



Investigation of the Toxocariasis diagnosis in children attended in the pediatric care hospital

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ABSTRACT

OBJECTIVE

This study aims to associate parasitological and hematological tests with the possible diagnosis of toxocariasis in children from Hospital Escola Wladimir Arruda's pediatric care, São Paulo, SP, Brazil.

METHODS

Observational, retrospective cross-sectional study, carried out from an active search on medical records of children assisted from Hospital Escola Wladimir Arruda's pediatric care. Data collection was conducted in the first semester of 2021. Medical records of children aged 0-15 years seen at HEWA were reviewed and information was collected regarding signs and symptoms of parasitic infections, data on blood tests, request for parasitological examination and serology for toxocariasis.

RESULTS

The research rated 101 medical records of children aged 0 to 15 years. Only 6 (5.4%) presented as diagnostic hypothesis about some type of parasitosis, however none of these had specific diagnosis request for human toxocariasis, as well as request stool examination or other specific examination for other parasitosis. Four (66.6%) of them had blood count data, among these 2 (33.3%) of them show data about eosinophil and leukocyte, which were with no alteration. Half of the suspected cases had dogs at home.

CONCLUSIONS

The lack of protocol or even a specific script to be followed in parasitosis suspected case and especially toxocariasis reflects absence of research on this parasitosis.

DESCRIPTORS

Children, Toxocariasis, Medical Records.

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INTRODUCTION

Toxocariasis has an etiological agent, the nematode of the Ascaridae family, of the genus *Toxocara* spp., being more common the *Toxocara canis* and *Toxocara catti* species, whose definitive hosts are dogs and cats, respectively. These parasites, however, also have paratenic hosts such as rodents, invertebrates, and mammals. In humans this parasite can be an important zoonosis causing diseases such as Occult Toxocariasis, Visceral Larva Migrans, Ocular Larva Migrans, and even Neurotoxocariasis^{1,2}.

Toxocariasis is more frequent in children because of the hygiene standards of this age group. Transmission is fecal-oral through food and water contaminated with the eggs of this parasite. In this parasitosis habits such as playing outdoors in contact with soil and sand, especially in parks, constitute an important source of transmission of the parasite due the frequency of dogs and cats in these places. Some studies in Brazil have shown that when *Toxocara* spp. is present in soil, its contamination ranges from 17.5 to 53.3%, and despite being an underreported disease, the prevalence of antibodies in the population, even healthy ones, ranges from 9.7 to 43%^{1,3,4}.

The pathogenesis of this pathology varies according to several factors such as the inflammatory reactions triggered by the presence of this larva, the immunological conditions of the host, the frequency of exposure and ingestion of these infected eggs, the number of eggs ingested and the sensitization of the host by antigens and toxins excreted by these larvae. Toxocariasis is usually asymptomatic and clinical manifestations are more prevalent in children and include fever, respiratory changes, abdominal pain, hepatomegaly, headache, and eosinophilia^{3,4}.

The diagnosis of toxocariasis is difficult, because this pathology is usually asymptomatic and the symptomatology is common to several others existing parasitic infections, which makes this disease underreported and so neglected. Therefore, it is necessary to consider many aspects beyond the clinical manifestations, such as the patient's history, the epidemiology of the disease, and to make a differential diagnosis from specific tests. Some changes can also be observed in the hematological exams of these patients, especially children, such as the presence of leukocytosis and eosinophilia, and when toxocariasis is a diagnostic hypothesis, it can be investigated through laboratory practice⁵⁻⁷.

Even in the face of the high prevalence of the parasite, few doctors consider it a diagnostic hypothesis, even in the face of laboratory tests that could justify the presence of or contact with the agent. Given this scenario, toxocariasis can be considered an underreported disease, despite the significant damage it causes to the health of the Brazilian child population⁸. This study aims to associate parasitological and hematological tests with the possible diagnosis of toxocariasis in children from Hospital Escola Wladimir Arruda's pediatric care in São Paulo, SP, Brazil.

METHODS

The research is an observational, retrospective cross-sectional study that was conducted from an active search in medical records of patients of the pediatric care of Hospital Escola Wladimir Arruda (HEWA), located in the south of São Paulo, SP, Brazil. Data collection was conducted in the first semester of 2021.

