Case Report

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Surgery Section

Spontaneous Perforation of the Colon in a Patient with Pseudomembranous Colitis: A Case Report

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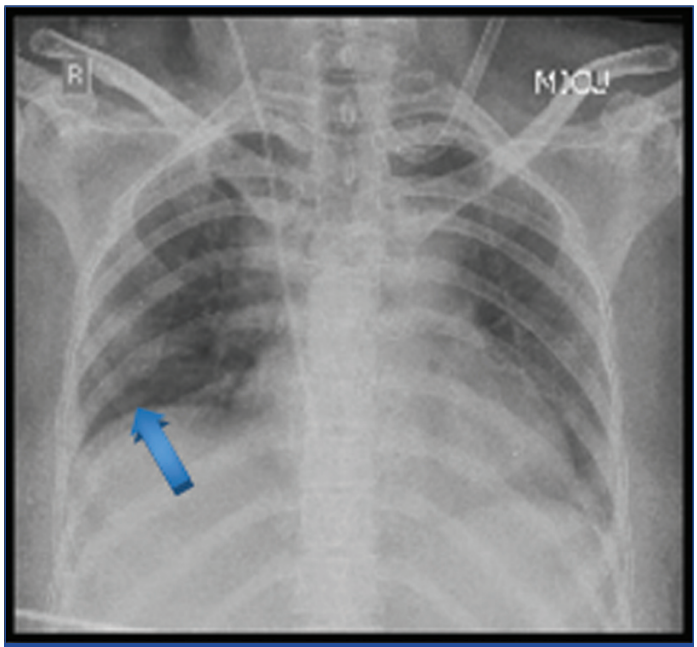
ABSTRACT

Pseudomembranous Colitis (PMC) is a severe inflammatory condition of the colon most commonly associated with *Clostridioides Difficile* Infection (CDI) and prolonged antibiotic use. Although it typically presents with diarrhea and abdominal pain, fulminant cases may lead to serious complications such as colonic necrosis and perforation, requiring prompt surgical intervention. In this case report, a 32-year-old female with a history of recurrent, self-limiting loose stools and prolonged, unsupervised antibiotic use presented with acute abdominal pain, vomiting, and distension. Radiological examination revealed signs of pneumoperitoneum, and an emergency exploratory laparotomy identified multiple colonic perforations with diffuse mucosal ulceration and necrosis. Histopathological examination of the resected specimen demonstrated classic features of PMC, including extensive transmural necrosis, crypt abscesses, epithelial sloughing, and dense neutrophilic infiltration, with no evidence of chronic Inflammatory Bowel Disease (IBD). The difficulty in diagnosing this case arose from the combination of long-standing symptoms mimicking IBD and the absence of stool testing in the emergency setting. The case underscores the rarity of multiple colonic perforations in PMC, a feature sparsely documented in the current literature. It highlights the need for timely clinical diagnosis, early surgical decision-making, and the importance of histopathological confirmation, particularly in patients with recurrent antibiotic exposure.

Keywords: Diarrhea, Histopathology, Inflammation, Necrosis, Peritonitis, Surgery, Toxicity

