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CASE REPORT

Diagnosis of Toxocariasis in a 3-year-old child, after presenting severe anemia and eosinophilia: case report

Isabela Albano Lage¹, Julia Amaral Coimbra¹, Caroline Caldeira Hosken¹, Julio César Miranda Santos¹, Lara Barbosa Santos¹, Aderson Zimmerer Guimaraes¹, Salvador Henrique Ceolin¹, Tarcisio Silva Borborema¹, Mariana Marta de Oliveira Antunes¹, Antônio Fernando Bolina Batista Filho¹

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Abstract

Introduction: Case description: This is B.F.S, 3 years old, 18kg, born in Carlos Chagas - Minas Gerais (MG), under follow-up with a hematologist, in Belo Horizonte - MG, after diagnosis of anemia refractory to treatment with oral ferrous sulfate. During the anemia investigation, he presented a positive fecal occult blood test and was referred to a gastroenterologist. In a specialized consultation, he reported flu-like symptoms, geophagia, edema of the lower limbs and face. Other signs seen were mucosal skin pallor, bipalpebral and lower limb edema, tachycardia, panfocal systolic murmur, hepatosplenomegaly, IgE hyperglobulinemia, hemoglobin 5.5 mg/dL and eosinophil count greater than 5 thousand. Blood transfusion was indicated and treatment with Albendazole was empirically initiated. Due to religious reasons, treatment with intravenous ferrous sulfate was carried out. Serology confirmed the hypothesis of Toxocariasis. Schistosomiasis, other parasites, COVID-19 infection and nephrotic syndrome were ruled out. **Discussion:** The infection can occur in the asymptomatic form, visceral larva migrans (LMV), ocular larva migrans, literature data also divides it into the neuronal and occult form. Treatment is with Albendazole 400mg twice a day for 5 to 7 days. The response to treatment is observed by the reduction of eosinophilia. **Conclusion:** The pediatrician must know the clinical condition and correlate it with epidemiology for diagnosis. Prevention measures, such as basic sanitation and awareness campaigns, are necessary.

¹ Hospital Metropolitano Odilon Behrens, Pediatria - Belo Horizonte - Minas Gerais - Brazil.

Correspondence to:

Isabela Albano Lage.

Hospital Metropolitano Odilon Behrens. Rua Formiga, 50, São Cristóvão, Belo Horizonte, MG, Brazil. CEP: 31110-430. E-mail: isabelalage@live.com

INTRODUCTION

Toxocariasis is a parasitic disease caused by infection through contamination with larvae and/or ingestion of eggs of *Toxocara* sp., most commonly found in puppies (*Toxocara canis*) and kittens (*Toxocara cati*) and/or in soil infected with the feces of these animals^{1,2}.

The types are: cutaneous, visceral, neuronal and ocular. Abdominal pain, fever, headache, edema, hepatomegaly, malaise, cough, meningitis, transverse myelitis, skin changes, reactive granulomas in the retina are some of the signs and symptoms. Clinical manifestations depend on the amount of larvae ingested and circulating, time of infection and immune response^{1,2}.

The diagnosis can be made through increased eosinophils, total IgE, immunosorbent assay (ELISA) test, Western blot (WB) and/or serology for *Toxocara*^{1,4}.

OBJECTIVE

To describe the clinical case and provide guidance on diagnosis and treatment.

CASE DESCRIPTION

B.F.S, 3 years old, 18 kg, born in Carlos Chagas, Minas Gerais (MG), has been under follow-up with the Hematology Department of the Odilon Behrens Metropolitan Hospital (HMOB), in Belo Horizonte, MG, since August 2021, after being diagnosed in 2020 with iron deficiency anemia refractory to treatment with oral ferrous sulfate. In addition, the mother reported geophagia for 6 months. During the investigation of anemia, he tested positive for occult blood in the stool and was referred to the gastroenterology outpatient clinic of this service. During a consultation with a gastroenterologist at HMOB, the child was evaluated and was pallor of the skin and mucosa (+++/4+), slight edema in both the eyelids and lower limbs, tachycardia, panfocal systolic murmur, hepatosplenomegaly, with a palpable liver 5 cm from the RCB and hepatometry of 8 cm, and a palpable spleen 1 cm from the LCB, daily abdominal discomfort, and a hypothesis of parasitosis and/or inflammatory bowel disease. The child was referred to the HMOB hospital.

