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Case Report

Hookworm infestation, an old but not vanished disease

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Abstract

Hookworms, together with other helminthes infestations, were serious health problems in Taiwan before. With improvements in public health and medicine, the prevalence of parasite infestations drops significantly and current attention has been shifted to foreign laborers coming from the Southeast Asia. Herein we reported a case of hookworm infestation who presented as subacute diarrhea. Initially, only peripheral eosinophilia was revealed. Anti-helminth treatment, but not the immunosuppressant for eosinophilic gastroenteritis, was given when the hookworm ova were finally harvested after repeated stool examinations. Please remember the old diseases when you meet a patient with gastrointestinal complaints and peripheral eosinophilia, especially when there are intermittent skin atopic manifestations. Repeated parasite ova checks with concentration method are necessary in acute stage, especially when the worm burden is not heavy.

Keywords: Diarrhea; Eosinophilia; Hookworms

1. Introduction

Hookworms, together with other helminth infestations, were serious health problems in Taiwan in the past.[1,2] With improvements in public health and medicine, the prevalence of parasite infestations has decreased significantly and current attention has been shifted to foreign laborers coming from Southeast Asia.[3,4] However, the helminth infestations have not gone away. Young doctors have little experience in these "old" diseases. Diagnosis of hookworm infestation is therefore not always straightforward. Herein, we report a case of subacute diarrhea in a patient, who was finally diagnosed as having hookworm infestation, after a series of examinations. His presentation, course of workups, and treatment are presented and discussed to remind primary care physicians.

2. Case report

This 36-year-old tea farmer visited our emergency department (ED) following 8 days of abdominal fullness and watery diarrhea, without mucus or blood. He denied nausea, vomiting, abdominal pain, or fever. He also denied ingestion of raw or spoiled food, or traveling to another country before the onset of symptoms. His past medical history was non-contributory, and no family members had ever had similar symptoms. On arrival, his consciousness was clear and vital signs were: respiration 20 breaths/min, heart rate 72 beats/min, blood pressure 148/72 mmHg, and temperature 35.9°C. His abdomen was soft and flat, normal in percussion, not tender, and the bowel sound was hypoactive. Stool examination revealed occult blood +1, RBC 6–10/HPF, and WBC 1–3/HPF, but no pus cells. Blood counts were WBC 9050/mmc (segments 48%, lymphocytes 26%, monocytes 5%, eosinophils 21%), Hb 16.0 g/dL, Hct 46.9%, RBC 5.13 M/mmc, MCV 91.4 fL, MCH 31.2 pg, MCHC 34.1 g/dL, and platelets 207,000/mmc. Biochemical parameters were all within normal limits. We

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provided the patient with oral rehydration and conservative treatment. A medical clinic visit for further workups was suggested.

He returned to the ED 2 days later with persistent symptoms. His consciousness was clear and vital signs were: respiration 18 breaths/min, heart rate 80 beats/min, blood pressure 128/92 mmHg, and temperature 36.2°C. Physical examination was notable for mild epigastric tenderness only. A repeat stool examination reported: occult blood +2, RBC 1−3/HPF, and WBC 0/HPF. No protozoa or parasite ova were found (concentration method). Blood tests were as follows: WBC 12,380/mmc (segments 61%, lymphocytes 17%, monocytes 6%, eosinophils 15%), Hb 16.8 g/dL, Hct 48.4%, MCV 91.7 fL, MCH 31.8 pg, MCHC 34.7 g/dL, platelets 204,000/mmc, and normal biochemical parameters. He was admitted for further evaluation and management.

After hospitalization, scattered, itching, migratory skin wheals developed on his body, which disappeared spontaneously within hours. Urticaria was diagnosed by the consulted dermatologist. Gastrointestinal workups, including gastroendoscopy, colonoscopy, and abdominal ultrasonography, revealed mild reflux esophagitis, antral gastritis, internal hemorrhoid, and a 1 cm angioma in the liver. The duodenum and colon were unremarkable. Blood tests revealed an elevation of IgE (1374 IU/mL). Daily stool examinations were non-contributory until the 3rd day, while hookworm ova were finally harvested. All gastrointestinal and skin symptoms responded well to oral mebendazole. Histopathological studies of endoscopic biopsies reported a mild infiltration of eosinophils and neutrophils in the mucosa of the ileum and colon only.

