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CASE REPORT

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Parasitic necrotizing pneumonia in an immunocompetent patient in United States

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ABSTRACT

A 59-year-old Baltimore native female, with a history of asthma and no history of travel outside of the USA, presented with productive cough and shortness of breath. Computed tomography scan showed left upper lobe consolidation of the lung with multiple tiny cavitations. She was empirically treated without improvement. Later, strongyloides were found in the sputum gram stain and she was treated with ivermectin. Pulmonary strongyloidiasis has been mainly described in patients who are immunosuppressed and have a history of travel to endemic areas, both of which were absent in our patient. Our case underlines the importance of considering strongyloides necrotizing pneumonia as a differential diagnosis of community-acquired pneumonia even in immunocompetent patients in the USA, especially if not responding to empiric treatment.

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Strongyloidiasis; necrotizing; pneumonia; asthma; sputum; culture; stain

1. Introduction

Parasitic infections of the lung are most often described in immunocompromised patients dwelling in endemic areas. It is rarely described in immunocompetent patients. However, with globalization and increased migration, such infections have become more prevalent in non-endemic areas as well. Strongyloides stercoralis is a nematode parasite that is most prevalent in tropical and subtropical countries including Southeast Asia, Latin America, and Sub Saharan Africa [1]. Strongyloidiasis infection is mostly seen in the USA in veteran population who returned from endemic areas [2]. Strongyloidiasis pneumonia is seen especially in the immunocompromised and patients on long-term corticosteroids. Patients usually present with wheezing as chief complaint mimicking asthma; and this makes the diagnosis challenging especially in patients with a history of asthma [3].

1.1. Case presentation

A 59-year-old Baltimore native female with bronchial asthma and type 2 diabetes mellitus presented with symptoms of cough with green-yellow sputum production for one week, shortness of breath on exertion and severe left upper back pain for one day. She did not have fevers, nor did she travel to an endemic area. Her symptoms had worsened after she received a five-day course of prednisone for a presumed asthma exacerbation. She was not on any long-term oral corticosteroids. She lived at home with her son who had tested positive for influenza. She also worked at the warehouse in Baltimore Washington international airport and had a 15-pack year smoking history.

On physical examination, vital signs were temperature 39.3°C, heart rate 134 beats/min, blood pressure 92/65 mmHg, respiratory rate 22/min and oxygen saturation 96% on ambient air. The left upper posterior area of the chest was tender to palpation and she had decreased breath sounds over the left upper lung fields. Abdomen was soft on palpation, and non-distended without any organomegaly. Significant laboratory investigations included white blood cell count 18.5 k/μL, 79.1% neutrophils, 0.5% eosinophils, AST 40 U/L and ALT 46 U/L. On computed tomography (CT) of the chest, a consolidation was found in the left upper lobe with multiple tiny cavitation and extending from the left midlung to the left apex [Figure 1].

She was started on linezolid, azithromycin, and ceftriaxone. Later, strongyloides were found in the sputum Gram stain [Figure 2].

HIV1&2, HTLV I/II antibody testing and strongyloides IgG antibody were negative. Patient was treated with ivermectin for two days. Her symptoms improved and she was discharged on cefuroxime. She returned four days later with recurrent back pain, fever, and perianal itching. Repeat chest CT showed consolidation in the left upper lobe that did not significantly change compared to prior imaging. Cavitations within the consolidation were slightly larger than seen previously likely due to coalescence. Findings were suspicious of necrotizing pneumonia. She was treated with a 12-day course of ivermectin

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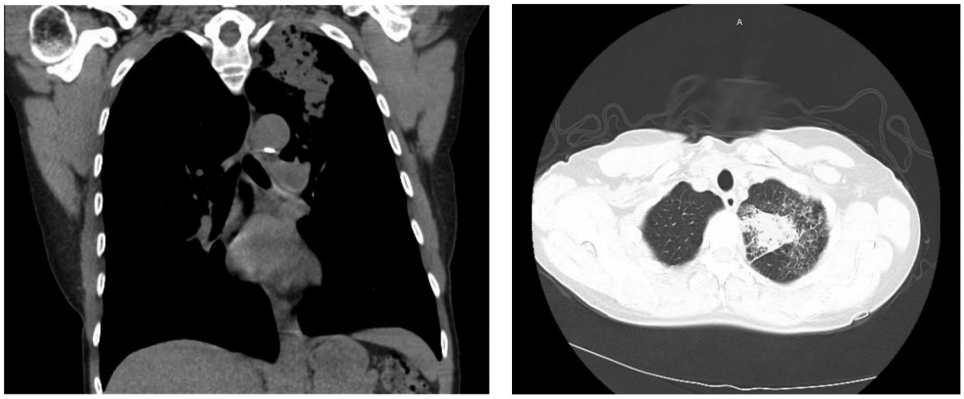

Figure 1. CT chest without IV contrast -coronal and transversal views.

