

Strongyloides Infection in an Immunocompromised Patient - A Case Report

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Introduction. Strongyloidiasis is a parasitic disease caused by infection with *Strongyloides stercoralis*. While most human infections with *Strongyloides stercoralis* are asymptomatic or chronic, immunocompromised populations, such as those on corticosteroid therapy or with HTLV-1 co-infection, may experience a variety of clinical manifestations and develop severe overinfection syndromes. Here, we present a case of strongyloidiasis infection in a patient with rheumatoid arthritis who was receiving long-term hormone therapy.

Keywords. Strongyloides disease, strongyloides, strongyloidiasis, *Strongyloides stercoralis*, strongyloides over infection syndrome, corticosteroids, immunocompromised patients

INTRODUCTION

Strongyloidiasis is a soil-transmitted helminthiasis, a parasitic disease caused by infection with *Strongyloides stercoralis*.^{1,2} A small portion is caused by *Strongyloides fuelleborni fuelleborni*.² According to statistics, there are approximately 3-10 billion infected people worldwide, mainly in tropical, subtropical and temperate regions.¹ The most common symptoms of strongyloidiasis in humans are hives, abdominal pain, and diarrhea.³ In most cases, strongyloidiasis is asymptomatic or chronic.^{3,4} However, if an infected person is immunocompromised, the helminth population increases dramatically and the infection spreads, leading to fecal worm overinfection, which can lead to serious consequences such as respiratory failure and shock.⁵

Humans are commonly infected by contact with soil contaminated with the filariform larvae through behaviors including, but not limited to, walking barefoot and contact with contaminated water.⁶ The life cycle of strongyloides is primarily divided into a free-living cycle and a parasitic cycle that alternate between the two.^{2,6} When humans come into contact with contaminated soil, the filamentous larvae penetrate the human skin, enter the bloodstream to reach the lungs, pass through the tracheobronchial tree into the gastrointestinal tract² and reproduce asexually in the host.⁶ Adult females *Strongyloides* parasitize the human small intestine, laying eggs in the duodenal mucosa that hatch into rhabditiform larvae and are excreted in the feces. In warm, moist soil, rhabditiform larvae molt to become infective threadlike larvae or develop into free-living adults.^{2,6} Sexual reproduction occurs only in the free-living stage.² Some rhabdoid larvae rhabditiform into invasive filarial larvae before excretion, and can invade the intestinal wall or perianal skin to reinfect the host and achieve indefinite autoinfection.² Here I will report a case of strongyloidiasis.

CASE PRESENTATION

A middle-aged woman with a 10-year history of rheumatoid arthritis and hypertension, who had been taking 4 milligrams of prednisone tablets daily for an extended period,

presented to the clinic with a three-day history of fever and diarrhea. The patient's CT scan suggested gallbladder stones and mild dilatation of the common bile duct. A complete blood count revealed anemia, thrombocytopenia (leukocyte count 4.1×10^9 /L, neutrophil percentage 90.5%, eosinophils normal, hemoglobin 104g/L, platelet count 70×10^9 /L), renal insufficiency (creatinine 115 μ mol/L), high C-reactive protein (73.83 mg/L), and a markedly elevated procalcitonin (24.79ng/ml), and normal stool test results. The patient was admitted to the internal medicine ward with cholecystitis and sepsis. During hospitalization, the patient received treatment including piperacillin tazobactam, albumin supplementation, and other interventions. MRI results showed multiple stones in the gallbladder and cholecystitis, as well as small stones in the lower part of the common bile duct. During this period, the patient's inflammatory indices were slightly elevated, and creatinine levels were also elevated due to infection-related renal dysfunction. In response, piperacillin tazobactam was discontinued and the anti-infective regimen was changed to meropenem. The patient had mildly elevated levels of brain natriuretic peptide (BNP) and troponin. It was determined that the patient had congestive heart failure and was treated accordingly to improve cardiac function. When the patient's inflammation index decreased and the patient's condition improved, the patient was discharged after step-down antibiotic treatment. Half a month after being discharged, the patient was readmitted to the hospital because of abdominal pain and diarrhea more than 10 times a day, accompanied by nausea, cough, and other symptoms. The patient's vital signs were recorded as follows: temperature of 36.6 degrees Celsius, pulse rate of 105 beats per minute, respiration rate of 16 breaths per minute, and blood pressure of 80/59 mmHg. The CT scan revealed that the lower lobe of the right lung is infected, and the patient also has thickening of the transverse colon and rectal wall, as well as gallbladder stones and mild dilatation of the common bile duct. Blood routine shows elevated leukocytes (leukocyte count 16.5×10^9 /L, neutrophil count 14.54×10^9 /L, neutrophil percentage 88.1%), the C-reactive protein is 59.62 mg/L. The patient's albumin level has significantly dropped to only 23 grams per liter. Albumin has dropped significantly to only 23 grams per liter. After being diagnosed with gallbladder stones with cholecystitis and pneumonia again, the patient was restarted on piperacillin-tazobactam while continuing to receive corticosteroids and leflunomide for rheumatoid arthritis. The patient was given supplemental albumin, vasoactive drugs to increase blood pressure, and other symptomatic treatments, but unfortunately, the patient's symptoms did not improve. The possibility of a fungal infection was considered, and fluconazole tablets 200 mg daily were added for antifungal treatment. Because of the patient's unstable condition, the patient was transferred to the intensive care unit. During this time, three stool cultures and egg collection tests were negative. The fourth fecal smear showed the presence of parasites, thought to be fecal nematodes, with rod-like larvae (Figure 1.) Corticosteroids were discontinued and Albendazole tablets were added at a dose of 2 tablets daily for 5 days. Unfortunately, the patient subsequently developed multiple organ failure. Despite continued efforts, the family eventually decided to discontinue treatment, and the patient passed away.