CASE REPORT

A 32-year-old female presented to the emergency department with a 4-5-day history of progressively worsening abdominal pain, accompanied by nausea, multiple episodes of non bilious vomiting, and frequent watery diarrhea. Additional symptoms included anorexia and two episodes of low-grade fever within the preceding three days. The medical history was notable for intermittent episodes of loose stools, occurring 2-3 times monthly over the past six years, typically self-limiting and managed without medical intervention. No history of weight loss, recent travel, or known comorbidities was reported. Surgical history was significant for two lower segment Caesarean sections performed in 2002 and 2006. There was a history of multiple prior episodes of similar abdominal symptoms, for which empirical antibiotic therapy had been administered by local healthcare providers. Medication history revealed frequent, unsupervised use of oral antibiotics such as amoxicillin-clavulanate, norfloxacin, and ofloxacin over a five-year period. Antibiotics were often discontinued prematurely following partial symptomatic relief. On initial clinical evaluation, the patient appeared toxic and irritable. Vital parameters revealed tachycardia (pulse rate: 120/min) and hypotension (blood pressure: 100/70 mmHg), suggestive of early haemodynamic compromise. Abdominal examination demonstrated diffuse distension with generalised tenderness, more pronounced in the right iliac fossa. Bowel sounds were present but sluggish. Digital rectal examination revealed fecal staining without evidence of melena or haematochezia. However, stool testing for *Clostridioides difficile* toxin could not be performed due to the urgent clinical condition. Furthermore, within 24 hours of admission, the patient developed progressive abdominal distension, absolute constipation, and clinical signs of peritonitis. An erect abdominal radiograph showed bilateral subdiaphragmatic free air, consistent with pneumoperitoneum [Table/Fig-1]. Laboratory examination demonstrated leucocytosis as shown in [Table/Fig-2]. In light of clinical deterioration and radiological evidence of hollow viscus perforation, an emergency exploratory laparotomy was performed.

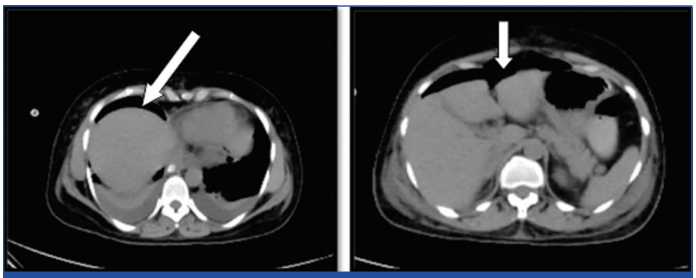


[Table/Fig-1]: High-definition erect chest X-ray showing subdiaphragmatic free air suggestive of pneumoperitoneum.

S. No.	Laboratory findings	Preoperative value	3 days postoperative value
1	Haemoglobin (Hb)	9.2 g/dL	10.0 g/dL
2	Total Leukocyte Count (TLC)	26,000 cells/mm^3	14,000 cells/mm^3
3	Platelet count	130,060 cells/mm^3	180,000 cells/mm^3
4	International Normalised Ratio (INR)	2.1	1.16
5	Serum creatinine	3.2 mg/dL	1.2 mg/dL

[Table/Fig-2]: Laboratory findings.

Abdominal ultrasonography and Contrast Enhanced Computed Tomography (CECT) of the abdomen demonstrated matted small-bowel loops in the right iliac fossa, free intraperitoneal fluid in the pelvis, and circumferential mural thickening of the distal ileum and caecum, findings suggestive of an underlying inflammatory or infectious colitis, as shown in [Table/Fig-3].



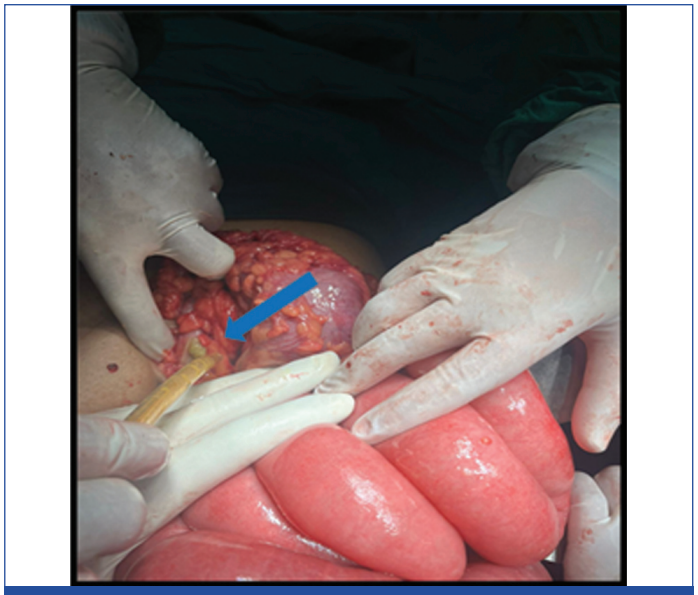
[Table/Fig-3]: CT scan showing pneumoperitoneum.

