Revue vétérinaire clinique (2015) **50**, 59—63

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CLINICAL CASE

Simultaneous infection by *Dirofilaria repens* and *Leishmania infantum* in a dog☆

Infection mixte à Dirofilaria repens *et* Leishmania infantum *chez un chien*

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Reçu le 13 juin 2014 ; accepté le 18 février 2015
Disponible sur Internet le 24 mars 2015

KEYWORDS
Dirofilaria repens;
Leishmania infantum;
Dog;
Nodular dermatitis

Summary
The subject. — *Dirofilaria repens* and *Leishmania infantum* are agents of skin diseases in dogs. While features of cutaneous lesions in canine leishmaniosis are well-known, the role of *D. repens* in inducing dermatopathies in infected animals is still unclear. Both parasites are gaining attention, given that their geographic distribution is expanding in different European areas.
Topicality and strong points. — The present report describes a case of simultaneous infection by *L. infantum* and *D. repens* in a dog with skin lesions. A 6-year-old dog living in Central Italy was referred for a dermatological examination, which showed an erosive-ulcerative nodular dermatitis with erythema on the inner part of left ear. The histological examination of the lesion revealed a *Leishmania*-induced granuloma. The skin lesion and the blood were also molecularly positive for *D. repens*. Circulating microfilariae were found with a value of 61 larvae/mL.
Perspectives and projects. — The epidemiologic and sanitary importance of co-infections by *D. repens* and *L. infantum* and their possible role in causing canine dermatopathies in co-infected dogs is discussed.

☆ Crédits de formation continue. - La lecture de cet article ouvre droit à 0,05 CFC. La déclaration de lecture, individuelle et volontaire, est à effectuer auprès du CNVFCC (cf.sommaire).

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http://dx.doi.org/10.1016/j.anicom.2015.02.001

MOTS CLÉS
Dirofilaria repens ;
Leishmania infantum ;
Chien ;
Dermatite nodulaire

Résumé
Le sujet. — *Dirofilaria repens* et *Leishmania infantum* sont des agents infectieux cutanés bien connus. Le rôle de *D. repens* comme inducteur d'affections cutanées reste mal connu, tandis que les lésions cutanées associées à la leishmaniose sont très bien décrites.
Points d'intérêts et spécificité. — Un cas clinique de dermatite nodulaire granulomateuse chez un chien avec infection mixte à *L. infantum* et *D. repens* est décrit. Le chien âgé de 6 ans et vivant dans la partie centrale de l'Italie a été référé en dermatologie pour des lésions cutanées nodulaires ulcératives et erythémateuses de la face interne du pavillon auriculaire gauche. L'examen histologique de la lésion a révélé une dermatite ulcérative granulomateuse causée par la leishmaniose. La lésion cutanée était positive pour *L. infantum* et *D. repens*. Par ailleurs, des microfilaires ont été mises en évidence dans la circulation sanguine (61 larvae/mL);
Prospective et projet. — Le rôle épidémiologique et sanitaire de la présence simultanée de *D. repens* et *L. infantum* est ici discuté, ainsi que le rôle de ces agents parasitaires dans le développement des lésions observées.

Introduction

Nodular to diffuse granulomatous vs pyogranulomatous skin lesions are often reported in dogs and represent a frequent clinical challenge. They are generally divided in four groups:
- infections with detectable agents;
- infections with no detectable agents;
- not infective lesion with detectable aetiologic agents (e.g. foreign body);
- and not infective lesion with an immune-mediated aetiology (e.g. sterile idiopathic dermatitis) [1].

The presence of different pathogens may easily induce pyogranulomatous skin lesions which can be subjected to histopathological examinations to allow a reliable diagnosis based on different assays, e.g. special stains or immunofluorescence [2,3]. Some parasitic agents, as *Leishmania infantum*, may not be detectable with special stains and, in these cases, PCR and immunohistochemistry are necessary for the diagnosis [1,4]. In more difficult cases, clinical examination and many different laboratory tools should be applied to achieve the diagnosis. The majority of skin lesions with a histological nodular to diffuse granulomatous vs pyogranulomatous infiltrate is mainly represented by papules, nodules, alopecia and erythema [5]. In such scenario, a clinical differentiation is difficult because similar lesions may be shared by different parasitic and non-parasitic diseases. A definitive and aetiological diagnosis is pivotal for a focused therapy in clinical settings and, for parasitic diseases, to interrupt the biological cycle of the parasite(s) involved, towards the control of the disease(s) in dogs and humans as well. Various ectoparasites (e.g. lice, ticks, fleas, mites), some nematodes (e.g. filariae, *Ancylostoma caninum*) and protozoa (e.g. *L. infantum* and *Neospora caninum*) may cause cutaneous lesions in dogs. Some of these parasites are changing their epidemiological distribution and posing new diagnostic challenges in clinical settings. This is particularly the case of the zoonotic vector-borne leishmaniosis and dirofilarioses, which have now an overlapping geographic distribution and may occur in suitable hosts at the same time [6].

Canine leishmaniosis presents with a plethora of clinical signs, and skin lesions are among the most common. These include typical and atypical presentations, e.g. exfoliative dermatitis, diffuse, non-itching generalized or localized alopecia, dry seborrhoea with scales, cutaneous ulcers, papules and nodules [5,7].

Adult stages and/or circulating microfilariae (mff) of *D. repens* in dogs may induce subclinical infections or cutaneous signs of varying severity, such as (sub)cutaneous nodules, itching [8], and various allergic reactions [9,10]. Also, this nematode has a zoonotic potential, as the human infection is usually characterized with subcutaneous nodules, pruriginous urticarioid patches, transient swellings, eosinophilia, photophobia, conjunctival irritation and nodules or cysts in eye or in peri-ocular tissues [6].

The present report describes a case of simultaneous infection by both *D. repens* and *L. infantum* in a dog with a localized nodular granulomatous dermatitis.

Observations

A 6-year-old neutered female mixed breed dog living in Central Italy was referred for a dermatological examination. The clinical history reported a past infection by *D. repens* two years before. Since then, the dog lived in a shelter located in an area endemic for canine filariae [11] and she was under treatment with allopurinol 10 mg/kg/bid for a leishmaniosis diagnosed 12 months before.

The dog was in poor general health conditions (BCS = 3/9) but, at the dermatological examinations, she showed only an erosive-desquamative dermatitis with ulcers, hemorrhagic crusts and erythema on the inner part of left ear (Fig. 1). No other skin lesions were found at the clinical examination.

Complementary hematological and dermatological exams were performed. Cell blood counts revealed a moderate neutrophilia, a mild lymphocytopenia and the presence of platelet aggregates. The blood biochemical