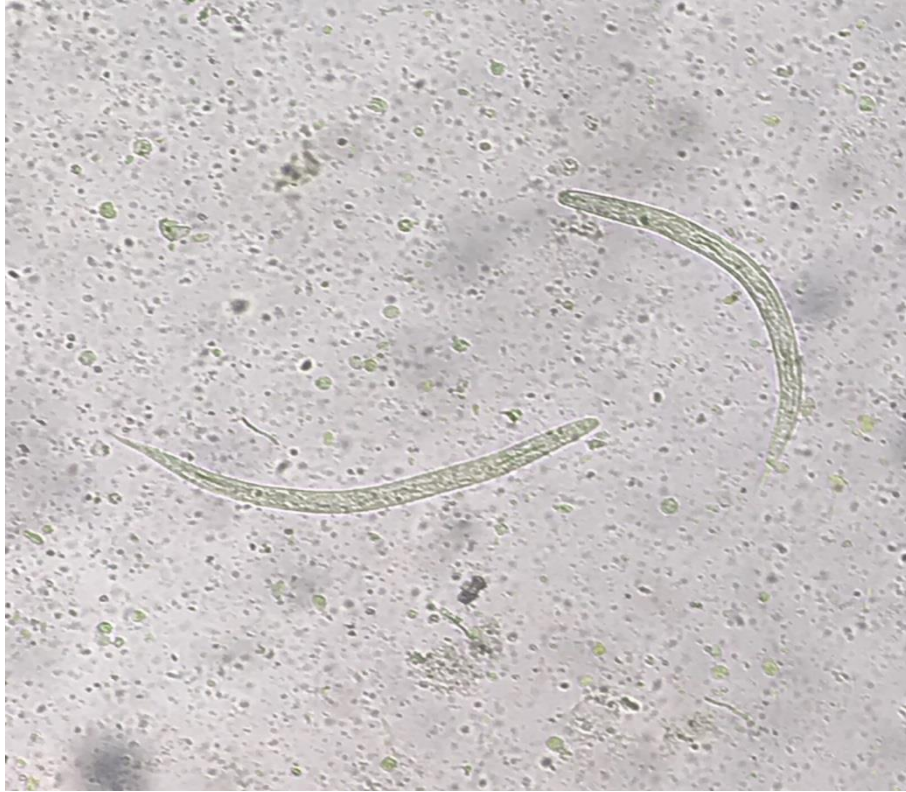


Figure 1. Microscopic stool examination revealed a larva of *Strongyloides stercoralis*

