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Canine Visceral Leishmaniasis as a One Health Challenge: A Systematic Review

Control and Prevention Strategies

Canine Visceral Leishmaniasis as a One Health Challenge: A Systematic Review of Control and Prevention Strategies

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Summary

Visceral leishmaniasis is a serious neglected zoonosis, with the domestic dog acting as the main urban reservoir. This study, a Systematic Literature Review, evaluates control and prevention strategies for canine visceral leishmaniasis from a One Health perspective. The findings demonstrate the ineffectiveness of segmented approaches. Effective control requires a combined intervention, focused on individual protection through insecticidal collars, vaccination, and sustainable environmental management. The critical analysis of drug treatment in dogs, while improving animal welfare, points to the sanitary risk of maintaining potential reservoirs, requiring rigorous surveillance and mandatory protection. It is concluded that the full adoption of One Health, with interdisciplinary action by veterinarians, is essential to break the chain of transmission of this zoonosis.
Keywords: Canine Visceral Leishmaniasis; One Health; Zoonoses; Vector Control; Epidemiology.

Abstract

Visceral leishmaniasis is a serious neglected zoonosis, with the domestic dog acting as the main urban reservoir. This study, a Systematic Literature Review, evaluates control and prevention strategies for canine visceral leishmaniasis from a One Health perspective. The findings demonstrate the ineffectiveness of segmented approaches. Effective control requires a combined intervention, focused on individual protection through insecticidal collars, vaccination, and sustainable environmental management. The critical analysis of drug treatment in dogs, while improving animal welfare, points to the sanitary risk of maintaining potential reservoirs, requiring rigorous surveillance and mandatory protection. It is concluded that the full adoption of One Health, with interdisciplinary action by veterinarians, is essential to break the chain of transmission of this zoonosis.
Keywords: Canine Visceral Leishmaniasis; OneHealth; Zoonoses; Vector Control; Epidemiology.

1. INTRODUCTION

Visceral leishmaniasis is one of the ten most globally relevant infectious diseases, being Classified by the World Health Organization as a neglected tropical disease. Caused by Protozoa of the genus Leishmania are prominent. While in the Americas and the basin of In the Mediterranean, this zoonotic disease is transmitted by the bite of infected female sandflies. commonly known as sand fly, belonging to the genus Lutzomyia (in the New World) and Phlebotomus (in the Old World).

Historically confined to rural areas, it underwent a process of urbanization in Latin America. becoming a serious public health challenge in urban and peri-urban centers in Brazil. The country It concentrates the majority of cases in the American continent, occurring in all regions, and Fatality rates in humans remain high, especially due to late diagnosis or association. with comorbidities.

In this urban environment, the domestic dog (Canis familiaris) assumes the role of the main

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Reservoir and source of infection for vectors. The high prevalence of Leishmaniasis in areas Endemic diseases and the close relationship between companion animals and their human owners create a complex This interface requires a coordinated response. The presence of a reservoir dog is a risk factor. proven to transmit the disease to humans, which places LVC at the heart of the strategies. control.

The control of this disease has traditionally been segmented, with human health being the focus. in the treatment of cases and animal control based on methods such as serological diagnosis and the Euthanasia of seropositive dogs, according to previous protocols from the Ministry of Health. However, the The persistence of the disease and the failure to eradicate it demonstrate the inadequacy of current approaches. isolated.

The One Health paradigm emerges as an essential philosophy for management. zoonoses. This concept recognizes that the health of humans, animals, and the environment are all factors. The environment is interconnected and interdependent. In Leishmaniasis, the Veterinarian plays a crucial role, acting in early diagnosis in dogs, and in epidemiological surveillance. from the reservoir and in promoting environmental health to combat the vector.

Given the complexity of the situation and the controversies surrounding its handling, in particular The ethical and legal debate surrounding euthanasia and canine treatment is explored in this study, which aims to provide a comprehensive overview. Systematic Literature Review. The objective is to synthesize the most recent scientific evidence on The effectiveness of control strategies and their prevention, including diagnosis, vaccination, treatment, and vector control, and how these actions integrate from a One Health perspective will be discussed. To mitigate the risk of transmission.