This study was carried out by consulting the medical records of children (0 to 15 years old) seen in 2019 and 2020, collecting data on blood cells profile, stool examination and request for serological examination for diagnosis of toxocariasis when present. The project was submitted to and approved by the CAEE Ethics Committee (number 4,390,082).

RESULTS

We evaluated 101 medical records of children aged 0 to 15 years old seen during 2019 and 2020 at the pediatric care of HEWA. Only 6 (5.4%) presented as diagnostic hypothesis some type of parasitosis: one child with 1 year of age, two with 2, one with 5, and two with 10. Among these medical records none had requested a specific diagnosis for human toxocariasis, as well as requests for stool tests or other specific tests for other parasitic diseases. Four (66.7%) records had recent values of blood count, and only two (33.3%) had described the values of eosinophils and white blood cells, but none of them had some change (Table 1).

The presence of dogs in the home environment was also evaluated and three medical record (50%) showed that information. Regarding the clinical examination, diarrhea, soft-ened feces, epistaxis, headache, cough, vomiting, and fatigue were found. The findings are shown in Table 1.

Table 1. Suspicious findings reported in the children medical records from HEWA's pediatric care (São Paulo, Brazil), 2019 and 2020.

DISCUSSION

Toxocariasis caused by the ascarid *Toxocara* spp is still considered one of the 5 most neglected diseases by the Centers

Age	Reason for suspicion	Laboratory tests	Animals
1	Dark green foul smell feces.	WBC: 6530; Eos: 2%, RBC: 4.3; Hb: 11.3; Ht: 32.7; Plat: 186,000	2 dogs
2	Coughing, diarrhea, scaling on the head, softened brown stools.	Eos. 2.1%	-
2	Intense diarrhea with persistent variable state, recurrent vomiting, dark colored and foul smell urine.	Hb:13.8; Ht: 38.8, WBC: 8300; Plat 319,000	3 dogs
5	Epistaxis with possible parasitosis, headache and tachycardia. Hypochromic stools.	-	-
10	Chest pain and excessive fatigue, previously she had fainting, vomiting and spots on her body.	Hb: 14.1; Ht: 43.5	-
10	Itchy skin and scrotal region with hyperemia and flaking, dry stools once a day.	-	1 dog

Legend: Hb: Hemoglobin; Ht: Hematocrit; WBC: White Blood cells; RBC: Red Blood cells; Plat: Platelets.

for Disease Control and Prevention in USA, even in view of its worldwide distribution and having humans as paratenic host. Epidemiological studies report an important underreporting number of cases of this disease worldwide, especially in Brazilian children, even with the high prevalence described⁸.

Infected children may present behavioral symptoms in addition to impairment in their growth and development. Concurrently with clinical manifestations, specific laboratory tests are an important tool in the investigation of human toxocariasis. In this study, we observed that in cases where a diagnostic hypothesis corroborated with infections caused by parasites, the medical team did not perform a more accurate investigation by requesting stool tests or any specific examination.

Serology is the gold standard for the diagnosis of this parasitosis and the literature provides important prevalence data, even in a population like the one studied here. According to Figueiredo et al. (2005)⁹, the seroprevalence of toxocariasis was 54.8% in children in the south of São Paulo. Campos (2015)¹⁰, in turn, found 15% positivity in serology in children from Belo Horizonte. These data reinforce that specific diagnostic test are needed and that the frequency of suspected cases found in this study (5.4%) is underestimated indeed.

In this study it was also observed that in 50% of the homes of the suspected patients there was the presence of a pet. Felix

et al. (2020)¹¹ evaluated that having a dog in the home environment is a risk factor for human contamination, especially when the animals are puppies under three months old. Older studies such as Chieffi and Müller (1976)¹² have already shown a high prevalence (44.3%) of parasitosis in dogs through parasitological examination of feces, and more recent studies such as that of Dantas-Torres (2020)¹³ have revealed up to 21.9%. These numbers demonstrate the active presence of the parasite in these animals that are increasingly present in human homes, constituting an important reservoir for human disease.

Regarding laboratory manifestations, this study did not detect alterations in the white series of the suspected patients. This fact corroborates the study by Marchioro et al. (2011)¹⁴, who sought to demonstrate that although eosinophilia is present in some cases of toxocariasis, its course is not necessarily parallel to the presence of anti-*Toxocara* spp. antibodies, because in their research only 7.8% of children had concomitant eosinophilia. In view of this fact, although the patients analyzed presented normal eosinophil values, this condition would not exclude the presence of the parasite, reinforcing the need for an effective and specific diagnosis.

