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Original article

Main clinical manifestations observed in dogs positive for Leishmaniasis with titers above 1:80

Principais manifestações clínicas encontradas em cães com leishmaniose com titulação acima de 1:80

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Resumo

Objetivo: identificar a ocorrência das principais manifestações clínicas em cães diagnosticados com Leishmaniose Visceral Canina em um hospital veterinário, em Montes Claros, Minas Gerais. **Materiais e Métodos**: realizou-se um estudo epidemiológico nos meses de setembro de 2018 a agosto de 2019, a partir de fichas de animais atendidos nesse período. Os prontuários foram divididos em grupos a partir das patologias apresentadas. Assim, as cinco principais alterações foram: dermatopatias, linfadenomegalia, oftalmopatias, esplenomegalia e hepatomegalia. Selecionaram-se animais de ambos os sexos, de qualquer raça e idade, diagnosticados positivamente por exame RIFI/ELISA, com valores iguais ou superiores a 1/80, com sinais indicativos da patologia. **Resultados**: dentre os 67 prontuários de cães analisados, aqueles com alterações dermatológicas representaram 75%, indicando a maior prevalência entre as outras alterações, seguido por 60% para linfadenomegalia, 28% para alterações oftálmicas, 4,5% para esplenomegalia e 1,5% para hepatomegalia. **Conclusão**: dentre as alterações mais frequentes, a dermatológica é a mais recorrente, sendo essa percepção importante para uma boa investigação pelo Médico Veterinário.
Palavras-chave: Leishmaniose Canina. Dermatopatias. Linfadenomegalias. Alterações Clínicas.

Abstract

Objective: the objective was to show the occurrence of the main clinical manifestations in dogs diagnosed with Canine Visceral Leishmaniasis in a veterinary hospital, in Montes Claros, Minas Gerais. **Materials and Methods:** this epidemiological study was conducted using records of animals treated between September 2018 and August 2019. The records were divided into groups based on the pathologies presented. The five main changes were dermatopathies, lymph node enlargement, ophthalmopathies, splenomegaly, and hepatomegaly. We selected animals of both sexes, of all breeds and ages, diagnosed positively by indirect immunofluorescence reaction (RIFI)/enzyme-linked immunosorbent assay (ELISA), with values equal to or greater than 1/80, and indicative signs of the pathology. **Results:** among the 67 dog records studied, animals with dermatological changes represented 75%, reducing the highest prevalence among other changes, followed by 60% for lymphadenomegaly, 28% for ophthalmic changes, 4.5% for splenomegaly and 1, 5% for hepatomegaly. **Conclusion:** among the most frequent changes, the dermatological one is the most recurrent, and this perception is important for a good investigation by the Veterinarian.
Keywords: Canine Leishmaniasis. Dermatopathies. Lymphadenomegaly. Clinical changes.

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Introduction

In the geographical area of this study, canine visceral leishmaniasis (CVL) is a zoonosis caused by *Leishmania chagasi* and transmitted by the phlebotomine sandfly *Lutzomyia longipalpis*[1]. Dogs are the primary reservoir of CVL, but other hosts include wild animals (e.g., crab-eating fox, maned wolf, and opossum), equids, rodents, and cats[2]. The incidence of CVL is high because of the difficulty of controlling vector transmission and the challenges of diagnosis and treatment[1]. The epidemiology of CVL is related to the type of climate, vegetation, and soil composition. In addition, phlebotomine activity is higher in the late afternoon and at night[3].

The clinical signs of CVL are variable and significantly influenced by the immune status of the animal and by the organs involved[4]. Signs and symptoms are nonspecific, namely ophthalmopathies (e.g., keratitis, conjunctivitis, uveitis), arthropathies (e.g., polyarthritis); dermatopathies (e.g., pustules, ulcers, scaling, nodules, alopecia, hypotrichosis, and onychogryphosis); alterations and disorders of tissue disposition that may affect the host's immune competence (e.g., lymph node enlargement, splenomegaly, hepatomegaly); nephropathies; apathy; anorexia and weight loss[5].

In dogs, CVL is systemic and severe, often starting asymptomatically and progressing slowly, but can become severe and chronic over time. Clinical manifestations depend on the nature of the immune response of the infected animal[1]. Clinical presentation can range from an apparently healthy animal to one in a severe terminal stage. Ocular changes, such as the presence of discharge, are often seen in CVL among the various changes to be considered in the overall evaluation[6].

