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Eradication of cryptosporidium from a defunctionalized colon limb by refeeding stoma effluent

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Abstract Over the last 40 years, cryptosporidium has increasingly been recognized as a cause of acute self-limiting diarrhea in normal hosts. In the immunocompromised patient, cryptosporidium may cause severe illness with prolonged diarrhea and malabsorption. Pharmacologic therapy of cryptosporidium relies on adequate delivery of drug metabolites to the colon. Here we describe a patient who developed toxic megacolon during induction therapy for leukemia, requiring ileostomy formation to proceed with leukemia treatment. Although the megacolon resolved promptly, the resulting isolation of the colon from the fecal stream prevented luminal delivery of active metabolites of anti-protozoal drugs, resulting in persistent cryptosporidiosis. Refeeding of the ileostomy output into the colon effectively eradicated cryptosporidium from the colon and permitted closure of the ileostomy.

Cryptosporidiosis is a self-limiting diarrheal illness in normal hosts. In adults and children with AIDS, it is a common cause of prolonged severe diarrhea with malabsorption [1-3]. Life-threatening diarrhea because of cryptosporidium infection has been reported in association with other immune deficiencies [4,5]. Pharmacologic therapy for this parasitic infection relies on active drug metabolites reaching the colonic lumen. We report a strategy for eradicating cryptosporidiosis of the colon in a patient who had required creation of a fully diverting ileostomy to manage toxic megacolon occurring during leukemia therapy.

1. Case report

A 5-year-old girl was diagnosed with acute myeloblastic leukemia (AML). She had a history of chronic functional constipation since the age of 2 years. Although her family had previously traveled widely in North and Central America, she had no history of significant gastrointestinal infection.

On day 7 after beginning her first cycle of chemotherapy (daunorubicin, cytarabine, etoposide thioguanine, dexamethasone [DCTER]), she developed a toxic megacolon manifested by abdominal distension and bloody diarrhea.

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Radiographic studies revealed significant distension of the entire colon, with pneumatosis in the ascending colon and terminal ileum. The bowel wall was thickened. The terminal ileum was mildly distended, but otherwise the small bowel was unremarkable. There was no free intraperitoneal air (Fig. 1). Stool examination revealed cryptosporidium. She was managed by bowel rest, nasogastric drainage and, once the diagnosis of cryptosporidiosis was established, oral nitazoxanide, with initial improvement. Follow-up imaging demonstrated resolution of bowel distension and pneumatosis. She was discharged home on day 14 after onset of gastrointestinal symptoms to complete a second course of nitazoxanide because her stool examination remained positive (2+) for cryptosporidium.

She was readmitted 6 days after discharge with vomiting and abdominal pain. Abdominal radiographs demonstrated recurrence of the toxic megacolon (Fig. 2). Stool remained positive for cryptosporidium. She began a further course of oral nitazoxanide together with oral azithromycin for possible synergistic treatment of infection. Impaired host immunity and ongoing poor gastrointestinal motility after the megacolon presumably combined to make the anti-helminth treatment ineffective at clearing the infection. Because of slow resolution of the megacolon and cryptosporidiosis and the consequent life-threatening delay of her AML treatment, a decision was made to create a fully diverting, double-barreled ileostomy and mucous fistula.

Postoperatively, the toxic megacolon resolved completely, enabling successful reinstitution of therapy for AML consisting of 4 cycles of DCTER, 2 cycles of Cappizzi II and Denver maintenance. Except for an episode of stoma prolapse requiring surgical correction and other minor stoma problems, the patient had no gastrointestinal symptoms during the remainder of her therapy. Specimens of colonic fluid obtained by colonic lavage, performed through the mucous fistula while the patient was sedated for regularly scheduled bone marrow aspirations, were persistently positive for cryptosporidium. In addition, *Trichuris trichiura* eggs were found on specimens collected almost 9 months after the development of toxic megacolon. She received multiple courses of oral nitazoxanide and oral paromomycin throughout her subsequent 8 months of chemotherapy.