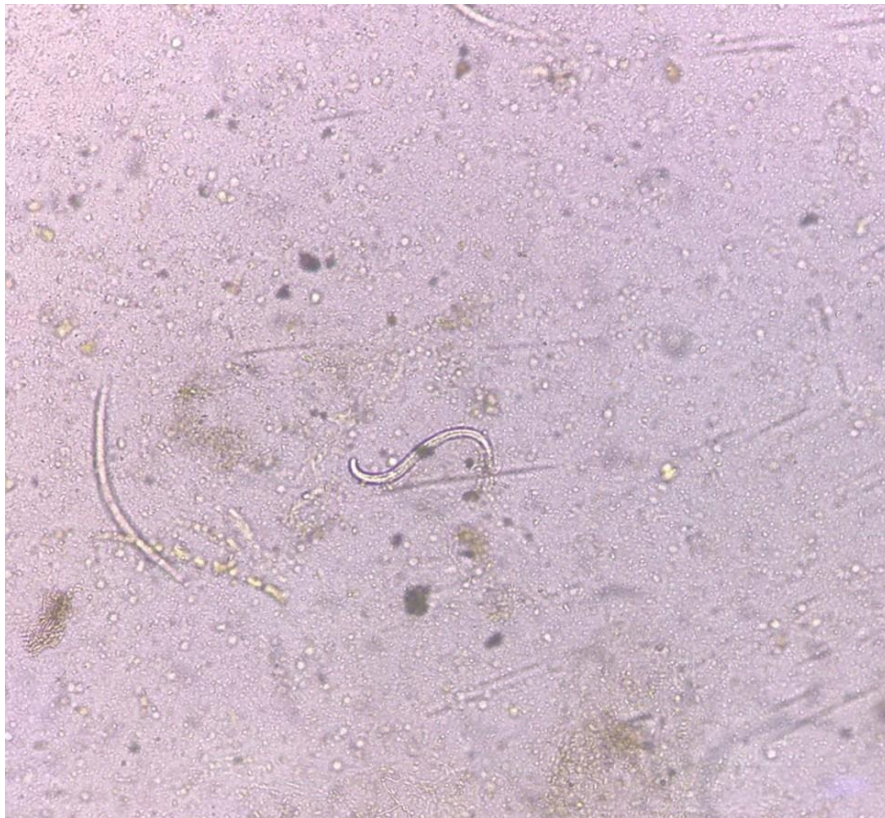


Figure 2. Microscopic stool examination revealed a larva of *Strongyloides stercoralis*.

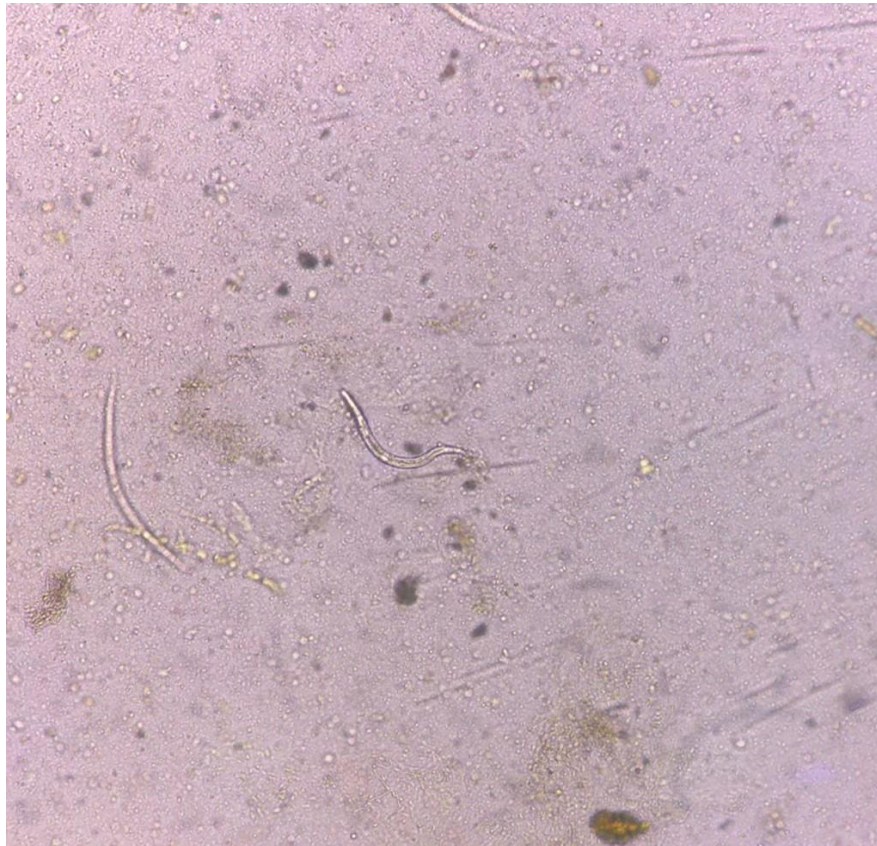


Figure 3. Microscopic stool examination revealed a larva of *Strongyloides stercoralis*.

