

CANINE VISCERAL LEISHMANIASIS WITH DERMATOLOGICAL MANIFESTATIONS: A CASE REPORT

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Abstract

Canine visceral leishmaniasis is a zoonosis of major clinical and epidemiological relevance, with dogs serving as the principal urban reservoir of the infection. This study aimed to report a case of canine visceral leishmaniasis in a two-year-old male Yorkshire Terrier that was presented with a history of chronic ulcerative lesions on the pinnae, periocular and perioral alopecia, diffuse hypotrichosis, and marked skin scaling. A complete blood count, biochemical profile, electrolyte profile, abdominal ultrasonography, and serological testing for leishmaniasis were performed. Laboratory tests revealed nonregenerative normocytic normochromic anemia, thrombocytopenia, hyperproteinemia, hyperglobulinemia, and mild hypoalbuminemia. Abdominal ultrasonography revealed mild splenomegaly and hepatomegaly. The diagnosis was confirmed by reactive enzyme-linked immunosorbent assay (ELISA) and indirect immunofluorescence antibody test (IFAT) results for *Leishmania infantum*. Based on the clinical, laboratory, and ultrasonographic findings, the patient was classified as stage III and treated with miltefosine, allopurinol, and domperidone, combined with supportive dermatological and ophthalmic

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therapies. After treatment was initiated, progressive clinical improvement was observed, characterized by reduced skin scaling, hair regrowth in the affected areas, and regression of the ulcerative lesions. It is concluded that dermatological abnormalities may be important clinical indicators of canine visceral leishmaniasis and that combining clinical assessment, complementary examinations, and serological testing is essential for diagnosis, staging, and the institution of appropriate therapy, thereby contributing to clinical improvement and quality of life in affected patients.

Keywords: Dermatopathy, Dog, Infectious disease, *Leishmania infantum*, Zoonosis.

INTRODUCTION

Leishmaniasis is an anthroponozoonosis with a broad worldwide distribution and major public health relevance and is considered one of the principal parasitic diseases affecting humans and domestic and wild animals (Ratzlatt et al., 2023). It is caused by protozoa of the genus *Leishmania*, transmitted primarily through the bite of infected phlebotomine sand flies, and affects humans and several animal species (World Health Organization, 2023; Leishvet, 2024). Among domestic animals, dogs play a fundamental role in the epidemiology of the disease, serving as its principal urban reservoir and contributing to the maintenance of the transmission cycle in endemic areas (Ministry Of Health, 2023; World Health Organization, 2023).

In Brazil, canine visceral leishmaniasis (CVL) is caused predominantly by *Leishmania infantum*, which is also responsible for the visceral form of the disease in humans. Transmission occurs primarily through the bite of infected female phlebotomine sand flies, commonly known in Brazil as *mosquitos-palha*. In the Americas, *Lutzomyia longipalpis* is the principal vector of visceral leishmaniasis because of its broad geographical distribution and capacity to adapt to urban and peri-urban environments (Morales-Yuste et al., 2022; Leishvet, 2024; Brasileish, 2025). In recent decades, visceral leishmaniasis has undergone substantial geographical expansion associated with environmental, climatic, and anthropogenic factors that favor the persistence of vectors and reservoirs. Unplanned urban growth, environmental

changes, and the increased adaptation of phlebotomine sand flies to urban centers have contributed to the occurrence of the disease in regions previously considered non-endemic.

In Rio Grande do Sul, confirmation of the circulation of *Leishmania infantum* demonstrated this expansion and reinforced the need for epidemiological surveillance and early diagnosis of infected animals (CEVS/RS, 2023). *Leishmania infantum* infection is characterized by a chronic course and potential multisystem involvement. Following inoculation of the parasite by the vector, it multiplies within cells of the mononuclear phagocyte system, enabling dissemination to different organs and tissues. Consequently, infected dogs may develop a variety of clinical manifestations, the severity of which depends on the interaction between the parasite and the host immune response (Leishvet, 2024; Brasileish, 2025).

