastomosis with diverting ileostomy.

CASE PRESENTATION

A 31-year-old man presented to the Emergency Department (ED) complaining of one day of the most severe abdominal pain he had ever experienced, located in the suprapubic area. The onset of pain was followed by several episodes of non-bloody diarrhea. He denied any nausea, vomiting, fever, chills, shortness of breath, or problems with urination. The patient has a past medical history of asthma and past surgical history of bilateral inguinal hernia repair in 2015. There was no family history of inflammatory bowel disease or colon cancer.

On initial examination, the patient was in no acute distress. All vital signs were within normal limits. An abdominal examination revealed a soft, non-distended abdomen with tenderness to palpation of the suprapubic region and left lower quadrant. There was no rebound tenderness or guarding. A complete blood count showed an elevated WBC count at 18.18 K/μL with a neutrophil differential count at 68.7%. Hemoglobin, hematocrit, platelet, electrolyte, bicarbonate, serum glucose, blood urea nitrogen, and creatinine levels were within reference ranges for adults (**Table 2**). Computed tomography of the abdomen and pelvis with oral and IV contrast showed colonic diverticulosis with abnormal wall thickening and fat stranding in the sigmoid colon, which was consistent with acute diverticulitis without visible abscess or signs of gross perforation (**Figure 1A**).

The patient was diagnosed with Hinchey Stage I acute diverticulitis and was admitted to the surgical acute care floor of the hospital. He was started on IV piperacillin/tazobactam, kept nil per os, and started on IV fluids, with concurrent pain control and thrombo-prophylaxis. Over the next five days, his WBC count decreased from 18.18 K/μL to 9.62 K/μL, his pain improved, his diet was advanced to clear liquids and then to a low fiber diet, he was ambulating, and he tolerated medications by mouth. He was discharged on hospital day (HD) 5 in stable condition on a ten-day course of oral amoxicillin/clavulanic acid.

Six days after discharge, the patient presented again to the ED with severe left abdominal pain. He reported compliance with his course of amoxicillin/clavulanic acid. The abdominal pain began twenty four hours prior and was associated with nausea and one episode of emesis. His stools were loose since being discharged from the hospital. He denied fever, chills, and shortness of breath.

On examination, the blood pressure was 152/74 mmHg, but all other vital signs were within normal limits. Abdominal examination showed a soft, non-distended abdomen with left lower quadrant tenderness and voluntary guarding. At that time, a complete blood count showed an elevated WBC count at 20.64 K/μL with a left-shifted neutrophil count at 78.8%. The hemoglobin, hematocrit, platelet, electrolyte, bicarbonate, serum glucose, blood urea nitrogen, and creatinine levels were within reference ranges for adults (**Table 2**). Abdominal X-ray showed no free intra-peritoneal air. CT scan of the abdomen and pelvis with oral and IV contrast showed diverticulitis of the sigmoid colon with a perisigmoid mesenteric abscess and contained perforation of the abscess (**Figure 1B**).

Table 2

Variable	Reference Range, Adults	First Admission	Second Admission	HD6	HD14	HD24
White Cell Count (K/μL)	4.3-11	18.18	20.64	17.99	18.08	16.48
Neutrophil Count (%)	50-65	68.7	78.8	74.6	82.1	62
Hemoglobin (g/dL)	14-18	15.3	14.8	13.9	13	12.5
Hematocrit (%)	40-54	42.7	43.4	39.6	39.7	37.2
Sodium (mmol/L)	136-145	133	137	138	140	139
Potassium (mmol/L)	3.5-5.1	-	4.3	3.9	3.8	4.0

Table 2. Laboratory data from the patient's hospital course.

On his second presentation, the patient was diagnosed with Hinchey Stage II diverticulitis and was admitted to the hospital's surgical intensive care unit (SICU). He was medically managed as in his first presentation. He was not a candidate for CT-guided percutaneous drainage of the abscess due to nearby anatomy obstructing access. On HD 5 of this presentation, the WBC count was still elevated, at 14.68 K/μL, and the patient had persistent abdominal pain and tenderness. A repeat CT scan of the abdomen and pelvis with oral and IV contrast again showed a contained perforation of the perisigmoid abscess, with increased size of the abscess, at 6 x 5 cm (**Figure 1C**).

On HD 7, the leukocytosis and pain had not improved despite continued intravenous antibiotics and the patient was taken to the operating room for diagnostic laparoscopy and underwent laparoscopic drainage of the perisigmoid mesenteric abscess. After drainage of the abscess cavity, the cavity was irrigated with approximately 50 mL of saline, until the effluent was clear, and a Jackson-Pratt (JP) drain was placed with the tip in the abscess cavity (**Figure 2**).

