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Previously Unreported Pseudomembranous Duodenitis: A Case Report With Histopathology

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Abstract: The pseudomembranous inflammatory process is a process characterized by the formation of a white membrane-like exudate over colonic mucosa and is mainly caused by *Clostridium difficile* toxin. The stool culture is considered to be the gold standard and is technically challenging and is not performed routinely. There are some reports of duodenitis and proximal jejunitis in horses attributed to *Clostridium difficile* infection. Hereby, we report a case of pseudomembranous duodenitis in a seven-year-old boy with a complaint of severe abdominal pain. Upper endoscopy revealed patchy ulceration and a white membrane in the duodenum. A biopsy was taken with the impression of a fungal infection. The histological study revealed crater-like ulceration with upward exudation of mucus consistent with the pseudomembranous inflammatory process. To the best of our knowledge, pseudomembranous duodenitis is not reported in the human as yet.

Key Words: pseudomembranous inflammation, *Clostridium difficile* toxin, duodenum, pediatric age group, upper endoscopy

INTRODUCTION

Clostridium difficile infection is usually caused by alteration of the normal intestinal flora after the use of systemic antibiotics.[1] Clinical manifestation of the infection is variable, ranging from asymptomatic[2] to life-threatening pancolitis,[1] presenting with diarrhea. Colonoscopy may reveal a white membrane coating the mucosal surface in the involved areas.

Involvement of the duodenum by the pseudomembranous inflammatory process is not reported in humans. There are some reports of duodenitis and proximal jejunitis in horses attributed to *C. difficile* infection. In a study performed by Elinav et al, the gastric fluid of affected horses was collected and the presence of *C. difficile* was investigated by several means such as culture and polymerase chain reaction,[3] while endoscopic studies are not available in horses. In the Griffith et al study, *Clostridium perfringens* was accused of causing anterior enteritis in horses.[4]

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Written informed consent was obtained from the patient's parents for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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The presence of a diffuse white membrane over mucosa is the characteristic of this process but may not be present in the early stages or is absent during the entire course of the disease. *C. difficile* can be identified within stool laboratory tests such as stool culture, detection of toxin antigen by enzyme-linked immunosorbent assay (ELISA), and detection of toxin genes by nucleic acid amplification tests. The stool culture is considered to be the gold standard and is technically challenging and is not performed routinely. Toxin A and/or B detection in the stool by enzyme immunoassays is widely used worldwide; however, the sensitivity of these enzyme immunoassays is reported to be low, ranging from 33% to 65%.[5,6]

Moreover, the nucleic acid amplification tests are not routinely performed; the reports claim that the sensitivity of this test is as high as 98%.[5]

Hereby, we report a case of pseudomembranous inflammatory process involving the duodenum in a 7-year-old boy. This condition is not yet reported in human beings to the best of our knowledge.

CASE REPORT

A 7-year-old boy was referred with a complaint of severe abdominal pain (above the umbilicus) lasting for half an hour the day before. He had a history of loose stool one time before the onset of pain and also, episodes of nausea early in the morning followed by 3 to 4 times vomiting, which occurred once a month from 4 months ago. He received no specific treatment at that time. Two months ago, he had an upper respiratory tract infection and received co-amoxiclav for 1 week. His parents are not consanguineous, and he is their only child. There was no history of a specific disease in him and his family. His socioeconomic condition was good and he was healthy and well-nourished (weight: 38 kg, height: 149 cm).

Upper endoscopy was performed on the child and reported grade A esophagitis, erythema with the diffuse extent in the fundus, and multiple ulcers and white membrane over duodenal mucosa, which were interpreted as Candida-like lesions (Fig. 1).

Duodenal biopsy was sent to our laboratory and underwent routine processing. Histological examination revealed mucopurulent exudate, erupting from the tip of some villi, forming mushroom-like clouds over the mucosal lining (Figs. 2 and 3). Also, extensive ulceration was seen on other sites with tissue destruction substituted by fibrino-leukocyter exudate (Fig. 4). Special staining was performed for fungal elements which were negative.