The clinical manifestations of CVL are highly heterogeneous and may range from subclinical infections to severe disease with systemic involvement. Frequently observed clinical signs include weight loss, lymphadenomegaly, lethargy, exercise intolerance, and dermatological abnormalities. The latter are particularly relevant in veterinary clinical practice because they frequently constitute one of the principal reasons owners seek specialized care, in addition to serving as important indicators of the disease. Diagnosis is based on the combination of epidemiological information, clinical signs, and complementary examinations, given the wide variability in its clinical manifestations. An integrated approach is therefore recommended for diagnostic confirmation, involving serological, molecular, and parasitological methods and the joint interpretation of clinical and laboratory findings (Leishvet, 2024; Brasileish, 2025).

The principal diagnostic methods include cytology, which enables direct identification of the parasite in bone marrow, lymph node, and skin samples; molecular tests such as polymerase chain reaction (PCR), which can detect *Leishmania* spp. DNA with high specificity; and serological tests such as ELISA and the indirect immunofluorescence antibody test (IFAT), which are widely used to detect anti-*Leishmania* antibodies. However, each method has its own advantages and limitations, making the integrated interpretation of clinical, laboratory, and epidemiological findings essential for establishing the

diagnosis. Brasileish (2025) proposes two complementary approaches to classifying dogs in relation to canine visceral leishmaniasis. The first is a general classification according to exposure, infection, and disease, while the second consists of the clinical staging of affected animals. Under the general classification, dogs are divided into three categories: exposed (stage I), infected but healthy (stage II), and infected and diseased (stages III, IV, V, and VI). Exposed animals show neither clinical manifestations nor laboratory abnormalities; they may be seropositive but have negative parasitological or molecular test results. Dogs classified as infected but healthy likewise show no clinical signs or laboratory abnormalities, but infection is confirmed through positive parasitological or molecular tests. Infected and diseased animals, in turn, exhibit clinical manifestations and/or laboratory abnormalities consistent with canine visceral leishmaniasis, together with confirmation of infection. Following this initial classification, diseased animals undergo clinical staging to determine disease severity and guide treatment and prognosis.

The staging system consists of five categories. Stage I corresponds to dogs without clinical disease that have low-to-medium antibody titers, no clinical signs, and no laboratory abnormalities, with a favorable prognosis. Stage II includes animals with mild disease characterized by subtle signs such as peripheral lymphadenopathy, papular dermatitis, and mild weight loss, generally without relevant laboratory abnormalities. Stage III corresponds to moderate disease and is characterized by more evident clinical manifestations, including diffuse or symmetrical skin lesions, onychogryphosis, ulcerations, anorexia, and weight loss. Laboratory findings may include mild nonregenerative anemia, hypergammaglobulinemia, hypoalbuminemia, and abnormalities arising from immune-complex deposition, such as uveitis and glomerulonephritis. At this stage, prognosis ranges from good to guarded. Stages IV and V represent the most severe forms of the disease and are associated with advanced systemic involvement, particularly renal impairment. Stage IV may involve nephrotic syndrome, pulmonary thromboembolism, and early-stage chronic kidney disease, resulting in a guarded-to-poor prognosis. Stage V is characterized by very severe disease, with progression of chronic kidney disease to advanced

stages, marked proteinuria, nephrotic syndrome, and end-stage renal failure, and carries an unfavorable prognosis. At all stages, therapeutic decisions are based on a combination of immunotherapy, immunomodulation, allopurinol, and miltefosine, together with management of renal abnormalities in accordance with the recommendations of the International Renal Interest Society (IRIS). The classification and staging systems proposed by Brasileish are therefore fundamental tools for clinical assessment, therapeutic decision-making, and determination of prognosis in dogs affected by canine visceral leishmaniasis (Brasileish, 2025).

Among the systemic abnormalities observed in diseased animals, renal impairment is noteworthy and is considered one of the principal causes of morbidity and mortality. Urinary system involvement may manifest as interstitial nephritis, glomerulonephritis, and glomerulonephrosis, with proteinuria, azotemia, hypercalciuria, hematuria, and acute renal failure frequently observed, and possible progression to chronic kidney disease. Glomerulonephritis secondary to immune-complex deposition is one of the principal renal lesions associated with the disease and is directly related to its clinical course and patient prognosis (Ribeiro, 2022).

