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Severe Anemia Secondary to *Trichuris trichiura* Hyperinfestation: The Critical Role of Endoscopic Evaluation

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Abstract

Intestinal parasitic infection caused by *Trichuris trichiura* represents a significant public health concern in socioeconomically disadvantaged regions, where inadequate sanitation infrastructure and limited health education facilitate transmission. A case is presented involving a 35-year-old woman with severe hypochromic microcytic anemia (hemoglobin 6.2 g/dL), associated with gastrointestinal symptoms and signs of hemodynamic instability. Stool examination revealed *T. trichiura* ova, and colonoscopy demonstrated multiple filiform structures causing mucosal erosions throughout the colon, extending from the rectum to the distal ileum. Treatment consisted of albendazole 400 mg daily for three days, red blood cell transfusions, and iron supplementation, resulting in clinical improvement and hemodynamic stabilization. This case underscores the importance of considering *T. trichiura* infection in the differential diagnosis of anemia and highlights the relevance of multidisciplinary approaches integrating nutritional interventions, health education, and community-based control measures to interrupt transmission cycles and reduce associated morbidity.

Keywords

Trichuris trichiura, iron-deficiency anemia, intestinal parasitoses, colonoscopy, albendazole.

INTRODUCTION

Intestinal parasitic infections constitute a global public health concern, particularly in regions with limited socioeconomic resources and insufficient healthcare systems that are unable to ensure adequate basic sanitation[1]. This situation contributes to the persistence of multiple parasitic diseases and leads to significant delays in the physical and intellectual development of affected populations[1,2]. Within this broad group of infections, soil-transmitted helminths occupy a prominent position, including whipworms, primarily *Trichuris trichiura*[1]. These parasites, also known as whipworms due to their capacity to adhere to the intestinal mucosa and feed on blood, represent a frequently underestimated cause of anemia in developing countries[2]. In severe cases, infection may lead to hypovolemic shock and poor response to blood transfusions, a risk that is increased in individuals with immunosuppression or concomitant nutritional deficiencies[2-5].

The World Health Organization (WHO) defines anemia as a reduction in hemoglobin levels below two standard deviations from the normal values for age and sex[5-7]. In some developing countries, prevalence reaches 43%, and infection with *T. trichiura* contributes significantly to this burden, particularly because it causes chronic blood loss within the gastrointestinal tract, resulting in worse clinical outcomes in individuals with malnutrition or immune dysfunction(3,8-10).

Although the primary route of transmission for hookworms involves direct contact with soil contaminated with infective larvae, fecal–oral transmission also plays a relevant role in *T. trichiura* infection, particularly in areas with inadequate sanitation infrastructure(1,2,11). It is estimated that approximately 24% of the global population is affected by soil-transmitted helminthiasis, with higher incidence in sub-Saharan Africa, Asia, and South America(1,12). This high prevalence, combined with the disproportionate impact on children and immunocompromised individuals, perpetuates the cycle of poverty and health deterioration(12).

Factors such as malnutrition, lack of footwear, overcrowding, poor hygiene practices, and inadequate living conditions facilitate parasite penetration and dissemination, thereby contributing to greater infection severity(1,2,13). Consequently, management extends beyond the administration of antiparasitic pharmacotherapy and requires nutritional interventions, mass deworming programs, and improvements in sanitation infrastructure and health education(2). These comprehensive strategies are essential to reduce morbidity associated with *T. trichiura* and other soil-transmitted helminths.

This article presents the case of a patient with severe anemia associated with *T. trichiura*, whose diagnosis was established through endoscopic evaluation. The report highlights the need to consider parasitic infections in the differential diagnosis of anemic syndromes.

CASE PRESENTATION

A 35-year-old woman, homemaker, residing in an urban area of Cartagena, Colombia, of low socioeconomic status, unemployed, and unaccompanied at the time of admission, presented challenges in obtaining initial clinical information. She sought medical attention for a one-week history characterized by asthenia, adynamia, positional vertigo, and one episode of orthostatic hypotension with transient loss of postural tone and no loss of consciousness. Additionally, she reported multiple episodes of vomiting (approximately six per day) containing food material, accompanied by three daily diarrheal bowel movements of dark appearance. Her medical history was notable only for prior laparoscopic appendectomy; she denied allergies or relevant gynecological or obstetric history.

