# Strongyloides stercoralis Hyperinfection with SARS-CoV-2 Coinfection in a Renal Transplant Recipient

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## ABSTRACT

A 74-year-old man with a history of kidney transplantation and recent pulse corticosteroid therapy was admitted with fever and abdominal pain, initially attributed to a urinary tract infection. His condition progressed with hemoptysis, dyspnea, and respiratory failure, and he was diagnosed with Strongyloides stercoralis hyperinfection syndrome, confirmed by colonic biopsy and bronchoalveolar lavage (BAL), with concurrent SARS-CoV-2 infection. Treatment with ivermectin and albendazole was initiated, leading to clinical recovery and parasitic eradication. Notably, the patient had negative stool parasitological tests before transplantation. Strongyloides stercoralis infection is prevalent in tropical and subtropical regions. Diagnosis is challenging due to the low sensitivity of stool tests and the limited availability of molecular methods, which may delay treatment.

**Keywords:** hyperinfection, Strongyloides stercoralis, COVID-19, immunosuppression, kidney transplantation, glucocorticoids.

### Hiperinfección por Strongyloides stercoralis en coinfección viral por Sars-Cov- 2 en paciente trasplantado renal

## RESUMEN

Masculino de 74 años, con trasplante renal y pulso de corticoides reciente, ingresa con fiebre y dolor abdominal, inicialmente atribuida a infección urinaria. Evoluciona con hemoptisis, disnea e insuficiencia respiratoria; se diagnostica síndrome de hiperinfección por *Strongyloides stercolaris* confirmado por biopsia colónica y lavado broncoalveolar en coinfección con SARS-CoV-2. Se inicia tratamiento con ivermectina y albendazol, logrando recuperación clínica y erradicación parasitaria. Cabe destacar que el paciente había presentado coproparasitológicos negativos en la evaluación pretrasplante. La infección por Strongyloides stercoralis es prevalente en regiones tropicales y subtropicales. El diagnóstico es desafiante por la baja sensibilidad de pruebas fecales y la limitada disponibilidad de métodos moleculares, lo que puede retrasar el tratamiento.

**Palabras clave:** hiperinfección, Strongyloides stercoralis, COVID-19, inmunosupresión, trasplante renal, glucocorticoides.

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## INTRODUCTION

*Strongyloides stercoralis* infection poses a diagnostic challenge in immunocompromised patients, particularly in solid organ transplant recipients. Immunosuppression may precipitate severe manifestations such as hyperinfection syndrome, which is associated with high mortality. Glucocorticoid therapy, even when administered for short periods, is one of the main triggering factors. Coinfection with respiratory viruses, such as SARS-CoV-2, may further worsen the clinical course and delay timely diagnosis, yet it has rarely been reported. In addition, the limited sensitivity of traditional diagnostic methods, such as stool parasitological examination, makes early detection difficult. Here, we report the case of a renal transplant recipient with chronic immunosuppression and recent corticosteroid therapy who developed *S. stercoralis* hyperinfection syndrome associated with concomitant pulmonary viral infection. This case underscores the importance of vigilance in endemic regions and highlights the need for more effective diagnostic and preventive strategies for patients at risk.

## CASE REPORT

A 74-year-old man, originally from Paraguay, where he lived until the age of 18, had a medical history of chronic kidney disease of unknown etiology and underwent kidney transplantation in June 2024. During the pre-transplant evaluation, isolated laboratory records showed a total leukocyte count of 7,900 cells/µL and 32% eosinophils. Two serial stool parasitological examinations were performed, both of which were negative for parasites. The eosinophilia was interpreted as likely of allergic origin.

In March 2025, the patient developed an episode of borderline acute rejection in the setting of progressive decline in glomerular filtration rate. He required hospitalization for three days and received pulse therapy with methylprednisolone (250 mg/day). He was discharged without complications.

On March 19, he was readmitted with a one-week history of hyporexia, asthenia, and diffuse abdominal pain, associated with fever up to 39 °C at home. At admission, he was receiving meprednisone 4 mg/day, tacrolimus 2.5 mg/day, and everolimus 2 mg every 12 hours. Initial studies revealed acute worsening of chronic kidney disease and abnormal urinary sediment. Urine culture grew extended-spectrum β-lactamase–producing *Escherichia coli*, and chest and abdominal computed tomography showed findings compatible with colitis. The clinical picture was interpreted as a complicated urinary tract infection, and empirical antibiotic therapy with meropenem was initiated.

During the first day of hospitalization, the patient presented an episode of hematochezia without hemodynamic compromise. A colonoscopy was performed, revealing erythematous and congestive mucosa without active bleeding.

