Case Report

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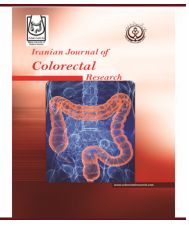

Pseudomembranous Colitis Presenting with Dual Colonic Perforation in a 15-year-old Girl: A Rare Case Report

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Abstract

Background: Pseudomembranous colitis (PMC) is an undesirable complication of *Clostridium difficile* infection. Although it is a part of normal gut flora, *C. difficile* can become a nuisance and cause varying degrees of colitis, given the opportunity of a conducive host environment. Even though most patients have mild colitis and abdominal pain, a few develop PMC, particularly immunocompromised and debilitated hosts. Pseudomembranous colitis is managed medically with metronidazole or vancomycin, fluids, and nutritional support. It can progress to toxic megacolon in up to 3% of cases. Toxic megacolon warrants a subtotal or total colectomy after a short trial of medical management. This dire complication is associated with a high mortality rate regardless of surgical intervention.

Case Presentation: A 15-year-old otherwise healthy patient presented with perforative peritonitis and septic shock. The patient did not have any significant past medical history. The patient was resuscitated and started on inotropes. An abdominal X-ray revealed gas under the diaphragm, with ultrasonography suggesting free fluid in the abdomen. Owing to the poor general condition of the patient, abdominal drains were inserted under local anesthesia. The patient was explored after 48 hours after fluid and electrolyte correction and antibiotic therapy. On exploratory laparotomy, the patient had dual colonic perforations. Despite best efforts at resuscitation, the patient died on postoperative day 3. Pathological analysis of the specimen suggested the presence of PMC throughout the resected segment of the colon.

Conclusion: We suggest considering PMC as a differential diagnosis in a complicated toxic megacolon, regardless of the patient's age, duration of antibiotic therapy, and underlying diagnosis, particularly when there is an obscure history and diagnostic uncertainty.

Keywords: Pseudomembranous, Colitis, Megacolon, Peritonitis

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Introduction

Pseudomembranous colitis (PMC) is a fulminant colonic inflammation, most commonly due to *Clostridium difficile* infection (1). Although a part of the normal microbial flora of the gastrointestinal tract, *C. difficile* can lead to a variety of host responses, such as abdominal pain, diarrhea, self-

limiting antibiotic-associated diarrhea, antibiotic-associated colitis, pseudomembranous colitis, and the much dreaded toxic megacolon with or without colonic perforation (2, 3). Certain host factors, such as advancing age, use of proton pump inhibitors, and immunosuppressed states, cause increased susceptibility to *C. difficile* infection (4). Although *C. difficile* is the most common culprit, other causes such as ischemic colitis, inflammatory bowel disease, vasculitis, and certain viral and bacterial pathogens need to be considered as differentials in cases of diagnostic uncertainty (5). *C. difficile* PMC needs aggressive medical management. Surgery should be considered if the patient does not improve in 2-3 days (6). PMC complicated with toxic megacolon and perforation should be managed with an ileostomy and subtotal or total colectomy (7).

Case Presentation

A 15-year-old female was brought by her guardians to the emergency room complaining of abdominal pain and distension for two days. The patient had a history of admission to another center one week ago, where she was treated for rectal bleeding under the diagnosis of internal hemorrhoids with severe anemia. In view of a hemoglobin of 2 mg/dl, she was given four packed cells and antibiotics (cephalosporins) and discharged after 48 hours without further evaluation. On examination, her pulse rate was 160/min, and her blood pressure was not recordable. Two large bore intravenous cannulas were inserted, and fluid resuscitation was given. After a lack of response, the patient was started on inotropes.

The abdomen was distended with generalized tenderness and guarding. Perforative peritonitis was confirmed on X-ray. On admission, the patient's hemoglobin was 6 mg/dl, total leukocyte count 76,000, pH 7.2, bicarbonate 14, and pCO2 27. In view of the diagnosis of septic shock secondary to perforative peritonitis with significant hemodynamic compromise, two intraperitoneal drains were inserted under local anesthesia. There was a total of 2 liters of feculent output in the drains in 24 hours. Meanwhile, the patient was treated with antibiotics, fluid resuscitation, and correction of acidosis and anemia.

Exploratory laparotomy was done 48 hours after admission. Intraoperative findings were a large cecal perforation in the anterior wall, extending up to the ascending colon, along with a second perforation in the mid-transverse colon (about 1.5*1.5 cm) located 10 cm distal to the hepatic flexure. A right hemicolectomy with a double barrel stoma consisting of end ileum and transverse colon was created. The patient was shifted to the intensive care unit post-surgery, and despite a multidisciplinary effort by the intensivist, surgical and medical teams, went into multiorgan failure and succumbed three days after the surgery.