Medical history: Born at 40 weeks, gestation without complications. Vaccinations up to date. No comorbidities, constipation, allergies to medications and foods. Introduction of cow's milk since 10 months of age. Previous hospitalizations: bronchiolitis at 2 months; COVID-19 infection in 2021. Report of rectal prolapse, hypothesis of parasitosis raised and prescription of Pyrvinium Pamoate. Recurrent episodes of gastroenteritis.

SH: They live in an urban area with basic sanitation. The region is endemic for schistosomiasis. The family is Christian, following the Jehovah's Witness doctrine. The grandmother has dogs at home, which the child plays with.

At the beginning of the hospitalization, the patient presented mild flu-like symptoms, and a rapid antigen test and RT

PCR for COVID-19 were undetectable, ruling out pulmonary involvement. The examination on admission showed microcytic and hypochromic anemia, with hemoglobin of 5.6, increased total leukocyte (GL) count, secondary to eosinophilia - GL = 25,700 cells/mm³ (eosinophils 8,481). Repeated tests after two days showed a slight increase in hemoglobin to 5.9, with other alterations remaining, and the patient was taking oral ferrous sulfate 5mg/kg/day. Because of the edema, nephrotic syndrome was ruled out due to the absence of proteinuria in the routine urine test. When measuring the serum protein level, hypoalbuminemia was observed – albumin: 2.5. During hospitalization, the patient presented worsening tachycardia, without other signs of hemodynamic decompensation. A new collection of tests was chosen, which showed worsening of anemia – hemoglobin of 5.5, reticulocytes: 3.15%. The case was discussed with a pediatric hematologist, and a blood transfusion was indicated, but the parents did not accept it due to religious differences – Jehovah's Witnesses. Intravenous ferrous sulfate was then prescribed. After 7 days of intravenous replacement, a repeated laboratory review showed improvement in anemia and bone marrow response – hemoglobin increased to 8.8 and reticulocytes to 7.53%, eosinophilia maintained, but already decreasing, with the last one being 3,274. He did not have lymphadenomegaly, episodes of diarrhea, constipation and/or hematochezia. The hypothesis of toxocariasis and schistosomiasis was raised. Treatment with Albendazole 400 mg twice a day for 7 days was started empirically while awaiting the results of the serology tests. Other tests performed: total IgE 1044, Kato-katz and Schistosomiasis IgG negative, toxocariasis IgG positive. IgM serology tests were not collected due to unavailability in the municipality. In order to analyze other foci of the parasitosis, an abdominal ultrasound, fundus examination and echocardiogram were performed, which showed no changes.

After hospital discharge, the patient was followed up with outpatient pediatric gastroenterology, showing improvement in eosinophilia and anemia. Hypoalbuminemia under investigation.

METHODS

A retrospective analysis of the patient's medical records was performed for data collection. Review articles and clinical trials that addressed visceral toxocariasis in children, diagnosis, treatment and epidemiology were searched. The research sites used were: PubMed, Cochrane and UpToDate. Articles published 13 years or less were analyzed. The report was approved by the Research Ethics Committee. We declare that we have no conflicts of interest.

DISCUSSION

Infection by larva migrans is a frequent parasitic disease with 1.4 billion people infected worldwide, being predominant in developing countries and in the pediatric age group⁴. The form of transmission favors its occurrence in preschool and

school children who have not yet developed hygiene and self-care measures and are exposed to potentially contaminated environments such as parks and leisure areas with sand, frequented by animals.

The clinical presentation is diverse, which makes it difficult to identify. The infection can occur in the asymptomatic form, visceral larva migrans (VLM), ocular larva migrans, and some literature also divides it into the neuronal and occult forms.