Intraoperative findings included a 2×1.5 cm perforation on the anterior wall of the caecum, a 1×1 cm perforation approximately 15 cm distal to the caecum and 5 cm proximal to the hepatic flexure, and an impending perforation in the ascending colon [Table/Fig-4]. Multiple mucosal abscesses were noted in the ascending and transverse colon, whereas the remaining bowel appeared grossly normal. These findings were consistent with fulminant colitis with multiple colonic perforations. Differential diagnoses included IBD and antibiotic-associated PMC.

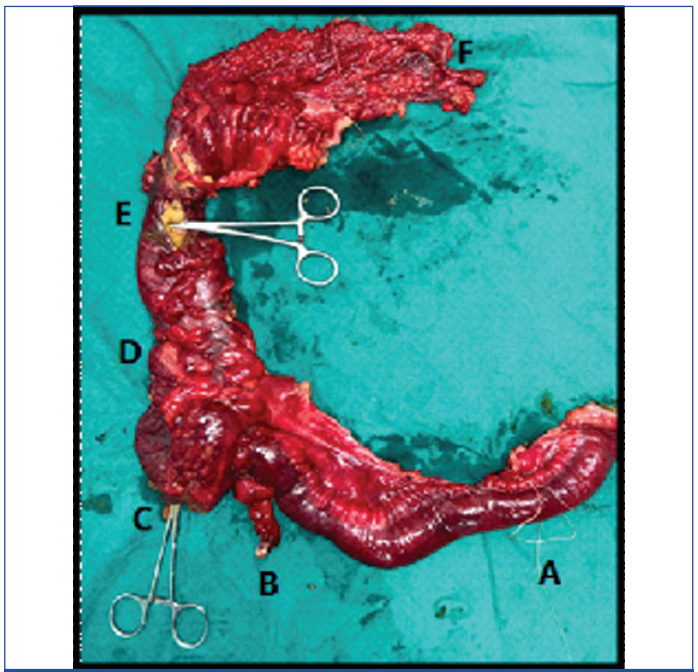
[Table/Fig-4]: A 1.5×2 cm sloughed out perforation at anterior wall of caecum.

Owing to the extensive involvement of the colon, an extended right hemicolectomy was undertaken. The resected segment included the distal 15 cm of ileum, caecum, ascending colon, and proximal transverse colon up to 10 cm from the splenic flexure [Table/Fig-5-7]. The distal colonic stump was closed. Two intra-abdominal drains were placed-one in the pelvic cavity and the other adjacent to the stump. Postoperatively, the patient was transferred to the Intensive Care Unit (ICU) for close monitoring and supportive care.

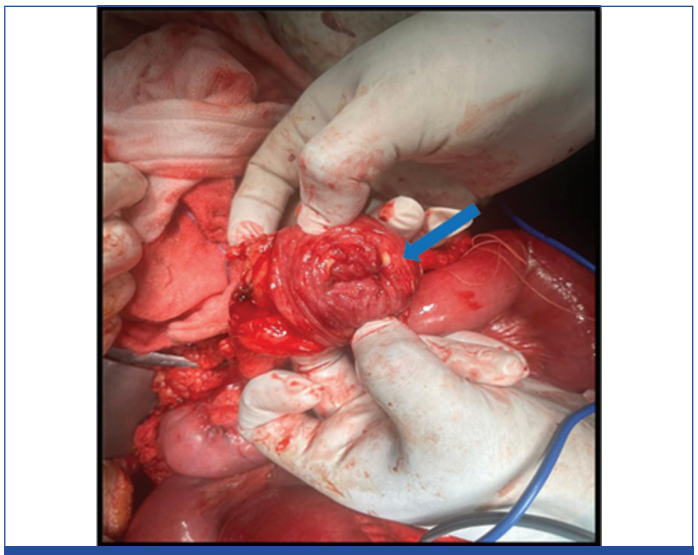
Histopathological examination of the resected specimen revealed extensive transmural necrosis of the colonic wall, dense neutrophilic infiltration, crypt abscesses, and marked vascular congestion, consistent with acute necrotising colitis [Table/Fig-8a-d]. Multiple mucosal abscesses and areas of epithelial sloughing were also present. Sections from the appendix showed mucosal necrosis with acute inflammation, consistent with acute appendicitis. No histological evidence of granulomas, parasites, fungal elements,