The result of the pathologic examination was reported to the gastroenterologist. Therefore, metronidazole and protexin balance were prescribed for the patient. Complementary tests were performed for the patient. The stool examination was unremarkable and *C. difficile* toxins A and B were negative. Also, colonoscopy was performed on the patient; nevertheless, no pathologic finding was reported in the colon. The patient has completed the treatment course and has no further complaints.

DISCUSSION

C. difficile infection is reported in the colon of human beings. Patients may be considered to have *C. difficile* infection if

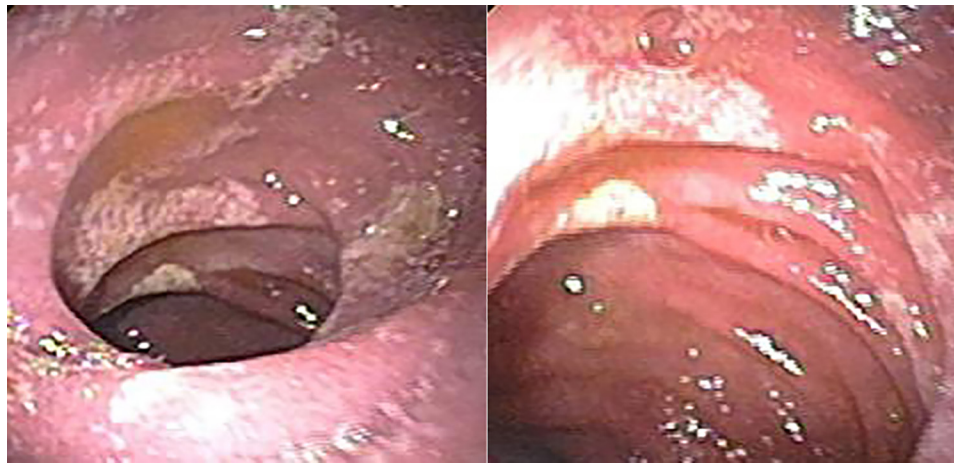

FIGURE 1. Upper endoscopy: duodenal mucosa with white patches.

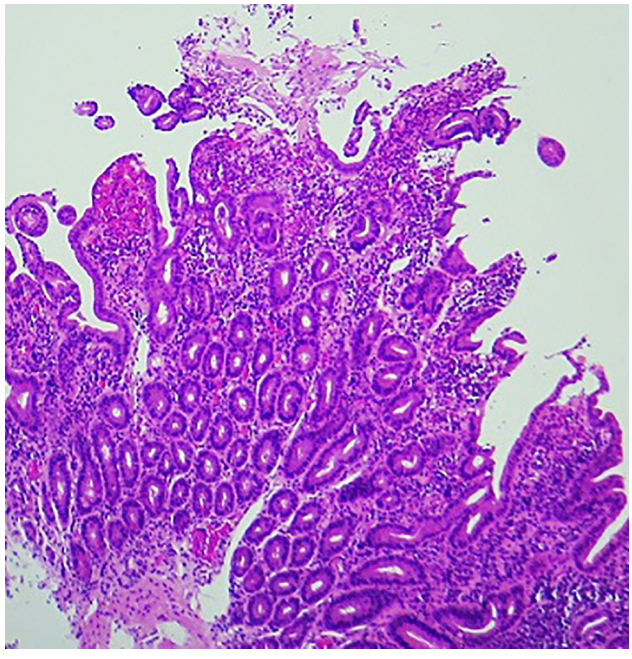

FIGURE 2. Duodenal mucosa with mucopurulent exudate coming out from the tip of a villus, which is forming mushroom-like cloud over mucosal lining (arrow) (H&E, ×100).

