



Letter

Eosinophilia associated with *Strongyloides* infection, severe asthma, and central bronchiectasis

The primary causative agent of human strongyloidiasis is *Strongyloides stercoralis*, a soil-transmitted helminth of the *Strongyloides* genus.¹ Although strongyloidiasis characteristically occurs through contact with contaminated soil, rare cases of human transmission have also been documented.¹ The nematode can be found globally; however, its prevalence is higher in tropical and subtropical regions.¹ Within the United States, the highest rates of strongyloidiasis are seen in immigrants, especially those coming from Latin American countries where intestinal parasites, such as *S stercoralis*, are endemic.² Reports indicate that 30 million to 100 million individuals are infected by *S stercoralis* worldwide and that strongyloidiasis is the primary helminth infection, resulting in the death of immunosuppressed individuals.³ The parasite's unique ability to autoinfect its hosts and chronically persist with nonspecific symptoms results in diagnostic difficulties.¹ This report describes a unique patient with central bronchiectasis and severe asthma who was found to have a coexisting *Strongyloides* infection.

A 65-year-old woman, who emigrated from the Dominican Republic 18 years ago, presented to our allergy/immunology clinic with severe asthma that required high-dose inhaled corticosteroids and multiple previous courses of oral corticosteroids. The patient had a 2-year history of eosinophilia and recent chest imaging that revealed central bronchiectasis and basal infiltrates (Fig 1); she was therefore referred to us for the evaluation of possible allergic bronchopulmonary aspergillosis. On our evaluation, the Asthma Control Test score was 12, and percutaneous skin test results were positive for trees, weeds, and ragweed and negative for *Aspergillus fumigatus* and many other mold types. Laboratory tests revealed eosinophilia of 28% (absolute eosinophil count, 2100/ μ L), total serum IgE level of 364.6 IU/mL (reference range, <180 IU/mL), normal quantitative immunoglobulins, negative test results for antineutrophil cytoplasmic antibodies, and negative *A fumigatus* IgE and IgG test results. Further workup for eosinophilia revealed negative stool study results for parasites but positive results for *S stercoralis* IgG. She received ivermectin (200 μ g/kg per day) for 2 days. The asthma symptoms persisted so the patient was given a prednisone taper for 2 weeks. Two months later, the patient's asthma symptoms had markedly improved (Asthma Control Test score of 20), and chest radiography revealed resolution of the pulmonary infiltrates.

This case presentation demonstrates the difficulty in detecting *S stercoralis* infection in a patient previously diagnosed with asthma and concurrent bronchiectasis. The clinical manifestations of strongyloidiasis are heterogeneous; they may be asymptomatic or can present with gastrointestinal, cutaneous, and/or respiratory symptoms.⁴ The typical respiratory findings include cough,

dyspnea, and radiographic pulmonary infiltrates. *Strongyloides* infections may therefore mimic exacerbations of asthma with or without coexisting bronchiectasis.⁴ The distinction of strongyloidiasis masquerading as asthma and/or bronchiectasis is crucial to make because misdiagnosis and subsequent corticosteroid treatment can result in severe complications, such as hyperinfection, disseminated infection, and even death.^{1,3–6}

Specific components of a patient history, in addition to physical findings, indicate a potential risk of a *Strongyloides* infection. Hyperinfection syndrome commonly occurs in the setting of corticosteroid use or human T-lymphotropic virus 1 infection attributable to decreased immunity.³ The highest risk of a *Strongyloides* infection remains travel to an endemic region, specifically Latin America.² However, nonendemic regions still possess a risk of transmission through exposure to environmental factors, such as human-to-human transmission.¹

Our patient presented to the clinic with bronchiectasis, which is caused by both persistent infection and a defect in host defense.⁷ Infections may predispose individuals to the development of bronchiectasis, which in turn predisposes them to other infections, the most lethal being *Pseudomonas aeruginosa* and methicillin-resistant *Staphylococcus aureus*.⁷ No previously published links, however, have connected bronchiectasis to strongyloidiasis.⁸ Study of previous cases encouraged strongyloidiasis screening in our patient because the hallmark signs of elevated eosinophil levels, pulmonary involvement, and emigration from an endemic region were present.² Our patient had emigrated from the Dominican Republic 18 years ago, and we considered the parasite's ability to autoinfect and remain dormant for decades.^{1,2} The finding of positive *S stercoralis* IgG test results, however, strengthened the case for strongyloidiasis. The subsequent decrease in eosinophil levels and resolution of pulmonary infiltrates after treatment with ivermectin were also consistent with similar reports.^{1,4} Through assessing the course of our patient's treatment, her residency in the Dominican Republic was the likely source of acquiring a *Strongyloides* infection that remained latent until pronounced pulmonary symptoms arose.^{1,2}

S stercoralis infections may present with nonspecific clinical findings and are often linked to diagnostic delays. The larvae that are excreted in feces provide the only method of definitive diagnosis through parasitologic examination of the stool samples, in which the parasite can be properly identified.^{1,3,6} This method of diagnosis unfortunately lacks adequate sensitivity in identifying *S stercoralis*, unless 7 consecutive stool samples are collected and analyzed.¹ Other serologic tests, such as enzyme-linked immunosorbent assay, have varying sensitivity and specificity, depending on the antigens and protocols used, immunity of the patient, and cross-reactions with other infections.⁵ Newer and more efficient

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Figure 1. Noncontrast computed tomograph of the chest shows extensive and diffuse central bronchiectasis with mucoid impacted bronchi.

diagnostic methods, including immunoassays and molecular tests, will soon be used in the upcoming years.³ Although the consequences of mistreating strongyloidiasis can be serious, strongyloidiasis still ranks as a neglected tropical disease because of the difficulty that it poses in diagnosis.^{1,3} This report indicates that clinicians must consider *Strongyloides* infection in the differential diagnosis of patients presenting with bronchiectasis.

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