Physical examination at admission revealed marked mucocutaneous pallor, tachycardia (heart rate: 120 beats per minute [bpm]), arterial hypotension (70/50 mm Hg), axillary temperature of 36.5 °C, and respiratory rate within normal limits. Orthostatic testing was positive, with symptom onset upon postural change. No signs of peritoneal irritation or neurological abnormalities were identified.

Initial laboratory tests (**Table 1**) demonstrated severe microcytic hypochromic anemia (hemoglobin: 6.2 g/dL), classified as grade IV according to World Health Organization (WHO) criteria, with thrombocytosis (595,000/µL), moderate leukocytosis (11,700/µL), and eosinophilia (1,521/µL). Iron studies showed reduced ferritin and transferrin saturation, confirming WHO grade III iron deficiency anemia. Two units of packed red blood cells were administered, resulting in a post-transfusion hemoglobin level of 7.8 g/dL. Serum vitamin B12 and folic acid levels were within normal limits, as were renal function parameters, liver function tests, coagulation times, and transaminases. Serum albumin was mildly decreased. Serologic testing showed a non-reactive fourth-generation human immunodeficiency virus (HIV) assay. However, a reactive Venereal Disease Research Laboratory (VDRL) test was identified and subsequently confirmed with the fluorescent treponemal antibody absorption test (FTA-ABS). Appropriate antibiotic therapy was then initiated.

Stool examination revealed a significant number of *T. trichiura* eggs, a finding that, together with eosinophilia and the clinical context, supported intestinal parasitosis as a potential differential diagnosis for the anemia.

Based on the abnormalities identified in laboratory testing and the clinical findings obtained during history-taking, the patient was initially managed as a possible case of gastrointestinal bleeding. Esophagogastroduodenoscopy was therefore performed, with normal findings. Given the need to clarify the etiology of the anemic syndrome, colonoscopy was subsequently performed (**Figure 1**), revealing multiple whitish, filamentous, motile structures associated with erosive areas in the colonic mucosa. These structures were observed from the rectum to the distal ileum. Samples were obtained using biopsy forceps and submitted to microbiology, where the helminth *T. trichiura* was confirmed (**Figure 2**).

Following confirmation of the diagnosis, treatment with albendazole 400 mg orally once daily for three days was initiated. The patient showed favorable clinical evolution, with improvement in gastrointestinal symptoms and hemodynamic stability. She was discharged with an oral iron supplement prescription and scheduled outpatient follow-up with internal medicine and clinical nutrition.

DISCUSSION

The *T. trichiura* infection illustrated in this case demonstrates its impact on populations living under limited socioeconomic conditions, in which lack of adequate sanitation,

Table 1. Laboratory tests at admission to the emergency department

Laboratory report		
Test	**Value**	**Reference range**
Sodium	136 mEq/L	135-145 mEq/L
Potassium	4.3 mEq/L	3.5-5.2 mEq/L
Chlorine	101 mEq/L	96-106 mEq/L
Calcium	9.4 mg/dL	8.5-10.2 mg/dL
Ferritin	9 ng/dL	20-200 ng/dL
Transferrin saturation	18%	21%-45%
Vitamin B_{12}	234 pg/mL	160-950 pg/mL
Folic acid	3.1 ng/mL	2.7-15 ng/mL
HIV (4th generation)	Non-reactive	Non-reactive
VDRL	1:4 dilutions	Non-reactive
FTA-ABS	Reactive	Non-reactive
Aspartate aminotransferase	31 U/L	4-40 U/L
Alanine aminotransferase	27 U/L	4-36 U/L
Creatinine	0.61 mg/dL	0.6-1.1 mg/dL
Blood urea nitrogen	11.2 mg/dL	7-21 mg/dL
C-reactive protein	7 mg/dL	<5 mg/dL
PT	12.8 seconds	Control 12.5 seconds
aPTT	26.4 seconds	Control 25.4 seconds
Albumin	3.6 g/dL	3.8-5 g/dL
Complete blood count		
Hemoglobin	6.2 g/dL	12.5-16 g/dL
Hematocrit	22.80%	33%-39%
Mean corpuscular volume	66.3 fL	80-97 fL
Leukocytes	11,700 /mm^3	4,500-10,000/mm^3
Neutrophils	5,616/mm^3	1,500-5,000/mm^3
Lymphocytes	4,329/mm^3	1,000-4,800/mm^3
Eosinophils	1,521/mm^3	<500/mm^3
Platelets	595,000/µL	150,000-450,000/µL

