

CASE REPORTS

Management of Perforated Sigmoid Diverticulitis with Associated Retroperitoneal Abscess and Generalized Peritonitis

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Abstract

Introduction: Diverticulitis represents a relatively common pathology within the gastrointestinal tract. While diverticula can occur throughout the digestive system, their prevalence is notably higher in the left colon, particularly in the sigmoid region. This condition predominantly affects middle-aged and elderly males. The most effective diagnostic methods for this disease are colonoscopy and computed tomography (CT) with contrast. Although severe complications of diverticulitis are infrequent, the optimal classification of these complications has been described by Hinchey.

The article aims to show the case of a young patient with complicated diverticulitis with perforation and generalized peritonitis, classified as stage III-IV, according to Hinchey.

Case report: A 43-year-old female patient was urgently admitted to the General Surgery Clinic at Tetovo Clinical Hospital, presenting with severe generalized abdominal pain and signs of peritoneal irritation. Comprehensive diagnostic imaging revealed a large retroperitoneal abscess located above the psoas muscle, accompanied by a significant accumulation of free fluid, suspected to be pus, in the abdominal cavity. Following initial resuscitation, surgical intervention was undertaken. Intraoperative findings included advanced inflammatory changes in the sigmoid colon, characterized by thickened fibrotic walls and a partially constricted lumen. A large abscess was also identified in the retroperitoneal space between the spleen and left kidney. Given these findings, resectioning the distal descending colon and most of the sigmoid colon was considered necessary. The retroperitoneal abscess was incised, its contents aspirated, and a thorough cavity debridement was performed. Subsequently, the Hartmann procedure was executed. Postoperatively, due to the patient's deteriorating condition, she was transferred to the intensive care unit for continued treatment. The patient was discharged from the hospital in stable condition on the tenth day following the surgery.

Conclusion: While complications from sigmoid diverticula are uncommon, they can occasionally be extremely severe and pose a significant risk to patient survival.

Keywords: sigmoid diverticula, peritonitis, retroperitoneal abscess

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Introduction

Diverticula are among the most common disorders of the gastrointestinal tract, with a higher prevalence observed in economically advanced countries such as the United States, Europe, and Australia [1, 3].

The widespread consumption of fast foods and low-fiber diets in these nations is postulated as a primary contributor to the increased incidence of diverticulosis.[5,6,8]

Epidemiological estimates suggest that over 50% of the population aged over 60 in these regions is affected by diverticulosis, and its incidence is rising globally [3].

Although the condition predominantly impacts older people, statistical analyses indicate an incidence of over 65% in individuals above 80, while the rate drops to about 5% in those under 40. [4]

Notably, in younger populations, diverticulosis tends to manifest more aggressively, with the likelihood of complications such as perforations and fistulas being approximately five times higher compared to patients over 60 years of age [7]

Diverticula, though potentially present throughout the gastrointestinal tract, are predominantly found in the large intestine, particularly in its sigmoid portion. Generally, diverticular disease does not pose significant health concerns, with approximately 75% of individuals with diverticulosis not developing severe complications [2].

In cases where diverticula become inflamed, patients typically experience pain localized in the lower left quadrant, often accompanied by fever and leukocytosis.

Abdominal computed tomography (CT) with contrast is the preferred diagnostic modality for identifying colon diverticula. [9, 10,11]

For mild complications, a regimen of antibiotics and a liquid diet is usually recommended [11]. Following stabilization of the patient's condition, ideally several weeks post-recovery, a colonoscopy is advised to assess the distribution of diverticula and to rule out other severe conditions, such as colorectal cancer.

Patients with multiple or more giant diverticula are at risk of developing more severe complications, including abscess formation, fistulas, fibrosis and strictures of the colon, or diverticular perforation leading to localized or generalized peritonitis. Managing patients with perforated diverticula and generalized peritonitis is particularly challenging for surgeons. In such cases, an abdominal CT is essential, followed by surgical intervention that typically involves resection of a segment of the colon, often in conjunction with the Hartmann procedure [12, 13,14, 15]

The objective of this article is to present the clinical management of a relatively young patient who developed generalized peritonitis due to perforation of a sigmoid diverticulum. Additionally, the patient exhibited fibrotic narrowing in a segment of the descending and sigmoid colon, a complication attributed to recurrent episodes of diverticula inflammation in that region of the large intestine.

