



Letter

Poorly controlled asthma and strongyloidiasis in a nonendemic area of the United States

Strongyloidiasis is an intestinal infection caused by 2 species of the intestinal nematode *Strongyloides*, the most common of which is the globally distributed *Strongyloides stercoralis*.¹ *S stercoralis* occurs in subtropical and tropical countries but is also endemic in several temperate countries where conditions are favorable.² In the United States, *S stercoralis* is endemic in the southeastern region.³ The parasite infects humans, other primates, and dogs.² *S stercoralis* is mainly transmitted by soil, but interhuman transmission and transmission from infected animals have been reported.^{4,5} Strongyloidiasis may persist for several decades in the host because of its ability to autoinfect; therefore, strongyloidiasis is frequently chronic and underrecognized.⁶ Strongyloidiasis is difficult to diagnose because conventional parasitologic methods have low diagnostic sensitivity, and only small numbers of *S stercoralis* larvae are shed in the feces. Because of the limitations of direct methods to detect the *S stercoralis* larvae, the diagnosis of strongyloidiasis is often based on serologic test results. However, interpretation of serologic test results is limited by the lack of a standard reference for infection, and eradication is often difficult to confirm.⁷ After treatment for strongyloidiasis, decreases in peripheral blood eosinophils and decreases in *S stercoralis* antibody levels occur.^{7,8}

Most infected individuals are asymptomatic or present for evaluation with unexplained eosinophilia. Some individuals may present with variable clinical manifestations, including gastrointestinal, dermatologic, and respiratory symptoms.⁹ Among immunocompromised individuals or patients taking systemic corticosteroids, hyperinfection syndrome and disseminated disease may occur and can be life-threatening.² Treatment of strongyloidiasis may not result in clinical improvement of asthma, but the infection must be addressed because recurrent courses of systemic corticosteroids in patients with uncontrolled asthma increase the risk for hyperinfection syndrome.¹⁰ The preferred treatment for strongyloidiasis is ivermectin at a recommended daily dose of 200 $\mu\text{g}/\text{kg}$ for 2 days. Adverse effects are mostly mild and transient and include gastrointestinal, skin, cardiovascular, and constitutional symptoms. Overall, ivermectin is well tolerated, effective, and inexpensive.⁹ This report describes a patient with poorly controlled asthma, with hypereosinophilia, and without prior exposure to a *Strongyloides* endemic area who was found to have strongyloidiasis.

A 55-year-old African American man presented to our clinic for the evaluation of poorly controlled severe persistent asthma. The patient was born in the Bronx, New York, and had not previously traveled to the southeastern United States or abroad. In the last 2 years before our evaluation, the patient had been living in a shelter in the Bronx with his family. In the shelter, the patient had been in close contact with immigrants and dogs.

Physical examination findings were remarkable for obesity and diffuse wheezes on auscultation of the lungs. Laboratory tests revealed an eosinophil count of 870 cells/ μL , a serum total IgE level of 977 IU/mL, positive *Strongyloides* IgG antibody test results, and negative stool ova and parasites test results. Human T-lymphotropic virus I/II antibodies were nonreactive. The patient received treatment for strongyloidiasis with ivermectin (200 $\mu\text{g}/\text{kg}$ daily for 2 days). Follow-up laboratory test results were notable for an eosinophil count of 460 cells/ μL , serum total IgE level of 170 IU/mL, and negative *Strongyloides* IgG antibody test results. Asthma symptoms did not significantly improve after strongyloidiasis treatment (Table 1).

Previous reports have recommended screening for *S stercoralis* infection in patients with asthma who have elevated peripheral blood eosinophil counts and are from *S stercoralis* endemic areas.¹⁰ Although *Strongyloides* is mainly transmitted by soil, a few cases of interhuman transmission and transmission from infected animals have been reported.^{4,5} The patient described in this case was born in the Bronx and had not previously traveled to the southeastern United States or abroad. Strongyloidiasis in this patient was not confirmed by direct methods; the high eosinophil count and positive *Strongyloides* IgG antibody test results were suggestive of strongyloidiasis. Moreover, the patient's eosinophil count and IgE level decreased after ivermectin, which supports the findings of others who have reported that eosinophil counts and serum IgE level decrease after therapy.^{7,8} Although *S stercoralis* infection was not confirmed by direct methods, this patient had environmental factors that could have exposed him to infection, mainly living in a shelter where he was in close contact with possibly infected immigrants and dogs.

The main purpose of this report is to educate clinicians about the importance of maintaining a high index of suspicion for strongyloidiasis in the setting of eosinophilia and poorly controlled asthma in patients with and without previous exposure to an endemic region. Patients with severe persistent asthma who require multiple courses of systemic corticosteroids to control

Table 1

Laboratory results before and after treatment with ivermectin

Laboratory component	Before treatment with ivermectin	After treatment with ivermectin
Eosinophils	870 cells/ μL	460 cells/ μL
IgE	977 IU/mL	170 IU/mL
<i>Strongyloides</i> IgG	Positive	Negative
Stool ova and parasites	Negative	Negative
HTLV I/II antibody	Nonreactive	Nonreactive

Abbreviation: HTLV, human T-lymphotropic virus.

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their symptoms would particularly benefit from screening for strongyloidiasis, regardless of endemic exposure, because treatment is effective, well tolerated, and inexpensive. Treatment may not result in the clinical improvement of asthma, as occurred in this case and previous reports.¹⁰ However, the need for recurrent courses of systemic corticosteroids in patients with uncontrolled asthma who are not promptly diagnosed as having and treated for *Strongyloides* infection may increase their risk for a hyperinfection syndrome that can be lethal.

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