The diagnosis of PMC was made by a pathologist on the hemicolectomy specimen. The mucosal surface of the colon was covered with pseudomembranes, while the serosal surface had exudates and congestion. There were dense inflammatory infiltrates in the lamina propria; the inflammation extended up to the serosa and surrounding fat, with patchy necrosis. The periodic acid-Schiff stain was negative for amoebic trophozoites.

Discussion

The term PMC and *C. difficile* go hand in hand. *C. difficile* is a commensal of the gastrointestinal tract, with its infection ranging from an asymptomatic stage, diarrhea, abdominal pain due to colitis, and the severest form, PMC (8). In PMC, elevated yellow-white plaques form pseudomembranes on the mucosal surface of the colon, demonstrated on colonoscopy and on pathological analysis (9). There is a sequential progression of *C. difficile* infection, starting with disruption of normal flora to colonization by *C. difficile*. Antibiotics like cephalosporins, fluoroquinolones, and clindamycin have been implicated, but any and every antibiotic can cause PMC (10). PPIs are also responsible for PMC, but the mechanism is unknown (11). Certain host factors such as advanced age, immunosuppressed state, concurrent malignancy, renal failure, and cardiothoracic procedures increase susceptibility to *C. difficile* infection (12). Other causes of PMC include Behçet's disease, inflammatory bowel disease, collagenous colitis, ischemic colitis, other bacterial and viral causes, and certain toxins (13-15). The clinical history and examination findings aid in diagnosis; immunotoxin assays can also be done.

Radiological findings are specific to PMC, including the presence of gaseous distension and the thumbprinting sign on a plain X-ray, pneumoperitoneum in toxic megacolon, and mucosal plaques on barium studies. Barium enemas, however, are not advised as they may precipitate perforation. Computed tomography scan findings of low attenuation mural thickening corresponding to mucosal and submucosal edema, accordion sign, target sign, pericolonic stranding, and ascites point toward PMC. Understanding the progression may help prevent its dreaded complications (16). Downey et al. studied cases of PMC for their ultrasound findings and suggested that a moderate to markedly thickened wall of the colon with complete effacement of the lumen secondary to mural edema in 69% of patients is diagnostic (17)

Toxic megacolon is a rare complication of PMC and is characterized by systemic toxicity and colonic distension (18). The incidence of toxin megacolon associated with *C. difficile* colitis varies from 0.4-3% and is due to inflammatory changes involving muscularis propria resulting in neural injury with

altered motility and dilatation (19). The diagnostic criteria described by Jalan et al. suggest that three out of four of the following are diagnostic: fever >101.5 °F, heart rate of >120 beats per minute, WBC count of more than 10,500 per micro litre, and anemia with hemoglobin or hematocrit of less than 60 percent of normal (20). Long et al. reported mortality as high as 33 percent in PMC complicated with toxic megacolon and suggested a subtotal colectomy would be the treatment of choice in these patients (21). Berman et al. reported a mortality of 50% in patients of PMC presenting with toxic megacolon and a further 50% mortality in patients who were operated on (22).

It has been postulated that chemical mediators like nitric oxide and interleukins play a pivotal role in the pathogenesis of toxic megacolon in PMC (23). Unfortunately, there is high morbidity and mortality regardless of the treatment (24). Medical management includes metronidazole and vancomycin, bowel decompression, and fluid and electrolyte management. Enemas and colonoscopic instillation of vancomycin have also been recommended by some to increase the concentration achieved in the colon, given the presence of hypomotility (25).

Up to 80% of patients with toxic megacolon need surgical intervention (26). Indications include colonic perforation, progressive colonic dilatation, bleeding, or lack of clinical improvement in 48–72 hours (27). Grundfest-Browniatowski et al. suggested that survival was higher in patients with total colectomy rather than subtotal colectomy (28). Mortality is lower if the patient is operated on earlier in the course of the disease. However, there is no clear consensus on when to operate on the patient.

Conclusion

Pseudomembranous colitis is a diagnosis that is often overlooked. Prolonged admission, antibiotic therapy, and old age are considered to be risk factors, but our experience with an otherwise healthy 15-year-old girl with a short course of antibiotics suggests that it is an important differential diagnosis in any case of toxic megacolon and should be considered, particularly if the history is obscure and the diagnosis is uncertain.

Authors' Contribution

Nida Khan: Original idea, writing the manuscript; Ashwanth Kumar: Study design; Jayant Pednekar and Adeel Ansari: Writing and editing the manuscript; Sandeep Tayade: Critical revision of the manuscript

Ethics Approval

The Institutional Ethics Committee for Biomedical and Health research (IECBH) of Dr D Y Patil Medical College & Hospital, Navi Mumbai: DYP/IECBH/2022/249

Conflict of interest: None declared.

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