Pneumatosis Intestinalis Complicating C. difficile Pseudomembranous Colitis

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ABSTRACT

Pneumatosis intestinalis (PI) is characterized by multiple gas-filled cysts or linear gas within the bowel wall. PI may be idiopathic (15%) or secondary (85%) to a variety of disorders. We report here the first otherwise healthy adult with C. difficile infection complicated by PI and review the possible mechanisms of this previously unrecognized complication of pseudomembranous colitis. With treatment of the underlying infection, the PI resolved within 6 days of presentation. (Am J Gastroenterol 1999;94:2560–2561. © 1999 by Am. Coll. of Gastroenterology)

INTRODUCTION

Pneumatosis intestinalis (PI) is characterized by subserosal or submucosal gas-filled cysts in the wall of the gastrointestinal tract or linear collections of gas in the bowel wall. PI is considered either primary or idiopathic (15%) or sec-

CASE REPORT

A 57-yr-old white woman with a history of diverticulitis, presented 5 days before admission with left lower quadrant abdominal pain, nausea, and vomiting. She was given cefuroxime, improved after 2 days, and then self-discontinued the treatment. Two days before admission, when her abdominal pain became more severe and her bowel movements became watery, she restarted the medication. On admission to the hospital she had a temperature of 99.5°F and a blood pressure of 130/80 mm Hg. Her abdomen was distended, tympanitic, and had diminished bowel sounds. She had mild generalized tenderness but no significant rebound or guarding. Stool was negative for occult blood. Plain films of the abdomen showed colonic distension with linear intramural gas in the wall of the cecum and right colon. Abdominal CT confirmed the linear pattern of gas and also showed thickening of the colon with diffuse bowel distension, especially of the cecum (Fig. 1). No free air or obstruction was evident. The white blood cell count was 8.9 x 10^9; hemoglobin was 16 g/dl; electrolytes and liver enzymes were normal. The patient was taken off oral feedings and treated with intravenous hydration and broad spectrum antibiotics. Stool cultures were negative and a C. difficile toxin assay was positive. Treatment was then changed to oral metronidazole (250 mg p.o. t.i.d.). Serial abdominal films were obtained and by hospital day 6, the colonic distension and PI had resolved and the patient had become asymptomatic. She was discharged with instruc-
tions to continue oral metronidazole for 10 days. Subsequent follow-up at several weeks and months after discharge revealed her still to be asymptomatic.

**DISCUSSION**

Several gastrointestinal infections have been implicated in the etiology of PI but, to our knowledge, this is the first case of PI in an otherwise healthy adult with *C. difficile* infection. Of the several theories proposed to explain the pathogenesis of PI, the mechanical and bacterial are most frequently invoked. The mechanical theory suggests that gas under pressure dissects through a mucosal defect into the bowel wall and forms cysts. This is thought to be the most likely cause of PI in cases of trauma, endoscopy, or obstruction. Retching and diarrhea with augmented peristalsis theoretically could produce PI by a similar mechanism.

The bacterial theory proposes that bacteria enter the submucosa through defects in the mucosa, where they then produce gas. In rats, various species of *Clostridia* can induce PI that resolves with antibiotic treatment (5, 6). In some patients with primary PI, an excessive amount of breath hydrogen has been demonstrated and thought to be due to a lack of methanogenic and sulfate-reducing bacteria that normally use H₂ (7). The accumulated H₂ in the colon of these patients then diffuses into the colonic wall.

In our patient, pseudomembranous colitis could have led to PI by several mechanisms, including disruption of the mucosal barrier with pseudomembranes and ischemia, the latter supported by the histological similarity of some cases of ischemic colitis and pseudomembranous colitis (8). Moreover, animal experiments have shown that inoculation of germ-free rats with cultures of *C. tetanus* and *C. perfringens* leads to PI in the presence of experimentally induced colonic ischemia (9); colonic distention and retching might have acted as additional factors. We believe that our patient had PI secondary to her *C. difficile* infection, as opposed to idiopathic PI, because follow-up abdominal CT scan obtained 9 months later for diverticulitis failed to show PI. Linear, not cystic, PI usually implies necrosis of the bowel wall and often is an indication for laparotomy. The recent observation of “benign” linear PI in some cases of opportunistic infections associated with AIDS (4) has led to a reevaluation of this clinical axiom. In our patient, who appears to have normal immune function, linear PI also resolved with appropriate antibiotic treatment.

Regardless of cause, to our knowledge, this is the first report of PI in an otherwise healthy adult with *C. difficile* infection. PI was of a linear pattern, and resolved quickly with conservative management.

**REFERENCES**