Case Report

A Rare Diagnosis of *Strongyloides stercoralis* in the Pleural Cavity

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Abstract

Description

Strongyloides stercoralis is a soil-transmitted helminth that causes strongyloidiasis, a chronic parasitic infection in humans. *S. stercoralis* is one of several worm species that cause soil-transmitted helminthiasis, a neglected tropical disease. Herein, we discuss a 78-year-old female residing in a nursing home presenting with abdominal pain and shortness of breath. During a thoracentesis, physicians found multiple rhabditoid larvae consistent with *S. stercoralis*. However, before the procedure, a serial assessment of stool sample was performed and failed to demonstrate a parasitic infestation. Many of those infected with *S. stercoralis* are asymptomatic. Lack of symptoms and low sensitivity in traditional parasitological testing hampers and delays the diagnosis of strongyloidiasis. This case serves as a reminder to consider helminthic disease in the differential diagnosis.

Keywords: *Strongyloides stercoralis;* pleural cavity; strongyloidiasis; parasitic disease; parasitic infection; soil-transmitted helminthiasis (STH)

Introduction

Strongyloides stercoralis is a soil-transmitted helminth that causes strongyloidiasis, a chronic parasitic infection in humans. Strongyloidiasis is endemic in tropical and subtropical regions and areas with poor hygienic conditions.[1] There are high infection rates among underserved populations, where prevalence rates can reach 75% in refugee and immigrant populations.[2] An estimated 30–100 million people are infected with *S. stercoralis* worldwide; however, this number may be understated as *S. stercoralis* is frequently underdiagnosed because many infections occur asymptomatically and diagnostic tests are not sufficiently sensitive.[1,3] For instance, using conventional techniques, a single stool examination failed to detect larvae in up to 70% of the cases.[4] Emad described a case study of a 61-year-old man with diabetes mellitus who happened to have filariform larvae of *S. stercoralis* in samples of his bronchial washings. Duodenal aspiration failed to yield ova or parasites, and culture examination revealed no bacteria, fungi or parasites.[5] Alternative tests such as serology and polymerase chain reaction can be more efficient in detecting this type of infection due to increased sensitivity.[6,7] Notwithstanding, *S. stercoralis* can appear in a non-endemic area where diagnostic tests are not of great sensitivity.

Case Description

A 78-year-old woman presented to the emergency department complaining of abdominal discomfort and shortness of breath. The patient had experienced progressively worsening abdominal pain, nausea, vomiting, dysuria and constipation two months before the admission. Her past medical history was significant for immune thrombocytopenic purpura (ITP), hypertension, diabetes mellitus, hyperlipidemia, gastroesophageal reflux disease, diverticulosis and an abdominal aortic aneurysm. The surgical history included splenectomy, hystero-oophorectomy and resection of a jaw tumor. The patient was a former smoker who resided in a nursing home.

Over the past two months, the patient was tested for abdominal pain that yielded nega-

tive results for human immunodeficiency virus (HIV) and human T-lymphotropic virus 1 (HTLV-1). A serial assessment of a stool sample was performed for a possible small bowel infection and failed to demonstrate the presence of a parasitic infection. She was diagnosed with enteritis and small bowel infection and was treated with vancomycin via a peripherally inserted central line at a skilled nursing facility.

The initial hospital presentation showed diminished bilateral breath sounds and significant leukocytosis (15 x10^9/L). Computerized tomography of the abdomen and pelvis without contrast showed a small bowel obstruction related to the distal jejunum/proximal ileum, diverticular disease and a 1.5 cm pleural-based nodule located in the right lower lobe, possibly a granuloma. The patient developed a persistent right pneumothorax and bilateral pleural effusion later and subsequently underwent a thoracentesis. On cytology evaluation of pleural fluid, multiple rhabditoid larvae with a short buccal canal and prominent genital primordium/spike in an acute inflammatory background were consistent with *S. stercoralis*. **(Figures 1 and 2)** Once the helminth was identified, a subsequent stool test was performed and returned positive for *S. stercoralis*.

