Case Report

Laparoscopic sigmoid colectomy for diverticulitis – stricture: A case report with review of literature

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ABSTRACT

Diverticulosis is a common condition in the western world. It is often asymptomatic. However, its inflammation and the occurrence of its complications precipitate symptoms. Uncomplicated diverticulitis can be managed conservatively, most of the times. Complicated diverticulitis may need an endoscopic, interventional radiological, or surgical intervention. Herein, we report the case of a 53-year-old patient with complicated sigmoid diverticulitis, i.e., stricture caused by repetitive attacks of acute diverticulitis, who underwent a laparoscopic sigmoid colectomy followed by primary anastomosis.

Key words: Diverticulitis, Diverticulosis, Laparoscopic, Sigmoid colectomy, Stricture

Sigmoid diverticulitis is an inflammation of the diverticulum, which is a sac-like protrusion from the sigmoid colonic wall. It is theorized to have formed due to micro-perforation. Diverticulitis occurs in 10–25% of patients with diverticulosis [1]. Diverticulosis is seen in 60% of people older than 60 years [1]. The nationwide inpatient sample, the largest all-payer inpatient care database in the United States, revealed that there was a 26% increase in hospitalizations for acute diverticulitis (AD) and a 38% increase in elective operations. It further shows that young patients (18–44 years) are more likely to be admitted to the hospital than older patients (45–74 years). This trend is likely due to prompt diagnosis and improvements in diagnostic testing modalities. Western nations are overwhelmingly likely to have left-sided diverticulosis, whereas those of Asian descent are likely to have the right-sided disease [1]. Across the world, the mean age for admission for AD is 63 years [1]. Though the disease was initially noted to be more prevalent in males, more recent data shows that the distribution of diverticulitis is equal in both males and females [1]. Diverticulitis more commonly occurs in men younger than the age of 50 and women 50–70 years old [1]. Patients with diverticulitis over the age of 70 are more likely to be female [1].

Here, we report the case of a 53-year-old patient with complicated sigmoid diverticulitis. The rationale for reporting this case is to highlight the stricture-causing potential of recurrent sigmoid diverticulitis and the feasibility of laparoscopic resection for it in an advanced setup.

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CASE REPORT

A 53-year-old male patient presented to the emergency ward with complaints of acute pain in the left side of the abdomen, nausea, constipation since 7 days, and obstipation since 1 day. He had no medical co-morbidities, was a known case of sigmoid diverticulosis, and had multiple attacks of acute sigmoid diverticulitis (diagnosed on serial contrast-enhanced computed tomography [CECT] scans of the abdomen and pelvis) in the past.

On examination, he had a tachycardia of 96 beats/min. His blood pressure was 140/90 mm Hg, and his respiratory rate was 16/min. His abdomen was distended, tympanic, and tender in the left lower half. He had hyperperistalsis, and his rectum was empty. Over the past 1.5 years, he had been admitted to our hospital from the emergency ward with AD on four occasions. In all of these instances, he was successfully treated conservatively with a favorable response to antibiotics.

On his latest presentation, his total leukocyte count was 15,000. A repeat CECT scan of the abdomen and pelvis was then done, which revealed the previously diagnosed and visualized diverticulitis (Fig. 1a). An additional finding this time was luminal narrowing with no entry of oral contrast into the affected segment (Fig. 1b and c). This suggested a long, strictured segment