Changes associated with leishmaniasis can range from mild (e.g., keratoconjunctivitis) to more severe forms (e.g., uveitis, dry keratoconjunctivitis, and chorioretinitis)[7]. Changes in the ocular adnexa can affect the entire globe, resulting in loss of visual function. Two main pathological mechanisms have been described as the cause of these ocular lesions: i) local granulomatous inflammation and ii) the formation of immune complexes that are deposited in the tissues[8].

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Nephropathies are also a significant alteration in CVL. The kidneys may be severely affected because of the deposition of immune complexes in renal structures and a marked plasmacytic inflammatory infiltrate[9]. Deposition of immune complexes along the glomerular and tubular basement

membranes can occasionally result in membranoproliferative glomerulonephritis and interstitial nephritis, potentially leading to renal failure, which is often the primary cause of death in dogs with CVL[10].

Diagnosis of CVL in dogs requires a combination of approaches due to the complexity of the disease and the variety of ways it can manifest. A thorough understanding of the methods for diagnosing CVL is necessary because they are difficult to interpret in conditions of low parasitemia and the procedure can be very painful for the animal. Serology tests are widely used to detect antibodies against *Leishmania chagasi*. Enzyme-linked immunosorbent assay (ELISA) and indirect immunofluorescence reaction (RIFI) are used for diagnosing CVL[11]. Besides, the rapid immunochromatographic test is commonly used for field or clinical screening. Polymerase chain reaction (PCR) is a sensitive molecular technique that detects parasite DNA in tissue, blood, or bone marrow samples, thereby providing a direct diagnosis. Direct parasitological testing involves the direct detection of the parasite in bone marrow aspirates, lymph node aspirates, or skin biopsies using staining techniques such as Giemsa stain, which can confirm the diagnosis[12].

Methods of controlling leishmaniasis include early diagnosis and treatment of human cases, identification of infected animals in endemic areas, vector surveillance and chemical control, and environmental management. Public health education, individual protection measures (e.g., the use of bed nets, repellents, screens in kennels, and individual protection of dogs with collars impregnated with 4% deltamethrin) are also important strategies[13].

Even with the implementation of containment methods, if an animal contracts CVL, the owner may choose to treat it. The treatment has been widely discussed over the years due to the resistance that has developed. The drug of choice for CVL is miltefosine. Miltefosine modifies the plasma membrane of the parasite and induces apoptosis when the protozoan is in the promastigote phase. However, it is essential to combine miltefosine with other drugs (e.g., allopurinol, domperidone, and corticosteroids) and immunotherapies[4].

Because of the wide variety of signs and symptoms, this study aimed to list the occurrence of the main clinical manifestations in dogs diagnosed with CVL at a veterinary hospital in the city of Montes Claros, state of Minas Gerais, Brazil.

Materials and Methods

This epidemiological study was conducted between September 2018 and August 2019. Pet's medical records of dogs treated at a veterinary hospital in Montes Claros were analyzed. Data collection was performed by reviewing pet's medical records, and all pathologies presented were

