**Strongyloides stercoralis Hyper Infection in an Immunocompromised Patient a Case Report**

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**Abstract:**

**Background:** Strongyloidiasis is an intestinal parasitic disease caused by the nematode *Strongyloides stercoralis* and is common in tropical countries. In immunocompromised hosts, the overwhelming accelerated autoinfective cycle can potentially lead to a life-threatening illness with multi-organ failure due to a massive larval invasion known as hyperinfection syndrome.

**Case Presentation:** A 46 years old female farmer (the patient was immunocompromised as she took high dose steroids for about four years as treatment for rheumatoid arthritis) was admitted at Regional Institute of Medical Sciences, Imphal, hospital in the Department of Medicine with chief complaints of swelling of limbs for 3 months and intermittent pain in the abdomen (colicky in nature) for one month, with nausea, vomiting and dark coloured watery diarrhoea for 10 days. Her stool was examined and a large number of rhabditiform larvae of *Strongyloides stercoralis* were seen in stool wet mount microscopy. She was treated with subcutaneous ivermectin.

**Conclusion:** Hyperinfection by *Strongyloides stercoralis* was found in this case which is a common finding in immunocompromised patients. Early diagnosis and aggressive treatment with subcutaneous ivermectin should be done to save the life of the patient.

**Keywords:** hyperinfection, immunocompromised, autoinfection

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**I. Introduction**

*Strongyloides stercoralis* is a soil-transmitted intestinal nematode that infects people, especially in tropical and subtropical regions \(^{(1)}\). The usual route of transmission is by penetration of the skin by filariform larvae (infective form), following contact with contaminated soil \(^{(1)}\). The results of several studies have documented an association of disseminated *Strongyloides* infection with malignant tumors, severe malnutrition, prolonged steroid therapy and renal transplantation \(^{(2)}\).

In immunocompetent hosts, the infection commonly leads to minor symptoms such as transient diarrhoea and abdominal pain, and may be asymptomatic and latent for decades \(^{(3)}\). In immunocompromised hosts, the overwhelming accelerated autoinfective cycle can potentially lead to a life-threatening illness with multi-organ failure due to a massive larval invasion known as hyperinfection syndrome \(^{(4)}\).

Hyperinfection syndrome is not exactly defined, but the hallmark is an increase in the number of larvae in the stool and/or sputum along with the manifestations confined to respiratory and gastrointestinal systems \(^{(4)}\). Hyperinfection syndrome is estimated to happen in 1.5 to 2.5 % of the patients with strongyloidiasis \(^{(5)}\). The reported mortality rate of this hyperinfection syndrome is high (up to 87%), highlighting the importance of prophylactic anthelmintic treatment in immunocompromised patients \(^{(6)}\). The intestinal ileus associated with the hyperinfection syndrome can reduce the bioavailability and the efficacy of an oral formulation of anti-parasitic drugs and should also be treated with subcutaneous ivermectin \(^{(3)}\).

**II. Case Report**

A 46 years old female, farmer by profession from a rural area of Imphal was admitted in the Department of Medicine, Regional Institute of Medical Sciences, Imphal, hospital with chief complaints of swelling of limbs for 3 months and intermittent pain in the abdomen (colicky in nature) for one month and also complained of nausea, vomiting, breathlessness and dark coloured watery diarrhoea for 10 days. As per the patient, bladder, bowel and sleep pattern were normal. The patient complained of loss of appetite for about four months before admission. There was past history of prolonged high dose corticosteroid therapy for 4 years for the treatment of rheumatoid arthritis as per the patient after thorough evaluation.

On clinical examination, her BP was low with a value of 60/90 mm Hg, she had pallor, edema, especially over the lower limbs and looked severely malnourished. All the laboratory investigation done on the
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Day of admission were found normal except for low level of total serum protein (3.5 gm%) & serum albumin (1.2 gm%); low Hb level of (10 gm%), and eosinophilia (12%). Patient is neither hypertensive nor diabetic and has no history of tuberculosis as well as is found negative for hepatitis B, C and HIV.

Stool R/E was done on the third day of admission and it showed a large number of Strongyloides stercoralis rhabditiform larva (≥35 larvae per ocular field) Fig-1. Fresh stool was taken and 25 gm of it was processed by adopting modified Baermann funnel technique5 for further observation (using a stereoscopic dissecting binocular microscope) and morphotaxonomical studies. The larva when observed under a compound microscope having a high magnifying power (Nikon, Eclipse E-200), was found to have possess features like shallow buccal cavity, short oesophagus, attenuated tail5 and a distinct easily visible genital rudiment. All these characters/morphological features are the taxonomically important and valid diagnostic features for systematic study of the rhabditiform larvae of Strongyloides stercoralis. Thus, based on the presence of these taxonomically valid characters, the larva has been identified as rhabditiform larva of S.stercoralis.

III. Discussion

Strongyloides stercoralis are found in warm and humid soil. Filariform larvae infect humans through the skin of bare feet. After infection, larvae migrate to the duodenum and grow into mature females. Rhabditiform larvae hatched from eggs are excreted from the host along with faeces. However, some develop into filariform larvae and reinfect through the colon or anal skin (autoinfection). Once infected, the infected individual remains in a carrier state for a long time6.

Strongyloides stercoralis hyperinfection syndrome has been described in immunocompromised patients. The most common predisposing factors are the use of prolonged and high dose steroids and HTLV-I infection8. Other underlying diseases leading to immunodeficiency such as lymphomas, leukemias, or infection with human immunodeficiency virus have been reported to facilitate Strongyloides hyperinfection9. In hyperinfection and dissemination, complete disruption of the mucosal patterns, ulcerations, and paralytic

![Fig-1: Showing large no fo Strongylodes stercoralis in the stool under compound microscope](image-url)
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ileus have been observed. Bacterial and fungal infections often occur in cases of hyperinfection because of the leakage of gut flora from a bowel damaged by moving larvae\(^{10}\).

Ivermectin is now recognized as the drug of choice for treating disseminated strongyloidiasis, compared to thiabendazole and albendazole, as it shows comparable and better rates of larval clearance and fewer and comparable side effects than the latter two drugs\(^ {11}\). However, since the clinical features of Strongyloides stercoralis hyperinfection include intestinal ileus, oral absorption of the drugs may be impaired\(^ {12}\).

Although the gastrointestinal tract is the primary site of Strongyloides infection, associated symptoms such as abdominal pain and intermittent diarrhea may be vague; if ignored by the clinician, lead to fatal dissemination and clinical deterioration of the patient like in our case. Eliciting an appropriate occupational and drug history from patients are the essential epidemiological clues for establishing early diagnosis.

As the stool sample of the patient was delayed in sending to our laboratory, diagnosis was delayed and hence despite immediately starting subcutaneous ivermectin after our reporting the patient died with respiratory failure after 3 days of treatment.

IV. Conclusion

On the basis of our finding, we recommend early routine testing of patients for stool examination especially for patients who are residing from rural areas and engaged in farming. Strongyloides hyperinfection should be kept as a differential and highly suspected in an immunosuppressed patient with abdominal pain presenting with watery diarrhea, generalized edema, eosinophilia and low protein levels and this should be followed by early intensive treatment with subcutaneous ivermectin.

References