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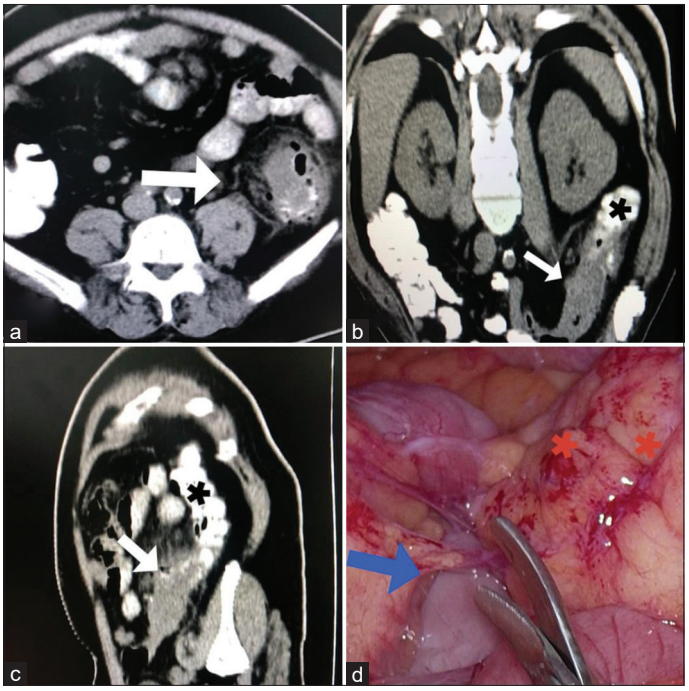

Figure 1: (a) CECT axial section shows affected sigmoid colon (white arrow), (b) CECT slanting axial view shows strictured sigmoid colon (white arrow) with normal contrast filled proximal colon (black asterisk), (c) CECT sagittal view with same findings as B, (d) Lysis of mesenteric adhesions (blue arrow) with the affected sigmoid colon (orange asterisks). CECT: Contrast-enhanced computed tomography

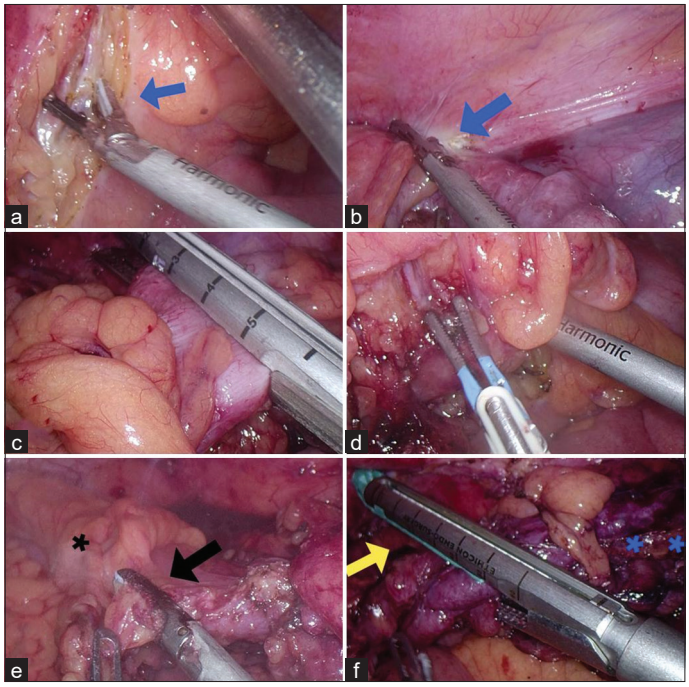

Figure 2: (a) Division of sigmoid colonic mesentery using harmonic scalpel (blue arrow), (b) Division of lateral peritoneal fold with harmonic scalpel (blue arrow), (c) Transection of sigmoid colon distal to affected segment after baring of serosa with a linear cutter (blue arrow), (d) Bipolar forceps and harmonic scalpel being used to devascularize the affected sigmoid colon, (e) Baring of the proximal normal descending colon (black asterisk) with harmonic scalpel (black arrow) prior to division, (f) Transection of normal colon with linear cutter (yellow arrow) just proximal to affected segment (blue asterisks)

in the sigmoid colon secondary to recurrent acute on chronic diverticulitis. There was no extravasation of the oral contrast.