The patient was treated with ivermectin; however, two weeks after treatment, a follow-up stool exam confirmed the infestation was still present. Therefore, the patient was given two courses of albendazole for ten days. Three weeks after the second round of treatment, computerized tomography of the chest showed a decrease in the pleural-based nodule's size to less than 1 cm. The nodule probably represented reactivity and not granuloma. Biopsies were not performed based on this result. Two months later, the patient was entirely asymptomatic with a negative chest x-ray.

Discussion

S. stercoralis is one of several worm species that cause soil-transmitted helminthiasis (STH), a neglected tropical disease. Approximately 1.5 billion people are infected with STH, with the majority in sub-Saharan Africa, the Americas, China and East Asia.[8] Individuals are classically infected by *S. stercoralis* through contact with soil that has been contaminated with free-living larvae. Unlike other soil-transmitted helminths, *S. stercoralis* is unique because it can complete an entire life cycle within a single individual, allowing for autoinfection.[2,9] Its ability to establish a cycle of repeated endogenous reinfection within the host, coupled with its typical asymptomatic nature, results in a chronic infection that can last for several decades.[9]

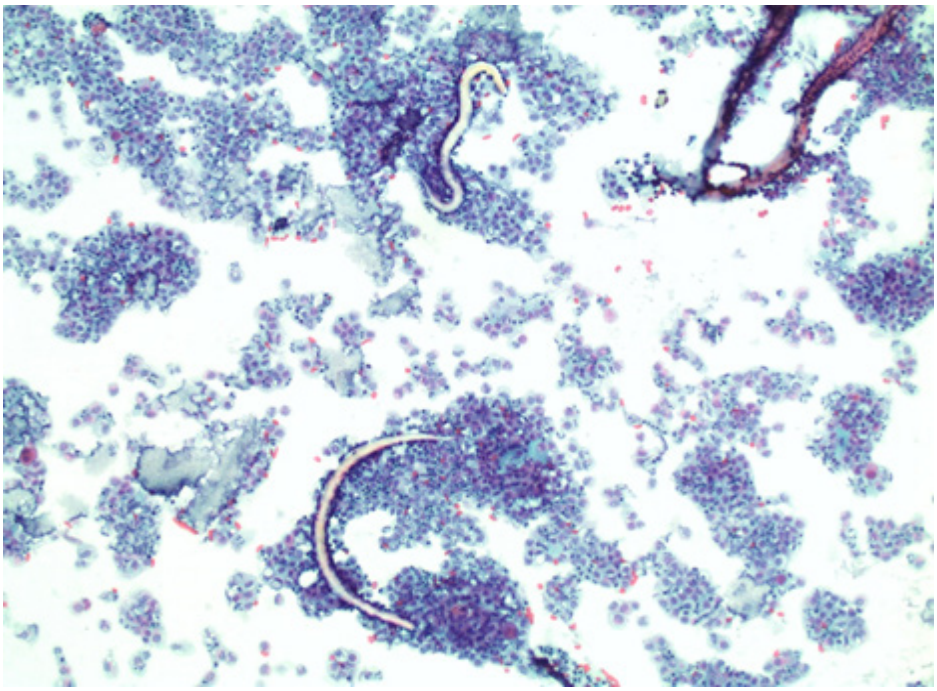

Figure 1. Filariform larvae found in pleural fluid.

