Strongyloides stercoralis Larvae in Bronchoalveolar Lavage Fluid in the Asthmatic Patient: A Case Report

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Abstract- *Strongyloides stercoralis* is a common cause of gastrointestinal infection. Symptoms are usually mild, but in the setting of impaired host immunity, severe and disseminated illnesses may occur. The present report describes a male patient with a history of asthma and corticosteroid therapy, now presented with dyspnea and abdominal pain. Examinations show *Strongyloides stercoralis* larvae in Bronchoalveolar lavage fluid specimens. The patients who have undergone immunosuppressive therapy are highly indicated for *Strongyloides stercoralis* screening which prevents hyperinflation in endemic areas.

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Keywords: Strongyloides stercoralis; Asthma; Hyperinfection

Introduction

Strongyloides stercoralis is an intestinal nematode of humans that infects tens of millions of people universally (1). The *Strongyloides stercoralis* is a soil-transmitted threadworm that is one of the mainly ignored helminth infections (2). Once the larvae go through the skin, they pass through the bloodstream, incoming the alveolar space of the lungs; this lung migration can cause pneumonitis, but mainly generally is clinically asymptomatic. Larvae are followed by expectorated, moving during the trachea, and then swallowed. The larvae mature into adult worms, mate, and discharge eggs in the gastrointestinal tract (3). Infection frequently consequences in asymptomatic chronic disease of the bowel, which can continue unnoticed for decades (4). Strongyloides is a distinctive parasite that can reason a hyperinfection syndrome and disseminated infection numerous years after the experience (5). Risk factors for infection consist of living in an endemic area, chronic malnutrition, malignancies, organ transplantation, diabetes mellitus, chronic obstructive pulmonary disease (COPD), alcoholism, chronic renal failure, and breast milk from a contaminated mother (6). The autoinfection cycle of this parasite becomes awesome, with larvae invading almost every organ, especially in patients with hematologic malignancies (particularly lymphoma), medically induced immune suppression (e.g., transplant recipients), or under corticosteroids therapy (7). Clinical examination recognized a high incidence of different pathologies and accepted tendencies to the worse health situation in helminth-infected persons (8).

Case Report

A 42-year-old male patient with a history of asthma disease from 8 years ago and corticosteroid therapy was referred to the pulmonary department of Shariati Hospital, affiliated to TUMS, in March 2019. The chief complaint of the patient was abdominal pain, weight loss, and anorexia from one month ago with exacerbation of dyspnea and accelerated asthmatic attack. His job was as a barber and lived in Rasht (one of the endemic areas in Iran (9)). The patient was treated with corticosteroid and bronchodilator drugs from 8 years ago but recently didn't respond to treatment. The patient's family history was unremarkable. Clinical examination showed generalized wheezing in both lungs. Usual biochemistry and blood cell count, as well as urine analysis, were done. All of them were within usual limits. In spiral chest CT scan

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without contrast showed bilateral ground-glass opacities in both lung fields with the more nodular appearance in left upper lung that findings were not specific but should be ruled out pneumonia. The patient underwent bronchoscopy, which shows no significant pathologic changes, and bronchoalveolar lavage (BAL) was done and sent to the cytology lab. BAL fluid was centrifuged which two slides and one cell block were prepared and stained by PAP and H and E methods. The cytologic examination of BAL fluid revealed some curved larvae compatible with *Strongyloides stercoralis* (Figure 1,2). For a definite diagnosis, BAL fluid and stool were sent to the parasitology lab in another special hospital. BAL fluid showed many larvae compatible with *Strongyloides stercoralis*, but stool examination showed no larvae. After a strongyloidiasis diagnosis, the patient was treated with Ivermectin and dramatically responded to treatment. Follow up the patient showed good recovery in respiratory and gastrointestinal symptoms after treatment. The patient is alive and healthy without major problems three months after diagnosis.