He was admitted to the surgical ward and put on a conservative line of management. He was kept nil per oral on intravenous fluid support and antibiotics (intravenous ceftriaxone and metronidazole). His bowels opened up on the 3rd day of hospitalization. He was counseled to undergo a surgical segmental resection as definitive therapy after due investigational workup. The patient and his family agreed with this plan. A sigmoidoscopy was then attempted, but the scope could not enter or negotiate the strictured segment. He was then given bowel preparation (2 L of PEGLAC powder solution on the day before the day of the planned surgery). After confirming his fitness for general anesthesia, he was taken up for a laparoscopic sigmoid colectomy. A four-trocar approach was adopted (Fig. 4d). Adhesions to the affected colon were lysed (Fig. 1d). The harmonic scalpel, along with bipolar electrocautery was used as the energy source to devascularize the affected segment (Fig. 2a, b, d, e). An Endo-GIA (Covidien) linear cutter was then used for proximal and distal transection (Fig. 2c and f). The proximal normal colon and the splenic flexure were then mobilized so as to achieve a tension-free anastomosis (Fig. 3b–d). The left flank 5 mm trocar site was then widened horizontally, and the specimen (Fig. 3a and 4b) was retrieved through it in a plastic bag. The two transected ends of normal colon were then approximated, sutured together, and brought out through the same incision (Fig. 3e, f, and 4a). Thereafter, an extracorporeal, hand-sewn, two-layered anastomosis was fashioned using 2–0 Mersilk. The anastomosed bowel was then reposited back into the abdomen. The incision was sutured closed, the pneumo-peritoneum was re-established, a peritoneal toilet was given, and a 32-inch French tube drain was kept *in situ* in the left para-colic gutter (Fig. 4c).

He had an uneventful post-operative recovery. He passed flatus on postoperative day (POD) 3 and was started on liquids per orally on POD 4. He was then given a semi-solid diet on POD 5, which he tolerated. The drain was removed, and he was discharged from the hospital on POD 6. On his POD 10 surgical outpatients department follow-up visit, all his wounds had healed well, and he was asymptomatic. The histopathology report of the operative specimen revealed diverticulitis with long segment stricture and ruled out cancer.

DISCUSSION

Diverticulitis is the result of microscopic and macroscopic perforations of the diverticular wall. Obstruction of the colonic diverticulum with fecoliths leads to increased pressure within the diverticulum and subsequent perforation. Also, increased luminal pressure due to food particles can lead to erosion of the diverticular wall. This causes focal inflammation and necrosis of the region, causing perforation [2]. Lifestyle factors associated with increased risk include western dietary patterns (high in red meat, fat, and refined grains) and red meat consumption alone. Obesity, and central obesity in particular, increases the risk of diverticulitis. Smoking is also associated with an increased risk of diverticulitis—particularly complicated diverticulitis. On the other hand, dietary fiber intake

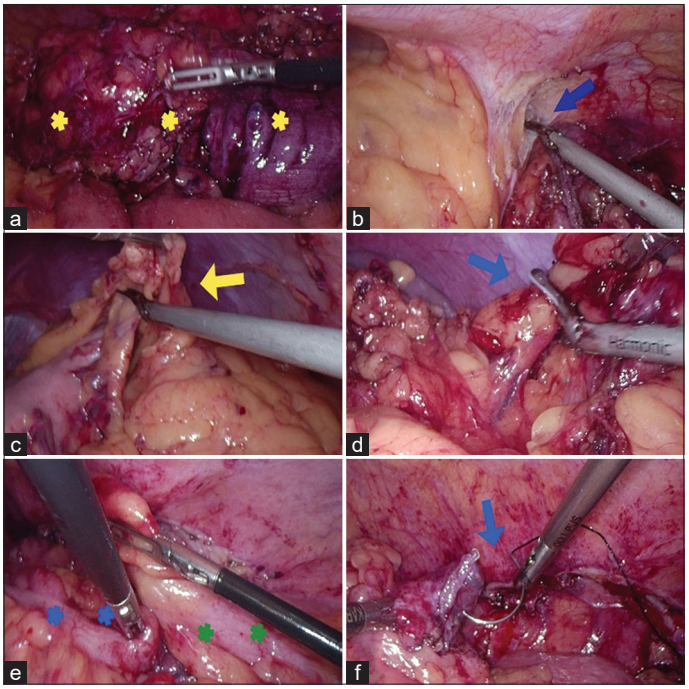

Figure 3: (a) The specimen (yellow asterisks), (b) Division of lateral attachments (blue arrow) to reduce tension on anastomosis, (c) Division of gastro-colic omentum to mobilize proximal colon (yellow arrow), (d) Division of spleno-colic ligament and splenic flexure attachments (blue arrow), (e) Trial approximation of proximal (blue asterisks) and distal (green asterisks) loops to assess tension, (f) Stitch being taken to appose proximal and distal transection margins of normal colon (blue arrow)