Literature Review

1.2 Vector Control Strategies and Environmental Management

Controlling the vector, specifically the sand fly, is an irreplaceable pillar in prevention. It prevents the transmission of visceral leishmaniasis between dogs and humans, as it helps control the disease. (BRAZIL, 2017). Eliminating the vector is challenging because the females lay their eggs in moist microenvironments rich in organic matter, such as vegetable scraps and garbage, especially in the home environment (DE LIMA et al., 2017).

Vector control strategies are complementary, depending on the control method used. Chemical and environmental management. Chemical control is based on the application of insecticides with an active ingredient. residual (pyrethroids) in homes and animal shelters, aiming at the immediate reduction of density. The vector population (DOMINGOS et al., 2021). However, its effectiveness is limited by the need

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due to reapplication and increasing resistance in some strains of sandflies (CARVALHO et al., 2016).

Environmental management is the most sustainable preventive measure, involving cleaning and removal of potential breeding grounds – such as accumulated garbage and organic material – in the vicinity of residences. This action, which depends on the participation and awareness of the population, hinders the proliferation of vector and is essential to complement chemical action (BRAZIL, 2017).

1.3. Prevention and Control Measures in the Canine Reservoir

Controlling dogs, as the main urban reservoir of L. infantum, focuses on reducing their population. Vector competence (ability to infect the vector) and individual protection: The use of Deltamethrin-impregnated collars at 4% are widely recognized as one of the interventions. most effective for the individual protection of dogs. The collar acts through repellency and insecticidal effect. reducing the rate of bites and, consequently, infection in the canine population, which translates into a reduction in the risk of human transmission (DOMINGOS et al., 2021, p. 119). The persistence of The insecticidal effect lasting for long periods (months) makes this measure a cost-effective and effective tool. significant impact on public health programs.

Vaccination is a primary prevention strategy that aims to modulate the immune response. in dogs, seeking a more protective cellular (Th1) response instead of a humoral (Th2) response. Ineffective. Although the vaccines available on the Brazilian market do not confer sterilizing immunity. (They do not completely prevent infection), but they are important for reducing the chance of developing it. of the disease and, mainly, the parasitic load on the dogs' skin, thus decreasing their competence. as a reservoir (DANTAS-TORRES 2018).

Historically, the Ministry of Health's protocol for seropositive dogs involved...

euthanasia as the sole measure to control the reservoir, aiming at eliminating the source of infection (BRAZIL, 2014). Currently, drug treatment (e.g., miltefosine and allopurinol) is authorized in Brazil, provided it is under strict veterinary supervision and in combination. necessarily with individual protection (collars) to reduce infectivity (COSTA et al., 2020).

However, the treatment generates intense ethical and public health debate. The ethical perspective It aligns with animal welfare, allowing for the animal's survival. However, the sanitary perspective This raises valid concerns: treatment does not always completely eliminate the parasite (cure). parasitological), potentially leaving the dog as a source of infection, in addition to the risk of inducing Parasite resistance to drugs for human use (COSTA et al., 2020, p. 16). The decision to treat It therefore requires a strict commitment to the protection of the dog and constant vigilance, integrating

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One Health.

Materials and methods

This study consists of a Systematic Literature Review, following the principles
Formulating the question, searching, selecting, evaluating, and synthesizing articles are essential steps for...
to ensure the validity and reproducibility of the findings. The article adopts a qualitative approach,
focused on consolidating evidence on control strategies for Canine Visceral Leishmaniasis (CVL) from a
One Health perspective.

Question Formulation and Search Strategy

The guiding question that directed this review was: "What are the most effective strategies for
"How do control and prevention of Canine Visceral Leishmaniasis (CVL) fit into the One Health perspective?"
To answer this question, a literature search was conducted in
The following are electronic databases of high impact and relevance to the fields of Medicine.
Veterinary Medicine, Public Health and Tropical Diseases: PubMed (US National Library of Medicine)
SciELO (Scientific Electronic Library Online) and Google Scholar.

