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Case Report

Pulmonary Strongyloidiasis You Should Suspect

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Abstract

Strongyloides stercoralis can cause asymptomatic infection in humans for a long period as the parasite can complete its whole life in the human body, but at any time for any cause that lower the body immunity a sever form of autoinfection can be developed resulting in a widespread parasitemia and disseminated strongyloidiasis with poor prognosis, So the early consideration of this infection is important for the early diagnosis and treatment with possible better outcome..

Keywords: *Strongyloides stercoralis; Pulmonary Strongyloidiasis; Parasite*

Abbreviations

ER: Emergency Room; RR: Respiratory Rate; BP: Blood Pressure; HR: Heart Rate; RA: Room Air; PE: Pulmonary Embolism; CTPA: Computerised Tomography Pulmonary Angiography; DVT: Deep Venous Thrombosis; CT: Computerised Tomography; CXR: Chest X Ray; BAL: Bronchoalveolar Lavage; TB: Tuberculosis; AFB: Acid Fast Bacillus; GI: Gastrointestinal

Introduction

Strongyloidiasis is usually asymptomatic infection that is difficult to be diagnosed and last long without any manifestations during which patient can transfer infection for others or autoinfected from poor hygiene [1]. A hyperinfection syndrome usually with high mortality rate, is an accelerated autoinfection associated with widespread parasitemia and disseminated disease after exposure to immunosuppression [2].

Case View

55 years old Bangladeshi male who works as a manager in a company dealing in metals, non-smoker and non-alcoholic, presented with abdominal swelling for the past 6 months increasing over one week before presentation associated with mild abdominal pain, constipation, hoarseness of voice and dyspnoea.

His past medical history is notable only for urticaria on and off for which he was received anti-histamines from private hospital at intermittent intervals.

In ER he was conscious alert oriented, afebrile with BP 120/80 mmhg, HR 150 beats/minute, RR 30 cycles/minute and SPO2 89-90% on RA corrected to 96% with 2L nasal cannula.

Cardiac examination was notable only for regular tachycardia, chest examination revealed bilateral faint wheezes, abdomen was distended, non-tender with dull percussion indicating ascites, lower limb showed no evidence of peripheral oedema or DVT and his neck examination was normal without swelling or goitre.

As the patient was tachycardic, tachypenic and hypoxemic without notable history for clear cause, PE suspected and CTPA was requested but confirmed no evidence of PE and showed a small right upper lobe cavity, bilateral reticulations and multiple nodular opacities with tree in bud pattern (Figure 1). Abdominal CT showed dilated intestine without evidence of obstructive lesion (Figure 2).

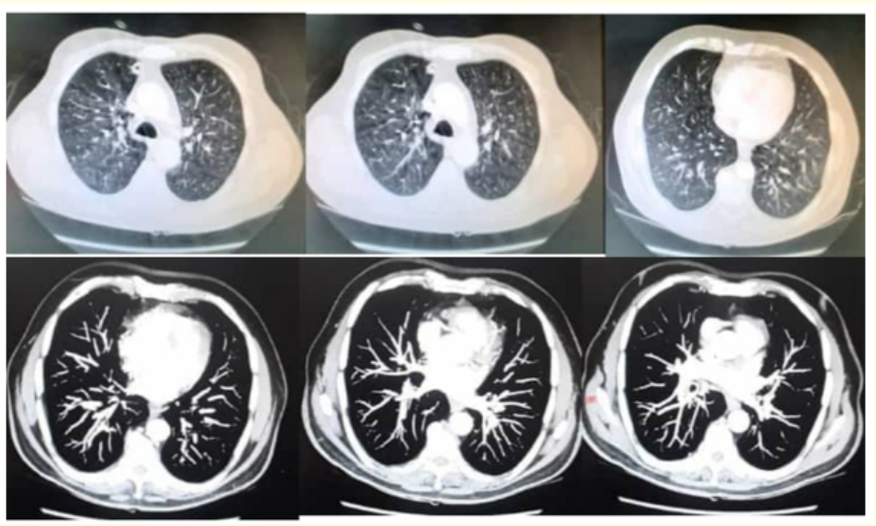

Figure 1: CTPA showed small right lung cavity with reticulo-nodular pattern and tree in bud but negative for PE.

