



## Images In Pediatrics

**Chronic diarrhea associated with trichuriasis in a 2-year-old boy**Youran Li,<sup>1</sup> Chunyan Lu,<sup>1</sup> Hui Hu<sup>1</sup>  and Ting Zhang<sup>1,2</sup><sup>1</sup>Department of Gastroenterology, Hepatology and Nutrition, <sup>2</sup>Institute of Pediatric Infection, Immunity and Critical Care Medicine, Shanghai Children's Hospital, School of Medicine, Shanghai Jiao Tong University, Shanghai, China

A previously healthy 2-year-old boy was referred to the Department of Gastroenterology at Shanghai Children's Hospital after experiencing irregular stools for 10 months and bloody diarrhea for 2 days. Despite repeated treatment with antidiarrheals and probiotics at the local medical facilities, the child's condition gradually worsened and he was failing to thrive. He lived in a rural area and he did not eat raw food or have allotriophagia but occasionally played in the dirt. On presentation, the child was 11.9 kg (−1SD) in weight, 90 cm in height (−1SD) and 46 cm in head circumference, with no change in the past 10 months. The child's whole abdomen was flat and soft, with no tenderness and rebounding pain, and bowel sound was 4–5 times/min. Blood examination showed white blood cells  $13.54 \times 10^9/L$  (normal range:  $8.0\text{--}12.0 \times 10^9/L$ ), eosinophils  $1,000 \times 10^6/L$  (normal range:  $50\text{--}450 \times 10^6/L$ ), accounting for 7.9%, hemoglobin 103 g/L (normal range: 110–160 g/L), serum albumin 42.5 g/L (normal range: 38–54 g/L), globulin 25 g/L (normal range: 13–21 g/L), erythrocyte sedimentation rate 42 mm/h (normal range: 0–20 mm/h), and immunoglobulin E increased by 538 IU/mL (normal range: 0–60 IU/mL). No parasite egg was found in the patient's fecal test for four times before admission, by using direct smear microscopy. However, fecal occult blood test was positive. After admission, a concentration procedure was performed to identify parasite eggs in the patient's fecal sample through a liquid-based parasite detection kit. Parasite eggs were not found. The age of the patient, duration of the disease and poor response to previous treatment led us to conclude that the etiology was unclear, requiring further examination.

Abdominal and pelvic enhanced computed tomography of the patient showed no abnormalities. Esophagogastroduodenoscopy revealed chronic superficial gastritis and duodenitis. The gastric mucosal biopsy suggested chronic moderate non-atrophic gastritis, with 3–5 eosinophils per high power field (HPF). The mucosal biopsy of duodenal bulb showed slight changes in the villi and crypt structure, and infiltration of lamina propria lymphocytes and plasma cells, with 5–8 eosinophils/HPF. In the colonoscopy, there were many white

