

Cutaneous mycobacteriosis in a dog

Micobacteriose cutânea em cão

Larissa Tomelin ¹

Tatiane Furtado de Carvalho ²

Juliano Santos Gueretz ^{1*}

¹ Instituto Federal Catarinense (IFC), Araquari, SC, Brazil

² Universidade Federal do Piauí (UFPI), Bom Jesus, PI, Brazil

*Correspondence: juliano.gueretz@ifc.edu.br

Received: 2022 Nov 24 | Accepted: 2023 Sep 25

DOI: <http://dx.doi.org/10.7213/acad.2023.21201>

Rev. Acad. Ciênc. Anim. 2023;21:e21201

Abstract

Mycobacteriosis is a skin disease caused by a bacterium of the genus *Mycobacterium*. Although prevalent, the infection has a difficult diagnosis, and its occurrence is underestimated in veterinary medicine. The disease presents firm, painless and non-pruritic nodules, mainly in the extremities of the body. The diagnosis can be confirmed by performing the histopathological exam in Ziehl-Nielsen stain to observe the bacilli. The purpose of this report was to describe a case of canine cutaneous mycobacteriosis in a mixed-breed dog, approximately 10 years old, with clinical signs of alopecia and hyperkeratosis in the lumbar region and pelvic area, and later developing nodules in the muzzle, ears, lips and scrotum, confirmed by histopathological examination. Antemortem diagnosis is laborious because it has a nonspecific clinical presentation, in addition to little knowledge about the pathogen. Based on the histopathology associated with the presence of acid-alcohol resistant bacilli in the macrophage cytoplasm, the diagnosis of cutaneous mycobacteriosis was established.

Keywords: Canine dermatology. *Mycobacterium* sp. Histopathology.

Resumo

Micobacteriose tegumentar é uma dermatopatia causada por uma bactéria do gênero Mycobacterium. A infecção embora prevalente, tem o seu diagnóstico desafiador e a sua ocorrência é subestimada na medicina veterinária. A doença se manifesta pela presença de nódulos firmes, indolores e não pruriginosos, principalmente nas extremidades do corpo. O diagnóstico pode ser confirmado pela realização de exame histopatológico e coloração de Ziehl-Nielsen para observação dos bacilos. O objetivo deste relato foi descrever um caso de micobacteriose cutânea em um cão, sem raça definida, de aproximadamente 10 anos de idade, com sinais clínicos de alopecia e hiperqueratose na região lombar e membros pélvicos, evoluindo posteriormente para nódulos no focinho, orelhas, lábios e escroto, confirmados através de exame histopatológico. O diagnóstico ante mortem é laborioso por ter uma apresentação clínica inespecífica, além do pouco conhecimento acerca do patógeno. Com base na histopatologia, associada à presença de bacilos ácido-álcool resistentes no citoplasma dos macrófagos, estabeleceu-se o diagnóstico de micobacteriose cutânea.

Palavras-chaves: Dermatologia canina. *Mycobacterium* sp. Histopatologia.

Introduction

Mycobacteriosis, or leproid granuloma, is an infection caused by the genus *Mycobacterium* sp., which is rare in dogs and cats and affects the subcutaneous and skin of these animals, especially

immunodeficient animals (Mattos et al., 2011). It is presented in the form of single or multiple, firm, ulcerated, fistulated, and painless nodules, mainly in the body extremities, such as the ear, foot, tail, and muzzle (Carmelo Jr et al., 2019). No lymph node reactivity, involvement of abdominal organs, or systemic signs are observed (Rodriguez-Tovar et al., 2015).

The diagnosis of mycobacteriosis is more difficult by attempts at in vitro culture to be unsuccessful, not allowing the precise etiology to be defined (Rodriguez-Tovar et al., 2015). Thus, what is known about the pathogen through research on etiology is that it appears to be saprophytic, developing in more humid environments. There are two hypotheses about how the infection occurs: through direct contact with the agent or in injuries caused by perforations such as insect bites (Maruyama, 2015). Due to the difficulty in performing the culture, histopathological examination is extremely important for visualizing the pathogen in the tissues, confirming the disease, and for initiating the most appropriate therapeutic protocol.