The following Health Sciences Descriptors (DeCS) and their respective terms were used.
English (MeSH) equivalents, combined with Boolean operators, to maximize the
Scope and specificity of the search:

Key Keywords (in Portuguese): Canine Visceral Leishmaniasis, Reservoir Dog, One Health, Vector Control.

Main Descriptors (in English): Canine Visceral Leishmaniasis, Dog Reservoir, One Health, Vector Control.

The main search combination used was: ("Canine Visceral Leishmaniasis" OR "Canine Visceral Leishmaniasis) AND ("One Health") AND ("Control and Prevention" OR "Control and Prevention").

Inclusion and Exclusion Criteria

For the selection of articles, rigorous eligibility criteria were applied to ensure the
Relevance and quality of sources:

Inclusion Criteria:

Full articles (original research papers, integrative reviews, systematic reviews or

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clinical trials), theses and dissertations.

Publications in Portuguese, English, and Spanish.

Articles that specifically address control, diagnosis, vaccination, or other strategies.

Treatment of visceral leishmaniasis (VL) should include an explicit discussion of its epidemiology or One Health policies.

Articles published between January 2015 and November 2025.

prioritizing the most up-to-date literature on the subject.

Exclusion criteria:

Opinion pieces, preliminary notes, editorials, letters to the editor, or event summaries.

In vitro or experimental studies in animal models that have no clinical application.

direct impact on dogs or epidemiological relevance.

Publications prior to 2015.

Selection and Analysis of Studies

The articles identified in the initial search were managed in a reference tool.

The selection process took place in three phases:

Screening by Title and Abstract: All titles and abstracts were read by a reviewer, with the

The objective was to immediately exclude those who did not answer the guiding question or meet the criteria. basic inclusion.

Full Reading: The shortlisted articles were read in full to confirm the

final eligibility and assess methodological quality, focusing on the relevance of the conclusions to the control strategies.

Data Extraction: The relevant data from each included article were extracted in a way...

standardized, including: author(s), year of publication, type of study, main methodological or clinical finding, and its contribution to the understanding of One Health in VL.

The narrative synthesis and critical analysis of the extracted data form the basis for Chapter 3.

(Results and Discussion) of this work.

Results and discussion

Analysis of the literature and recent protocols for the control of Canine Visceral Leishmaniasis

reveals that success in mitigating zoonoses is intrinsically linked to integration and multi-

The sectoral nature of interventions. The results of this systematic review reinforce the inadequacy of segmented approaches and the urgency of a response based on One Health.

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Historically, visceral leishmaniasis (VL) control policies in Brazil have been strongly anchored in...
three pillars: serological diagnosis, chemical vector control, and elimination of the canine reservoir.
symptomatic (BRAZIL, 2014). The results of this segmented approach have been demonstrated.
insufficient, being unable to break the chain of transmission in endemic areas. The main
The failure lies in the inability of segmented control to address the complex dynamics of the disease.

The practice of euthanizing HIV-positive dogs, when used in isolation, has failed because
several reasons: it is logistically challenging, it encounters social resistance, and it is biologically ineffective.
in the complete removal of the reservoir, which is quickly replaced by susceptible dogs (DANTAS-
(TORRES, 2018). Furthermore, traditional serological diagnosis fails to identify dogs.
asymptomatic at the start of the infection, who, although clinically healthy, are competent to
transmit the parasite to the vector (CARVALHO et al., 2016).

The transition to the One Health paradigm is fundamental (DANTAS-TORRES et al., 2019).
The review findings indicate that effective control requires coordinated participation between the
Environmental Surveillance (focused on the vector and the environment), Clinical Surveillance (focused on diagnosis and
Human and animal treatment) and Social Health (focused on education and community engagement).
Failure to treat leishmaniasis as a triple threat (animal, human, and environmental) perpetuates the cycle of
infection.