The JP drain collected about 25mL of serosanguinous fluid in the first two postoperative days and the patient's pain and clinical picture improved. On POD 3 (HD 10), the JP drain began to collect green-brown fluid, followed by feculent material on POD 6 (HD 13). A CT scan of the abdomen and pelvis with only oral contrast showed the tip of the JP drain in the abscess cavity and oral contrast agent in the drain, indicative of enteric leakage into the abscess (**Figure 2**). On POD 7 (HD 14), the patient reported 9/10 abdominal pain, had a temperature of 101.3 °F, and the WBC count increased from 9.53 K/μL the day prior to 18.08 K/μL. The patient was taken to the OR for urgent sigmoid colon resection with primary anastomosis and diverting loop ileostomy. The second post-operative course was uneventful. The patient was discharged on second POD 10 (HD 25) and underwent successful ileostomy reversal twelve weeks later, after a colonoscopy showed no underlying pathology other than diverticulosis. The patient returned to his activities of daily living with no recurrent symptoms two months after his ileostomy reversal. Lab values from key points in the patient's course are shown in **Table 2**.

DISCUSSION

This patient was not managed with either HP or LLD. He first underwent laparoscopic drainage of the 6 x 5 cm localized abscess, as he was not a candidate for percutaneous drainage. Only the abscess cavity was irrigated, as opposed to

Fig. 1. CT Images of Pericolonic Abscess and Perforation. All CT images were obtained with both oral and IV contrast. (A) CT on initial presentation from the first hospital admission revealed Hinchey Stage I diverticulitis, with formation of a phlegmon (arrow). (B) CT from the presentation on second hospital admission revealed Hinchey Stage II diverticulitis with contained perforation and perisigmoidal abscess in the mesentery (arrow). (C) CT from HD 5 of the second hospital admission revealed contained perforation of the abscess with growth to 6 x 5 cm (arrow).

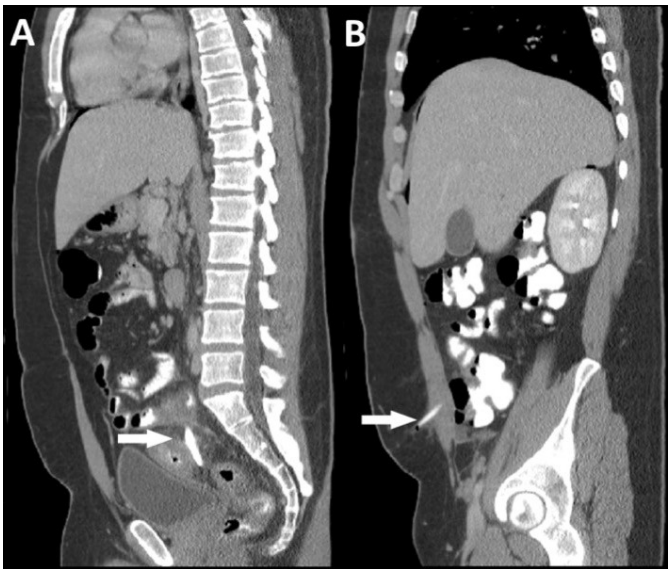

Fig. 2. Post-operative CT after laparoscopic drainage of peri-colonic abscess. Both images were obtained with only oral contrast on POD 6 (HD 13) to assess for extravasation of oral contrast through the sigmoid perforation. (A) Sagittal view of the tip of the JP drain located in the pericolonic abscess (arrow). (B) JP drain catheter exiting the abdominal wall, containing oral contrast, demonstrating continuity with enteric lumen and controlled fistulization.

the whole peritoneal cavity as in LLD. This approach was taken because the patient did not initially present with perforation or generalized peritonitis and neither HP nor LLD are generally indicated in Hinchey Stage II diverticulitis. Although the patient required reoperation due to sigmoid perforation, the authors feel the initial conservative management and placement of JP drain possibly prevented progression to generalized feculent peritonitis. Evidence for perforation was seen when the JP drain began to collect feculent material, implying that a controlled fistula formed between the sigmoid colon and JP drain, which prevented spread of feculent material throughout the peritoneal cavity. Reoperation with a primary anastomosis and diverting loop ileostomy was likely made possible through containment of feculent material by the JP drain. We speculate the patient may have otherwise developed more severe peritonitis and may have required HP with subsequent end colostomy reversal, which is associated with more complications than ileostomy reversal.[13] The protective loop ileostomy was performed to ensure that the primary anastomosis would be viable and decrease the likelihood of reoperation.

CONCLUSION

This patient presented with Hinchey Stage I diverticulitis, which was first managed conservatively, and then had a severe relapse with Hinchey Stage II diverticulitis. In lieu of HP or LLD, his relapse of diverticulitis was initially managed with laparoscopic drainage and JP drain placement followed by resection with primary anastomosis and protective ileostomy. More investigation is required into the surgical management of patients with complicated and worsening recurrent diverticulitis, and individual factors must always be considered in the management of such patients.

Patient Consent: Written informed consent was obtained from the patient by the authors for publication of this case report and images. Identifying personal information has been removed. A copy of the written consent is retained by the Journal.

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Abbreviations: CT, computed tomography; ED, Emergency Department; HD, hospital day; HP, Hartmann's procedure; IV, intravenous; JP, Jackson-Pratt; LLD, laparoscopic lavage and drainage; POD, post-operative day; WBC, white blood cell.

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