

**CASE REPORT**


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## ***Strongyloides stercoralis* HYPERINFECTION IN A RENAL TRANSPLANT RECIPIENT**

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**ABSTRACT**

Strongyloidiasis is a worldwide intestinal infection produced by the nematode *Strongyloides stercoralis*. In this study, we report the case of a 47-year-old female patient who was submitted to renal transplant and an immunosuppression regimen. She was admitted to the emergency service with intense abdominal pain, evolving to an acute respiratory insufficiency, gram-negative bacteremia, refractory shock and death. *S. stercoralis* larvae were identified in the parasitological exam and bronchoalveolar lavage. This provides evidence for the importance of the early diagnosis of this neglected helminthiasis in transplanted patients undergoing immunosuppressive therapy.

**KEY WORDS:** Strongyloidiasis; hyperinfection; immunosuppression.

**INTRODUCTION**

Strongyloidiasis is an intestinal worm infection induced by the nematode *Strongyloides stercoralis*. The parasite is transmitted from the soil and commonly lives in the small intestine of infected people. In most immunocompetent patients, it does not cause relevant symptoms (Teixeira et al., 2016).

The intestinal form of the disease usually produces nonspecific abdominal symptoms with or without sporadic diarrhea, frequently attributed to other diseases. Many of these patients are asymptomatic and the infection may remain unnoticed for years (Issa et al., 2011; Chokkalingam et al., 2013).

Risk groups include patients with weakened immunological system, such as people chronically infected with HIV, chronic alcoholics, patients using immunosuppressants, patients with diabetes mellitus, rheumatoid arthritis, chronic renal insufficiency and transplanted patients (Issa et al., 2011; Figueira

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et al., 2015). In these individuals, the disease may be severe or deadly and can evolve to hyperinfection, endangering the lungs or involving other organs and tissues as it disseminates. (Figueira et al., 2015; Pochineni et al., 2015).

This study reports the case of a patient presenting hyperinfectious condition caused by *S. stercoralis* after renal transplantation.

## CASE REPORT

A married 47-year-old white, female patient, with a history of hypertension, who had been diagnosed with chronic end stage renal disease (chronic glomerulonephritis), received renal transplantation. The patient's immunosuppressive regimen consisted of 540 mg mycophenolate sodium, 3 mg tacrolimus and 50 mg prednisone every 12 hours, in gradually reducing doses. She was treated with oral nystatin against candidiasis, presenting gradual improvement. Forty-three days post-transplantation (July 1), the patient was admitted to the emergency service and hospitalized in the city of Blumenau, Santa Catarina with severe abdominal pain.

At the time of admission, the patient was conscious, oriented, contactable and with walking ability with isochoric and photo-reactive pupils. The patient was normotensive and normocardic, presenting no intestinal eliminations, a flat abdomen and no pain upon palpation. She did not present diuresis, and was afebrile, hydrated and with normal skin coloring. Oral physical examination showed lesions, such as white plaques on the tongue and palate. Empirical treatment was initiated with ganciclovir due to the suspicion of infection by cytomegalovirus (CMV) which was later confirmed by means of a polymerase chain reaction (PCR) test.

Five days later, there was a progressive worsening of epigastric pain associated with hyporexia, asthenia, vomiting and intense weakness. The patient was medicated with metoclopramide hydrochloride and ondansetron hydrochloride, for a headache and abdominal pain. The patient presented episodes of diarrhea without mucus, pus or blood, and unproductive cough.

The blood count revealed: hemoglobin 12.5 g/dL, hematocrit 36.3%, leukocyte count 14,400/ $\mu$ L and platelet count of 227,000/ $\mu$ L. The differential leukocyte count was: segmented neutrophils 88.0%, rods 3.0%, lymphocytes 5.0%, monocytes 3.0% and eosinophils 1.0%. The serological tests revealed: creatinine 1.39 mg/dL, sodium 140.0 mmol/L, magnesium 1.40 mg/dL and potassium 3.7 mmol/L.

Ultrasonography of the abdomen demonstrated a slight increase of the portal vein. A chest x-ray demonstrated a bilateral diffuse reticulonodular infiltrate. Acute respiratory failure caused by interstitial pneumonia was evidenced, therefore the patient was submitted to orotracheal intubation, mechanical ventilation, sedation and a vasoactive drug was prescribed.

On July 9, the patient presented nausea during meals and vomiting in large quantities, progressing to moderate dyspnea, followed by a decrease in O<sub>2</sub> saturation to 83.0%. Oxygen therapy was used with nasal catheter-type glasses. At night, the patient's blood pressure was 110/60 mmHg, heart rate of 133 bpm and O<sub>2</sub> saturation of 40% with O<sub>2</sub> in a venturi mask at 10%. After support measures, the patient was sedated and intubated, with resolution of the candidiasis. She was empirically prescribed meropenem, trimethoprim-sulphamethoxazole, liposomal amphotericin, clarithromycin, ivermectin and coxip, while maintaining the immunosuppressants.

On July 10, the patient was transferred to the intensive care unit. A new blood count revealed haemoglobin dosage of 5.32 g/dL, haematocrit 17.9%, leukocyte count 8,030/  $\mu$ L and platelets 197,000/  $\mu$ L. The serological analysis showed: creatinine 0.94 mg/dL, sodium 120.0 mmol/L, magnesium 1.02 mg/dL, ionic calcium 1.03 mmol/L, glucose 161.0 mg/dL, urea 40.0 mg/dL, potassium 4.5 mmol/L and C-reactive protein 5.07 mg/L. Two units of packed red blood cells and magnesium replacement were prescribed. The uroculture presented a colony growth greater than 100,000 CFU/mL of *Escherichia coli*.