Normally the lesions are self-limiting, however, they can lead to chronic skin infections, especially in immunosuppressed animals, requiring treatment for the remission of the lesions and improvement of the patient's clinical condition, being essential to follow up throughout the protocol (Malik et al., 2015). Therefore, the purpose of this report is to describe a case of cutaneous mycobacteriosis in a dog, in Santa Catarina State, Brazil, as well as emphasizing the importance of histopathological examination for diagnostic dermatopathology.

Case report

A mixed-breed dog, approximately 10 years old, with a body weight of 12 kg, was rescued in a homeless situation in Araquari city, Santa Catarina, presenting clinical signs of alopecia and hyperkeratosis in the lumbar and pelvic regions, later developing nodules on the muzzle, ears, lips, and scrotum (Figure 1). The nodules presented macroscopically, a brownish surface and soft consistency, some of which were ulcerated. The clinical signs suggested cutaneous leishmaniasis, and therefore, a serological test and fine-needle aspiration for cytological examination of the bone marrow for identifying *Leishmania* sp. were performed, but these tests results were negative.

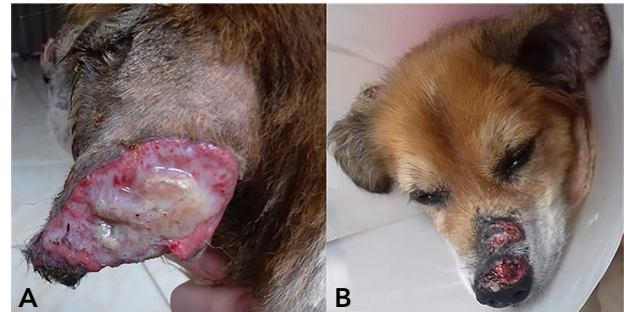


Figure 1 - An ulcerated lesion in the external region of the left ear, with intense inflammatory reaction (A) and ulcerated and crusted lesions in the dorsal region of the muzzle (B).

Based on the negative result for leishmaniasis, it was decided to perform a biopsy for histopathological evaluation. Fragments of the nodular lesions of the testicles, muzzle, and ears were collected. Orchiectomy and ablation of the scrotum were also performed. Microscopically, there was a lymphoplasmacytic inflammatory infiltrate, with epithelioid cells and foamy macrophages in the skin and scrotum, compromising the deeper layers of the skin, but without characteristics of malignancy. Bacterial structures, with individualized bacillary morphology, were observed in the cytoplasm of macrophages and epithelioid cells, which in hematoxylin and eosin (HE) staining presented a negative image (Figure 2A and B). The search for acid-alcohol resistant bacillus (BAAR) by Ziehl-Neelsen staining was positive, showing long bacilli in the macrophage cytoplasm, compatible with *Mycobacterium* spp.

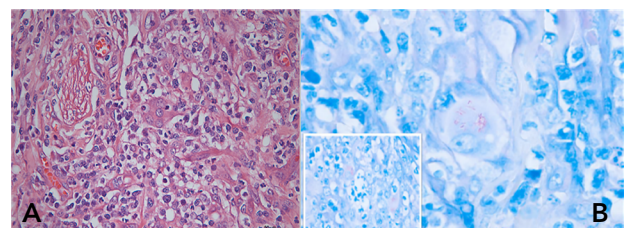


Figure 2 - Fragment of a dog's skin, mixed-breed, approximately 10 years old. (A) Dermis with lymphoplasmacytic and neutrophilic inflammatory infiltrates, with epithelioid cells and foamy macrophages. Hematoxylin and eosin (HE). (B) Presence of acid-alcohol resistant bacilli (BAAR) positive in the macrophage cytoplasm. Ziehl-Neelsen staining. Ziehl-Neelsen, 1000x.