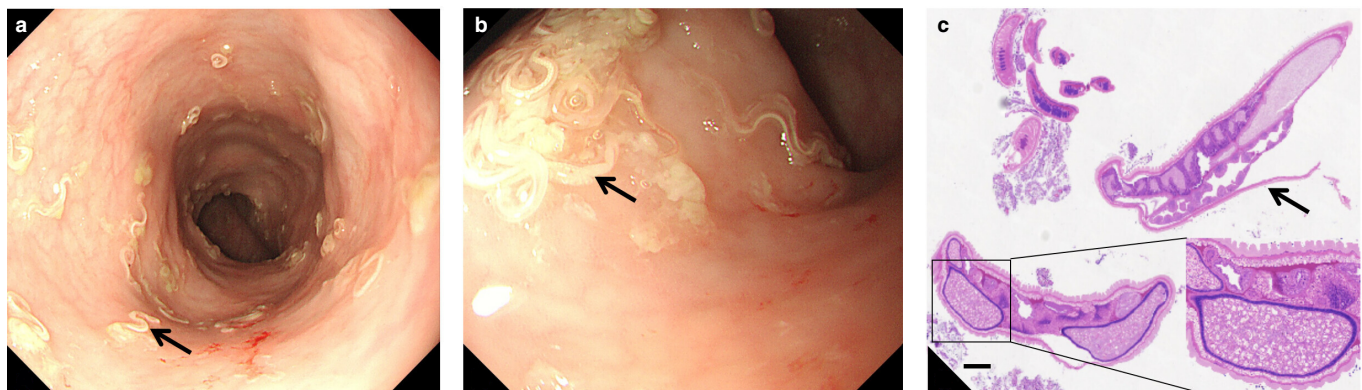
and transparent parasites about 2–3 cm length in the whole colon, some of which were curly, and peristalsis was visible. The white-striped parasites adsorbed on the colon wall could not be washed away easily (Fig. 1a). In the right colon, a large number of parasites had gathered, and the colon mucosa was slightly pale, accompanied by patchy hyperemia, edema, and erosion, which was consistent with parasitic colitis (Fig. 1b). Part of the parasite bodies were removed with a net and sent for pathological examination. The male mature trichurid and a large number of fusiform eggs in the female trichurid body could be seen. The thick eggshells and a plug at both ends were consistent with trichurid egg (Fig. 1c). The diagnosis of irritable bowel syndrome, intestinal tuberculosis, clostridium difficile infection, henoch-schonlein purpura and inflammatory bowel disease could be excluded, finally resulting in a diagnosis of trichuriasis infection. Oral albendazole tablets (400 mg/day, once daily) were administered for seven consecutive days, and the patient's diarrhea improved significantly until he gradually had a regular stool. Written informed consent was obtained from the patient's parents for publication of their child's personal or clinical details.

Trichuriasis is an intestinal parasitic disease caused by trichurid, which is common in rural areas and often observed among people aged 5–19 years. The prevalence of trichuriasis infection was 1.02% in mainland of China, which is highly prevalent in western regions and moderately prevalent in central regions, but uncommon in the northern regions. The prevalence was 1.74%, 2.13%, and 1.81% in the 5–9, 10–14, and 15–19 year age groups, respectively.<sup>1</sup> The trichurid inserts its slender front end into the intestinal mucosa to absorb nutrients from the tissue and blood. Stimulated by secretions, the intestinal mucosa become inflammatory and bleeding. Chronic mucosal bleeding and inflammation affect children's nutritional status.<sup>2</sup> The diagnosis of trichuriasis by colonoscopy is rare in children under 3 years old.<sup>3</sup> Colonoscopy is a useful diagnostic and therapeutic tool when the patient is mildly infected or is invaded by a small number of male parasites without eggs in the stool.<sup>4</sup> Albendazole and mebendazole are the two benzimid azoles that have been used most widely for decades against soil-transmitted helminths, including trichuriasis, which is considered safe and well tolerated in children. Implementation of co-administered ivermectin and albendazole treatment have been recommended in countries with a high prevalence of trichuriasis infection.<sup>5</sup> As for the patient, part of the parasites were removed during colonoscopy, but there were still many parasites adsorbed on the patient's colon wall.

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**Fig. 1** Endoscopic and pathology images: (a) Many white and transparent curved parasites, shaped like a riding crop and adsorbed on the colon wall, inducing hyperemic and edematous mucosa (black arrow). (b) The parasites were concentrated in the ascending colon (black arrow). (c) The male mature trichurid (black arrow) and a large number of fusiform eggs in the female trichurid body could be seen (inside the box) (hematoxylin and eosin staining,  $\times 40$ , scale bar: 500  $\mu\text{m}$ ). The thick egg shells and a plug at both ends were consistent with trichurid egg (bottom right) (H&E staining,  $\times 200$ ).

Based on the patient's history and all the examination results, severe trichuriasis infection was considered and the administration period of albendazole (400 mg/day) was extended to 7 days. Although sanitary conditions have been improved nowadays, clinicians should still take care to exclude the possibility of intestinal parasitic infection, especially trichuriasis, in young children with a long history of diarrhea or hematochezia.

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### Disclosure

The authors declare no conflict of interest.

### Author contributions

Y.L., C.L. and H.H. provided clinical care to the patient. T.Z. conceived the study. Y.L. wrote the first draft, which was

revised and formatted for publication by H.H. All authors read and approved the final manuscript.

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