3. Discussion

Soil-transmitted helminthiasis remains a significant tropical disease in developing countries, even though it has decreased significantly in developed countries. Recent estimates suggest that *Ascaris lumbricoides* infects 1.221 billion people, *Trichuris trichiura* 795 million, and hookworms 740 million, with the greatest numbers of infestations occurring in China, South and Southeast Asia, Central and South Americas, and sub-Saharan Africa.[5] Hookworm infestation leads to anemia, because of blood loss from the worms sucking blood and also at the site of attachment. Besides increased maternal morbidity and mortality, neonatal prematurity, and reduced neonatal birth weight, this infestation reduces the host's performance, and productivity, and increases susceptibility to other infections.[6,7] The high medical and economic burdens of helminth infestations often translate into poverty-promoting effects, and individuals remain mired in a vicious cycle of destitution.

Hookworms, unlike protozoa, bacteria, fungi, and viruses, do not replicate within the human body. The eggs of hookworms are hatched in the soil. The larvae penetrate the skin, generally between the toes and fingers, to get into the human body. There is intense itching and dermatitis at the site of entry, known as "ground itching". When the larva migrates to the lungs, symptoms of bronchitis, and rarely, pneumonitis, can occur, but the helminthiasis is seldom recognized. Larvae are coughed out and swallowed to reach their final destination, the small intestine. Diagnosis of hookworm infestation depends on analyzing stool samples for the presence of eggs. The Kato-Katz technique is often used for a semi-quantitative diagnosis, based on the number of eggs per gram of feces (epg).[8] Light intensity of infestation is defined as 1−1999 epg, which relates to a loss of <2 mg of hemoglobin per gram of feces, while 2000−3999 epg for moderate intensity of infestation, and 4000 or more epg for heavy intensity of infestation relates to a loss of >5 mg of hemoglobin per gram of feces.[9] Clinical manifestation of infected humans depends on the intensity of infestation. Recurrent epigastric pain and tenderness, nausea, palpitation, exertional dyspnea, fatigue, importance, pain at sternum, legs, and joints are common in moderate to heavy intensities of infestation. Iron deficiency anemia and hypoalbuminemia are frequent from chronic intestinal blood loss. In addition to the hypochromic anemia, eosinophilia peaks at 5−9 weeks of infestation.[10] Poor learning, decreased school attendance and even growth retardation are common in infected children.[11,12] Besides the above manifestations, skin allergic symptoms were sometimes reported and considered as the result of host immunity manipulation by parasites.[13] Although acute abdominal pain, nausea, vomiting, and diarrhea without mucus, pus, or blood have not been mentioned as clinical manifestations of hookworm infestation in current textbooks, they were reported in acute hookworms infestation in troops when they moved in endemic areas.[14]

Our case attended because of diarrhea, and eosinophilia was the only positive finding in initial workups. In addition to intestinal parasite infestations, eosinophilic gastroenteritis (EGE), drug-related enterocolitis, and gastrointestinal food allergy or intolerance need to be differentiated. EGE is a rare and heterogeneous disorder characterized by eosinophilic inflammation of one or several segments of the gastrointestinal tract. Diagnosis of EGE depends on biopsy-proved dense eosinophilic infiltration, within and beyond the muscularis mucosae, signs of eosinophilic degranulation, and sometimes eosinophilic ascites.[15] Although food allergy or intolerance, and drug-related enterocolitis were excluded due to age and history of the patient, EGE remains on the list of differentials before harvest of parasite ova from his stool, and more definitively, the full recovery after mebendazole treatment. Differential diagnosis between helminth infestation and EGE is important, because their treatments are totally different.

Although hookworm infestation is an old disease with a significantly declined prevalence in developed countries, it has not vanished. Today's textbooks do not include acute gastroenteritis as a hookworm infestation manifestation, and most of our patients presenting with gastroenteritis do not have the parasite infection. This increases the difficulty of diagnosis and thereafter correct treatment. This disease should be remembered when a patient presents with gastrointestinal complaints and peripheral eosinophilia, especially when there are intermittent skin atopic manifestations.

Repeated parasite ova checks with the concentration method are necessary in the acute stage, especially when the worm burden is not heavy.

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