It is noted the absence of an in-depth research of doctors associated to failure to request specific diagnostic tests even when they suspect parasitosis. This lack of research and deepening when it comes to parasitosis, means that a lot of these diseases, despite having high prevalence in Brazil, are under-reported, and neglected, as is the case with toxocariasis. This fact may be directly related to lack of knowledge more specific on the subject, and with the lack of academic articles that could help the doctor, since toxocariasis is barely studied by medical academics. Thus, omitting to investigate the chances of parasitosis diagnosis, the doctor may be impacting negatively of these children future, as this disease can result in several problems to the children health.

REFERENCES

1. Fonseca GR. Toxocaríase murina experimental: diagnóstico por PCR e comparação com técnicas imunológicas. 2018. 121 f. Dissertação (Mestrado) - Curso de Medicina, Faculdade de Medicina da Universidade de São Paulo, 2018.
2. Aires WO, Frias RB, Paschoal GR, Neves MF. Toxocaríase e Larva Migrans Visceral. Rev Cient Elet Med Vet, 2008 Jul;11(4).
3. Carvalho EAA, Rocha RL. Toxocariasis: visceral larva migrans in children: visceral larva migrans in children. J Pediatría. 2011 Abr;87(2):100-10.
4. Woodhall DM, Garcia AP, Shapiro CA, Wray SL, Shane AL, Mani CS, Stimpert KK, Fox LM, Montgomery SP. Assessment of U.S. Pediatrician Knowledge of Toxocariasis. Am J Trop Med And Hygiene. 2017 Out;97(4):1243-6.
5. Rostami A, Ma G, Wang T, Koehler AV, Hofmann A, Chang BC, Macpherson CN, Gasser RB. Human toxocariasis - A look at a neglected disease through an epidemiological 'prism'. Infect Gen Evolution. 2019 Out;74:104002.
6. Rostami A, Riahi SM, Holland CV, Taghipour A, Khalili-Fomeshi M, Fakhri Y, Omrani VF, Hotez PJ, Gasser RB. Seroprevalence estimates for toxocariasis in people worldwide: A systematic review and meta-analysis. PLoS Negl Trop Dis. 2019 Dec 19;13(12):e0007809.
7. Phasuk N, Punsawad C. Seroprevalence of *Toxocara canis* infection and associated risk factors among primary schoolchildren in rural Southern Thailand. Trop Med Health. 2020 Apr 22;48:23.
8. Chieffi PP, Zevallos Lescano SA, Rodrigues E Fonseca G, Dos Santos SV. Human Toxocariasis: 2010 to 2020 Contributions from Brazilian Researchers. Res Rep Trop Med. 2021 May 19;12:81-91.
9. Figueiredo SDP, Taddei JAAC, Menezes JJC, Novo NF, Silva EOM, Cristóvão HLG, Cury MCF. Estudo clínico-epidemiológico da toxocaríase em população infantil. J. Pediatr. 2005 Abr; 81:126-32.
10. Campos LP. Prevalência de toxocaríase em crianças de uma escola pública de belo horizonte e fatores associados. 2015. 88 f. Dissertação (Mestrado) - Curso de Farmácia, Universidade Federal de Minas Gerais, Belo Horizonte, 2015.
11. Felix DAS, Silva CX, Gomes JS, Dias EG, Freitas JS, Fernandes LES, Mendes TM, Farias LA. *Toxocara* spp., Larva migrans visceral e Saúde Pública: Revisão. Pubvet. 2020 Dez;14(12):1-8.
12. Chieffi PP, Müller EE. Prevalência de parasitismo por *Toxocara canis* em cães e presença de ovos de *Toxocara* sp. no solo de localidades públicas da zona urbana do município de Londrina, Estado do Paraná, Brasil. Rev Saúde Públ. 1976 Dez;10(4):367-72.
13. Dantas-Torres F. Toxocara prevalence in dogs and cats in Brazil. Adv Parasitol. 2020;109:715-741.
14. Marchioro AA, Colli CM, Mattia S, Paludo ML, Melo GC, Adami CM, Pelloso SM, Guilherme ALF. Avaliação eosinofílica e soropositividade para anticorpos IgG anti-*toxocara* em crianças atendidas pelo Sistema Único de Saúde. Rev Paul Pediatr 2011;29(1):80-4.