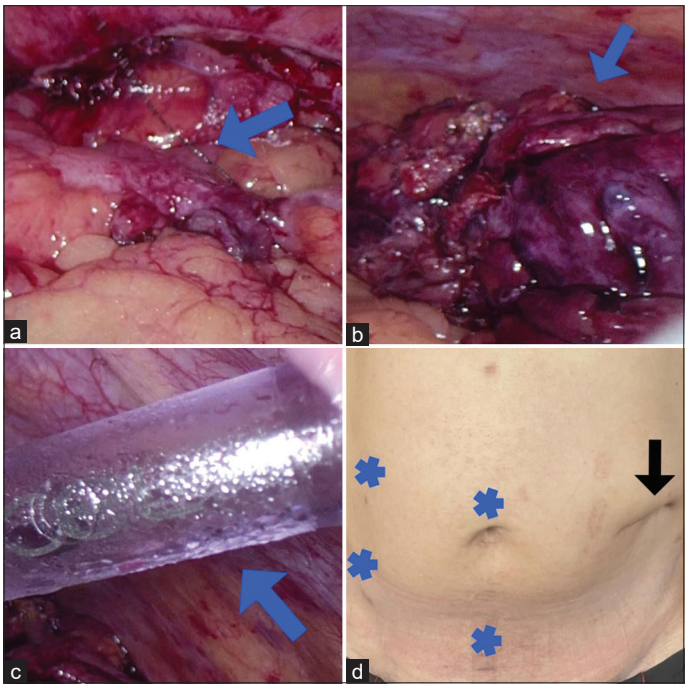

Figure 4: (a) Suture approximated proximal and distal normal colon (blue arrow), (b) The specimen (blue arrow), (c) Tube drain inserted *in situ* (blue arrow), (d) Trocar sites (blue asterisks) and specimen retrieval site (black arrow)

and prudent diets (high in fruits, vegetables, and whole grains) reduce the risk of diverticulitis. Physical activity (particularly vigorous activity, such as running) is associated with decreased risk [3]. Most patients with diverticulosis are asymptomatic. The presence of diverticula is commonly identified incidentally during colonoscopy or radiologic studies. Patients with AD may present with fever, left lower quadrant pain, and changes in bowel habits. The pain is mainly crampy and may be associated with a change in bowel habits. Other symptoms of diverticulitis include nausea, vomiting, constipation, flatulence, and bloating. AD is clinically mimicked by irritable bowel syndrome.

The Hinchey classification system is useful in determining the severity of disease and in allocating patients to different treatment algorithms [4]. Table 1 amalgamates the same with stage-wise recommended therapy.

Laboratory findings include leukocytosis and elevated inflammatory markers. A computed tomography scan of the abdomen and pelvis with intravenous and oral contrast is the preferred modality. Its diagnostic accuracy is high, with a sensitivity of 98% [5]. Findings of colonic wall thickening and fat stranding are noted in diverticulitis.

Patients with complicated diverticulitis may present with signs of sepsis and physical findings consistent with peritonitis. They may have abdominal tenderness, abdominal distension, a tender mass in the abdomen, absent peristalsis, and possible findings related to fistula formation. The presence of fecaluria and pneumaturia must alert the clinician to the possibility of a colo-vesical fistula. Also, another known complication is diverticular bleeding, which usually presents as hematochezia or melena. Repetitive attacks of inflammation in a diverticular segment lead to luminal narrowing in the long run and cause large bowel obstruction. Our patient had this.

