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# *Strongyloides stercoralis* Infection in a Patient with Crohn's Disease: A Case Report

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**Abstract** **Case Report**

*Strongyloides stercoralis* is a common nematode in sub-Saharan Africa and Southeast Asia. It is mostly asymptomatic, but if symptoms are present, they are usually associated with vague gastrointestinal complaints. Hyperinfection may occur due to dissemination of Strongyloides stercoralis in immunocompromised patients, particularly those receiving corticosteroid therapy. We hereby present a case of S. *stercoralis* infection in a sixteen-year-old patient who had a one-year history of Crohn's disease, initially treated with long-term corticosteroid therapy and later switched to biotherapy. While under biotherapy, the patient developed an infectious syndrome with elevated inflammatory markers and respiratory symptoms, without any pathogens detected in multiple microbiological tests. Parasitological stool examination finally revealed S. stercoralis infection. The patient was then prescribed 400 mg/day of albendazole and showed significant clinical improvement, with normalization of various biological tests.

**Keywords**: Strongyloides Stercoralis, Crohn's Disease, Immunosuppression, Hyperinfection, Biotherapy.



## INTRODUCTION

*Strongyloides stercoralis* is a roundworm (nematode) that causes the disease known as strongyloidiasis [1]. It has been estimated to affect over 600 million people worldwide, and is of particular clinical importance due to its ability to cause chronic infection that can become life-threatening in the setting of immunosuppression [1].

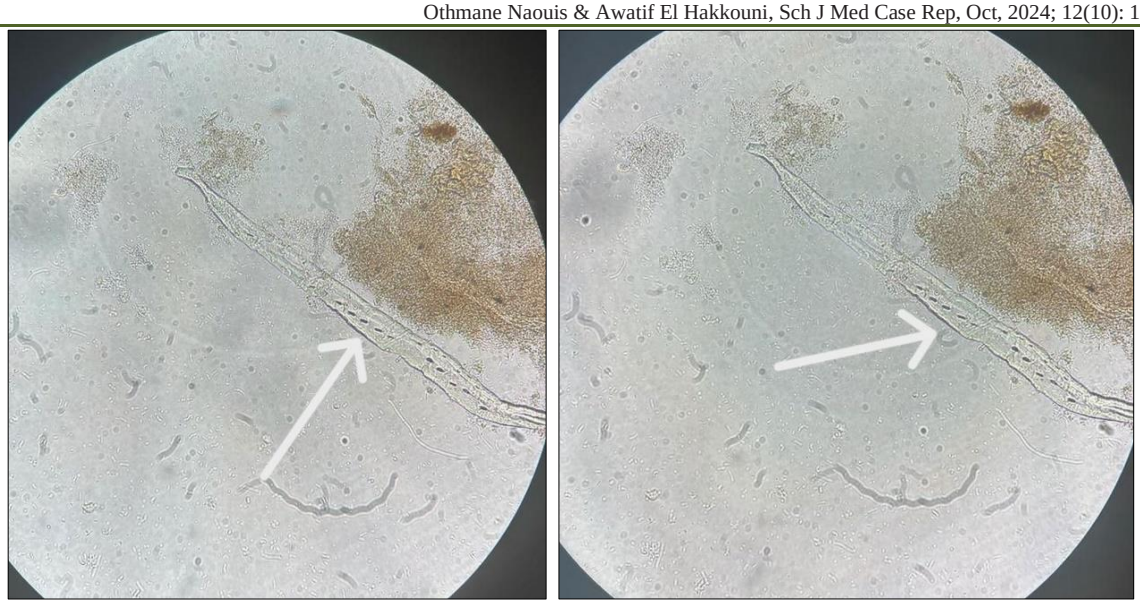
Infection with S. stercoralis is most often clinically asymptomatic [2], but symptomatic individuals may complain of diarrhea, constipation, intermittent vomiting or borborygmus. Dermatologic manifestations such as recurrent urticaria can occur as can larva currens, as a result of migrating larvae [2].

## CASE REPORT

A sixteen-year-old patient presented with a one-year history of Crohn's disease that initially required long-term oral, then intravenous (IV), corticosteroid therapy plus Mesalazine, and was later switched to infliximab injections. The patient was scheduled for his fourth infliximab injection but presented with a fever of 38.2°C, pulmonary symptoms (such as coughing and mild dyspnea), and gastrointestinal symptoms (such as abdominal pain, anorexia, and diarrhea). A microcytic hypochromic anemia (hemoglobin = 9.6), a normal eosinophil count, and elevated inflammatory markers, such as CRP at 96, were noted, but no pathogens were detected in multiple bacteriological and viral tests. A parasitological stool examination was performed to rule out any underlying cause. After the Baermann technique was applied to fresh stool, microscopic examination revealed larval forms of S. stercoralis [Figures 1, 2].

The patient was prescribed 400 mg/day of albendazole for five days. The patient then showed a significant regression of fever, abdominal symptoms (regression, then disappearance of abdominal pain, normalization of bowel transit after a few days, and regression of anorexia), and a significant reduction in coughing and dyspnea as well.

A parasitological stool examination using the Baermann technique was repeated at the end of treatment and found no larvae of Strongyloides stercoralis.



**Figures 1, 2: Larval forms of *Strongyloides stercoralis* seen under optical microscope (objective x10) after Baermann technique was used on the stool**

## DISCUSSION

*Strongyloides stercoralis* is a helminth widely distributed in tropical and subtropical countries. Its infestation in humans usually does not produce symptoms. However, in some patients, severe and life-threatening forms of this infection can occur, especially in immunocompromised individuals [3]. A rare and characteristic feature of autoinfection occurs in its life cycle. As a result, whenever there is an immune imbalance between the host and the parasite, life-threatening complications like hyperinfection syndrome and disseminated tissue infestation can occur [3].

