

Letter to the editor

Endoscopic Diagnosis of Hookworms

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Keywords

Uncinariasis, trichuriasis.

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After reading the article by Pizza et al. on endoscopic diagnosis of hookworms, we thought it would be important to mention some issues related to this case of hookworms diagnosed in a patient with anemia. (1) Endoscopy found a mobile parasite in the duodenum and multiple worms in the ascending colon and in the cecum. The authors assumed that findings from esophagogastroduodenoscopy and colonoscopy were compatible with hookworms.

However, *Necator americanus* helminths and *Ancylostoma duodenale* helminths (commonly grouped together as hookworms) reside in the upper portions of the small intestine while helminths of the genus *Trichuris trichiura* (commonly known as whipworm) reside in the cecum and the ascending colon. (2) If the usual habitat sites of these germs and macroscopic aspects clearly evidenced in the two photographs included with the article are taken into account, the etiological agents identified by endoscopy and colonoscopy in the case described in this article are from a different species.

The photographs show a worm in the cecum whose appearance is distinct from the worm detected in upper endoscopy: it has a rolled end that resembles the macroscopic characteristics of a male *T. trichiura*. (2, 3) *T. trichiura* can produce clinical symptoms such as severe anemia and even dysentery which are similar to those of hookworm infections. (3, 4)

Similarly, intestinal polyparasitism should be considered in patients who come from vulnerable populations such as rural areas and developing countries. Studies in Colombia have established prevalences of polyparasitism of 84% and 89.2% of the patients analyzed in regions of the Amazon and the Atlantic Coast. (5, 6) The combination of hookworms and *T. trichiura* had a prevalence of 16.7%. (5)

Diagnosis of intestinal helminthiasis can be complex. It begins with detection of eggs or adult parasites in fecal matter as indicated in the review of the topic. (7) However, the authors do not report performing any stool tests making other techniques for establishing the taxonomy of these worms, and thereby providing optimal therapy, a requirement.

One such technique is extraction of the worm with biopsy forceps after it has been identified during endoscopy. (7) This procedure is not only diagnostic but is also therapeutic since *T. trichiura* is sometimes embedded in the mucosa and cannot be expelled after anthelmintic treatment. (8, 9)

The article also indicated that the patient was treated with pyrantel pamoate, but the most suitable treatments for polyparasitism are based on repeated doses of benzimi-

dazoles such as albendazole, mebendazole and ivermectin. Among these drugs, albendazole is the most effective for management of both immature and adult forms of hookworms and whipworms. (10, 11)

Pyrantel pamoate is generally left as an alternative therapy for *N. americanus* or *A. duodenale* infections but is not effective for treatment of trichuriasis. (2, 3)

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Response to a letter to the editor

Endoscopic Diagnosis of Hookworms

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Keywords

Hookworm infections, *Trichuris trichiura*, antiparasitic agents, gastrointestinal endoscopy.

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To start, I would like to express my appreciation for the interest shown in the clinical case and in endoscopic diagnosis of hookworms. (1) I consider the contribution and the deep academic discussion based on endoscopic semiology of differential diagnosis of intestinal parasitosis raised in the letter to the editor to be of great relevance.

I agree that the primary location or habitat of hookworms is the upper digestive tract, especially the small intestine (duodenum and jejunum). Nevertheless, there have been increasing numbers of reported cases in which hookworms are found in the colorectal region and even in the cecal appendix. (2-5)

Trichuris trichiura is an intestinal parasite whose usual habitat is the colon and which is most frequently diagnosed through colonoscopy. It constitutes a differential diagnosis that must be considered in this case. But it is essential to note that *Trichuris trichiura* gets its name from the Greek word *Thrikhos*, which means hair, given the thin shape of the anterior two thirds of this parasite.

This gives it its typical whip-like appearance of a long, thin anterior whip lash with a thick posterior whip handle. The female's posterior end is straight while the male has a pronounced curvature and has a copulatory spicule that is 3 to 5 cm long. (6)

Morphologically, hookworms have been described as white cylindrical parasites that measure 10 to 15 mm in length. Their anterior ends are generally straight, but their bodies are curved: wide C-shaped curves for *Ancylostoma duodenale* but slight S curves in the opposite direction for *Necator americanus*. These findings are very similar to those seen in **Figure 1** of the case under discussion.

Given the morphological differences just described, we concluded that even though a male *T. trichiura* has a pronounced curvature that gives it a "coiled" appearance, its most characteristic feature is its front end whip (**Figure 2**) which was not evident in our case. (7)

Two other clinical data make it unlikely that the parasites observed through colonoscopy in this case were *T. trichiura*.