DISCUSSION

Strongyloides stercoralis infection can lead to chronic intestinal infections, asymptomatic or symptomatic autoinfections, and disseminated hyperinfection syndromes.^{7,8} Asymptomatic, chronic, or mildly symptomatic infections are frequently observed in patients with normal immune function.⁸ If symptomatic, it may present with a variety of clinical manifestations related to the pathways by which the larvae migrate to the small intestine; cutaneous, gastrointestinal, and pulmonary symptoms may be present. If the larvae penetrate the skin, localized skin edema or urticaria and pruritic streaks may occur.² Symptoms of respiratory irritation, such as a dry cough, shortness of breath, or asthma symptoms, may occur within a week of *Strongyloides stercoralis* infection.^{7,8} Abdominal pain, diarrhea, constipation, and anorexia may occur if the larvae infect the intestines.^{2,7} Blood counts may show eosinophilia or elevated IgE levels.^{2,7} Immunosuppressed patients, such as those treated with corticosteroids or co-infected with HTLV-1, have a large population of larvae and may develop overinfection syndrome.^{7,8} Overinfection syndrome can present with a range of gastrointestinal symptoms, including abdominal pain, diarrhea,

constipation, bowel obstruction, and gastrointestinal bleeding.⁸ Pneumonia, gram-negative bacteremia, meningitis, respiratory failure, and hypoalbuminemia are common complications of severe strongyloidiasis.⁹ In patients with severe strongyloidiasis, the number of larvae in feces and sputum is increased.² Fardet et al. reported positive blood and cerebrospinal fluid cultures in 29.1% (44/151) and 15.2% (23/151) of patients with severe strongyloidiasis, respectively; most of the microorganisms identified were enteric pathogens.⁹

The definitive diagnosis of *Strongyloides* infection is usually achieved by examining *Strongyloides faecalis* larvae in feces and duodenal fluid. However, in most uncomplicated cases, the intestinal worm loads are low, and in up to 70% of cases, nematodes cannot be detected by a single fecal examination.¹⁰ Direct examination of fecal samples can result in false negative results due to low parasite loads and irregular shedding.⁹

The patient, who had a history of rheumatoid arthritis for more than 10 years, had been taking steroids for a long time, which caused the patient to be immunosuppressed and vulnerable to the spread of the disease, leading to over-infection syndrome. Due to the difficulty in detecting strongyloidiasis, it is easy to delay the patient's disease and further aggravate the infection. This patient was seen and hospitalized twice for non-specific symptoms such as abdominal pain, diarrhea, nausea, vomiting, and fever, and stools were sent for examination several times. However, the correct diagnosis was not made until the 4th stool examination on the 2nd hospitalization. During the patient's first hospitalization, the primary complaints were abdominal pain and fever. At that time, the patient had an elevated inflammatory index, and repeated blood tests showed a normal eosinophil count. A positive result on CT examination suggested the presence of gallbladder stones with cholecystitis. These clinical manifestations tend to confuse us and make it difficult to think that the patient was infected with parasites at the same time. Obviously, the patient had a history of rheumatoid arthritis, was on hormone therapy for a long time, and was in a state of immunosuppression, with a high risk of infection by multiple pathogenic microorganisms. However, due to the low detection rate of *Strongyloides stercoralis*, it was difficult to detect the patient's parasitic infection, which could easily lead to delay and exacerbation of the disease. This patient had severe gastrointestinal symptoms and shock on the patient's second visit, with CT suggesting pneumonia and intestinal wall thickening, and was already in the *Strongyloides stercoralis* overinfection syndrome. The patient's constellation of significant gastrointestinal symptoms, pneumonia, hypoproteinemia, shock, and multiple organ failure suggested that the *Strongyloides stercoralis* was rapidly spreading throughout the patient's body. Despite the fact that albendazole was administered at the first sign of parasitic infection, the patient's life was not saved.

Therefore, early diagnosis and prompt treatment of severe infections or diffuse disease are crucial in improving patient prognosis. Currently, the mainstay of treatment is to reduce the patient's immunosuppressive state,⁶ with concomitant administration of drugs that kill strongyloides, such as ivermectin, albendazole,

mebendazole, and thiabendazole.¹¹

CONCLUSION

Given the low detection rate of *Strongyloides stercoralis* infection and the potential for over-infection syndrome in immunosuppressed patients, it is essential to remain vigilant for the possibility of parasitic infections when patients present with cutaneous, respiratory, or gastrointestinal symptoms during an immunosuppressed patient's visit.

Early recognition and treatment are important for patients, as prompt intervention can improve outcomes and reduce the risk of complications.

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