Before the biopsy result, the patient was treated with doxycycline at a dose of 10 mg/kg BID for 21 days, as he had previously been diagnosed with ehrlichiosis. Additionally, after the diagnosis of mycobacteriosis, therapy with Omeprazole 1 mg/kg QD was instituted for 30 days, vitamin supplement (Hepvet) every 24 hours for 60 days, clarithromycin 7.5 mg/Kg QD for 90 days, and rifampicin 10 mg/kg QD for 90 days, in addition to cleaning the lesions every 12 hours with chlorhexidine antiseptic shampoo. After the end of the treatment, the lesions were smaller and without signs of inflammation, maintaining as a treatment protocol only cleaning them with chlorhexidine shampoo (Figure 3).

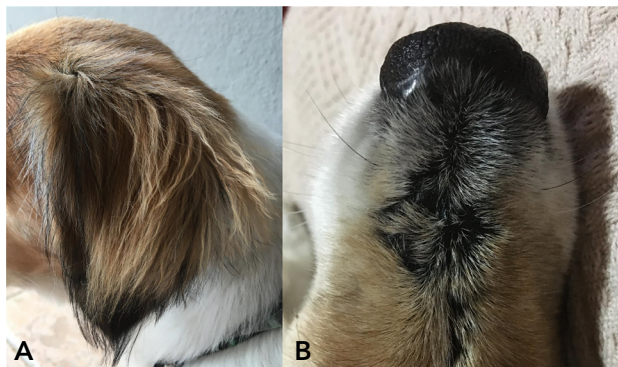


Figure 3 - Ear (A) and muzzle (B) of a dog after complete remission of the lesions observed in mycobacteriosis.

Discussion

The occurrence of mycobacteriosis is considered rare (Mattos et al., 2011) and may be associated with difficulty in diagnosis, due to the characteristic of nonspecific clinical infection, simulating other diseases that develop papules or nodules, in addition to the complexity of bacterial culture to confirm the diagnosis (Rodriguez-Tovar et al., 2015). For this reason, it is believed that cutaneous mycobacteriosis can be underdiagnosed, emphasizing the importance of this case report.

Studies on the disease have associated a greater predisposition for the boxer breed and its half-breed (Maruyama, 2015; Rodriguez-Tovar et al., 2015). Due to the lack of information on the history of the animal in this report and the fact that it does not have a defined breed, the diagnosis became more difficult,

in addition to less knowledge of the disease and its epidemiology in the region.

Canine cutaneous leishmaniasis presents mucocutaneous, ulcerated, and granulomatous lesions, with difficult to heal edges in ears, muzzles, and scrotum, which are non-pruritic and painless (Mattos et al, 2011; Maruyama, 2015). Therefore, the differential diagnosis for leishmaniasis has become important, with the need for serology, bone marrow aspiration, and histopathological examination. In the case of public health, considering it to be a zoonosis, its exclusion becomes even more essential because it presents several vectors, reservoirs, and transmission patterns, which make this disease difficult to control, leading Brazil to occupy a notable position in the number of cases of cutaneous and visceral leishmaniasis (Rodriguez-Tovar et al., 2015).

The diagnosis of canine leishmaniasis must be based on clinical, epidemiological, serological, and parasitological diagnosis (Mattos et al., 2011). As the patient's clinical diagnosis was suggestive of leishmaniasis, since it presents characteristic lesions in indicative places, and the epidemiological diagnosis was not possible to determine because the animal's history was not known, the serological examination using a rapid indirect ELISA test was performed. Despite the negative result, bone marrow aspirate and histopathological examination were performed, since negative serology does not refuse the infection, and further tests are necessary for confirmation. The parasitological diagnosis was performed, therefore, using two methods to reject canine cutaneous leishmaniasis with clinical presentation in the mucosa. The puncture was performed to search amastigote forms in the bone marrow and the histopathological examination to observe the parasite in the tissues.