The first is that *T. trichiura* is not hematophagous. The mechanisms associated with anemia in this type of parasitosis are related to mechanical damage of the mucosa by insertion of the anterior portion of the parasite into the mucosa. This trauma generates local inflammatory changes and hemorrhaging which is why patients frequently have symptoms such as diarrhea, bleeding, and dysentery. There are even presentations that are indistinguishable from inflammatory bowel disease although not in our case. (8, 9) The severity of the inflammation is clearly related to the quantity of parasites.

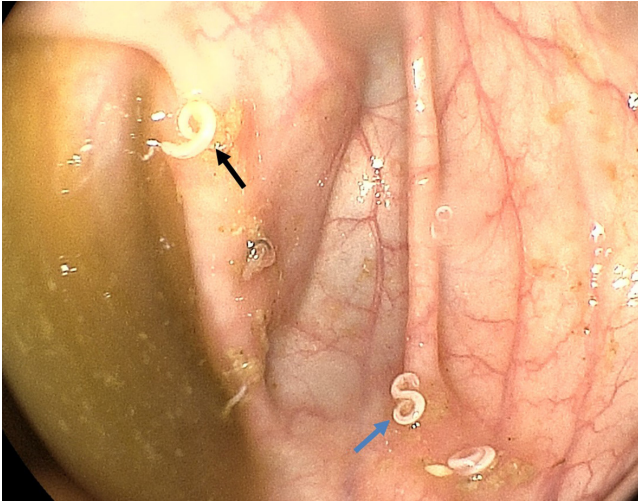


Figure 1. Multiple hookworms in the right colon. The blue arrow shows the characteristic S-shape of *N. americanus*, while the black arrow indicates the characteristic C-shape of *A. duodenale*.

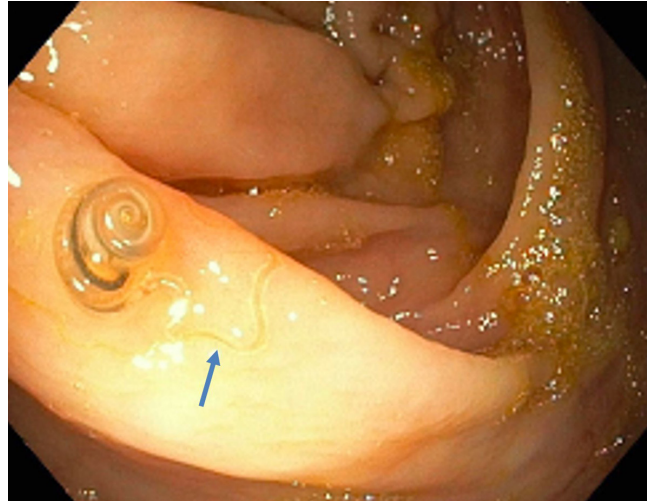


Figure 2. The blue arrow shows the characteristic anterior whip of the parasite. Taken from reference 7.

The second was our patient's very good clinical response to treatment with pyrantel pamoate. (1) Pyrantel pamoate and benzimidazoles are the drugs of choice for hookworms. Recommended treatment calls for three-day schedules every six months for three years. Thus, pyrantel pamoate has high cure and egg reduction rates for hookworms, but it should not be used for *T. trichiura* because of its ineffectiveness. (1, 6)

Within this context, benzimidazoles have historically been recommended as the treatment of choice for *T. trichiura* despite the fact that cures occur in less than 75% of cases with monotherapy. (6) Egg eradication rates can be improved by combined benzimidazole and ivermectin regimens as shown in a study by Knopp et al. (10)

In that study, significant eradication rates as high as 97% were achieved with the combination of mebendazole and ivermectin while an eradication rate of 91% was achieved with albendazole and ivermectin. (10) Nevertheless, when ivermectin is used alone to treat these parasites, its cure rate is only 11%, and egg its reduction rate is only 59%. (6, 11)

Consequently, it is not recommended as monotherapy for either *T. trichiura* or for hookworms.

We agree that in Colombia, polyparasitism frequently occurs in individuals from rural areas. We also consider doubts about the types of parasites found in endoscopic studies to be pertinent because they increase the probability of establishing an accurate diagnosis when parasites are extracted.

With the exceptions of malaria, leishmaniasis, and lymphatic filariasis, the global disease burden of hookworms (measured in disability-adjusted life years) outweighs all other major tropical infectious diseases. (4)

For this reason, it seems fundamental to me to clarify that hookworms are the helminths that are most closely associated with severe chronic anemia. In all cases they must be treated with effective antiparasitic agents for at least 3 years, as established in this patient. In contrast, although severe *T. trichiura* infections should always be treated, mild *T. trichiura* infections without clinical manifestations have been described. In these cases, treatment is not strictly required. (6)

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