The innate immune response to *S. stercoralis* larvae is characterized by the recruitment of neutrophils, macrophages, and eosinophils to the parasite, while the adaptive immune response induced by immunization with live larvae is highly effective, with more than 90% of the challenge larvae killed within 24 hours [4].

Certain conditions have been recognized to affect the immune system, putting the host at risk for the development of hyperinfection syndrome and dissemination, such as HTLV-1 infection, corticosteroid use, transplants, alcoholism, HIV, and malnutrition [5].

This was indeed the case for our patient, who had been taking not only corticosteroids (oral and IV forms) and Mesalazine for more than 6 months, but had also been switched to infliximab injections for his Crohn's disease. We can presume that our patient was already at high risk of developing hyperinfection syndrome and general dissemination.

It has been reported in an article by Yanik and al. the case of a 55-year-old male patient who had been followed for 25 years with a diagnosis of ankylosing spondylitis and had been taking corticosteroids for a very long period, as well as infliximab for the last five years [6].

*Strongyloides stercoralis* is an intestinal nematode of humans that infects tens of millions of people worldwide. S. stercoralis is unique among intestinal nematodes in its ability to complete its life cycle within the host through an asexual autoinfective cycle, allowing the infection to persist in the host indefinitely. Under some conditions associated with immunocompromised, this autoinfective cycle can become amplified into a potentially fatal hyperinfection syndrome, characterized by increased numbers of infective filariform larvae in stool and sputum, and clinical manifestations of the increased parasite burden and migration, such as gastrointestinal bleeding and respiratory distress. *S.stercoralis* hyperinfection is often accompanied by sepsis or meningitis with enteric organisms. Glucocorticoid treatment and human T-lymphotropic virus type 1 infection are the two conditions most specifically associated with triggering hyperinfection, but cases have been reported in association with hematologic malignancy, malnutrition, and AIDS. Anthelmintic agents such as ivermectin have been used successfully in treating hyperinfection syndrome as well as for primary and secondary prevention of hyperinfection in patients whose exposure history and underlying condition put them at increased risk [7]. The patient complained of swelling in the right foot and abdominal pain. Blood tests revealed a CRP of 94.8, a sedimentation rate of 82 mm/h, and normal eosinophils (2%-6.2%). Microscopic examination of the stool revealed S. stercoralis in both Lugol and formaldehyde ether precipitation. The patient was prescribed albendazole 400 mg/day for 7 days, and at the end of the treatment, no larvae were found in the stool examinations [6]. Our patient was taking the same

medications as in the case reported by Yanik and al. He presented with abdominal symptoms and showed an elevated CRP and a normal eosinophil count. However, our patient did not present any dermatological symptoms (such as swelling or larva currens) compared to the case reported, but both patients showed remarkable improvement after being prescribed albendazole 400 mg/day.

It has also been reported in Clinical Microbiology Reviews by Keiser *et al*., which focused on different aspects of strongyloidiasis management in the immunocompromised population, that patients at higher risk of developing hyperinfection and dissemination are generally those receiving immunosuppressive drug therapy (such as glucocorticoids or cyclosporine), certain types of chemotherapy agents (e.g., vincristine), those with hematologic malignancies, immunocompromising viral infections (e.g., HTLV-1, HIV), hypogammaglobinemia, or malnutrition [7]. It was also reported that the most common clinical manifestations of acute strongyloidiasis are pulmonary symptoms, such as cough and tracheal irritation, mimicking bronchitis, and gastrointestinal symptoms (diarrhea, constipation, anorexia, abdominal pain), which begin about two weeks after infection, with larvae detectable in the stool after three to four weeks [7], which was the case in our report. It was also reported that a local reaction at the site of larval entry can occur almost immediately and may last up to several weeks, though this was not the case for our patient.

It was also recommended for immunocompromised patients to monitor for hyperinfection syndrome, especially if they present with fever and chills (not uniformly present and should prompt a search for an associated bacterial infection), fatigue, weakness, total body pain, and emphasis on any gastrointestinal, pulmonary, dermatological, or central nervous system manifestations. Blood counts during hyperinfection may show eosinophilia, but more often show a suppressed eosinophil count [7]. The patient in our case report presented with fever, which led to a search for bacterial or viral infection, and also presented with pulmonary symptoms, such as coughing, and especially gastrointestinal symptoms, as described before. The eosinophil count was normal, which suggests either acute strongyloidiasis or hyperinfection syndrome with suppressed eosinophil count.

Keiser *et al*., also studied diagnostic methods and reported that relying on stool studies alone for screening is inadequate and likely less sensitive for asymptomatic patients. However, they emphasized the efficiency of the Baermann and formalin-ethyl acetate concentration techniques in improving the sensitivity of stool exams. They also mentioned that serologic testing is very sensitive, although not specific, and can lead to false-positives [7], For our case, we primarily used the Baermann and formalin-ethyl acetate concentration methods on stool exams for diagnosis.

It was also reported that azole drugs (such as albendazole or mebendazole) have been shown to clear *S.stercoralis* larvae from the stool in 38% to 45% of patently infected individuals and normalize serologies in 75% of chronically infected individuals in whom larvae were not detectable, with few side effects. Compared to albendazole, ivermectin has shown better rates of larval clearance from stool with a similarly favorable side-effect profile [7]. In our case report, the patient was prescribed 400 mg/day of albendazole for five days, and a parasitological stool examination using the Baermann technique was repeated at the end of treatment, showing no *Strongyloides stercoralis* larvae.

This discussion emphasizes the importance of testing for Strongyloides in immunocompromised patients, as highlighted in a public letter by the Spanish Society of Nephrology [8].

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