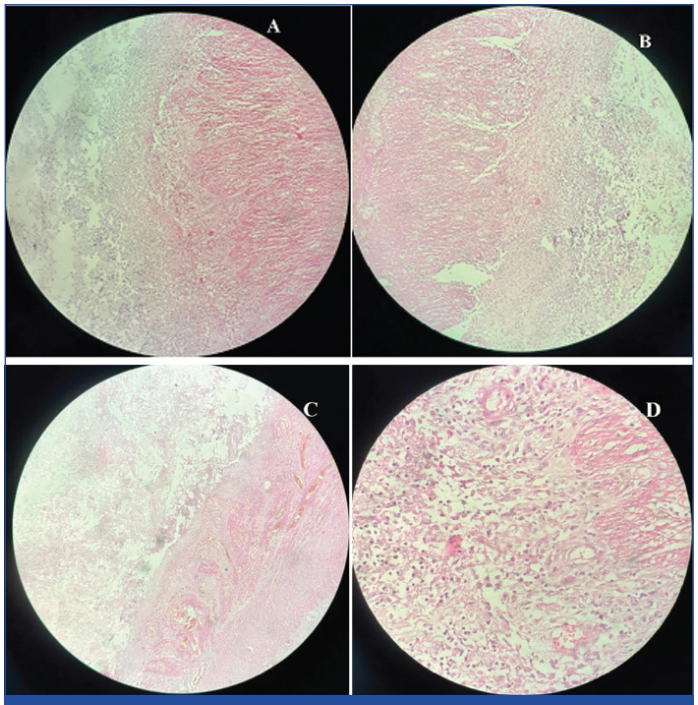
[Table/Fig-5]: Showing 1×1 cm perforation at ascending colon 5 cm from hepatic flexure and 15 cm from caecum.



[Table/Fig-6]: Resected bowel specimen showing various anatomical segments and pathological findings: (a) Terminal ileum; (b) Appendix; (c) Caecal perforation; (d) Caecum and ascending colon; (e) Perforation in ascending colon; and (f) Transverse colon.



[Table/Fig-7]: Crypt abscess-a collection of inflammatory cells that build up in the crypts of the gastrointestinal tract, including the colon (neutrophilic > apoptotic).



[Table/Fig-8]: a-c) Low power 10x view show features of acute necrotising colitis with a perforation site. Areas of extensive necrosis are noted along with dense neutrophilic exudate; d): High power 40x view reveals features consistent with Pseudomembranous Colitis (PMC), exhibiting superimposed ischemic changes.

malignancy, or features of chronic IBD was observed. The overall histological picture was diagnostic of fulminant PMC with colonic perforation.

Postoperatively, the patient was kept NPO and managed with intravenous fluids and broad spectrum antibiotics for six days. Oral intake was reintroduced gradually, beginning with liquids and transitioning to a soft diet. Abdominal drains were removed on Postoperative Day (POD) 10, and the surgical wound showed healthy healing. The postoperative course was uneventful, and the patient was discharged on POD 15 following suture removal.