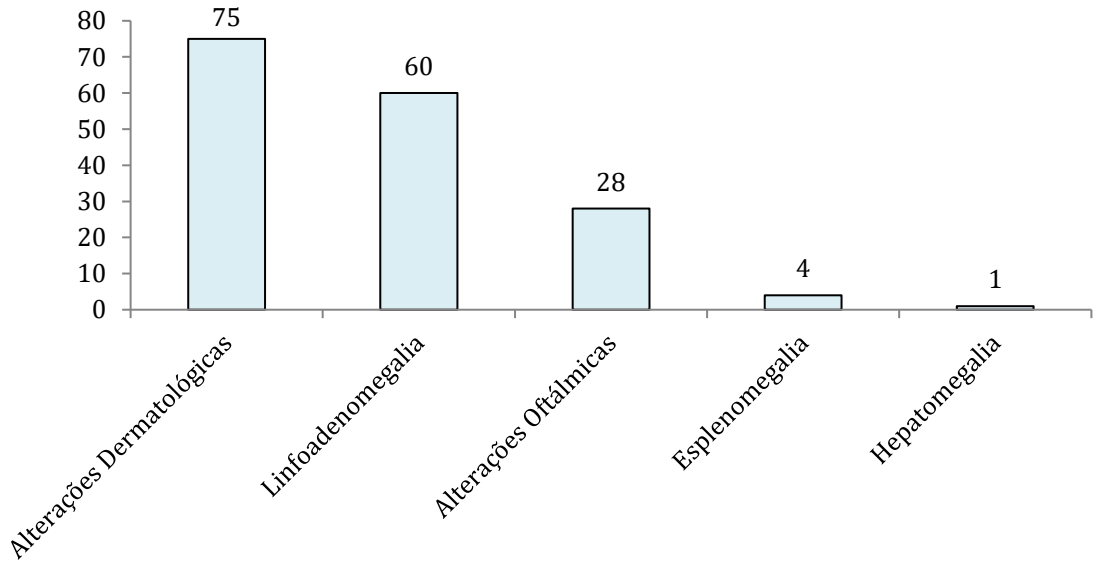
categorized into groups. Five main changes were analyzed: dermatopathies, lymph node enlargement, ophthalmopathies, splenomegaly, and hepatomegaly.

Pet's medical records of dogs of both sexes, of all breeds and ages, diagnosed by using RIFI/ELISA tests with values equal to or greater than 1/80, and showing indicative signs of CVL were selected. Of these, 67 pet's medical records describing dermatologic, ophthalmologic, and immunocompetent organ changes were analyzed.

Results

Of the 67 medical records analyzed, 75% (n=50) of dogs had dermatologic changes, which was the highest prevalence among changes (Figure 1).

Figure 1. Major clinical findings in naturally infected dogs treated at a veterinary hospital in the city of Montes Claros-MG.



The most common ocular changes analyzed were conjunctival edema (n=18; 26.3%), keratoconjunctivitis (n=14; 21%), and uveitis (n=11; 15.8%) (Figure 2).

Of the records analyzed, 50 showed dermatologic changes identified as hypotrichosis, hyperkeratosis, scaly and ulcerative lesions, pustules, papules, and crusts. The most common changes were hypotrichosis and scaly lesions (n=13; 25.37%), followed by alopecia (n=8; 16.42%) and ulcerative lesions (n=6; 11.94%) (Table 1).

Figure 2. Major ophthalmological findings in naturally infected dogs treated at a veterinary hospital in the city of Montes Claros-MG.

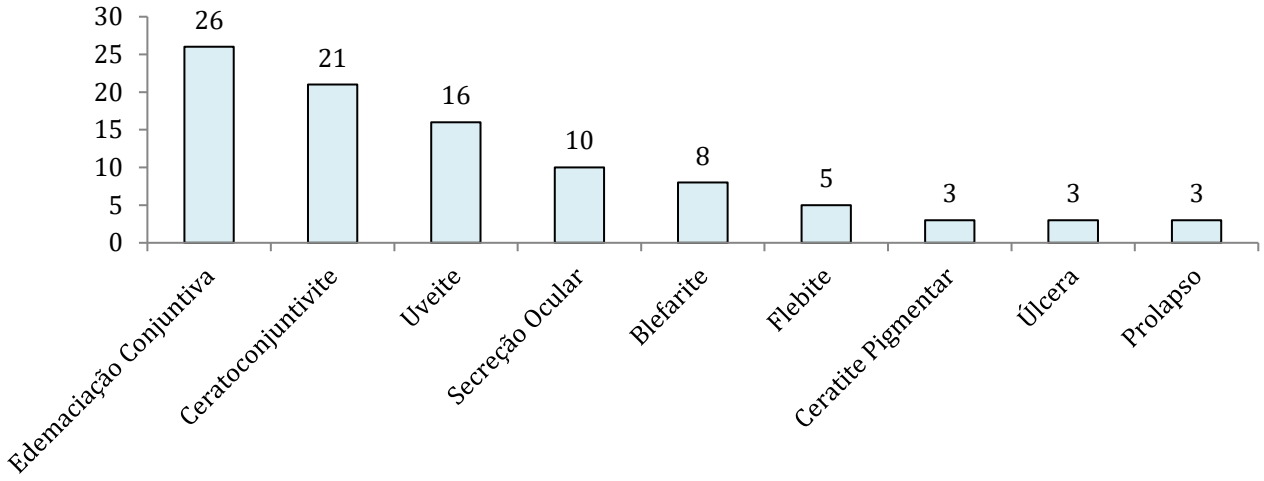


Table 1. Dermatological changes in naturally infected dogs treated at a veterinary hospital in the city of Montes Claros-MG.