FTA-ABS: fluorescent treponemal antibody absorption test; PT: prothrombin time; aPTT: activated partial thromboplastin time; MCV: mean corpuscular volume; VDRL: Venereal Disease Research Laboratory; HIV: human immunodeficiency virus. Table prepared by the authors.

insufficient health education, and overcrowding facilitate the transmission cycle(1,2,14). This situation perpetuates the cycle of poverty, as parasitic infection may negatively affect intellectual development through its nutritional impact, while socioeconomic constraints hinder the timely implementation of preventive and therapeutic measures(2). In the present case, although upper or lower gastrointestinal bleeding was initially suspected, endoscopic evaluation confirmed that chronic blood loss originated from colonic mucosa heavily colonized by large numbers of parasites, which caused mucosal erosions and contributed to iron loss. Together with eosinophilia and the detection of whipworm eggs supported by microbiological confirmation, these findings established the definitive diagnosis, highlighting the importance of including *T. trichiura* and other soil-transmitted helminths in the differential diagnosis of anemia, particularly in endemic regions(9,15-17).

Among the differential diagnoses of parasitic infections, hematophagous soil-transmitted helminths such as hookworms, represented by *Ancylostoma duodenale* and *Necator americanus*, as well as *Schistosoma mansoni*, should be considered. *Enterobius vermicularis* is also frequently associated with these populations. However, it is not hematophagous, and therefore its impact on hemodynamic status may be less significant(1,2,18). Non-infectious causes must also be considered in the differential diagnosis of anemia, including gynecological bleeding, peptic ulcers, coagulation disorders, and chronic diseases. Comprehensive laboratory support is essential, including serial stool examinations, iron kinetics profile, complete blood count, and specialized studies, complemented by endoscopic evaluation to exclude alternative etiologies(3,6,7,9).

Treatment of trichuriasis is based on broad-spectrum anthelmintic agents such as albendazole or mebendazole, which achieve favorable clinical outcomes in most cases(1,2). In this patient, administration of albendazole 400 mg orally once daily for three days, combined with packed red blood cell transfusions and iron supplementation, resulted in clinical improvement and stabilization of hemoglobin levels. However, sustained control of parasitic infection at the community level requires the implementation of periodic deworming programs in vulnerable populations, reinforced by strategies addressing malnutrition, limited access to potable water, and inadequate health education(2,14).

Subsequent clinical follow-up should include monitoring hemoglobin and ferritin levels, as well as repeat stool examinations to detect reinfection. Nutritional assessment is essential to correct protein–calorie deficiencies, strengthen immune function, and prevent relapse(2,4).

At the population level, prevention and control of trichuriasis require a multidisciplinary approach involving