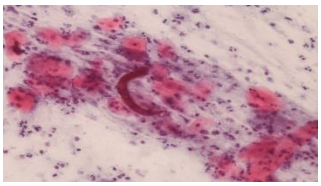

Figure 1. Microscopic examination of BAL fluid centrifuged smear revealed one curved larva compatible with *Strongyloides Stercoralis* (PAP stain, x400)

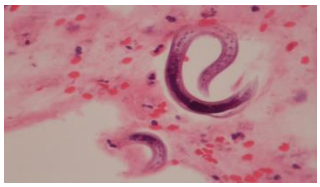

Figure 2. Microscopic examination of BAL fluid cell block preparation revealed few curved larvae compatible with *Strongyloides Stercoralis* (H and E stain, x400)

Discussion

Strongyloides stercoralis is an everywhere soil-transmitted intestinal nematode that is endemic in many areas during both tropical (sub-Saharan Africa, South-east Asia, Latin America) and moderate regions (the south-eastern USA, some European countries) (10). Classification of infection consists of acute, chronic-uncomplicated, and disseminated forms. Clinical symptoms and signs depend on the exacting organs implicated (11). It is regularly manifested by a 'larva currens' rash and distinct eosinophilia. The situation is extremely treatable (12). The hyperinfection syndrome happens in immunocompromised patients and is related to glucocorticoid steroid therapy. This predisposition is due to the considerable propagation of larval forms (13). This may happen with no increase of serum IgE level or eosinophilia (14). Eosinophilia is not a requirement; consequently, the diagnosis of strongyloidiasis requires a strong clinically suspicious that is similar to our patient (15). Although pulmonary symptoms from strongyloidiasis can be mild, including just cough and bronchospasm, the impending for severe pulmonary disease and adult respiratory distress syndrome is enormous in confident persons at elevated risk for strongyloidiasis, which in our patient showing with exacerbation of asthmatic attacks and dyspnea (16). Also, Strongyloides has a distinctive feature that explains which is that the infection is capable of being long duration because of the 'autoinfection cycle' the eggs formed by the adult female originate while they are motionless in the intestinal lumen, and newborn larvae can go through the last part of the bowel or the perianal skin, restarting the cycle within the human body (17). The diagnosis of *Strongyloides stercoralis* infection is typically prepared by discovering larvae of the parasite in the feces (18). Serology is more susceptible than fecal examination and culture (19). Examination of sputum and BAL fluid for the parasite is suggested if pulmonary signs are present, similar to our patient, which showing some larvae in BAL fluid (20). Sputum Gram stain may be a helpful method to screen for pulmonary strongyloidiasis in steroid-treated patients with chronic lung disease, for example, asthmatic patients who come from an endemic area (21). In endemic areas of S. stercoralis, pulmonary strongyloidiasis should be careful as a component of a differential diagnosis if chest imaging results resembling alveolar and interstitial shadow patterns or lobar pneumonia are discovered in patients with immunosuppression (22). *Strongyloides stercoralis* hyperinfection can imitate pulmonary fibrosis without any recognizable reasons and accelerated underlying pulmonary disease (23). In patients treated by immunosuppressive drugs, *Strongyloides stercoralis* can reason a life-threatening septic shock, with several organ malfunction and invasion (24). If intestinal infection with S. stercoralis is recognized and treated before immunosuppressive therapy is begun and if a high clinically suspicious for the hyperinfection syndrome is maintained while immunosuppressive therapy is given, the mortality from this disease should reduce (25). Ivermectin is the gold standard for treatment and in our

patient is a better choice (26). It has been recommended to utilize combined therapy with albendazole and ivermectin pending there is facts that the parasite is eradicated (27). In predominantly complicated positions where either worm suppression is not possible, or reinfection is apparent, short monthly courses of antihelminthic therapy seem to be useful in the prevention of persistent general infection (28).

Although Strongyloides infection is widespread, it is potentially severe if missing untreated, principally in elderly or immunocompromised persons. It is predominantly significant to recognize and treat patients who have Strongyloides if they are expected to undergo immunosuppression by chemotherapy or high-dose steroids, which according to the recurrent study findings, for example, asthmatic patient, even if they are asymptomatic. Thus delayed identification and treatment have life-threatening consequences in patients with situations predisposing to the progress of hyperinfection and dissemination (29).

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