The classification proposed by Brasileish thus assists in identifying the stage of infection, guides therapeutic management, and contributes to the prognostic assessment of dogs affected by canine visceral leishmaniasis. Given the increasing epidemiological importance of CVL in Brazil and the diversity of its clinical manifestations, this study aims to report and discuss a clinical case of CVL in a dog, correlating the clinical, laboratory, diagnostic, and therapeutic findings with the evidence available in the scientific literature.

CASE REPORT

A two-year-old male Yorkshire Terrier weighing 1.9 kg was presented for care. During the initial consultation, a medical history was obtained and a general physical examination was performed. The primary complaint reported by the owner consisted of episodes of grass ingestion associated with

vomiting for approximately three days. During history-taking, chronic ulcerative lesions on the tips of the pinnae were reported. These had previously been evaluated by veterinarians but had not responded satisfactorily to treatment. According to the information provided, conservative management had initially been chosen while awaiting possible spontaneous regression of the lesions. Physical examination revealed periocular alopecia, alopecia in the perioral region (Figure 1B), diffuse hypotrichosis, and marked skin scaling, which was most pronounced in the abdominal and dorsal regions (Figures 2A and 2B). Ulcerative lesions were also identified on the tips of the pinnae, suggestive of ear-tip vasculitis (Figure 1A), in addition to skin crusting and exfoliative dermatopathy. In view of the clinical signs, epidemiological history, and pattern of the dermatological lesions, CVL was the principal diagnostic hypothesis. Figure 1 – Dermatological lesions in a dog with canine visceral leishmaniasis. (A) Ulcerative and scaling lesions along the margins of the pinna before treatment. (B) Periocular and perioral alopecia observed during the initial clinical assessment. Source: Personal archive, 2026. Figure 2 – Abdominal and dorsal regions of a dog with canine visceral leishmaniasis. (A) Ventral abdominal region before treatment, showing diffuse alopecia and skin scaling. (B) Dorsal region before treatment, with marked skin scaling associated with the dermatological manifestations of the disease. Source: Personal archive, 2026. Based on these findings, a complete blood count, biochemical tests, an electrolyte profile, and abdominal ultrasonography were requested. Given the clinical suspicion, serological tests for leishmaniasis were requested using the enzyme-linked immunosorbent assay (ELISA) and indirect immunofluorescence antibody test (IFAT), with the latter performed without full sample dilution. During history-taking, the owner reported that no repellent measures against phlebotomine sand flies were being used. In addition, because enlargement in the epididymal region was observed during physical examination (Figure 3), serological testing for *Brucella canis* was requested as a differential diagnosis, together with ultrasonography. Figure 3 – Scrotal region of a dog with canine visceral leishmaniasis, showing epididymal enlargement disproportionate to the animal's body size. Source: Personal archive, 2026. The gastrointestinal signs were considered nonspecific and not directly related to the suspected systemic dermatological condition and may have

been associated with a transient gastrointestinal disorder or dietary indiscretion. Symptomatic treatment was instituted to control the vomiting episodes, with a favorable initial clinical course. The erythrogram revealed mild normocytic normochromic anemia associated with hyperproteinemia. In the leukogram, the total leukocyte count remained within the reference range, with only mild isolated eosinopenia identified. Moderate thrombocytopenia was also observed. In the biochemical profile, alanine aminotransferase (ALT), alkaline phosphatase, urea, creatinine, and glucose remained within normal limits, with no evidence of hepatic or renal impairment at the time of assessment. Sodium, potassium, and chloride concentrations were within the reference ranges, with a mild reduction in ionized calcium. The most significant abnormality in the serum biochemical profile involved the protein profile. Marked hyperproteinemia was found, with total protein of 93 g/L (reference: 54–71 g/L), associated with marked hyperglobulinemia of 69 g/L (reference: 27–44 g/L), mild hypoalbuminemia of 24 g/L (reference: 26–33 g/L), and a reduced albumin-to-globulin ratio of 0.35 (reference: 0.59–1.11). A mild reduction in ionized calcium was also observed, with a value of 1.25 mmol/L (reference: 1.3–1.5 mmol/L). Abdominal ultrasonography revealed mild-to-moderate splenomegaly and mild hepatomegaly, with echotextural abnormalities in both organs. Material consistent with biliary sludge was also observed in the gallbladder, together with a mild pancreatic abnormality. No significant abnormalities were identified in the remaining abdominal organs. Serological testing yielded a reactive ELISA result, with an index of 3.52 (reference value: nonreactive < 0.9; indeterminate 0.9–1.1; reactive > 1.1), and a reactive IFAT result, with a titer $\geq$ 1:40, the cutoff considered positive for the technique (Brazil, 2021). The findings were consistent with *Leishmania infantum* infection and corroborated the clinical and laboratory abnormalities observed. According to the staging criteria proposed by Brasileish, the patient's condition was consistent with moderate, stage III disease, characterized by diffuse cutaneous manifestations, mild nonregenerative anemia, and hyperglobulinemia, without evidence of renal impairment at the time of assessment (Brasileish, 2025). Serological testing for *Brucella canis* was nonreactive, ruling out this hypothesis as the cause of the enlargement in the epididymal region. On the day the results were released, the veterinarian