Case report

A 43-year-old female patient presented to the Abdominal Surgery Clinic at the Clinical Hospital of Tetovo, exhibiting abdominal pain. Upon presentation, the patient appeared acutely ill, reporting diffuse abdominal pain and a body temperature of approximately 38°C. She said the onset of pain six days prior was initially localized in the left flank before progressively spreading throughout the abdomen. Accompanying symptoms included high fever, vomiting, and general weakness. Ultrasonographic examination

revealed a hypodense formation approximately 15 cm in diameter, suggesting a retroperitoneal abscess above the psoas muscle between the spleen and left kidney.

Upon admission, the patient appeared pale and experienced difficulty in movement, with exacerbated abdominal pain while walking. Physical examination revealed a tense abdomen with peritoneal irritation signs present in all quadrants. She reported frequent vomiting, several days of constipation, persistent high fever, anorexia, and nocturnal sweating. Biochemical analyses indicated several abnormalities, including anemia (Erythrocyte count 3.1, Hemoglobin 9.2 g/dL, Hematocrit 31.2%), leukocytosis ($21.4 \times 10^9/L$), elevated C-reactive protein (CRP 194 mg), hypoproteinemia (52.9 g/L), hypoalbuminemia (2.2 g/dL), elevated AST (72 IU/L), elevated ALT (64 IU/L), and electrolyte imbalances, including hypokalemia and hypocalcemia.

The abdomen's contrast-enhanced computed tomography (CT) revealed a sizeable hypodense formation, measuring approximately 20 cm in diameter above the psoas muscle, extending from below the spleen to below the left kidney. Thickening of the walls in the distal descending colon and proximal sigmoid colon was described, with a segment of circumscribed narrowing in the sigmoid. The CT scan also highlighted edema throughout the digestive tract, distension of the intestinal loops, and a substantial amount of abdominal fluid, noted in both Douglas pouches and between the intestinal loops.

Following patient stabilization and antibiotic administration, surgical intervention was planned. The procedure began laparoscopically with the creation of four ports. During abdominal exploration, a substantial volume of pus was aspirated. Notably, the left colon displayed pronounced inflammatory changes, characterized by thickened, edematous walls, making its mobilization to explore the left lateral canal impossible. Due to the inability to adequately address the retro sigmoid abscess and considering the possibility of an underlying neoplastic process, as suggested by CT findings, the decision was made to convert to an open surgical approach.

The operation involved a median incision extending from below the xiphoid process to approximately five centimeters above the pubic symphysis. Upon retraction of the small intestines, extensive inflammatory and fibrotic changes were observed in a portion of the left colon, alongside luminal narrowing in the sigmoid. (fig. 1, 2, 3, 4)

The initial step involved mobilizing the distal descending and sigmoid colon, followed by drainage of the retroperitoneal abscess, with a portion of the aspirated pus sent for microbiological analysis. Given the significant fibrotic alterations and luminal constriction in the sigmoid, a decision was made to perform a left hemicolectomy and create a colostomy. Concurrently, debridement of the abscessed cavity and irrigation with saline solution were conducted. After thoroughly washing the intestines and abdominal cavity, two drains were positioned—one in the left Douglas pouch and the other along the left lateral canal. The abdominal wall was

