

## Case Report

# Hyperinfection with *Strongyloides Stercoralis*

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### ABSTRACT

A case of *Strongyloides* hyperinfection syndrome, associated with corticosteroid therapy is described here. A 69-year-old male patient was admitted with a minor stroke. A history of headache and a markedly elevated ESR prompted a temporal artery biopsy, which was consistent with temporal arteritis. Treatment was started with prednisolone 60 mg per day and the patient was discharged for follow-up. He was readmitted with a

dense hemiplegia and high fever. Blood culture grew *E.coli*. He rapidly deteriorated and died with evidence of disseminated intravascular coagulation and acute respiratory distress syndrome. Wet smears of sputum were positive for larvae of *Strongyloides stercoralis*, suggesting generalised infection. The importance of early diagnosis and therapy, and screening methods for detection of parasites in stool are discussed.

KEY WORDS: disseminated Strongyloidiasis, complications of steroid therapy, temporal arteritis

### INTRODUCTION

Strongyloidiasis is usually a benign infestation producing relatively little morbidity or mortality. Occasionally, the worm becomes invasive giving rise to severe symptoms and mortality. This occurs, most often, in the setting of immunocompromised state associated with malignancy, including lymphoma, human immunodeficiency virus (HIV) infection, or corticosteroid administration. We present a case in which hyperinfection was associated with corticosteroid administration.

### CASE REPORT

A 69-year-old Kuwaiti male was admitted for evaluation after a minor stroke. He gave a history of generalized aches, pains and headaches for about five years. Clinical examination showed mild right-sided weakness but was otherwise unremarkable. There was no temporal artery tenderness and all other peripheral pulses were normal. Computerized tomography (CT) of the head was reported normal. The only remarkable laboratory findings were a raised erythrocyte sedimentation rate (ESR) at 88 mm/hour and C reactive protein (CRP) of 61.7 mg% (N<8 mg%) along with mild hyperglobulinaemia. Plasma protein electrophoresis showed no monoclonal bands, antinuclear antibodies and rheumatoid factor were negative. Bence Jones proteins were absent in the urine. He was advised to have a bone marrow examination but refused. In view of the

headache and the markedly elevated ESR, temporal artery biopsy was advised and done. The histology was reported to be consistent with temporal arteritis.

He was started on prednisolone 60 mg daily and discharged for follow up after a few days, after showing improvement in his hemiparesis and headache. Two weeks later he was readmitted with dense right sided hemiplegia, drowsiness and fever of 38°C. Repeated CT of the head showed a recent cerebral infarction. Corticosteroids were withdrawn and he was started on IV ampicillin 1gm, 6 hourly and gentamycin 80 mg, 12 hourly after taking blood, urine and sputum for cultures. His condition progressively deteriorated with increasing drowsiness and hypotension. He became dysphonic. Further evaluation showed laboratory evidence of disseminated intravascular coagulation (DIC) and bilateral patchy consolidations on the chest X-ray. He was transferred to intensive care unit (ICU) for assisted ventilation and further management. Blood cultures were reported positive for *Escherichia coli* (*E.coli*). Ampicillin was changed to piperacillin according to culture and susceptibility result. Inotropic support was given in the form of dobutamine infusion. He was given fresh blood and platelets. He continued to deteriorate and became oliguric. He died soon after. We got the report of sputum examination on the day he died, as positive for *S.stercoralis* larvae.

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## DISCUSSION

Considering the frequency of administration of corticosteroids, hyperinfection with *S.stercoralis* must be one of its less common complications. It occurs with the immunosuppression associated with haematological malignancies including lymphoma<sup>[1]</sup> or HIV infection<sup>[2,3]</sup>. There were several reports in association with use of corticosteroids<sup>[4-8]</sup>.

The clinical manifestations in our patient were mainly those of sepsis with fever and dyspnoea followed by adult respiratory distress syndrome (ARDS) and shock. Eosinophilia<sup>[7]</sup> in an apparently septic patient could be a pointer to the diagnosis, although it was not present in our patient. Absence of eosinophilia correlates with a poorer prognosis and high mortality<sup>[9]</sup>. Gram negative bacteremia is a common complication of disseminated strongyloidiasis<sup>[7]</sup>, as in our patient. Breach of the bowel mucosa by the worms allows gut organisms access to the blood stream. Deterioration in the face of an apparently adequate antibiotic cover for gram-negative sepsis, as in our patient, may be another clue.

A high index of suspicion is necessary for diagnosis, in appropriate clinical situations, in the immunosuppressed patient living in an endemic area. If suspected, and especially if the patient is hypoxic or has radiological findings in the chest, wet smears of the sputum or broncho alveolar lavage seem to give the highest diagnostic yield<sup>[2,4]</sup>, as in our case. In many cases, the diagnosis is made accidentally by alert laboratory staff.