On the ninth day of hospitalization, the patient developed dyspnea, tachypnea, worsening ventilatory mechanics, dry cough, and hemoptysis, with oxygen desaturation on room air. Multiplex PCR for respiratory viruses was positive for SARS-CoV-2, rhinovirus, and enterovirus. Chest computed tomography showed diffuse bilateral infiltrates with a reticulonodular pattern (Fig. 1), and bronchoalveolar lavage (BAL) yielded hemorrhagic fluid. The clinical picture was interpreted as diffuse alveolar hemorrhage likely of infectious origin. Broad-spectrum antibiotics, remdesivir, high-dose corticosteroids, nebulized tranexamic acid, and ventilatory support with high-flow nasal cannula were initiated. Despite these measures, the patient's condition deteriorated, requiring orotracheal intubation and mechanical ventilation on day 11 of hospitalization.

At the same time, the histopathological report of the colonic biopsies became available, revealing the presence of nematodes compatible with *Strongyloides stercoralis* (Fig. 2). Based on this finding, the direct microscopy of the BAL (Fig. 3) was reviewed, where larval forms were also identified. In light of these findings, on day 13 of hospitalization, the diagnosis was revised to Strongyloides hyperinfection syndrome associated with concomitant viral infection in the setting of intense immunosuppression.

Antiparasitic therapy with ivermectin 12 mg/day and albendazole 400 mg every 12 hours was initiated. The patient showed favorable clinical evolution, with progressive respiratory improvement and uncomplicated extubation. He completed a 14-day course of treatment, later transitioning to ivermectin monotherapy at 12 mg/day.

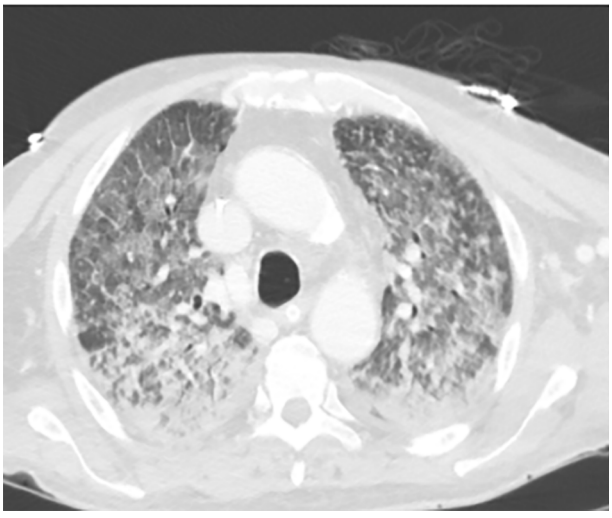

**Figure 1.** Axial chest computed tomography. Alternative text for visual assistance: Axial chest CT obtained above the carinal bifurcation and below the aortic arch. In the lung parenchymal window, a bilateral reticulonodular pattern can be observed, predominantly involving the posterior and central regions.

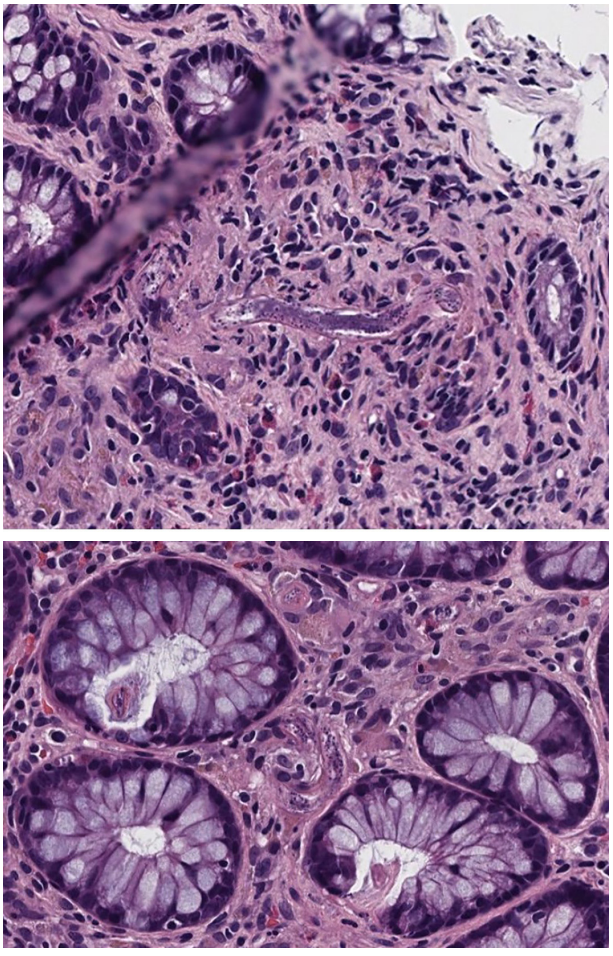

**Figure 2.** Histopathology of a left colon biopsy.

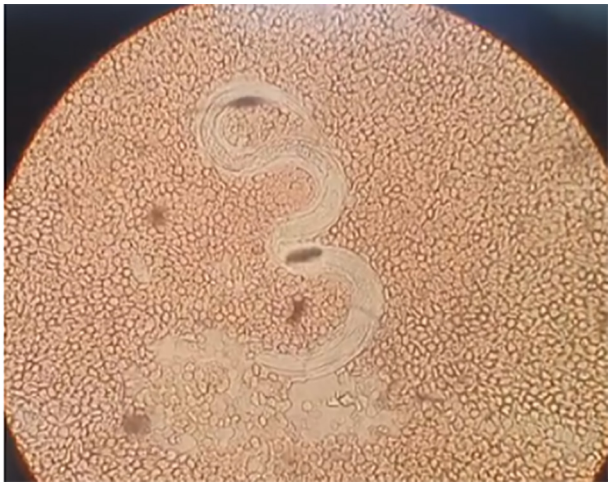

**Figure 3.** Direct microscopy of a bronchoalveolar lavage sample. Alternative text for visual assistance: Direct microscopy of a bronchoalveolar lavage specimen showing a well-defined, tortuous elongated structure compatible with a nematode larva.