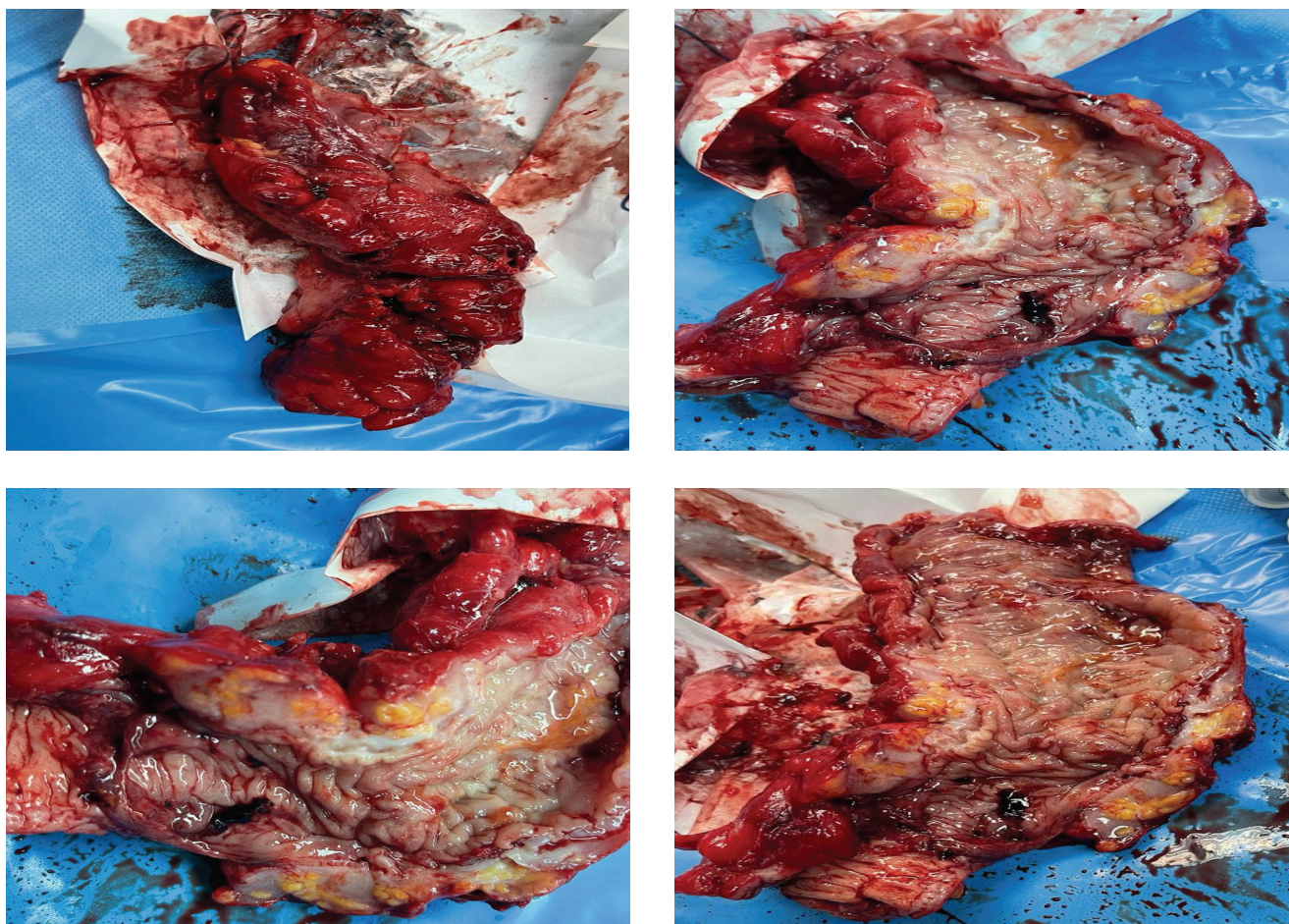


Figure 1,2,3,4 - Left hemicolectomy

closed using PDS sutures, and the excised sigmoid segment was sent for pathohistological examination.

In the immediate postoperative period, the patient's condition remained critical, necessitating intensive care unit management. On the tenth postoperative day, the patient was discharged in good health. The pathohistological analysis confirmed sigmoid diverticulosis with several perforated diverticula. Post-discharge, the patient was advised to undergo colostomy closure after a three-month interval.

Discussion

Although sigmoid diverticula are a relatively frequent disorder, especially in the elderly, they show a low rate of serious complications such as perforation with generalized peritonitis². The most used classification of complications of colonic diverticula, to which most (tab. 1) researchers refer, is that of Hinchey [16].

According to this classification, there are four stages of colonic diverticula complications: stage 0, characterized by mild inflammation; stage I, with pericolic inflammation but without abscess; stage Ib, confined pericolic abscess; stage two, marked by distant spot amenable to percutaneous drainage, stage IIb that of complex abscess associated

with or without fistula, in stage III due to the perforation of one or more diverticula, generalized purulent peritonitis simultaneously develops, and stage IV where due to open communication with bowel lumen until feculent peritonitis appears.