Most patients with uncomplicated sigmoid diverticulitis respond to medical treatment and generally experience significant decreases in their abdominal pain, temperature, and white blood cell count within the first 48 h after the initiation of antibiotic treatment [6]. Uncomplicated diverticulitis includes stages 0 and Ia, according to the modified Hinchey classification [7,8]. When the inflammatory process is limited to the sigmoid, it is generally treated with antibiotics. If symptoms are not severe and the patient is otherwise healthy and compliant with medical treatment, wide-spectrum antibiotic treatment can be administered orally on an outpatient basis. On the other hand, if the patient is systemically ill, elderly, or has significant comorbidities, a hospital admission and treatment with intravenous antibiotics are required. Complicated diverticulitis includes stages Ib to IV (fecal peritonitis) according to the modified Hinchey classification [7,8]. It often requires hospitalization due to variable systemic toxicity, a high fever, severe localized abdominal tenderness, and leukocytosis. Complications of diverticulitis include pelvic abscess, intestinal perforation, bowel fistula, peritonitis, bowel obstruction, sepsis, and bleeding per rectum. Treatment of small mesocolic abscesses (<4 cm) with broad-spectrum antibiotics is successful in up to 70% of patients [9]. Compared with small mesocolic abscesses (<4cm), larger abscesses require percutaneous drainage and semi-elective surgery if drainage is unsuccessful [9]. Large diverticular abscesses are associated with a high risk of recurrence, with successful drain placement often serving as a bridge to surgical resection.

Table 1: Modified Hinchey classification for sigmoid diverticulitis [4]

Stage	Clinical picture	CT findings	Therapy
Stage 0	LLQ pain+with or without fever+change in bowel movement	Diverticula with colonic wall thickening	Antibiotics
Stage Ia	Stage 0+fever with/without chills and rigors	Pericolic or mesocolic abscess	CT guided aspiration+Parenteral antibiotics
Stage Ib	Stage Ia+tenderness+Nausea and vomiting	Ia changes and distant abscess, usually deep pelvic	CT guided aspiration +Systemic antibiotics
Stage II	Same as stage Ib	Localized or generalized ascites, pneumoperitoneum, peritoneal thickened	USG guided and CT guided drainage; Laparoscopic surgery
Stage III	Severe LLQ pain+tenderness +fever with chills and rigors+leucocytosis +tachycardia +hypotension+sepsis	Generalized purulent peritonitis	Emergency laparotomy
Stage IV	Same as stage III	Generalized fecal peritonitis	Emergency laparotomy

CT: Computed tomography, LLQ:left lower quadrant

Fistula formation is another complication of AD. The most common fistula is the colo-vesical fistula, which occurs in about 65% of cases [9]. Fecaluria is diagnostic of a colo-vesical fistula. Surgical repair of the fistula with primary anastomosis is the treatment of choice [9]. Peritoneal infection is an indication of an emergency exploratory laparotomy. Traditionally, laparotomy and thorough washout of contamination are performed, and then there is a choice between Hartmann's procedure (sigmoid resection with colostomy and closure of the rectal stump) and resection with colonic washout and primary anastomosis with an optional dysfunctioning loop ileostomy [10].

The role of colonoscopy after an episode of AD remains controversial. It is usually advised to wait for at least 6 weeks after an episode of AD due to concerns about iatrogenic injury to the inflamed, friable bowel. It is needed for confirmation and to exclude malignancy and complications [11]. Colonoscopy also plays a role in the therapy of acute diverticular bleeding. Endoscopic banding to manage diverticular bleeding is similar to the banding of esophageal varices. It requires prior identification of the culprit diverticulum and marking the site with India ink or hemoclip [12]. Interventional radiology plays a role in patients who have profuse bleeding and are hemodynamically unstable. Angiography detects bleeding rates of 1.0 mL/min, but only if the patient is actively bleeding. Nuclear scintigraphy can detect bleeding rates as low as 0.1–0.35 mL/min [13]. Patients with immediate blush on red blood cell scintigraphy are more likely to require urgent angiography, and those with delayed blush have a low angiographic yield [14]. Transcatheter arterial embolization is effective for controlling acute diverticular bleeding. Embolization should only be performed when the catheter has been advanced to the mesenteric border of the colon [15]. Vasopressin infusion is also an option, as the vessels responsible for diverticular bleeds tend to be smaller in diameter and thus more responsive to its constricting effect [16].

