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Aguiar Figueredo, Luciana; de Paiva-Cavalcanti, Milena; Lima Almeida, Ericka; Pinto
Brandão-Filho, Sinval; Dantas-Torres, Filipe

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Clinical and hematological findings in *Leishmania braziliensis*-infected dogs from Pernambuco, Brazil

Achados clínicos e hematológicos em cães infectados por *Leishmania braziliensis* de Pernambuco, Brasil

Luciana Aguiar Figueredo¹; Milena de Paiva-Cavalcanti¹; Ericka Lima Almeida¹;
 Sinval Pinto Brandão-Filho¹; Filipe Dantas-Torres^{1,2*}

¹Departamento de Imunologia, Centro de Pesquisas Aggeu Magalhães – CPqAM, Recife, PE, Brasil

²Dipartimento di Medicina Veterinaria, Università degli Studi di Bari – UNIBA, Valenzano, BA, Itália

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Abstract

Canine cutaneous leishmaniasis by *Leishmania braziliensis* is a neglected, but widespread disease of dogs in South America. This paper describes clinical and hematological alterations in 17 *L. braziliensis*-infected dogs from Brazil. The most common hematological findings were thrombocytopenia (82.4%), anemia (70.6%), low packed cell volume (52.9%) and eosinophilia (41.2%). Twelve (70.6%) dogs displayed at least one evident physical alteration; 11 dogs (64.7%) presented skin lesions, four (23.5%) had weight loss and two (11.8%) onychogryphosis. *L. braziliensis*-infected dogs present clinical and hematological signs often observed in dogs infected by other pathogens. This indicates that veterinarians and public health workers should not consider the presence of non-specific clinical signs as diagnostic criteria for visceral leishmaniasis in dogs living endemic areas to avoid misdiagnosis and subsequent elimination of dogs infected by *L. braziliensis*.

Keywords: *Leishmania braziliensis*, dogs, Pernambuco, Brazil.

Resumo

A leishmaniose cutânea canina causada por *Leishmania braziliensis* é uma doença negligenciada, mas disseminada entre cães na América do Sul. Este artigo descreve alterações clínicas e hematológicas em 17 cães infectados por *L. braziliensis* do Brasil. As alterações hematológicas mais comuns foram trombocitopenia (82,4%), anemia (70,6%), baixo valor de hematócrito (52,9%) e eosinofilia (41,2%). Doze (70,6%) cães apresentaram pelo menos uma alteração física; 11 (64,7%) apresentaram lesões cutâneas, quatro (23,5%) perda de peso e dois (11,8%) onicogribose. Cães infectados por *L. braziliensis* apresentaram alterações clínicas e hematológicas inespecíficas que são comumente observadas em cães infectados por outros patógenos. Isso indica que veterinários e profissionais de saúde pública não deveriam considerar a presença de tais sinais clínicos como critério de diagnóstico para leishmaniose visceral em cães, em áreas endêmicas, no intuito de evitar um diagnóstico equivocado e a subsequente eliminação de cães infectados por *L. braziliensis*.

Palavras-chave: *Leishmania braziliensis*, cães, Pernambuco, Brasil.

Canine cutaneous leishmaniasis is a widespread disease affecting dogs caused by different species of *Leishmania* parasites. In South America, *Leishmania braziliensis* is the most widespread causative agent (DANTAS-TORRES, 2009). The disease in dogs is characterized by local, self-healing ulcerative lesions on the ears, scrotum, feet, nipples, and muzzle (PIRMEZ et al., 1988; MADEIRA et al., 2003). However, canine cutaneous leishmaniasis is a neglected disease, mainly because most of the cases occur

far away from the cities, that is, far from veterinary services. For this reason, there is limited information on clinical findings of dogs infected by *L. braziliensis*. In a recent epidemiological study conducted in a rural community in northeastern Brazil, a high prevalence (58.5%) of *L. braziliensis* infection was detected in dogs using a conventional polymerase chain reaction (PCR) (DANTAS-TORRES et al., 2010). Considering the limited amount of data in the literature, the aim of this article is to report clinical alterations in 17 *L. braziliensis*-infected dogs from Pernambuco, Brazil.