responsible for the case contacted the owner to communicate the CVL diagnosis and provide guidance regarding the prognosis, the chronic nature of the disease, and therapeutic measures. Specific treatment was instituted with miltefosine (Milteforan®, 2 mg/kg orally [PO] every 24 hours for 28 days), allopurinol (13.2 mg/kg PO every 12 hours, continuously), and domperidone (0.53 mg/kg PO every 12 hours for 30 days). Treatment began in the days following diagnostic confirmation because of the time required to obtain the prescribed medications. Ten days after the first consultation, the patient returned for clinical reassessment, at which time no significant improvement in the dermatological lesions had yet been observed. The owner reported increased skin scaling and periocular pruritus. An ophthalmic assessment was therefore requested, and an ophthalmic ointment containing dexamethasone, neomycin sulfate, and polymyxin B sulfate (Maxinom®) was prescribed for application around the eyes every eight hours for 14 days. A dermatological evaluation was also performed, and skin dryness secondary to the underlying disease was suspected. Conservative management was selected using Allermyl Glyco® therapeutic shampoo (Virbac), with bathing twice weekly, combined with Ibasal® Moisturizing Mousse on days alternating with the therapeutic baths. At a further clinical follow-up 15 days after the first consultation, the owner reported significant improvement in the dermatological abnormalities, characterized by reduced alopecia, regression of the ulcerative lesions on the tips of the pinnae, hair regrowth in the periocular, perioral, and abdominal regions, and resolution of generalized skin scaling. Resolution of ocular pruritus was also observed following the institution of ophthalmic treatment, accompanied by hair regrowth around the eyes, indicating a favorable clinical response. To accelerate healing of the auricular lesions, topical application of betamethasone combined with gentamicin sulfate (Betogenta®), or alternatively the previously prescribed ophthalmic ointment, was recommended for the affected area, both of which produced a good therapeutic response. Figure 4 – Clinical course of a dog with canine visceral leishmaniasis at the end of treatment. (A) Regression of ear-tip vasculitis, showing reduced local inflammation and progression of healing. (B) General appearance of the face at the end of treatment, showing hair regrowth in the periocular and perioral regions and improvement in the

dermatological abnormalities. (C) Abdominal region at the end of treatment, showing reduced skin scaling, improvement in alopecia, and restoration of the skin's dermatological appearance. Source: Personal archive, 2026.

To date, the patient has completed the entire prescribed medication protocol and remains under continuous clinical follow-up, with a satisfactory therapeutic response and significant clinical improvement in the signs observed, particularly the dermatological manifestations. This was evidenced by hair regrowth in previously alopecic areas of the periocular, perioral (Figure 4B), and abdominal regions, resolution of generalized skin scaling (Figure 4C), regression of ulcerative lesions on the ear tips (Figure 4A), and resolution of ocular pruritus, demonstrating clinical control of canine visceral leishmaniasis. The patient remains clinically stable, with no evidence of systemic deterioration to date. The owner was advised regarding the importance of periodic clinical monitoring, including follow-up every four to six months with serological, parasitological, and/or molecular testing, as well as complementary examinations for disease staging and treatment review, with the aim of detecting possible relapse or disease progression at an early stage. A Scalibor® repellent collar continues to be used as an additional preventive measure against exposure to new vectors.