On the 12th day after admission, *S. stercoralis* larvae were observed in the parasitological stool test and bronchoalveolar lavage. Ivermectin, meropenem and ganciclovir were maintained, while the other antimicrobials were withdrawn. Laboratorial tests demonstrated a sodium dosage of 150.0 mmol/L and a gasometry pH of 7.48. Leukopenia with a reduction of all series and thrombocytopenia were observed. Treatment was initiated with 400.0 mg albendazole twice a day and 7.5 mg prednisone once a day.

The patient developed reddish punctate lesions on her chest and abdomen and presented signs of stiffness in the neck. A lumbar puncture was performed and the cerebrospinal fluid proved clear and colourless. The results of the culture, bacterioscopy and fungi research in the liquor were negative. Furthermore, there were no changes in the computed tomography. Due to the patient's severe leukopenia and anaemia, the administration of filgrastim once a day was started, since the use of ganciclovir and albendazole was interrupted.

On the 25th day of hospitalization, the patient was still clinically worsening. The blood culture was positive for *Klebsiella pneumoniae* with no growth of fungi. Parasitological stool, coproculture, stool fat and stool leukocyte tests were performed and all showed negative results. Treatment with meropenem (2.0 g every eight hours), vancomycin (1.0 g every 12 hours) and polymyxin (500,000 every 12 hours) was initiated. Treatment with anidulafungin and ivermectin continued.

Eighty-two days after renal transplantation, the patient evolved to refractory shock and death. After death, the result of the microbiological analysis proved to be positive for *K. pneumoniae* carbapenemase-producing K (KPC).

## ETHICAL CONSIDERATIONS

This study was approved by the Human Research Ethics Committee of the Regional University of Blumenau (Protocol number 1.992.578).

## DISCUSSION

Most cases of strongyloidiasis that occur in the post-transplantation period, mainly in the hyperinfection form, are observed in patients who receive renal transplantation. In a large portion of these individuals, the disease seems to be related to the administration of high doses of glucocorticoids, with the cases of hyperinfection associated with the reactivation of latent infection and, rarely, with the transmission by donated organs (Issa et al., 2011; Chokkalingam et al., 2013).

This study reports the case of a post-transplant patient under immunosuppressive therapy (mycophenolate sodium, tacrolimus and prednisone), considered a risk factor for opportunistic diseases (Sousa et al., 2010). Moreover, we observed a clinical setting of oral candidiasis, one of the most common forms of opportunistic fungal infections, which suggests weakening of the immune system (Holanda et al., 2007). We also noted an active infection by CMV, which occurs in about 50 to 80% of renal receptors, especially in the first six postoperative months (Junior, 2010).

In the present case, the identification of *S. stercoralis* in the parasitological stool and bronchoalveolar lavage was preceded by unsuccessful empirical treatment. Presently, the pharmacological agents against this parasite include ivermectin, albendazole and thiabendazole, with ivermectin being the treatment chosen; however, combination therapy with ivermectin and albendazole is more successful therapeutically (Teixeira et al., 2016; Kuriakose et al., 2017).

The lack of eosinophilia in the peripheral blood count cannot exclude strongyloides infection, since the use of immunosuppressive medication may affect the eosinophil response (Newberry et al., 2005). In addition, in disseminated cases of the disease, the blood eosinophil count may be normal or decreased, and thus, it is not considered a good diagnostic marker (Luna et al., 2007). It is also worth mentioning that false-negative parasitological results can occur, which increases the difficulty of diagnosing this intestinal infection (Veloso et al., 2008).

In this study, the respiratory complications were related to the presence of *S. stercoralis* larvae, which, due to the respiratory failure, required ventilatory support. Symptoms such as coughing are observed during the larvae's migratory phase through the lungs (Kuriakose et al., 2017). Moreover, in nematode hyperinfections, pulmonary infiltrations are the most common characteristic

in chest radiography. These infiltrates can be caused by bleeding, secondary infection, inflammatory pneumonitis and the formation of bacterial abscesses (Lozada Ramos & Daza Arana, 2016).

In this case, the patient developed Gram-negative bacilli bacteremia and refractory shock. Thus, it is important to note that death was not due to the *S. stercoralis* hyperinfection. The Gram-negative bacteremia and the fatal outcome presented here corroborate other literature reports (Newberry et al., 2005; Cimerman et al., 2006; Benincasa et al., 2007). This is explained by the fact that, during the parasite cycle, the transport of bacteria from the intestine is facilitated by migration to other organs. In particular, patients with hyperinfection commonly present respiratory symptoms with progression to sepsis, caused by Gram-negative bacteria (Newberry et al., 2005).

The results of this study suggest a lapse on the part of the transplant service regarding preventive measures to eliminate this parasitosis before performing the procedure. The prognosis of strongyloidiasis depends on early diagnosis and suitable therapy, which reduces both morbidity and mortality associated with the disease (Teixeira et al., 2016). Moreover, *S. stercoralis* hyperinfection must be evaluated in any immunodepressed patient with unexplained gastrointestinal symptoms presenting eosinophilia or exposure to the parasite (Pochineni et al., 2015).

In conclusion, this study highlights the importance of early diagnosis of this neglected intestinal parasitosis in transplanted patients under immunosuppressive therapy, considering the relevant forms of self-infection under these conditions.

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