Dogs from a rural community located in the municipality of São Vicente Férrer (07° 35' 28" S and 35° 29' 29" W) were positive by PCR for *L. braziliensis* in a previous study. All dogs

*Corresponding author: Filipe Dantas-Torres
 Departamento de Imunologia, Centro de Pesquisas Aggeu Magalhães,
 Fundação Oswaldo Cruz – Fiocruz, Av. Prof. Moraes Rego, s/n,
 Cidade Universitária, CEP 50670-420, Recife, PE, Brasil
 e-mail: filipe.vet@globo.com

were tested by real time PCR for *L. infantum*, by blood cytology for hemoparasites, and by immunofluorescent-antibody test (IFAT) for anti-*Leishmania* spp. antibodies (see DANTAS-TORRES et al., 2010). Dogs were physically examined and physical alterations (e.g., skin lesions, weight loss, and alopecia) recorded. Blood samples were withdrawn from the jugular, femoral or cephalic vein and complete blood count was performed. The following parameters were recorded: total red blood cell (RBC) count, hemoglobin concentration (Hgb), packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), total white blood cell (WBC) count, differential leukocyte counts, platelet count and serum total protein (JAIN, 1993; KANEKO et al., 1997). This study was part of a project (P.0174-03) approved by the Commission for Ethics in the Use of Animals (CEUA) of the Oswaldo Cruz Foundation (Fiocruz), Brazil.

Out of 20 dogs PCR-positive for *L. braziliensis*, three were co-infected by other pathogens (1 by *L. infantum*, 1 by *Babesia vogeli*, and 1 by *Hepatozoon canis*) and were excluded. The most common hematological abnormalities (Figure 1) found among the 17 *L. braziliensis*-positive dogs were thrombocytopenia, anemia, low PCV and eosinophilia (Table 1). The anemia was regenerative in seven of 12 (58.3%) dogs. Moreover, in six (50%) dogs the anemia was normocytic normochromic, in four (33.3%) macrocytic normochromic and in two (16.7%) microcytic normochromic.

In relation to physical alterations, 12 (70.6%) dogs displayed at least one evident physical alteration. Of these, 11 presented skin lesions (e.g., ulcers, desquamation and hyperpigmentation), four had weight loss and two onychogryphosis (Table 1).

In the present study, many *L. braziliensis*-infected dogs presented hematological values within the normal range. Some dogs presented non-specific hematological and clinical alterations commonly observed in dogs with other diseases, including visceral leishmaniasis. For this reason, the diagnosis of leishmaniasis in dogs should be confirmed using PCR-based tools or by the isolation and subsequent characterization of the parasite using reference isoenzymatic methods. This is important to avoid misdiagnosis with other diseases (e.g., sporotrichosis) with overlapping clinical and laboratory findings (SANTOS et al., 2007). From a public health perspective and considering the control of visceral leishmaniasis, this would be relevant in order to avoid the unnecessary culling of *L. braziliensis*-infected dogs (MADEIRA et al., 2006). In this regard, the use of specific PCR-based methods should be advisable to distinguish dogs infected by *L. braziliensis* from those infected by *L. infantum* (SILVEIRA NETO et al., 2012).

