

## Pseudomembranous colitis in a 3-year-old resulting from *Clostridium difficile* infection not associated with prior antibiotic therapy

Lubana Akram, Mohammad Wahiduzzaman Mazumder, Fahmida Begum, Nadira Musabbir, Mohammad Nazmul Hassan

Pseudomembranous colitis (PMC) is a serious condition caused by *Clostridium difficile*, frequently arising after antimicrobial therapy. In recent years, *Clostridium difficile* infection rates have been rising and more younger patients have been affected than adult. This case report is about a 3-year-old boy with clinical, laboratory, and endoscopic findings typical of pseudomembranous colitis, without a history of previous antibiotic therapy. [Paediatr Indones. 2024;64:277-80; DOI: 10.14238/pi64.3.2024.277-80 ].

**Keywords:** *Clostridium difficile*; pseudomembranous colitis

**C**lostridium difficile (CD) are Gram-positive, toxin-producing, spore-forming anaerobic bacteria.<sup>1</sup> In the last 10-20 years, the prevalence of pseudomembranous colitis caused by CD has increased, leading to significant morbidity in pediatric patients.<sup>2</sup> *C. difficile* is a normal part of fecal microbiota,<sup>2</sup> with many children colonized by CD as asymptomatic carriers.<sup>3</sup> Some of them develop the disease, but in most cases, symptoms resolve with proper treatment.<sup>4</sup> Because of the asymptomatic carrier state in children, particularly in infants, consensus recommendations have advised against routine testing for CD in pediatric patients.<sup>2</sup>

In the pediatric population, CD causes symptoms such as failure to thrive, food refusal, severe dehydration with electrolyte imbalance, intractable diarrhea, dysentery, hematochezia, and abdominal

pain, which are associated with significant morbidity and mortality.<sup>5</sup> Here we report on the case of a 3-year-old child who presented with rectal bleeding, bloody stool, and pseudomembranes on colonoscopy, as well as CD-toxin positive stool.

### The case

The patient was a 3-year-old male admitted to the hospital due to rectal bleeding for the previous 7 days, with either periodic bloody stool or bleeding after defecation. His stool had a semi-solid consistency and was mixed with mucus, bowel movements were at a frequency of 4-5 times/day. He also had occasional colicky abdominal pain for the same period of time, which occurred during defecation. He has no history of fever or recent antibiotic use. Five months prior, he underwent a colonoscopic polypectomy, the

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From Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

**Corresponding author:** Lubana Akram. Department of Paediatric Gastroenterology. Bangabandhu Sheikh Mujib Medical University. Room no. 514, Block D, 4<sup>th</sup> floor. Phone: +8801816511361. Email: [lubanaakram@gmail.com](mailto:lubanaakram@gmail.com).

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histopathology report revealed a juvenile rectal polyp. On examination, the patient looked unwell, no signs of dehydration, and had stable vital signs. His abdomen was soft, non-tender, with no hepatosplenomegaly. Rectal examination showed no evidence of polyps or hemorrhoid. We provisionally thought about a recurrence of polyps and a differential diagnosis of infectious colitis.

Laboratory tests revealed leukocytosis up to 14,000/mm<sup>3</sup> with 80% neutrophilia, C-reactive protein was 5.98 mg/L, ESR was 50 mm/hr; routine urinalysis, liver function, and renal function were normal. Stool examination showed 1-5 red blood cell/HPF, 21-50 pus cell/HPF, and 1-5 macrophages/HPF. Stool was negative for CD toxin A, but positive for CD toxin B. Stool culture revealed no pathogenic bacterial growth. Fecal calprotectin was 346 µg/g. Colonoscopy revealed microembossed plaques of various sizes dispersed throughout the descending colon, sigmoid colon, and rectal mucosa (**Figure 1**). The surface was covered in a moss-like yellow pseudomembranous material that was difficult to remove. The mucosa in the areas between the lesions was normal. The patient was diagnosed with pseudomembranous colitis (PMC) based on the those results and treated with oral metronidazole for 7 days. All signs and symptoms resolved over the subsequent 1-week period and the patient was discharged.

## Discussion

Pseudomembranes covering the mucosa of the colon indicate CD colitis caused by toxin A and toxin B. These exotoxins can damage intestinal epithelial cells, causing considerable and sometimes severe inflammatory reactions.<sup>6</sup> These reactions can result in intestinal malabsorption as well as intestinal leakage, resulting in bloody diarrhea and abdominal pain. *C. difficile* infection might present with mild, non-specific diarrhea to severe colitis with toxic megacolon and perforation, which can be fatal.<sup>7</sup> Our case patient presented with periodic rectal bleeding and bloody stool.

Most cases of pediatric PMC occur in previously healthy children.<sup>8</sup> However, certain conditions act as predisposing factors for the development of PMC, include Hirschsprung disease, prematurity, previous