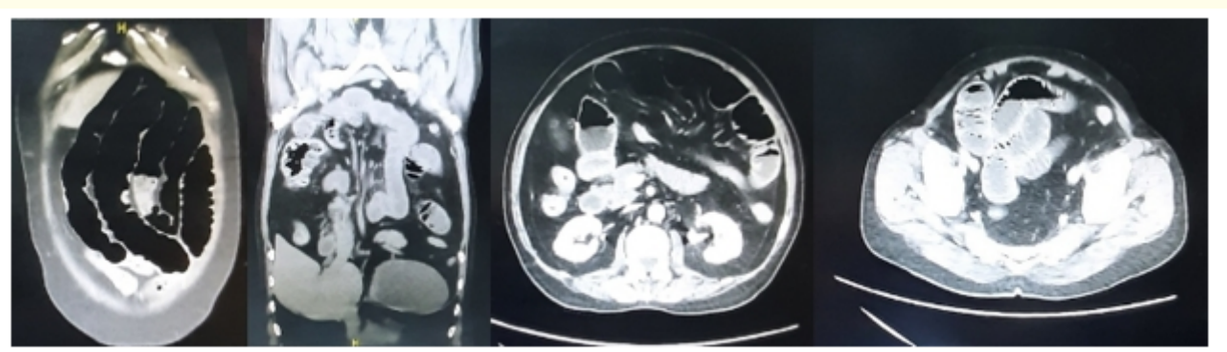

Figure 2: Abdominal CT showed dilated intestine without evidence of obstructive lesion.

Patient admitted in regular ward and basic investigations were done. AFB sputum and COVID19 swab came negative for twice.

Unfortunately, patient deteriorated and become severally hypoxemic with increased O_2 requirements and CXR showed bilateral extensive alveolar filling opacities (Figure 3) for which patient was intubated and mechanically ventilated with inotropic support and started on broad spectrum antibiotics linezolid and meropenem with metronidazole.

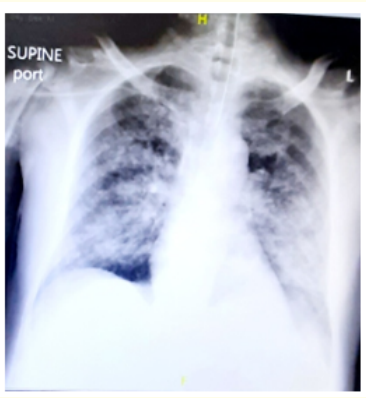

Figure 3: CXR showing bilateral progressive alveolar filling opacities.

Nasogastric tube was inserted and drained about 2 litres and half for this surgeon was consulted (for suspected acute abdomen) who advised to exclude TB before any intervention.

Bronchoscopy was done and revealed no evidence of any bleeding or bronchial lesion but friable easily bleeding mucosa on touch with thick secretions, BAL sent for analysis that came later negative for TB and malignancy but numerous round worms mostly strongyloides (Figure 4) but unfortunately after patient deceased.

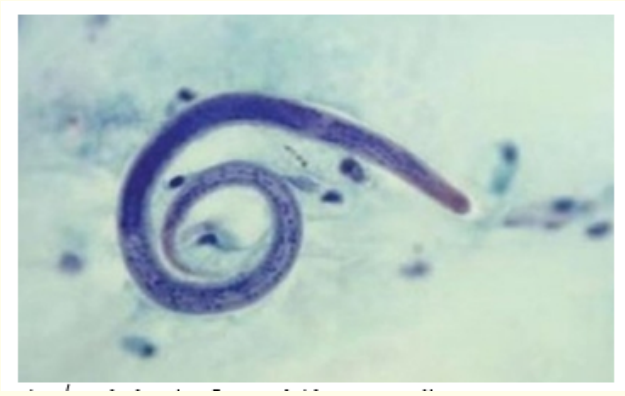

Figure 4: BAL photomicrograph showing Strongyloides stercoralis.

Discussion

Strongyloidiasis is an infection caused by the helminth *Strongyloides stercoralis*, an intestinal nematode endemic in the rural areas of tropical and sub-tropical regions [3]. this parasite can complete its complex life cycle involving the pulmonary and gastrointestinal systems entirely within the human body [4]. For this chronic asymptomatic infection can be lasting for long period and clinical manifestations

may occur long after the initial infection. During this period of asymptomatic infection patients can developed disseminated infection if exposed to immunosuppression [2,3].