In the clinical case presented, the child has the visceral manifestation with diverse clinical presentation presumably resulting from the damage caused by the migration of larvae and the eosinophilic response of the host. Pulmonary involvement with chronic dry cough and episodes of bronchospasm are present in 20-80% of patients.⁴ Chest X-ray in symptomatic respiratory cases may show peribronchial infiltrate. Hepatic involvement is related to the possible allocation of larvae in the liver, justifying hepatomegaly. There is a possibility of liver nodules, which were ruled out in this case by a normal abdominal ultrasound. Abdominal pain is a common and multifactorial complaint; its occurrence may be related to lymphadenitis resulting from the immune response to larval migration. Ocular presentation is frequent, either in isolation or in association with the systemic form. It manifests as visual complaints and in this case was ruled out after ophthalmological evaluation. Cardiac involvement is rare, but potentially fatal due to myocarditis, pericarditis, and Loeffler's endocarditis, justifying the performance of an echocardiogram. The hematologic manifestation with anemia, although described in other pediatric cases, is not a finding that is directly related to the infection.⁵ In the case presented, the child presents signs of nutritional deficiency, recurrent gastrointestinal infections, and lack of iron sulfate replacement in the first years of life, justifying the existence of iron deficiency anemia intensified by the occurrence of LMV.

According to the medical code of ethics, Article 31, it is forbidden for a physician to "disrespect the right of the patient or his/her legal representative to freely decide on the implementation of diagnostic or therapeutic practices, except in cases of imminent risk of death". Thus, despite the initial indication for blood transfusion, considering the absence of imminent risk and hospitalization with monitoring regarding clinical evolution, it was possible to carry out satisfactory clinical treatment with iron supplementation, preserving the values of the family nucleus and strengthening the doctor-patient relationship⁶.

The diagnosis of toxocariasis is clinical and laboratory, initially based on the history, clinical examination and epidemiology, and findings of leukocytosis and eosinophilia. The child had contact with dogs at his grandmother's house and presented geophagia, which are probable sources of contamination. Confirmation is made by laboratory serology; IgG (ELISA) anti-Toxocara canis can be used. A negative ELISA result excludes the disease, while a positive result does not prove

that the clinical symptoms are attributable to toxocariasis. There must be a strong clinical correlation and, if necessary, confirmation by the Western Blot method, which has greater sensitivity and specificity but is not available in the service. Differential diagnosis with exclusion of other parasitic diseases by serology and parasitological examination of feces strengthens the diagnostic hypothesis.

Treatment is indicated for moderate and severe symptomatic conditions and is done with the antiparasitic Albendazole 400 mg twice a day for 5 to 7 days (the period is not yet well defined in the literature). Response to treatment is observed by the reduction of eosinophilia. Involvement of other organs should be treated according to the clinical manifestation⁷.

Eosinophilia is common in pediatric clinical practice, especially when values are between 500 and 1000 eosinophils/microL, and indicates the presence of parasitic disease, allergy or reaction to medications⁸. Blood eosinophilias are categorized as reactive, clonal, and idiopathic. A hematologic cause should be considered if the initial evaluation findings do not persuasively point to a clear secondary cause of eosinophilia or a characteristic clinical syndrome (e.g., eosinophilic esophagitis, episodic angioedema with eosinophilia, eosinophilic granulomatosis with polyangiitis). Findings that should raise suspicion of a hematologic disorder include absolute eosinophil count $\geq 1500/\text{microL}$, dysplastic eosinophils or leukemic blasts, unexplained anemia, neutropenia, polycythemia or thrombocytopenia, elevated serum B12 or tryptase levels, lymphocytosis ($\geq 4000/\text{microL}$), unexplained lymphadenopathy, splenomegaly or constitutional symptoms, and resistance of eosinophilia to glucocorticoid therapy¹⁰.

CONCLUSION

This case report aims to illustrate that, despite being a frequent and generally oligosymptomatic disease with self-limiting duration, there is potential for complexity in the diagnosis and management of visceral toxocariasis in children. The patient presented clinical symptoms compatible with *Toxocara* sp. infection, including hepatosplenomegaly, abdominal pain, edema, refractory iron deficiency anemia, and significant eosinophilia, in addition to a history of geophagia and contact with dogs, important risk factors for contamination. Serological confirmation and a favorable response to antiparasitic treatment with Albendazole corroborated the clinical diagnosis. Therefore, it is recommended to consider toxocariasis in the differential diagnosis of refractory anemia and eosinophilia in endemic areas and highlights the need for a multidisciplinary approach. The positive evolution after therapeutic intervention reinforces the efficacy of Albendazole and the importance of early identification and appropriate treatment of this parasitosis.

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