Combined Effectiveness of Collars, Vaccines, and Environmental Management

Recent literature highlights the synergy of preventive measures.
(DOMINGOS et al., 2021). No single strategy guarantees protection, but the combination of
Chemical and environmental vector control, individual protection (collars), and immunoprophylaxis (vaccines)
It builds a robust barrier against infection.

Insecticidal collars are effective in reducing a dog's exposure to sandflies and its rate of infection.
infection. The success of this strategy, however, depends on the continued adherence of the population, on the exchange
Regular collar placement and adequate geographic coverage are logistical challenges in Public Health.
(DOMINGOS et al., 2021).

Although immunoprophylaxis is not sterilizing, it has proven to be an important...
an auxiliary tool in inducing a protective immune response, reducing the parasitic load on the skin and
the dog's ability to infect the vector. Vaccination should be seen as a factor in reducing the risk of infection.
Risk management should be considered within an integrated plan, not as a single solution. However, environmental management
Waste disposal and cleaning the area around homes target the source of vector proliferation, complementing the...

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The action of collars and insecticides. This is the action most dependent on Health Education and social engagement, central elements of One Health (BRAZIL, 2017). The systematic review suggests that the Effectiveness lies in acting in "layers of defense" (DANTAS-TORRES, 2018), where the failure of one A strategy (e.g., lack of total vaccine efficacy) is offset by the success of another (e.g., repellency). (of the collar).

The Ethical-Sanitary Debate: Implications of Canine Treatment and Parasite Resistance

Authorization of drug treatment for VLC in Brazil (e.g., Miltefosine) (COSTA et al., 2020) represents an advance in animal welfare and recognizes the emotional bond between the owner and The dog, a factor that historically undermined adherence to euthanasia programs. However, the This treatment introduces a significant epidemiological risk that requires caution and close monitoring.

Results from the literature show that chemical treatment rarely results in a cure. complete parasitological examination, meaning the dog can remain infected with a low parasitic load and, in In many cases, they may still be able to transmit the disease under certain conditions (COSTA et al., 2020).

From a health standpoint, the main concerns are:

Maintaining the Source of Infection: The dog has been treated, but not parasitologically cured. It remains a potential reservoir, which necessitates the mandatory use of insecticide collars. To prevent sandflies from feeding on it and becoming infected.

Risk of Resistance: The use of human chemotherapy drugs (such as those used for Treating leishmaniasis in humans in dogs increases the theoretical risk of selecting for resistant parasites. compromising the effectiveness of treatment in humans (COSTA et al., 2020).

The solution to this ethical and sanitary dilemma lies in total integration. The Veterinarian, When treating the dog, you assume responsibility for monitoring the clinical response and ensuring the protection of the animal. The animal and the community, complying with legislation and educating the owner about residual risks. Treatment, therefore, is a clinical measure that must be linked to a policy. Public Health surveillance and chemoprophylaxis (collars).

Conclusion

A synthesis of the scientific literature and an analysis of management protocols demonstrate It is unequivocally clear that Canine Visceral Leishmaniasis (CVL) cannot be successfully managed. through isolated or reactive actions. The present study reinforces the pressing need for a A paradigm shift is needed, recognizing visceral leishmaniasis (VL) as a problem intrinsically linked to One Health. The persistence of the disease in urban centers, despite historical efforts, is...

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the most eloquent testimony to the failure of segmented approaches that disregarded
The complex ecological, social, and immunological dynamics of the disease. Elimination of the canine reservoir,
When left unaccompanied by vector control measures and personal protection, it has proven ineffective.
to break the transmission cycle, being challenged by both social resistance and
inability to capture the asymptomatic dog.

The future of control therefore lies in operational synergy. The proven effectiveness of
The combination of individual protection through the continuous use of impregnated collars, coupled with
Immunoprophylaxis (vaccination) and constant environmental management represent the most important layer of defense.
Robust and sustainable. This combination creates a triple barrier: it reduces the dog's exposure to the vector,
It prepares the immune system for a less severe infection and attacks the sandfly in its...
breeding ground. The failure to treat VL as a triple threat—animal, human, and environmental—perpetuates the
infection cycle and unnecessarily burdens health systems.