Screening for the parasites in the stool is recommended but may have its own problems, in addition to its low sensitivity. Thus, it should be emphasized that negative faecal smears are not absolute evidence against infection with *S.stercoralis*. Diagnosis by examination of the stool can be very difficult; ova are very often absent and larvae may be found only after prolonged search using special concentration methods (Barmann concentration technique)<sup>[10]</sup>. Stool culture methods are other lines of investigations. The ordinary agar plate culture method is easier to handle and much more sensitive than the conventional filter paper culture method and it is considered the most useful non-invasive method in the diagnosis of strongyloidiasis and in the evaluation of therapy<sup>[11]</sup>.

More invasive techniques such as examination of the duodenal aspirate or jejunal biopsy material may diagnostically be helpful<sup>[12]</sup>. In view of low sensitivity of stool examination in the diagnosis of chronic *S.stercoralis*, serological tests have been developed. One of these, enzyme linked

immunosorbant assay (ELISA) has a higher sensitivity (85-90%) in patients with parasitologically proven *S.stercoralis*<sup>[13]</sup> but it gives false positive reactions in patients with other parasitic infections, for example, filariasis or schistosomiasis. ELISA may be helpful in the evaluation of patients with unexplained eosinophilia who may have acquired the infection while visiting an endemic area. It is also valuable in detecting both symptomatic and asymptomatic infections with repeatedly negative stool examinations. However, this test is not widely available and better ordered only if diagnosis is highly suspected. In a study on 164 cases of haematological malignancies, it has been found that ELISA may be an excellent assay to rule out the diagnosis of strongyloidiasis in these patients<sup>[14]</sup>. The combination of serology and the Barmann concentration method seem to be the best diagnostic approach for *S.stercoralis* infection<sup>[15]</sup>.

It is not uniformly fatal. Recovery rates are as high as 70% with the use of thiabendazole 25mg/kg twice daily for 3-7 days. Unfortunately, thiabendazole treatment is not always effective and repeated courses may be required. Prolonged courses of thiabendazole from 5-14 days have been recommended for the treatment of immunosuppressed patients with systemic strongyloidiasis. Early diagnosis and rapid institution of therapy are the most important determinants of outcome. Ivermectin is a semisynthetic antihelminthic agent, only active against the intestinal forms of *S.stercoralis*. In one randomized study of patients infected with *S.stercoralis*, ivermectin and thiabendazole eliminated the parasite in 33 out of 34, and 17 out of 19 patients, respectively. Adverse side effects were experienced in only 18 % of patients on ivermectin, compared to 93% of those on thiabendazole<sup>[16]</sup>. An uncontrolled study<sup>[17]</sup> reported on the use of ivermectin in HIV patients with presumptive diagnosis of *S.stercoralis* hyperinfection. Sustained clinical and parasitologic cure was obtained in 8 out of 14 cases. Recently, several reports documented ivermectin as a very effective agent in the treatment of strongyloidiasis, including disseminated infections in immunocompromised patients<sup>[18]</sup>.

## Prevalence, mode of transmission & life cycle of the worm

Although most prevalent in tropical and subtropical areas *S.stercoralis* is found worldwide. The primary mode of transmission of *S.stercoralis* occurs when infective larvae in the soil

contaminated with faeces, penetrate the skin. Transmission through fecal, oral and sexual contact may also occur. *S.stercoralis* is unique in many ways. Infection is acquired when the infective filariform larvae invade the skin. These enter the circulation and reach the capillaries of the lung. They then penetrate the alveolar walls and enter the respiratory passages, traveling up the bronchi and trachea, eventually reaching the pharynx, from where they are swallowed. The larvae penetrate the mucosa of the jejunum, developing into adult worms. The female produces eggs, which hatch in the gut, into rhabditiform larvae. These either develop directly into the infective filariform larvae in the gut (internal autoinfection) or penetrate the perianal skin after being passed in the stool (external autoinfection).

They also mature into free-living adults in the soil if conditions are favorable. These produce larvae, which mature into infective filariform larvae to complete the cycle. It is possible that our patient acquired the infection through faecoral contact by means of maids and cooks in the Kuwaiti houses.

Symptoms can be present in three stages - skin penetration stage, with rash (*larva currens*) a rapidly spreading creeping eruption on the legs or perianal area, larval migration or pulmonary stage, (*visceral larva migrans* or *Loeffler's syndrome*) with fever, cough, eosinophilia and lung infiltrates and intestinal penetration stage with abdominal pain, diarrhoea, malabsorption or intestinal obstruction. Auto-infection can maintain the worms in the body for as long as forty years, so that persons who have ever been in an endemic area or have been exposed to the worm are at risk if they become immunocompromised. Due to the potential for dissemination when immunosuppressed, treatment is recommended for all suspected cases whether symptomatic or not.

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