DISCUSSION

In the present case, the patient lived in the Agronomia neighborhood of Porto Alegre, a region characterized by extensive green areas, dense vegetation, and proximity to areas of closed woodland, conditions that favor maintenance of the epidemiological cycle of canine visceral leishmaniasis and increase exposure to phlebotomine sand fly vectors (Gutiérrez et al., 2024). Frequent access to outdoor areas further increases the risk of contact with the vector. Several *Leishmania* species have been reported in domestic animals in South America; however, *Leishmania braziliensis* and, particularly, *Leishmania infantum* are the species most frequently reported in dogs (Brasileish, 2025).

Evidence based on dynamic modeling indicates that environmental factors associated with

ecological changes and urbanization patterns exert a significant influence on the persistence and possible expansion of visceral leishmaniasis in endemic areas, reinforcing the need for integrated surveillance and control strategies (Fonseca I Llopis et al., 2026).

The dermatopathies affecting dogs diagnosed with the disease include dry exfoliative dermatitis, located primarily in the periocular region, dorsal bridge of the nose, margins of the pinnae, and areas over bony prominences such as the elbows and calcanei; ulcerative dermatitis, located predominantly over bony prominences, at mucocutaneous junctions, on the muzzle, in the interdigital region, and along the inner margin of the ear; papular dermatitis; pustular dermatitis; multifocal nodular dermatitis; alopecia; ear-tip vasculitis; nasal and footpad hyperkeratosis; nasal depigmentation; nail disorders; sebaceous adenitis; and cutaneous asthenia (Brasileish, 2025).

The skin lesions observed in this case, including periocular alopecia, dry exfoliative dermatitis, skin scaling, and ulcerative lesions on the pinnae, are consistent with the clinical pattern described in the World Association for Veterinary Dermatology (WAVD) consensus statement. According to this consensus, dermatological abnormalities are among the most frequent manifestations of the disease and are present in approximately 56% to 90% of infected dogs. Exfoliative dermatitis is considered the most common cutaneous presentation and is characterized by diffuse scaling and alopecia, frequently distributed over the face, periocular region, pinnae, and extremities, features that were also observed in this case (Saridomichelakis et al., 2025).

The diagnostic importance of dermatological lesions in CVL is widely recognized. According to the WAVD consensus statement, cutaneous manifestations may represent one of the principal clinical findings of the disease and play a relevant role in diagnostic suspicion and early recognition of infection. Recognition of abnormalities such as exfoliative dermatitis, periocular alopecia, and ulcerative lesions may therefore assist in identifying the disease, particularly in endemic areas (Saridomichelakis et al., 2025).

The skin scaling associated with periocular pruritus observed in this patient is consistent with the

ophthalmocutaneous manifestations of CVL described in the World Association for Veterinary Dermatology consensus statement (Saridomichelakis et al., 2025) and may involve blepharitis, conjunctivitis, and eyelid lesions related to *Leishmania infantum* infection. These abnormalities are associated with immune-mediated and inflammatory mechanisms resulting from both the presence of the parasite in adnexal tissues and immune-complex deposition, contributing to signs such as irritation and periocular pruritus.

In view of the local involvement and risk of secondary ocular disease, topical therapy was instituted with Maxinom® ophthalmic ointment (gentamicin + betamethasone + clotrimazole), applied to the periocular region every eight hours for 14 days, with the objective of controlling inflammation, reducing pruritus, and preventing associated ocular complications.

The clinical findings are consistent with recent literature, which describes cutaneous manifestations as some of the most frequent abnormalities in CVL and, in certain cases, as the only clinical evidence of infection (WAVD, 2025; Leishvet, 2024). Studies have demonstrated a higher frequency of lesions on the face and pinnae, an anatomical pattern associated both with greater exposure to phlebotomine sand fly vectors and with the cutaneous tropism of *Leishmania infantum* (Saridomichelakis et al., 2025; Baneth et al., 2019).