Follow-up visits were scheduled monthly, during which the patient exhibited good tolerance to oral intake and a weight gain of five kilograms. A stoma reversal was planned after a four-month interval and was successfully performed without complications. The patient was subsequently discharged in a stable condition and expressed satisfaction with the outcome of the surgical management.

DISCUSSION

The PMC, primarily caused by CDI, continues to be a major contributor to antibiotic-associated diarrhea and colitis worldwide [1,2]. The spectrum of clinical manifestations ranges from mild, self-limiting diarrhea to fulminant colitis with serious complications such as toxic megacolon, septic shock, and bowel perforation [3]. According to a study by Jagirdhar GSK et al., the incidence of PMC related to CDI ranges between 3% and 8%, with a rising global trend [4]. Although it has a relatively low occurrence, PMC-associated perforation is associated with considerable morbidity and mortality, especially among elderly individuals and those with compromised immune function [5].

Perforation in PMC may occur suddenly, usually in the setting of severe colitis, as observed in the present study. Distinguishing primary spontaneous colonic perforation from secondary perforation due to fulminant colitis is essential [6]. Secondary perforation involves transmural inflammation, mucosal necrosis, and colonic wall damage [7]. In the present case report, multiple colonic perforations were observed intraoperatively in the setting of diffuse mucosal necrosis and abscess formation, which emphasises secondary perforation related to fulminant colitis.

In this case, the initial consideration of IBD, particularly Crohn's disease, was based on the patient's presentation with chronic intermittent diarrhea, which is a hallmark feature of IBD. Crohn's disease, known for its relapsing and remitting course, can present with a wide spectrum of gastrointestinal symptoms including diarrhea, abdominal discomfort, and systemic features, often necessitating its inclusion in the differential diagnosis. However, in this case, the sudden acute onset of symptoms following recent antibiotic exposure strongly suggested an alternative aetiology. Histopathological evaluation further supported this shift in diagnosis, as it revealed an absence of granulomatous inflammation, a characteristic finding in Crohn's disease. Instead, the clinical context and pathological findings were more consistent with PMC, most commonly associated with CDI. This diagnostic reasoning aligns with the findings reported by McGary CT et al., who described a similar presentation where PMC mimicked chronic inflammatory conditions of the bowel [8].

This case report revealed multiple colonic perforations, which is a very rare manifestation of PMC. Some previous studies and case presentations have reported single-site perforations, commonly in the caecum or sigmoid colon, due to their relatively thin walls and reduced perfusion [9,10]. The presence of three separate perforation sites in this patient, including one impending perforation, demonstrates the severity and fulminant nature of the disease process. This underscores the importance of early surgical management in patients with signs of sepsis or peritonitis.

Furthermore, histopathological examination revealed classic features of PMC, including transmural necrosis, neutrophilic infiltration, crypt abscesses, and mucosal sloughing. Similar to recent case reports, pseudomembranes were identified histologically as epithelial denudation with adherent inflammatory debris, aiding in the exclusion of IBD, ischemic colitis, and other infectious causes [11].

Based on the findings of the present case, the patient's chronic gastrointestinal symptoms warrant consideration of underlying IBD. However, histopathological evaluation revealed no features suggestive of chronic IBD, such as basal plasmacytosis, crypt architectural distortion, or granuloma formation. Additionally, a detailed clinical history revealed frequent, unsupervised use of broad-spectrum antibiotics, raising strong suspicion for recurrent subclinical CDI, which likely progressed to fulminant colitis. This highlights the importance of antibiotic use and awareness of CDI in outpatient settings.

CONCLUSION(S)

In conclusion, this case illustrates a rare and severe presentation of C. difficile-associated PMC with multiple colonic perforations in a young female. The clinical course emphasises the need for early recognition of fulminant colitis, particularly in patients with chronic antibiotic exposure and evolving abdominal symptoms. A high index of suspicion, timely imaging, and prompt surgical intervention are recommended for improving outcomes in such life-threatening cases.

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