Stage	Characteristics
0	Mild clinical diverticulitis (left lower quadrant abdominal pain, low-grade fever, leukocytosis, no imaging information)
Ia	Confined pericolic inflammation, no abscess
Ib	Confined pericolic abscess (abscess or phlegmon may be palpable; fever; severe, localized abdominal pain)
IIa	Distant abscess amenable to percutaneous drainage
IIb	Complex abscess associated with/without fistula
III	Generalized purulent peritonitis, no communication with the bowel lumen
IV	Feculent peritonitis, open communication with bowel lumen

Table 1 Classification of Acute Diverticulitis according to Hinchey

The management of Hinchey classification grades 0, Ia, and Ib diverticulitis typically follows a conservative approach, primarily involving the administration of antibiotics and anti-inflammatory medications. For cases classified as grade IIa, traditional therapy may be sufficient, but these often necessitate puncture and aspiration of purulent content guided by ultrasonography or interventional computed tomography [9, 10].

Patients diagnosed with stage IIb diverticulitis require surgical intervention, which typically involves the aspiration of pus, closure of the sigmoid defect, and fistulectomy in cases where a fistula is present. Similarly, the management of third-degree diverticulitis is exclusively surgical, often necessitating bowel resection [17, 18].

In patients diagnosed with grade IV diverticulitis, surgical intervention is imperative. This procedure involves thorough peritoneal lavage, resection of the colon segment affected by diverticula, and establishing a Hartmann colostomy. For patients in advanced stage IV diverticulitis, especially those with aggravated general conditions due to sepsis, damage control surgery is recommended. This involves peritoneal lavage and closure of intestinal defects or minimal resection of the affected intestinal segment in cases of extensive damage, followed by the implementation of Hartmann's procedure for colostomy. Additionally, one or two abdominal drains are typically placed [18].

Performing intestinal resection with primary anastomosis in stage IV patients is associated with increased morbidity and mortality risks. Numerous studies corroborate the preference for the Hartmann procedure in cases of diverticulitis complicated by generalized peritonitis. However, many researchers advocate for the combination of segmental intestinal resection with primary anastomosis, even in severe diverticulitis cases. Their studies indicate no significant difference in morbidity and mortality rates between patients undergoing the Hartmann procedure and those receiving primary anastomosis [19, 20, 21].

A 2019 study suggests a preference for primary anastomosis over the Hartmann procedure in patients without comorbidities and those under the age of 85. This finding emphasizes the importance of individualized treatment plans based on patient condition and overall health status [19, 20, 22].

In recent decades, laparoscopic techniques have become the preferred method for treating most forms of diverticulitis, except those classified as stage IV according to the Hinchey system [23, 24, 25]. These laparoscopic interventions are associated with reduced morbidity and demonstrate superior outcomes in the postoperative period. Benefits include shorter hospital stays, decreased pain intensity, minor surgical wounds, and reduced hospitalization costs [26, 27, 28, 31].

Studies conducted by many researchers indicate that for uncomplicated diverticulitis, laparoscopic sigmoidectomy offers a safer alternative with a lower risk of postoperative complications compared to traditional open surgery [26, 27, 29, 30]. Furthermore, while acute diverticulitis is prone

to recurrence, recent research indicates that the incidence of recurrence is lower than previously estimated. Data suggest that the recurrence rate following an episode of uncomplicated diverticulitis is less than 1.79% over the subsequent five years [32, 33].

In the case of our patient, the surgical intervention initially commenced with a laparoscopic approach. However, the procedure was converted to an open system due to extensive adhesions of the sigmoid colon to the abdominal wall and pronounced inflammatory changes. This decision highlights the necessity of flexibility in surgical planning, adapting to intraoperative findings for optimal patient outcomes.

Conclusion:

Diverticular disease represents a notably high prevalence among the elderly population. While most cases do not result in severe complications, varying complications can occur, generally mild and amenable to conservative management. However, acute diverticulitis may occasionally lead to grave complications, such as perforation and the subsequent onset of generalized peritonitis. These critical conditions necessitate prompt and aggressive intervention due to their potential to endanger patient survival significantly.

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