**Short Report**

*Strongyloides stercoralis* infection mimicking a malignant tumour in a non-immunocompromised patient. Diagnosis by bronchoalveolar cytology

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The endemic parasitic nematode *Strongyloides stercoralis* is most often found in tropical and subtropical regions, although cases have been reported in other areas. Infection with this parasite is diagnosed relatively frequently in areas of Spain where paddy fields are found, and farm workers are most often affected (with or without symptoms). Thus, the Valencian coastal region is an endemic site for this parasitosis, which can also rarely be seen in other areas, such as Galicia or Aragon. Human infection begins with the filariform larvae penetrating the skin and migrating hematogenously to the lungs. Larvae then ascend the airway, are swallowed, and finally mature in the gut. Unlike other nematodes, *S stercoralis* can autoinfect the same host and persist for decades. The different categories of infection include chronic infection, hyperinfection syndrome, and disseminated strongyloidiasis. The infection can disseminate as a result of changes in the larval phase, and this principally affects the lung. Although it is not necessary for patients to be immunosuppressed, systemic infection is often seen in such patients, and is usually more severe and frequently fatal. We report a patient who had no obvious immunodeficiency, but who suffered from hyperinfective syndrome with disseminated strongyloidosis. Initially, a pulmonary tumour was suspected, and an accurate diagnosis was only achieved by the study of cytological material. Once the definitive diagnosis was reached an appropriate therapeutic protocol was established, but the patient died two days later as a result of intercurrent pulmonary complications.

**Case Report**

A 79 year old man from Zaragoza (Aragon, Spain), who had no associations with local endemic areas or a history of travel to other countries, had suffered from abdominal discomfort for the past 20 years. Several days before admission to our hospital, the patient showed effort dyspnoea, orthopnoea with progressive malleolar oedema, and pain in the right hypochondria. The electrocardiogram and eosinophil values were within normal limits, and no other changes were seen. A chest radiograph was performed and revealed an irregular central pulmonary mass (fig 1). A bronchoscopy was carried out because of the suspicion of neoplasia, and showed narrowing in the left bronchi, with abundant brown exudates but no endobronchial tumour. Examination of cytological samples obtained from the bronchial aspirate and brushings revealed normal epithelial cells with scarce polynuclear neutrophils, lymphocytes, foamy cells, and some filariform larvae measuring approximately 300–600 μm (fig 2). All larvae showed an eosinophilic cuticle and a good state of conservation, so that their morphological characteristics could be perfectly assessed, particularly their oral cavity and the long, slim, and cylindrical oesophagus and notched tail. Based on this morphological information, the filariform larvae were identified as *S stercoralis*. Therefore, the diagnosis was infection with *S stercoralis* in the absence of immunosuppression, diabetes, alcohol abuse, and corticosteroid intake. The patient received specific treatment with thiabendazole (25 mg/kg/ twice a day), which unfortunately lasted only two days because of the fatal outcome. The evolution of the disease was unfavourable, showing pulmonary oedema, haemorrhagic alveolitis, complete atelectasia in the left lung, and hepatic and renal insufficiency. Finally, the patient died as a result of cardiorespiratory failure. Necropsy was not authorised.

**Discussion**

There are several pulmonary entities that could be confused with tumours, such as hamartoma, fungal infection, hydatid cyst, or other parasitic infections.

Although radiological techniques are important diagnostic tools, histology and cytology are the most accurate and specific methods for diagnosis. Sputum, bronchoalveolar lavage, transbronchial aspirates, brush biopsy specimens, or

Figure 1 Chest x ray showing an irregular mass near the mediastinum.
open lung biopsy specimens are useful methods to diagnose all types of pulmonary pathology. Parasitosis of the lung can produce pneumonia, pneumonitis, or Loeffler’s syndrome, and rarely it can mimic a malignant tumour. Both migrating larvae and eggs may be found in the lung and therefore demonstrated in cytological samples, allowing a correct diagnosis.

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Strongyloides stercoralis is often found in the digestive tract and produces abdominal pain, epigastric tenderness, mild gastrointestinal symptoms, and non-specific diarrhoea—as was seen in our patient—in addition to non-specific inflammatory changes that can be seen in the endoscopic-pathological studies. However, widespread dissemination involving extraintestinal organs such as the lung, skin, liver, kidneys, spleen, heart, brain, and meninges has also been described. Pulmonary infection is often seen in the hyperinfection syndrome, and is also relatively common in the case of deep autoinfection in immunocompromised patients or those with cancer. However, our patient was immunocompetent and had diabetes, malnutrition, alcoholism, and corticosteroid treatment were absent, so that initially a tumour was suspected. Our patient also lacked other predisposing factors such as achlorhydria, prolonged intestinal transit, dementia, or being an institutionalised resident. Our patient only presented symptoms mimicking peptic ulcer disease and mild malnutrition related to his age. Even though the cytological findings were surprising they led to the correct diagnosis. Different methods to achieve an accurate diagnosis have been described, and blood eosinophilia has been reported to have the best predictive value by accurate diagnosis have been described, and blood eosinophilia was not seen.

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Cytology may be essential in some cases, as was the case here, and we believe that it should be carried out for all atypical pulmonary processes.

In conclusion, we encourage the use of respiratory cytology in all patients with an atypical pulmonary clinical outcome. Cytological studies are useful in the diagnosis of lung parasitoses, especially when radiography or computed tomography do not yield a definitive diagnosis, and should be used before other more invasive procedures.

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