Current guidelines and consensus statements emphasize that the skin is an important site of parasite burden because it contains large numbers of macrophages and other cells of the mononuclear phagocyte system capable of internalizing the parasite and supporting its multiplication. Following inoculation by the vector, promastigotes are phagocytosed by cutaneous macrophages and transform into amastigotes, which replicate intracellularly. Persistence of the parasite in the skin promotes continuous antigenic stimulation, cellular recruitment, and the release of inflammatory mediators, triggering local and systemic immunological abnormalities. In addition, the formation and deposition of immune complexes, together with the development of vasculitic processes, contribute to the emergence of dermatological lesions such as alopecia, scaling, and ulceration.

Because the skin is the principal feeding site of phlebotomine sand flies, it also plays a fundamental role in maintaining the epidemiological cycle of the disease, allowing infected dogs to serve as important reservoirs of *Leishmania infantum*. Thus, even in the absence of severe systemic manifestations, infected animals may have a high cutaneous parasite burden and contribute to transmission of the infection.

CVL is also characterized by marked clinical variability, with dermatological manifestations frequently occurring in association with systemic abnormalities such as anemia, thrombocytopenia, and hyperglobulinemia (Leishvet, 2024; Brasileish, 2025). In this context, the agreement between the clinical and laboratory findings observed in the present case and those described in the literature reinforces the importance of including the disease in the differential diagnosis of chronic dermatopathies, particularly in endemic regions.

The hematological abnormalities observed in the present case, characterized by normocytic normochromic anemia associated with thrombocytopenia, are consistent with the pattern described in CVL. According to LeishVet (2024) and Brasileish (2025), these abnormalities result primarily from the chronic systemic inflammation associated with *Leishmania infantum* infection, which affects erythropoiesis, as well as from immune-mediated mechanisms and changes in cellular dynamics. The absence of a regenerative response suggests a predominance of anemia of chronic disease, consistent with established systemic disease.

Thrombocytopenia, which is likewise frequent in the disease, has a multifactorial etiology involving immune-mediated destruction, peripheral consumption, and splenic sequestration. In the present case, the splenomegaly identified by ultrasonography supports the involvement of splenic sequestration as a contributing mechanism, as described by LeishVet (2024). Unlike the more severe cases reported in the literature, in which hemorrhagic manifestations may occur, the abnormality in this case was limited to the laboratory profile, suggesting moderate involvement.

In the biochemical profile, marked hyperglobulinemia associated with hyperproteinemia and a

reduced albumin-to-globulin ratio was consistent with the classic pattern described by LeishVet (2024) and Brasileish (2025). These abnormalities reflect the persistent chronic antigenic stimulation promoted by *Leishmania infantum*, resulting in polyclonal B-lymphocyte activation and excessive immunoglobulin production. Mild hypoalbuminemia may be related to the chronic inflammatory state and possible associated early hepatic involvement (Leishvet, 2024; Brasileish, 2025). The skin abnormalities observed, together with hyperglobulinemia and nonregenerative anemia, reflect immunopathological mechanisms characteristic of the disease.

The persistence of *Leishmania infantum* promotes intense antigenic stimulation and favors the formation and deposition of immune complexes in different tissues, contributing to the development of systemic and dermatological clinical manifestations. This process may be related to the emergence of ulcerative lesions and vascular abnormalities, such as the ear-tip vasculitis observed in this case (Baneth et al., 2019; Solano-Gallego et al., 2020; Saridomichelakis et al., 2025).

The ultrasonographic findings, characterized by mild-to-moderate splenomegaly and hepatomegaly with echotextural abnormalities, were consistent with the hepatosplenic involvement described in CVL and reflected activation of the mononuclear phagocyte system associated with the chronic systemic inflammatory response. According to LeishVet (2024) and Brasileish (2025), splenomegaly is a frequent finding in dogs infected with *Leishmania infantum* and is related to lymphoid hyperplasia and increased splenic phagocytic activity.

Similarly to the findings described by De Majo et al. (2021), hepatosplenic abnormalities may provide complementary information in the assessment of CVL severity, although they have low diagnostic specificity when considered in isolation. Thus, although nonspecific, these findings became relevant when integrated with the other clinical and laboratory data, reinforcing the systemic and chronic nature of the disease.