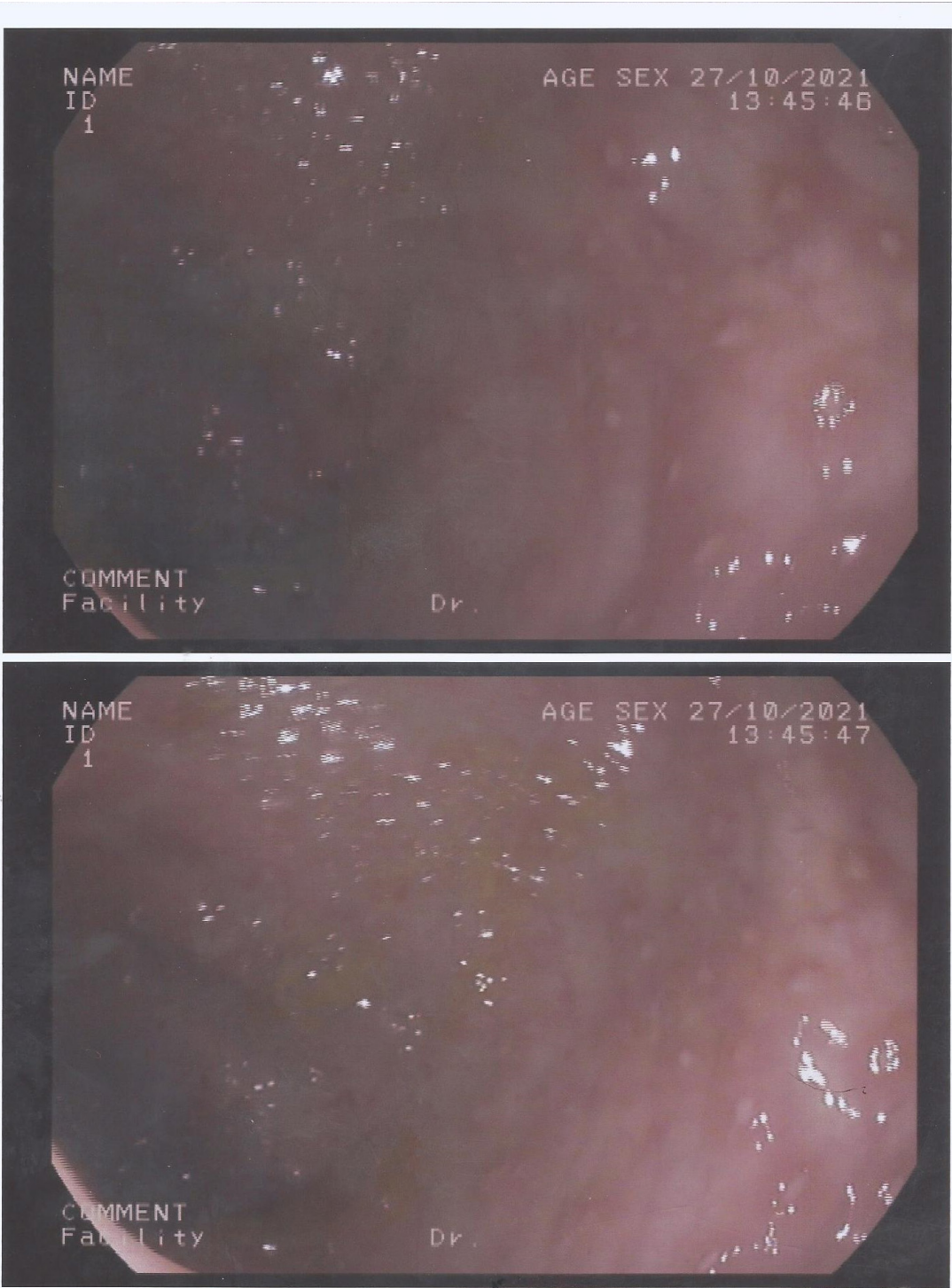
antibiotic therapy, and conditions that cause bowel stasis or anatomical obstruction.<sup>8</sup>

The following criteria are used to make the diagnosis of CD associated colitis: (1) ≥ 3 unformed stools per 24 h for ≥ 2 days, without any definite cause; (2) toxin A or B identified in the stool, toxin-producing *C. difficile* detected by the stool culture, or pseudomembranes seen in the colon on colonoscopy.<sup>9</sup> Pseudomembranes are commonly found on the mucosa of the large intestine in the affected patients and appear as white-yellowish plaques with a diameter of 1-2 mm. As the disease progresses, pseudomembranes merge to form larger, confluent plaques that engage the entire circumference of the colon.<sup>9</sup> Our patient tested positive for CD toxin and his colonoscopy showed typical features. Patchy necrosis of the colonic epithelium with intraluminal exudation of neutrophils and fibrin are the earliest microscopical findings of PMC. After that, epithelial ulcers appear, and pseudomembranes, which are made up of leukocytes, fibrin, mucus, and cell debris, comprise the diffuse epithelial necrosis.<sup>10</sup>

Fecal calprotectin is a noninvasive test reflecting various pathological processes occurring in intestinal mucosa such as inflammatory bowel disease (IBD), infectious colitis etc. The cut-off value of fecal calprotectin is different in different disease. Fecal calprotectin level below 50 micro µg/g is considered normal for children older than 4 years.<sup>11</sup>

Supportive therapy is usually adequate for patients with mild symptoms. Patients with severe symptoms require prompt and aggressive therapy. The most effective treatment option is vancomycin, but it is expensive, does not taste good, and has been associated with a relapse rate of up to 20%.<sup>10</sup> Oral metronidazole has similar efficacy.<sup>12</sup> Our patient was treated with oral metronidazole and he improved within 7 days.

In conclusion, we report a case of pseudomembranous colitis due to *C. difficile* infection in a patient without a history of previous antibiotic therapy. Cases like this are infrequent in clinical practice. The fact that pseudomembranous colitis was not associated with antibiotic therapy in our patient, serves as a warning that PMC may still occur, hence, keeping it as a differential diagnosis in patients with bloody stool is important.



**Figure 1.** Colonoscopy shows pseudomembranes in the colon

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