The differential diagnosis should include extensive infection caused by *Staphylococcus intermedius* and *Microrosporium canis*, canine cutaneous sterile pyogranulomatous syndrome, histiocytomas, basal cell and mast cell tumors, pseudomycetomas caused by *Sporothrix* spp., *Cryptococcus* spp. and *Leishmania* sp. (Malik et al., 2015; Maruyama, 2015).

Due to the non-specificity of the lesions, histopathological analysis became essential, the identification of the etiologic agent made possible the diagnosis and subsequent definition of the appropriate treatment, which is the most indicated exam in confirming the diagnosis (Malik et al., 2015).

As the lesions were located, with defined and discrete nodules being ulcerated, the performance of the surgery to remove them had as objective, in addition to the extraction of fragments for histopathological evaluation, a curative effect on nodules of the muzzle, lips, and scrotum, adjuvant to the antimicrobial therapy (Malik et al., 2015; Mitchell et al., 2019).

Treatment with antibiotic therapy indicated for mycobacteriosis includes rifampicin 10-15 mg/kg SID or enrofloxacin 5 mg/kg BID used alone because they present good results without adverse effects, with a mean clinical cure of 85 days. However, the same authors cite a study successfully performed in Paraná, using clarithromycin, doxycycline, and/or quinolone, applied in isolation or not (Maruyama, 2015).

Therapy with more than one agent in cases where the animal's response is insufficient in the long term has been indicated. As the patient in this report had already been treated with doxycycline for the treatment of another disease and still developed the lesions during therapy, the choice of using clarithromycin and rifampicin together is mainly due to the low response of the lesions to the doxycycline. The clinician opted to change the active ingredient to ensure greater success in curing the animal. This association is indicated for the treatment of severe or refractory cases of leproid granuloma (Rhodes e Werner, 2014; Malik et al., 2015).

Conclusion

Based on the histopathology associated with the presence of acid-alcohol resistant bacilli in the macrophage cytoplasm, the diagnosis of cutaneous mycobacteriosis was established, although the ante-mortem diagnosis is challenging because the clinical infection is nonspecific and simulates other skin diseases that present solid formations (papules or nodules). Therefore, the histopathological examination is essential to establish the diagnosis and subsequent treatment of mycobacteriosis, providing well-being and quality of life to the patient.

References

- Carmelo Jr F, Alves CC, Fonseca MGM, Soares MA, Bilhalva MA, Brito RSA. Síndrome do granuloma leproide em um cão na cidade de Pelotas: Relato de caso. *Pubvet*. 2019;13(3):1-4.
- Malik R, O'Brien CR, Fyfe JA. Infecções micobacterianas - Granulomas leproides caninos (Hanseníase canina). In: Greene CE. *Doenças infecciosas em cães e gatos*. 4 ed. Rio de Janeiro: Elsevier; 2015. 1404 p.
- Maruyama S. Micobacterioses tegumentares. In: Larsson CE, Lucas R. *Tratado de Medicina Externa - Dermatologia Veterinária*. São Paulo: Interbook Editorial; 2015. p. 547-62.
- Mattos GR, Ribeiro PA, Malaquias MFD, Maciel NS, Acosta ICL, Martins CT. Micobacteriose cutânea em cão. *Rev MV&Z*. 2011;9(2):41-2.
- Mitchell JL, Gunn-Moore DA. Mycobacterial infections in cats and dogs. *Vet Nurs J*. 2019;34(4):102-7.
- Rhodes KH, Werner AH. *Dermatologia de pequenos animais: consulta em 5 minutos*. Rio de Janeiro: Revinter; 2014. 632 p.
- Rodriguez-Tovar LE, Cantu-Oviedo CB, Trejo-Chavez A, Arce-Mendoza AY, Nevarez-Garza AM, Wong-Gonzalez A, et al. First report of ulcerative dermatitis due to a simultaneous infection by mycobacteria and dermatophytes in a dog. *Res J Vet Sci*. 2015;8(1):15-20.