The diagnosis was established through the integration of clinical signs, laboratory abnormalities, ultrasonographic findings, and positive ELISA and IFAT results. ELISA is an enzyme immunoassay used

to detect anti-Leishmania antibodies and is widely employed as a screening method because of its high sensitivity and practicality. The indirect immunofluorescence antibody test detects antibodies through fluorescence microscopy and may be performed with or without titration, depending on the laboratory protocol.

Neither test differentiates active infection from previous exposure, and both may produce cross-reactivity; their interpretation in association with the clinical and epidemiological context is therefore essential. In this context, the absence of parasitological or molecular confirmation was offset by the strong association among compatible clinical findings, typical laboratory abnormalities, suggestive ultrasonographic changes, and concurrent positive ELISA and IFAT results. This body of evidence strongly supports the diagnosis of *Leishmania infantum* infection, classifying the case as highly suggestive within the integrated approach recommended by Brasileish (2025).

During the clinical assessment, enlargement in the scrotal region was observed, and canine brucellosis was initially considered as a differential diagnosis. Serological testing for *Brucella canis* was nonreactive, ruling out this hypothesis. Although no further investigation was performed, the literature describes epididymitis and orchitis associated with *Leishmania infantum* infection in dogs with visceral leishmaniasis (Peris et al., 2022; Davidson, 2025). However, a direct causal relationship could not be established in this case, and ultrasonography showed both testicles to be normal.

The therapeutic choice is directly related to the clinical staging of canine visceral leishmaniasis, which considers the integration of clinical signs, laboratory abnormalities, and complementary examinations, as recommended by Brasileish (2025). Based on these criteria, the patient was classified as stage III, or moderate disease, because of the presence of diffuse cutaneous manifestations, mild nonregenerative anemia, hyperglobulinemia, and hypoalbuminemia, with no evidence of renal impairment on biochemical assessment.

However, failure to determine the urinary protein-to-creatinine ratio (UPC) prevented definition of the corresponding renal substage. This test is important for the early detection of glomerular involvement

because proteinuria may precede changes in serum urea and creatinine concentrations in dogs with canine visceral leishmaniasis, thereby enabling a more accurate assessment of renal function and patient prognosis (Leishvet, 2024; Brasileish, 2025).

In this context, the literature describes different therapeutic approaches to canine visceral leishmaniasis, including drugs with leishmanicidal, leishmaniostatic, and immunomodulatory activity. Among the principal medications used, miltefosine is notable for its leishmanicidal activity, promoting clinical improvement and a reduction in parasite burden. Allopurinol, in turn, has a leishmaniostatic effect, acting to control parasite replication and contributing to the patient's clinical stabilization. Domperidone has immunomodulatory activity and assists the host immune response against the parasite.

However, prolonged use of allopurinol requires clinical and laboratory monitoring because of the risk of xanthinuria and xanthine urolithiasis (Dias et al., 2020; Miró; López-Vélez, 2018; Oliveira et al., 2025). The more advanced forms of the disease are frequently associated with greater systemic involvement, particularly progression of chronic kidney disease, requiring stratification according to the IRIS classification, a condition not observed in this case.

Treatment with miltefosine, allopurinol, and domperidone followed the recommendations of Brasileish (2025), and progressive clinical improvement in the dermatological lesions was observed, consistent with the therapeutic response expected in patients at this stage. The clinical course was consistent with the therapeutic response expected in dogs with canine visceral leishmaniasis. Skin scaling decreased, hair regrew in the periocular and perioral regions, and the ear-tip vasculitis progressively regressed.

According to the WAVD consensus statement, improvement in dermatological lesions is associated with a reduced parasite burden and control of the inflammatory response, and supportive dermatological management is an important adjunct for restoring the skin barrier and improving quality of life in affected patients (Saridomichelakis et al., 2025).