Colonic lavage specimens remained positive for cryptosporidium and trichuris after completion of chemotherapy with no improvement after change in therapy to oral albendazole. The patient was asymptomatic from the infestation once the initial megacolon had resolved, but there was significant concern that the megacolon and clinical cryptosporidiosis could recur after reversal of the ileostomy. We postulated that the presence of a fully diverting ileostomy was preventing the active metabolites of her antimicrobial medications from reaching their intended target. Thus, 9 months after initial diagnosis of leukemia and within 1 month of completing her chemotherapy, a program of daily refeeding of the distal bowel, via the mucous fistula, with 200–400 mL of ileostomy effluent was instituted. The effluent from the preceding hours was collected by the ward nurses, or later by the parents at home, and then injected down the mucous fistula using 16F red rubber catheter, introduced into the distal stoma, over 5 to 10 minutes. We reasoned that the effluent would contain clinically active levels of antimicrobials. After 3 weeks, diagnostic colonic

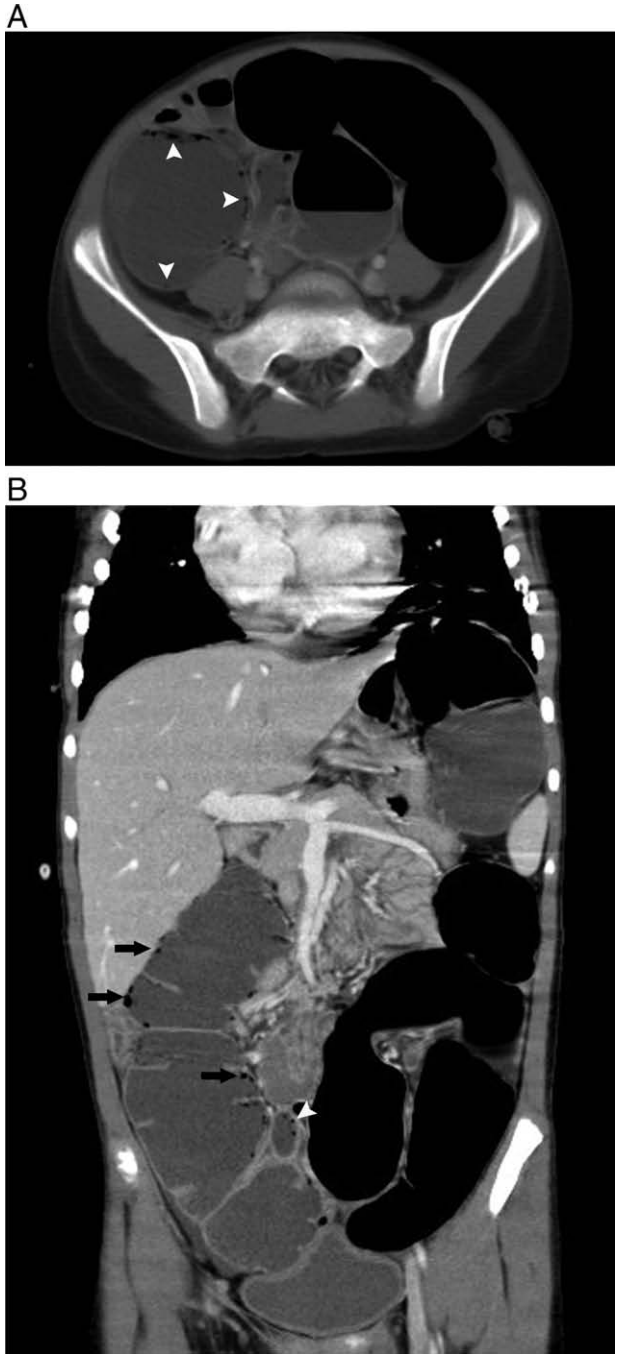

Fig. 1 Contrast-enhanced CT of the abdomen and pelvis. A, Axial image shows a dilated fluid filled ascending colon with intramural air (arrowheads). Distended descending colon and rectosigmoid are visualized. B, Coronal reformatted image demonstrates intramural air in the distended cecum and ascending colon (arrows). Pneumatosis is also present in the wall of the terminal ileum (arrowhead).