Subsequently, three serial stool parasitological examinations performed one week apart showed no detectable larval forms, and the regimen was changed to weekly ivermectin. The patient experienced sustained clinical improvement and was discharged from the hospital. During outpatient follow-up, he attended a single Infectious Diseases visit, during which he reported having continued the prescribed medication. A new stool parasitological examination was requested to assess parasitic eradication; however, the patient did not attend subsequent appointments and was lost to clinical follow-up in the medium term.

## DISCUSSION

*Strongyloides stercoralis* infection affects an estimated 30-70 million people worldwide and is endemic in approximately 70 countries, predominantly in tropical and subtropical regions[1]. In South America, the highest prevalence has been reported in hyperendemic areas of southern Brazil. Transmission occurs mainly through direct skin contact with contaminated soil, although fecal–oral or interpersonal transmission may also occur. Unlike other helminths, *S. stercoralis* is capable of completing an autoinfection cycle within the host.

In immunocompetent individuals, infection is often asymptomatic, which makes diagnosis difficult. However, in immunosuppressed patients, complicated forms such as hyperinfection syndrome may develop, characterized by accelerated larval proliferation and increased pulmonary and intestinal migration[2]. The most important risk factors include solid organ transplantation, HTLV-1 infection, and particularly the use of glucocorticoids[3]. In the present case, the patient had a history of kidney transplantation, chronic immunosuppression, and a recent course of high-dose corticosteroids. In addition to inducing apoptosis of Th2 cells and reducing eosinophil counts, glucocorticoids generate hepatic metabolites with ecdysone-like activity –a molecule involved in helminth oviposition and larval ecdysis– which may accelerate the parasitic cycle and facilitate dissemination beyond the host's immune control[4].

The diagnosis of this parasitic infection remains challenging. Direct stool tests have low sensitivity due to the intermittent and low-volume excretion of larvae. Their diagnostic yield improves with serial collection over at least three days, reaching a sensitivity of up to 90%, compared with 30–40% for a single sample. In the pre-transplant period, although serial stool examinations were negative, no serological or molecular tests for *Strongyloides stercoralis* were performed, mainly due to their limited availability at our center; consequently, they are not included in the standard screening protocol. In this case, the diagnosis was missed during the pre-transplant evaluation, highlighting a relevant limitation in the

diagnostic approach for high-risk patients. Although serological techniques offer greater sensitivity, they may show cross-reactivity with other helminths and do not distinguish between current and past infections. Molecular tests, on the other hand, are considered the reference standard (gold standard), although their availability remains limited in many centers.

Regarding treatment, in uncomplicated cases, ivermectin at a dose of 200 µg/kg/day for two days has been shown to be safe and effective, and a second course at 14 days is recommended in immunosuppressed patients[5]. However, in complicated forms, there is no clear consensus regarding the optimal regimen. Current evidence suggests that a combination of ivermectin (12 mg/day) and mebendazole (400 mg every 12 hours) for 14 days may be effective[6], although there are no established recommendations regarding the total duration of therapy or the need for maintenance treatment. Reduction or suspension of immunosuppression, when feasible, is also a key component of management.

Regarding SARS-CoV-2 infection, numerous cases have been reported in which the viral infection leads to the need for corticosteroid therapy, subsequently precipitating *S. stercoralis* hyperinfection[7]. In the present case, the simultaneous detection of SARS-CoV-2 and hyperinfection syndrome raises the possibility of a multifactorial role of the virus—either as an indirect trigger through intensification of immunosuppression, as a factor worsening respiratory compromise, or as a coexisting infection without a direct causal impact. Notably, the initiation of antiparasitic therapy temporally coincided with sustained clinical improvement, particularly in respiratory status, suggesting that parasite burden played a central role in the pathophysiology of the clinical presentation. However, the temporal overlap of both infections limits the ability to precisely attribute the specific contribution of SARS-CoV-2 to the clinical outcome, representing a limitation in the interpretation of this case.

## CONCLUSION

This case highlights the importance of considering *Strongyloides stercoralis* infection in immunosuppressed patients, particularly in the setting of recent corticosteroid therapy. Early detection and timely initiation of antiparasitic treatment may improve prognosis, even in the context of coinfection with SARS-CoV-2. The limited availability of diagnostic methods remains a challenge in clinical practice.

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