CONCLUSION

As seen in this report, large bowel obstruction due to stricture is one of the known complications of recurrent sigmoid diverticulitis. Laparoscopic therapy for the same, is feasible in an advanced setup that is ably complemented by advanced laparoscopic surgical skills.

REFERENCES

1. Severi C, Carabotti M, Cicenia A, Pallotta L, Annibale B. Recent advances in understanding and managing diverticulitis. F1000Res 2018;7:971.
2. Schieffer KM, Kline BP, Yochum GS, Koltun WA. Pathophysiology of diverticular disease. Expert Rev Gastroenterol Hepatol 2018;12:683-92.
3. Strate LL, Keeley BR, Cao Y, Wu K, Giovannucci EL, Chan AT. Western dietary pattern increases, and prudent dietary pattern decreases, risk of incident diverticulitis in a prospective cohort study. Gastroenterology 2017;152:1023-30.e2.
4. Kaiser AM, Jiang JK, Lake JP, Ault G, Artinyan A, Gonzalez-Ruiz C. The management of complicated diverticulitis and the role of computed tomography. Am J Gastroenterol 2005;100:910-7.
5. Laméris W, van Randen A, Bipat S, Bossuyt PM, Boermeester MA, Stoker J. Graded compression ultrasonography and computed tomography in acute colonic diverticulitis: Meta-analysis of test accuracy. Eur Radiol 2008;18:2498-511.
6. Evans J, Kozol R, Frederick W, Voytavich A, Pennoyer W, Lukianoff A, *et al*. Does a 48-hour rule predict outcomes in patients with acute sigmoid diverticulitis? J Gastrointest Surg 2008;12:577-82.
7. Sher ME, Agachan F, Bortul M, Nogueras JJ, Weiss EG, Wexner SD. Laparoscopic surgery for diverticulitis. Surg Endosc 1997;11:264-7.
8. Hinchey EJ, Schaal PG, Richards GK. Treatment of perforated diverticular disease of the colon. Adv Surg 1978;12:85-109.
9. Linzay CD, Pandit S. Acute diverticulitis. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2023.
10. O'Connell PR, McCaskie AW, Sayers RD. Bailey & Love's Short Practice of Surgery. The Large Intestine. 28th ed., Ch. 77. New Delhi: Taylor & Francis Books India Pvt. Ltd.; 2022. p. 1369-70.
11. Flor N, Maconi G, Cornalba G, Pickhardt PJ. The current role of radiologic and endoscopic imaging in the diagnosis and follow-up of colonic diverticular disease. Am J Roentgenol 2017;207:1-10.
12. Ishii N, Setoyama T, Deshpande GA, Omata F, Matsuda M, Suzuki S, *et al*. Endoscopic band ligation for colonic diverticular hemorrhage. Gastrointest Endosc 2012;75:382-7.
13. Ford PV, Bartold SP, Fink-Bennett DM, Jolles PR, Lull RJ, Maurer AH, *et al*. Procedure guideline for gastrointestinal bleeding and Meckel's diverticulum scintigraphy. Society of Nuclear Medicine. J Nucl Med 1999;40:1226-32.
14. Allen TW, Tulchinsky M. Nuclear medicine tests for acute gastrointestinal conditions. Semin Nucl Med 2013;43:88-101.
15. Valji K. The Practice of Interventional Radiology with Online Cases and Videos. Philadelphia, PA: Elsevier/Saunders; 2012.
16. Darcy M. Treatment of lower gastrointestinal bleeding: Vasopressin infusion versus embolization. J Vasc Interv Radiol 2003;14:535-43.

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