Dermatological changes	n	%
Hypotrichosis	13	25.37
Scaly lesions	13	25.37
Alopecia	8	16.42
Ulcerative lesions	6	11.94
Erythema	3	5.97
Pustules	2	4.48
Petechiae	2	4.48
Dry skin	1	2.98
Hyperkeratosis	1	2.98
Crusts	1	2.98
Hair thinning	1	2.98
Lichenification	1	2.98
Comedones	1	1.49
Folliculitis	1	1.49
Erosive lesions	1	1.49
Papules	1	1.49
Oily seborrhea	1	1.49

Of the 67 records analyzed, 44 showed changes such as lymph node enlargement, splenomegaly, and hepatomegaly, identified by physical examination and considering titers above 1/80. Lymph node enlargement represented 60% (n=40) of the changes, splenomegaly 4.5% (n=3), and hepatomegaly 1.5% (n=1).

Discussion

As observed in the present study, the most common alteration was hypotrichosis, which can occur in various diseases. The clinical signs of hypotrichosis, also known as alopecia, always result

from some form of tegumentary leishmaniasis, such as diffuse forms caused by scaly or nodular lesions. Scaly lesions are characterized by white-silver scales that can appear anywhere on the body[14]. According to a study conducted in the city of Vassouras, state of Rio de Janeiro, 16.6% of dogs examined for CVL had scaly lesions and hypotrichosis as dermatologic changes[1].

Based on the data obtained in this study in the hospital located in Montes Claros, the most common alteration was dermatological. This alteration is related to cutaneous parasitism. The most common changes observed were hypotrichosis and scaly lesions. Dogs with scaly dermatitis had destroyed sebaceous glands or ducts obstructed by inflammatory processes, which may have contributed to a decrease in epidermal lipid quality, resulting in excessive skin desquamation[7]. These observations are justified because the areas in the lymphoid organs become smaller, with lymph node enlargement being the most common alteration found in the lymph nodes, liver, and spleen. This condition leads to proliferation of B lymphocytes, plasma cells, histiocytes, and macrophages[15].

Two main pathologic mechanisms have been described to cause ocular lesions: local granulomatous inflammation and the formation of immune complexes that are deposited in the tissues[7]. In most cases, the ocular changes occur along with other systemic signs of the disease, but sometimes they are the only obvious change and the primary concern of the owners[13]. These observations are consistent with a study conducted at a veterinary hospital in Rio Grande do Sul, where 23.2% of the animals evaluated had ocular discharge, 10.7% had ocular lesions, and 1.8% developed blindness. Most common ocular diseases were keratoconjunctivitis, blepharitis, uveitis, retinopathy, and hyphema[12].

CVL is challenging due to the complexity of the *Leishmania spp*. parasite and the lack of pathognomonic signs. Disease management must consider the severity and clinical condition of the animal. Drugs such as allopurinol, miltefosine, and amphotericin B are prescribed to reduce parasitic load and improve quality of life. The choice of medication should be individualized considering the overall health of the dog[16].

The difficulties encountered in this study were due to incomplete case histories and the non-specificity of the clinical signs observed, as well as outdated information on the status of CVL in the region studied. Further research is of significant importance to characterize the epidemiological profile, allowing the development of targeted intervention strategies and ensuring effective control measures against CVL.

Conclusion

Dermatological lesions are among the most common changes. This observation is important

for a thorough examination by the veterinarian.

Due to the wide variety of signs and symptoms, understanding the prevalence of CVL is particularly important for veterinary screening and for alerting owners. Early diagnosis of CVL can benefit the animal by allowing for the best choice of treatment, resulting in an improved quality of life.

Conflict of interest

The authors declare no competing interests.

Authors' contributions

The authors have approved the final version of this article and declare themselves responsible for all aspects of the manuscript, such as integrity, originality and accuracy.

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