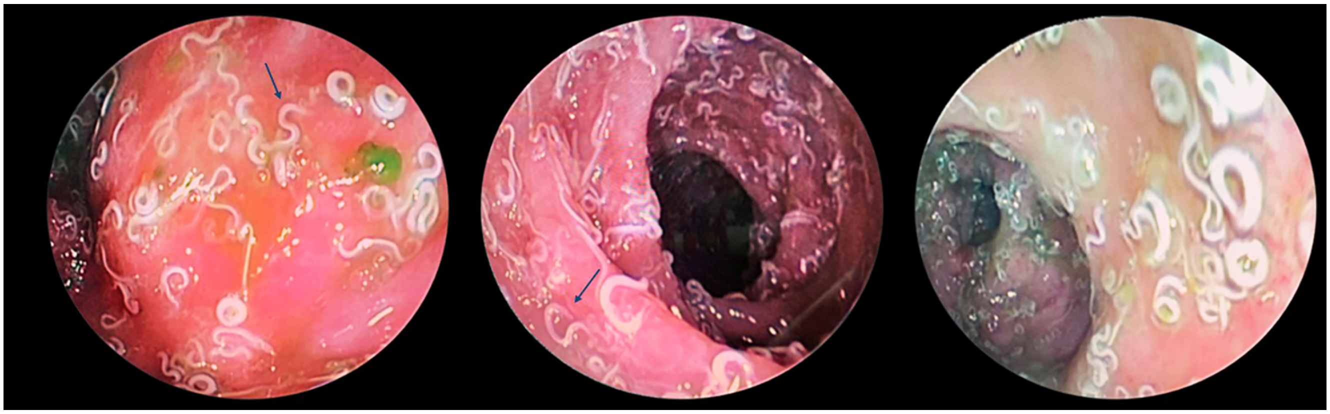

Figure 1. Direct visualization of whipworms during colonoscopy. Multiple whitish filamentous structures are observed extending from the rectum to the distal ileum. Images property of the authors.

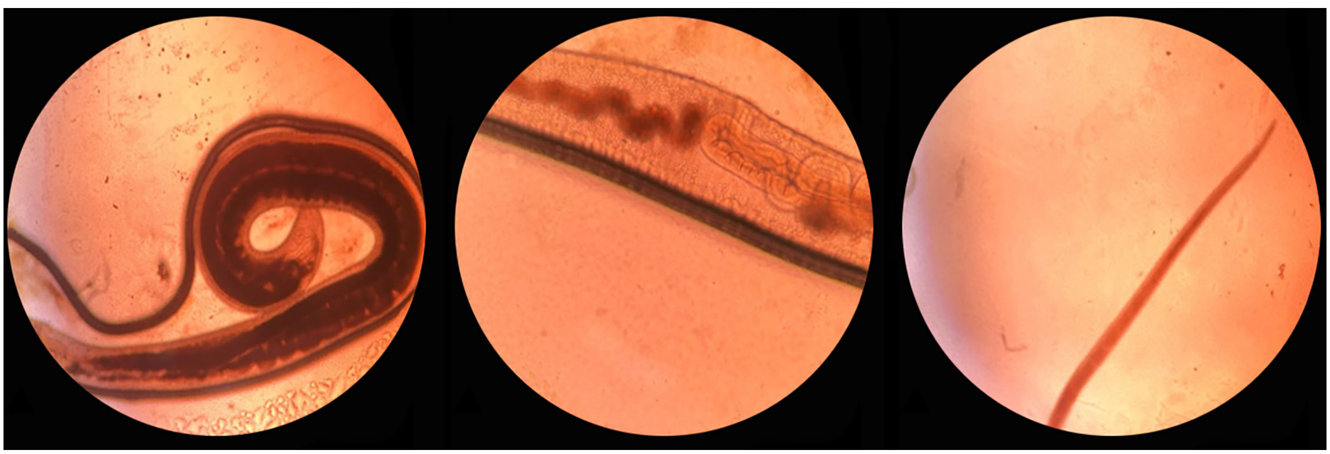

Figure 2. Microscopic visualization of the parasite showing internal structures, head, and tail. Images property of the authors.

increased investment in environmental sanitation, access to safe water, mass deworming programs, and hygiene education[1,2]. Collaboration between governmental institutions and the community is essential to reduce the prevalence of *T. trichiura* and other parasitic infections associated with contaminated soil. Through an integrated approach that combines curative and preventive strategies, it is possible to mitigate the health impact of these infections and improve living conditions in developing regions[2,3,12].

CONCLUSION

As illustrated in this case, trichuriasis remains a relevant and underdiagnosed cause of severe anemia in socially vulnerable and immunosuppressed adult populations. Identification of *T. trichiura* as the etiologic agent in this patient with anemic syndrome underscores the importance of including intestinal parasitic infections in the differential diagnosis in endemic settings and reinforces the need for comprehensive clinical and laboratory evaluation to determine the origin of severe anemia. Although anthelmintic therapy was effective at the individual level, sustained control of this parasitic infection requires community-based strategies addressing social determinants of health, including sanitation infrastructure, access to potable water, and health education. Only through a multisectoral approach can the disease burden associated with *T. trichiura* and its nutritional, hematological, and social complications be effectively reduced.

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