The principal means of preventing *Leishmania infantum* infection in dogs is to reduce contact

with phlebotomine sand fly vectors through individual protective measures and environmental control. In endemic areas, continuous use of repellent collars or other repellent products is recommended for both uninfected and infected dogs, contributing to reduced disease transmission. Environmental measures, including the installation of screens in kennels, windows, and doors, maintenance of environmental hygiene, and reduced exposure of animals during periods of peak vector activity, also assist in preventing infection. In the present clinical case, these preventive measures were instituted as part of therapeutic management and disease control.

CONCLUSION

Canine visceral leishmaniasis is a disease of major clinical and epidemiological relevance, characterized by highly variable clinical manifestations and potential systemic involvement. In the present report, the diagnosis was established through the integration of clinical, laboratory, ultrasonographic, and serological findings, demonstrating the importance of the multimodal diagnostic approach recommended by the Brasileish Guidelines (2025). The case reinforces that isolated interpretation of test results is insufficient for establishing a diagnosis and that correlation among clinical signs, hematological and biochemical abnormalities, diagnostic imaging findings, and serological test results is essential.

The relevance of clinical staging in canine visceral leishmaniasis should also be emphasized, as it enables stratification of disease severity and directly guides therapeutic planning and patient prognosis. Classification based on the integration of different clinical and laboratory parameters is fundamental for clinical decision-making and the implementation of appropriate therapeutic protocols, as recommended by current guidelines.

The present case therefore demonstrates the importance of early diagnosis and an integrated approach to canine visceral leishmaniasis, particularly in endemic regions, where dogs play a central role in maintaining the epidemiological cycle of the disease. The need for prolonged clinical follow-up should also be emphasized, considering the chronic nature of *Leishmania infantum* infection and the possibility

of relapse and parasite persistence even after clinical improvement.

FIGURE TITLES (BOXES, TABLES, ETC.)

Figure 1

Dermatological lesions in a dog with canine visceral leishmaniasis. (A) Ulcerative and scaling lesions along the margins of the pinna before treatment. (B) Periocular and perioral alopecia observed during the initial clinical assessment.



Source: Personal archive, 2026.

Figure 2

Abdominal and dorsal regions of a dog with canine visceral leishmaniasis. (A) Ventral abdominal region before treatment, showing diffuse alopecia and skin scaling. (B) Dorsal region before treatment, with marked skin scaling associated with the dermatological manifestations of the disease.



Source: Personal archive, 2026.

Figure 3

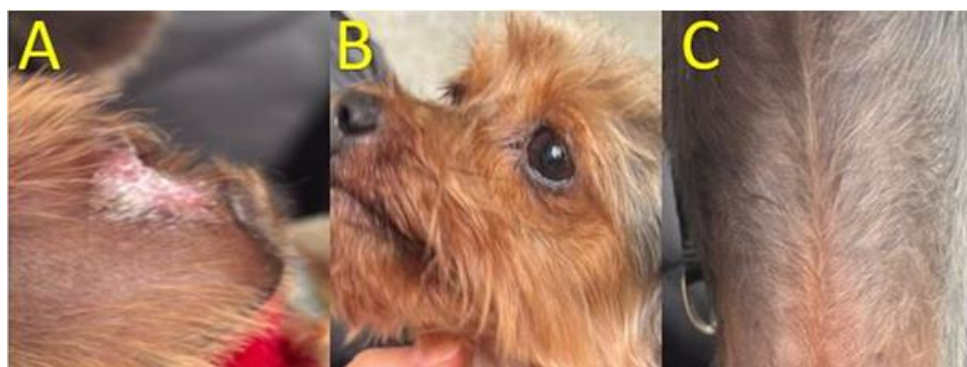
Scrotal region of a dog with canine visceral leishmaniasis, showing epididymal enlargement disproportionate to the animal's body size.



Source: Personal archive, 2026.

Figure 4

Clinical course of a dog with canine visceral leishmaniasis at the end of treatment. (A) Regression of ear-tip vasculitis, showing reduced local inflammation and progression of healing. (B) General appearance of the face at the end of treatment, showing hair regrowth in the periocular and perioral regions and improvement in the dermatological abnormalities. (C) Abdominal region at the end of treatment, showing reduced skin scaling, improvement in alopecia, and improvement in the skin's appearance.



Source: Personal archive, 2026.

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