Canine cutaneous leishmaniasis is widespread in South America (DANTAS-TORRES, 2009), being usually prevalent in areas where human cases of the disease have been diagnosed (SOCCOL et al., 2009). However, there is no scientific-based evidence supporting the participation of dogs in the zoonotic transmission cycle of this parasite, which is maintained by small terrestrial mammals

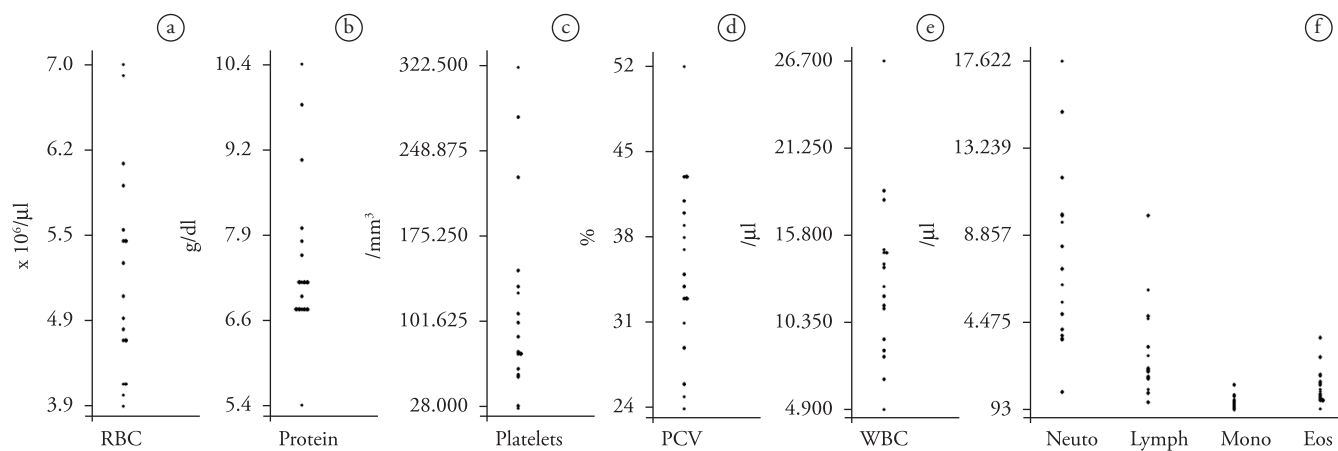


Figure 1. Red blood cells (a), total serum protein (b), platelets (c), packet cell volume (d), white blood cells (e), and neutrophils, lymphocytes, monocytes and eosinophils values (f) recorded for each *L. braziliensis*-infected dog (n = 17). Reference values (KANEKO et al., 1997): RBC, 5.5-8.5 × 10⁶/μL; PCV, 37-55%; platelets, 200,000-500,000/mm³; total serum protein, 6.0-8.0 g/dL; WBC, 6,000-17,000/μL; neutrophils, 3,000-11,500/μL; lymphocytes, 1,000-4,800/μL; monocytes, 150-1,350/μL; eosinophils, 100-1,200/μL.

Table 1. Main physical and hematological findings in dogs (n = 17) infected by *Leishmania braziliensis*, Pernambuco, Brazil.

Clinical signs	Number of dogs	Frequency (%)
Thrombocytopenia	14	82.4
Anemia	12	70.6
Skin lesion	11	64.7
Low PCV	9	52.9
Eosinophilia	7	41.2
Weight loss	4	23.5
Onychogryphosis	2	11.8

(BRANDÃO-FILHO et al., 2003). Nevertheless, *L. braziliensis*-infected dogs might serve as sentinels, that is, indicators for the risk of infection in humans. Incidentally, clinical, histopathological, and serological pictures of canine cutaneous leishmaniasis appear to be similar to those observed in human patients (PIRMEZ et al., 1988). While intralesional injections of N-methylglucamine antimoniate are reputed to be effective (BARBOSA SANTOS et al., 1998), the treatment of canine cutaneous leishmaniasis is not routinely performed in Brazil (DANTAS-TORRES, 2009).

In conclusion, this study suggests that the diagnosis of cutaneous leishmaniasis in dogs cannot be made on a clinical basis only, mainly considering that clinical and hematological findings observed in dogs infected by *L. braziliensis* might be suggestive, but are not specific.

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