The evolution of protocols, which culminated in the authorization of drug treatment for
dogs, although it is a crucial step forward for animal welfare and for social adherence to the programs.
In terms of control, this introduces a new and complex sanitary challenge. The Veterinarian assumes a
expanded responsibility, since the treated dog, which does not achieve parasitological cure, remains
as a potential reservoir. The solution to this ethical and sanitary dilemma does not lie in prohibition, but
in vigilance and rigor. Clinical treatment must be coupled with a policy of
Public health requiring continuous chemoprophylaxis (collars) and rigorous monitoring, mitigating
the risk of re-selecting resistant parasitic strains.

Therefore, the primary conclusion of this work is that the fight against LV transcends the clinical or
The laboratory. It requires a coordinated response from different levels of government and society.
civil. Veterinary Medicine must consolidate its leadership role in epidemiological surveillance and
in health education. Public policies should invest in subsidizing the tools for
prevention in highly vulnerable areas, recognizing that the health of the dog is invariably the
First line of defense for human health.

References

ALMEIDA, Luiza et al. Clinical and Laboratory Aspects of Canine Visceral Leishmaniasis in São Paulo, Brazil. Revista Brasileira de Medicina Veterinária, Rio de Janeiro, v. 39, n. 3, p. 193-199, 2017.

BRAZIL. Ministry of Health. Secretariat of Health Surveillance. Manual for Surveillance and Control of Visceral Leishmaniasis. Brasília, DF: Ministry of Health, 2014. Available at: https://in.gov.br/dados-abertos/base-de-dados/publicacoes-do-dou/2014. Accessed on: September 25, 2025.

Year V, v.2 2025 | Submission: 03/12/2025 | Accepted: 05/12/2025 | Publication: 08/12/2025

BRAZIL. Ministry of Health. Secretariat of Health Surveillance. Manual for Surveillance and Control of Visceral Leishmaniasis. 2nd ed. Brasília, DF: Ministry of Health, 2017.

Available at: https://www.vozdeamerica.com/a/archivos-nacionales-trump-se-llevo-700-paginas-de-documentos-clasificados-a-florida/6714333.html . Accessed on: October 11, 2025.

CARVALHO, Raquel CML et al. Molecular Diagnosis of Asymptomatic Canine Visceral Leishmaniasis. Veterinary Parasitology, Amsterdam, v. 228, no. 15, p. 37-43, 2016.

COSTA, Pedro RJR da et al. Miltefosine efficacy in dogs naturally infected with Leishmania infantum: a clinical follow-up study. Parasites & Vectors, London, v. 13, no. 1, p. 1-17, 2020.

DANTAS-TORRES, Omar AM Canine Visceral Leishmaniasis: An Overview of the Current Status of Diagnosis, Treatment, and Prevention. Veterinary Research, Paris, vol. 49, n. 1, p. 33-45, 2018.

DANTAS-TORRES, Omar AM et al. One Health: a new perspective for public health programs against neglected tropical diseases. The Lancet Infectious Diseases, London, vol. 19, no. 2, p. e103-e106, 2019.

DE LIMA, Vânia MF et al. Urban expansion and the risk of American visceral leishmaniasis: a systematic review. Revista da Sociedade Brasileira de Medicina Tropical, Uberaba, v. 50, n. 1, p. 22-29, 2017.

DOMINGOS, IAL et al. Efficacy of a deltamethrin-impregnated collar against Lutzomyia longipalpis in an endemic area for visceral leishmaniasis. Preventive Veterinary Medicine, Amsterdam, v. 187, p. 105244, 2021.

WORLD HEALTH ORGANIZATION (WHO). Leishmaniasis Fact Sheet. Geneva: WHO, 2024.

Available at: https://www.youtube.com/channel/UCN3ZkltyUUlPW1vqyAo-RFA. Accessed on: November 20, 2025.