While skin contact with contaminated soil is the most common mode for transmission [5], feco-oral transmission and person-to-person transmission can also occur due to poor hygiene [6] and even organs or tissues donors with asymptomatic Strongyloides infection can infect the recipients [7].

After human skin contacts filariform larvae, the infective larval stage of *S. stercoralis*, it penetrate the skin and migrate through the bloodstream and lymphatics to the lungs where it penetrate into the alveolar air sacs then ascend the tracheobronchial tree and are swallowed then become mature adult worms that burrow into the mucosa of the duodenum and jejunum and may live for up to five years [8]. Pathogenic adult females worms produce eggs, from which non-infectious larvae (rhabditiform larvae) developed within the lumen of the gastrointestinal tract and generally passed in the stool but it can become infective filariform larvae within the human GI tract and penetrate the intestinal mucosa (internal autoinfection) or the perianal skin (external autoinfection) to complete the life cycle by migrating via the bloodstream and lymphatics to the lungs and then the intestine [1,2,8]. This transformation of rhabditiform larvae to filariform larvae within the GI tract may be accelerated by conditions that reduce bowel motility and use of steroids or other immunosuppressive agents [8].

Strongyloid infection is mostly asymptomatic but symptoms can range from nonspecific cutaneous, gastrointestinal, and respiratory manifestations to a fatal hyperinfection syndrome [9].

In our patient he denied any abdominal problem before his current illness or any family similar condition.

Respiratory involvement varies from asymptomatic pulmonary infiltrates to respiratory failure and diffuse alveolar hemorrhage that is usually indicate a fatal hyperinfection syndrome. Patient may complain of throat irritation, cough, dyspnea, wheezing, and hemoptysis as a respiratory symptoms but in chronic strongyloides infection there is may be asthma like symptoms that can be explained by larval migration across alveolar-septal walls, maturation of larvae in pulmonary parenchyma, or widespread dissemination during the hyperinfection syndrome [10,11].

In our patient, although presented by hypoxemia and dyspnoea together with abdominal problem, he denied any respiratory symptoms before.

A hyperinfection syndrome, that is carry high mortality rate, is an accelerated autoinfection as a result of decreased cell mediated immunity that may cause widespread parasitemia and disseminated disease. There are many risk factors for hyperinfection including corticosteroids, HIV, alcoholism, stem-cell transplantation, and HTLV-1 infection. Fever, abdominal pain, diarrhoea, anaemia are common manifestations and Gram-negative bacteremia may occurs as a result of mucosal disruption by strongyloides larvae causing bacterial translocation in the intestine [12,13]. Peripheral eosinophilia is usually absent in the setting of hyperinfection and disseminated infection but its presence appears to predict a better prognosis [14].

Our patient received steroid, as a suspected case of covid19 with hypoxemia together with possibility of eosinophilia supported by urticaria history and old blood film that showed eosinophilia, and this may be the cause of his rapid deterioration and development of disseminated form as we concluded later.

Although the diagnosis can be challenging, Strongyloidiasis should be suspected in those with epidemiologic exposure (skin contact with contaminated soil in tropical and subtropical regions) and manifestations (gastrointestinal, respiratory, and/or dermatologic) with or without eosinophilia [15]. Strongyloidiasis should be also suspected where there is a systemic infection by enteric organism without clear cause [16].

While the diagnosis can be achieved by identification of larvae in stool, sputum, or BAL fluid, the serological tests for *Strongyloides stercoralis* have high sensitivity with high negative predictive value [17].

In our patient we reach the diagnosis incidentally, honestly was not expected, via BAL done primarily for exclusion of TB, superimposed infection (as per surgeon recommendation) or alveolar hemorrhage.

While the 1st line of treatment for uncomplicated strongyloidiasis is Ivermectin or albendazole, the optimal treatment for the disseminated disease still uncertain. subcutaneous ivermectin may be used in cases of disseminated strongyloidiasis as the oral form may be ineffective due to associated ileus [18].

In our patient we did not give any treatment as patient died before achieving the definitive diagnosis and we even didn't suspect the diagnosis.

Conclusion

Strongyloidiasis is a challenging diagnosis as infection is mostly asymptomatic for a long period and disseminated infection can follow immunosuppression statuses with fatal outcome. So, it should be considered in patients from endemic areas (tropical and sub-tropical areas) as the early suspicion is a crucial for early diagnosis and treatment.

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