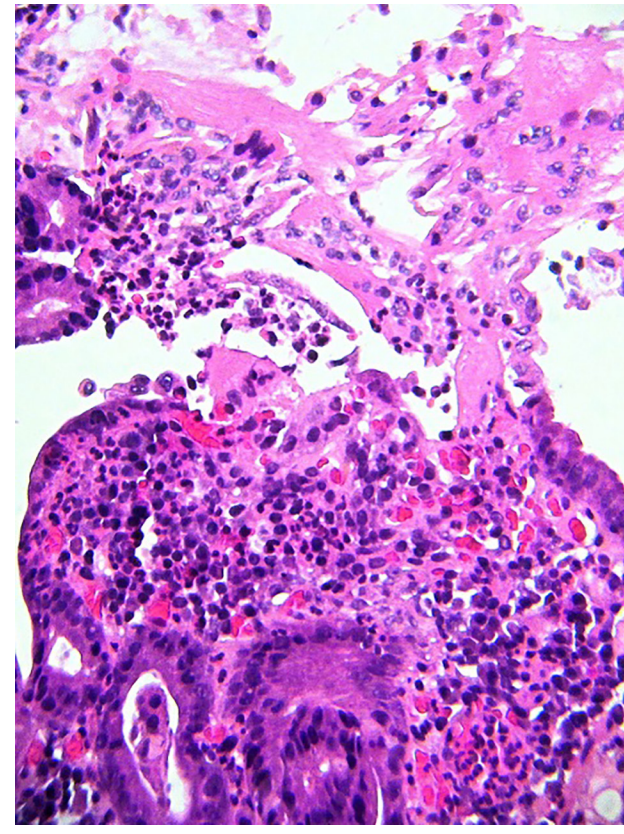

FIGURE 3. Closer view of a mushroom-like cloud (H&E, ×400).

they have diarrhea and also a positive laboratory stool analysis for the presence of toxigenic *C. difficile*.[6] However, there are reports of infected cases with no clinical symptoms,[2] and also another report of a case, referred with 2 weeks of constipation, which proved to be ileus following *C. difficile* infection.[7] Our patient was referred with acute onset severe abdominal pain above the umbilicus lasting for half an hour, which was not repeated thereafter. Only one time of loose stool was reported prior to the onset of abdominal pain by the patient.

There is no report of pseudomembranous inflammatory process in the duodenum of human beings, while the possibility of *C. difficile* associated infection in the duodenum and proximal jejunum was suggested in horses.[3] The patients usually have a history of antibiotic consumption 5 to 10 days before the onset of symptoms[1]; nevertheless, our case had a history of antibiotic usage 2 months ago.

Colonoscopy was performed after upper endoscopy for the child and was completely normal, which suggested isolated involvement of the duodenum in this process.

The only available test for *C. difficile* toxin detection in Iran is the ELISA test, which is mostly negative in those patients, who

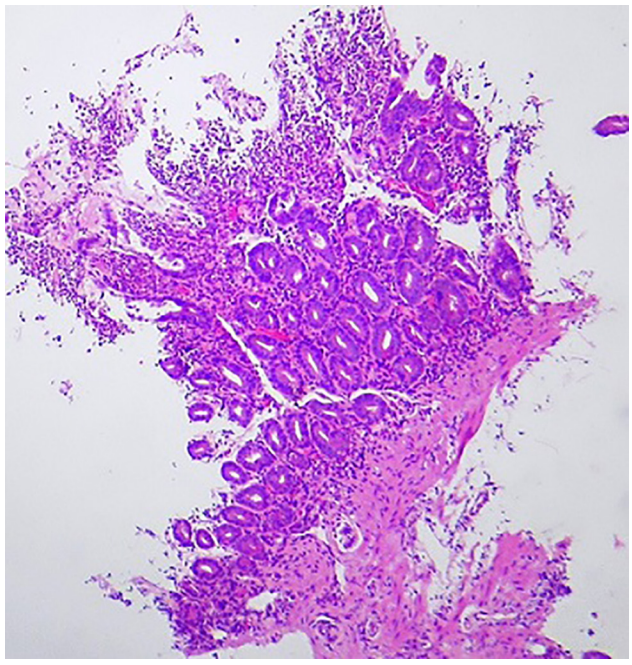

FIGURE 4. Extensive tissue destruction is substituted by fibrino-leukocyter exudate on other areas (H&E, ×100).

have clinical and endoscopic signs of pseudomembranous colitis. The ELISA test was performed on our patient and was negative. The pseudomembranous inflammatory processes are not always caused by *C. difficile* toxin. Other causes such as *Escherichia coli* and ischemia are also reported in the literature.[8]

The course of the disease was short and self-limiting in this child, which denotes a different nature from its colitis counterpart.

To our knowledge, this is the first case of the pseudomembranous inflammatory process in the duodenum of human beings, proved by endoscopic and histologic methods.

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