Introduction

With an increase in travel and immunosuppression, parasitic lung and pleural diseases are increasingly reported. The diagnosis in certain cases is very challenging because of nonspecific clinical and radiological features. Here we present a case of a 60-year-old immunocompetent female complaining of difficulty in breathing for 4–5 days for which sputum sample along with the coughed-up fragment of the parasite was sent to the laboratory. All the blood parameters along with blood and sputum culture were within normal limits. Direct microscopy for sputum and multiple fecal samples did not yield any significant information. Chest X-ray was normal, whereas contrast-enhanced computed tomography scan changes were suggestive of fibrotic changes and mucoid impaction. The histopathological examination showed thick mucus content and no evidence of a parasitic infestation, worm, larva, or ova. So the differential diagnosis of the right lower lobe obstruction probably due to mucus plug was made, and the patient was referred to a pulmonologist for further follow-up. This case highlights the importance of common respiratory disorders characterized by mucus plugs and that some may mimic parasitic segments. Specific clinical, radiological, and pathologic features, microscopic examination, or serological testing can help to narrow the differential diagnosis of infective or noninfective causes and help the patients in early and accurate diagnosis and treatment and save them from unnecessary expensive and invasive investigations.

Keywords: Ascaris, mucus plug, parasitic microscopy, parasitic particle, parasite in sputum

Case Report

A 61-years-old immunocompetent female reported to the emergency department with chief complaints of cough with expectoration for 5–7 days, difficulty in breathing, 5–7 days and pain in abdomen, 45 days, coughing up of a worm-like viscid substance 4–5 times in the last 2–3 days [Figure 1]. The patient was apparently asymptomatic 10 days back when she complained of breathlessness which exaggerated on exertion in a conventional laboratory setup is very challenging, especially when the fragments of the worm are received rather than an intact worm forcing one to think out of the box. We hereby present one such case of diagnostic challenge in which parasitic obstructive change was clinically suspected and sputum sample along with a fragment of the parasite was sent to the parasitology laboratory.

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DOI: 10.4103/jfmpc.jfmpc_1482_21
and relieved her on rest. Cough was more in the morning and was associated with the excretion of a thick viscid substance at least on 4-5 different occasions without associated blood, pus, etc., The patient complained of generalized pain in the abdomen and no exaggerating and relieving factors, no passage of worms in faces. She had no history of fever, nausea, or vomiting. Bowel and bladder habits were normal. She had no significant past medical history but she complained of several episodes of cough and breathlessness in the past years as well for which she used steroid inhalers as and when required without any prescription.

At the time of presentation, the patients’ vitals were stable. Chest examination showed bilateral symmetrical chest movement with intercostal retractions. On auscultation, there was decreased air entry on the right side of the chest with mild expiratory wheeze. On auscultation, heart sounds were distinct, with no murmurs or abnormal beats. The abdomen was soft and nontender on percussion, with no signs of organomegaly.

The laboratory parameters of the patient like complete blood counts (CBC), blood, and sputum cultures were normal, barring an isolated elevation of total IgE levels to about six times more than the control values. Erythrocyte sedimentation rate (ESR) (28 mm in 1 h) and CRP (11 mg/L) values were also raised.

There were no abnormal findings on the ultrasound abdomen and upper gastro-intestinal endoscopy. X-ray chest posteroanterior (PA) view showed grossly normal parenchymal findings [Figure 2]; however, considering the clinical history of the patient, contrast-enhanced computed tomography scan (CECT) was ordered which revealed hyper densities in segmental bronchi in the right lower lobe with mild features suggestive of fibrotic changes. These features were said to be due to probable mucoid impaction and not associated with any parasite per se. Mild fibrocalkific changes were also found in bilateral lung fields suggestive of a sequel to an old infective etiology [Figure 3].

To further confirm the diagnosis of worm-like substance, morphological examination (direct wet mount) of the parasite was done in the microbiology department. It was not very helpful in accurate and sensitive diagnosis. Stool samples were examined on three different occasions, which failed to reveal any parasitic elements. Still unable to reveal the mystery of the worm, the histopathological examination was done which showed thick mucus content and no evidence of a parasitic worm, larva, ova, or any parasitic infestation [Figure 4 and 5]. So, the differential diagnosis of the right lower lobe obstruction probably due to mucus plug was made, and the patient was referred to a pulmonologist for further follow-up.

**Discussion**

The protozoan and helminthic lung infections like Toxoplasma gondii pneumonia in acquired-immunodeficiency-syndrome (AIDS) patients, pulmonary strongyloidiasis with patients on chemotherapy or chronic steroid intake, and ascaris and hookworm infestations are commonly reported in immunocompromised patients in India. Ascaris patients may be asymptomatic or present with a wide spectrum of symptoms like abdominal pain, cough, dyspnea, weight loss, hemoptysis, pneumothorax, acute respiratory distress syndrome (ARDS), hypersensitivity reaction like wheeze, urticaria, and rarely anaphylaxis. Radiologically, they have varied presentation as focal lung lesions such as cystic lung lesions, coin lesions, lung consolidation or pleural effusion or diffuse lung disease presenting as transient pulmonary infiltrates and alveolar/interstitial lung changes.

Direct microscopic examination of sputum is most useful in identifying Paragonimus westermani eggs, Strongyloides stercoralis larvae, Ascaris lumbricoides larvae, hookworm larvae, and rarely Entamoeba histolytica. Amongst these, Ascaris lumbricoides is one of the most common helminthic human infections with the highest prevalence in tropical and subtropical regions. It is highly prevalent because of the large number of eggs per parasite, stability of eggs under...
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diverse environments, and poor sanitary conditions. Though only very few cases have been reported in the literature where *Ascaris lumbricoides* had appeared in the oral cavity, vomitus, and small intestine and caused airway obstruction.

Our healthy, immunocompetent patient presented with cough, dyspnea, the passage of viscid worm-like substance, typical colicky pain, and weight loss. So, the provisional diagnosis of a parasitic disease was made. However, extensive microscopic, hematological, and radiological examinations did not show any signs of parasites or parasitic associations. This further led to the investigation of the fragment received which turns out to be thick and inspissated forms of mucus plug that accumulate within the respiratory airways. Common conditions that involve mucus plugs are allergic broncho-pulmonary aspergillosis (ABPA), plastic bronchitis, asthma, *Aspergillus* tracheobronchitis, hyper-immunoglobulin E syndromes, exogenous lipid pneumonia, pulmonary alveolar proteinosis, and chronic eosinophilic pneumonia. Further diagnosis of the underlying cause of mucus plugs will hopefully facilitate the diagnosis and management of these diseases.

**Conclusion**

This highlights the importance of respiratory disorders characterized by mucus plugs that mimic parasitic fragments and mislead the clinicians. Clinical, radiological, and pathologic features, detailed microscopic examination of stool or respiratory tract samples, and serological testing can help to diagnose the patients accurately and early and save them from unnecessary expensive and invasive investigations and treatment.

**Acknowledgements**

We would like to thank Dr. Manjunath B G and Dr. Saloni Bansal for their expert opinion and advice regarding this case.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**

Nil.
Conflicts of interest

There are no conflicts of interest.

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