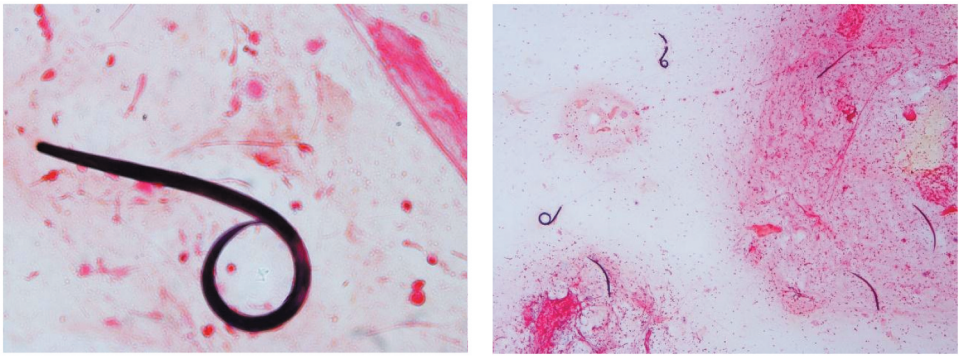

Figure 2. Sputum Gram stain showing stronglyoides.

and 7 days of amoxicillin-clavulanic acid with appropriate improvement. On follow up 2 weeks later, she remained asymptomatic.

2. Discussion

It is always important to remember that uncommon causes can come as common presentations. Each year, according to CDC, 250,000 patients with community-acquired pneumonia are admitted to the hospital [4]. Although bacterial pneumonias are more common, atypical organisms should be considered even in immunocompetent patients such as this patient.

Among parasites, Toxoplasma gondii pneumonia is the most common in the USA but observed most frequently in acquired-immunodeficiency-syndrome patients [5]. Strongyloidiasis is generally a benign parasitic infection, more common in tropical and subtropical countries [6]. There have been cases of strongyloides pneumonia seen in immunocompromised patients, like HTLV-I, HIV, malignancy, congenital immunodeficiency or those on long-term corticosteroids or other immunosuppressive agents [7,8]. Although the exact dose of corticosteroids is not known, doses as low as 20 mg daily for 5 weeks have been shown to be sufficient to cause immunosuppression causing strongyloides necrotizing pneumonia [9]. Steroids are known to cause the transformation of rhabditiform larvae to invasive and infective form, filariform larvae [10].

Diagnosing strongyloides infections is always a challenge, especially in immunocompetent patients without any recent travel to endemic areas, diarrhea, prolonged use of steroids or eosinophilia. This challenge is one of the factors contributing to the high mortality rate of 70% when the diagnosis is missed [11]. When a patient with an asthma exacerbation fails to improve on increasing doses of corticosteroids, pulmonary strongyloidiasis should be suspected, even in non-endemic areas. The diagnosis is usually made by demonstration of rhabditiform larvae in stool, sputum, or duodenal aspirates. Antibody assays are shown to have sensitivities of approximately 90%; however, cross-reactions can cause antibody levels to also be low in immunocompromised patients [7]. Fortunately, in this case, the diagnosis could quickly and easily be made by the analysis of the sputum stain. Sputum samples should be analyzed in patients who present with asthma exacerbation, failing to improve with standard therapy. The drug of choice for treatment is ivermectin and in cases of necrotizing pneumonia, prolonged treatments may be required. The optimal duration of ivermectin for pulmonary strongyloidiasis is uncertain as there are no randomized controlled trials to guide us with the duration of treatment. However, in our patient treatment during the initial admission treatment with ivermectin was provided

for 2 days as per CDC guidelines [12]. However, due to recurrence of symptoms, treatment was continued for 2 weeks with improvement. Empiric coverage with antibiotics was given since parasites can cause a breakdown of normal gut mucosal barrier causing a high risk of gram-negative bacteremia [13].

2.1. Conclusion

Strongyloides necrotizing pneumonia should be considered as a differential diagnosis of necrotizing pneumonia in immunocompetent patients even in the USA, especially if not responding to initial empiric treatment.

Disclosure statement

The authors report no conflict of interest.

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