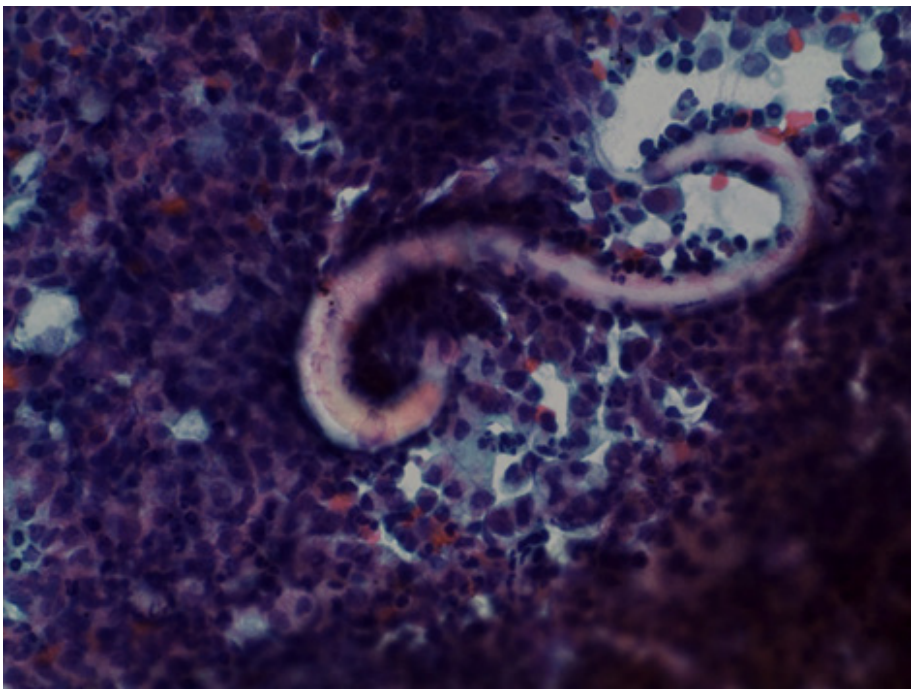

Figure 2. Filariform larvae with marked acute inflammation.

Even though many of those infected with *S. stercoralis* are asymptomatic, the disease can be characterized by, but not limited to, abdominal pain, episodes of diarrhea and constipation, chronic bronchitis, heartburn, pruritus and kidney problems. According to a 2013 meta-analysis of case-controlled studies by Schär et al., high infection prevalence rates of *S. stercoralis* occur in the following high-risk groups: HIV/AIDS, HTLV-1, alcohol addiction, diarrhea, malignancy and immune-compromising conditions.[2] Additionally, in immunosuppression cases, *S. stercoralis* can cause hyperinfection in its host where it can transport gut bacteria into the blood, which can subsequently cause pyogenic meningitis and sepsis.[7] In our case, the skilled nursing facility patient had a history of an auto-immune disease (ITP), diabetes and splenectomy, all of which made her more susceptible to systemic *S. stercoralis* infestation. Immunosuppressed and elderly patients are more likely to manifest the infestation.

Strongyloidiasis can be diagnosed through various modalities, including a sputum culture, duodenal aspiration, a blood antigen test and most commonly by stool samples for ova and parasites. The patient's initial stool sample failed to demonstrate the presence of parasitic infection, but subsequent samples were able to detect larvae. This variability in a strongyloidiasis diagnosis occurs because the larval output is irregular and the parasite load is low, where there are less than 25 larvae per gram of stool in more than two-thirds of strongyloidiasis cases.[10] In addition to low parasite load and variable output, gastrointestinal symptoms, as seen in this patient, complicate a strongyloidiasis diagnosis.

The authors could find only one article that illustrates an *S. stercoralis* infestation in the pleural cavity. [5] However, additional infestations caused by other helminths in the pleural cavity have been reported in the literature. Farahmand and Yadollahi describe a case of a 14-year-old patient with a hydatidosis infestation. The patient presented with decreased breath sounds on the left side, normal white cells, a hydropneumothorax on the left side and two pulmonary hydatid cysts. One of the cysts drained to the left pleural cavity.[11] The patient was treated surgically and received albendazole. The patient was a shepherd who commonly was in close contact with mammals who were hosts for the larvae that cause hydatid disease.

Treatment for strongyloidiasis involves eliminating the organisms to prevent autoinfection that may lead to hyperinfection, given this helminth's unique life cycle. Ivermectin belongs

to a group of drugs known as antihelmintic and is the first-line therapy to treat strongyloidiasis. Patients treated with ivermectin should receive follow-up stool tests to verify infection eradication.[12] Albendazole and thiabendazole are also used as treatment. An analysis by Henriquez-Camacho et al. involving 1,147 participants from 1994 to 2011 in several continents concluded ivermectin results in more people cured than albendazole. In other trials where ivermectin with thiabendazole was used, there are more adverse events with thiabendazole, though the parasitological cure was similar.[13]

Although *Strongyloides stercoralis* infestation of the pleura is rare, this case serves as a reminder to consider helminthic disease in the differential diagnosis.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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