

# Myocarditis in a dog with leishmaniasis and dirofilariasis coinfection

## Abstract

Heartworm disease and leishmaniasis are parasitic diseases caused by the nematode *Dirofilaria immitis* and by the protozoan *Leishmania infantum* respectively. These two vector-borne parasitoses share not only the same geographic distribution as coincident foci of endemicity. Brazil is considered an endemic country for these two parasitoses. Cardiac symptomatology is well defined in heartworm disease, whereas leishmaniasis is still not well defined. Some cardiac biomarkers are important to clarify cardiac damage; among them we have the enzyme Creatinine kinase (CK), its CK-MB isoenzyme, aspartate-transaminase (AST) and lactate dehydrogenase (LDH). The electrocardiogram examination is also important as a marker of cardiac injury. In this sense, the study aimed to report a case of co-infection between these two parasitosis in a 5-year-old dog from the Center of Zoonoses of Fortaleza-Ceará.

**Keywords:** dirofilaria immitis, co-infection, Leishmania infantum

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## Case report

Cardiovascular injury caused by visceral leishmaniasis was investigated at the Center of Zoonosis Control, Fortaleza (CCZ). CCZ is a public health agency responsible for the euthanasia of animals suffering from according to Brazilian legislation. This study was approved by the Institutional Ethical Committee, State University, Ceara (Protocol number 2891954/2016). Dogs that tested positive for Leishmaniasis on both immunochromatographic rapid test (DPP® kit) and ELISA test (EIE-leishmaniose-canina-Bio-Manguinhos, EIE-LC kit), underwent blood collection for biochemistry test and ECG (ECGDeltaVer®) to evaluate possible heart damage before mandatory euthanasia. Unexpectedly, one of the studied animals displayed *Dirofilaria immitis* co-infection,<sup>1</sup> which is not a common condition. This is a case study of a 5-years-old male Pit Bull dog that presented Leishmaniasis and Heartworm disease concomitantly.<sup>2</sup> On physical examination, the dog presented weight loss, lesion on the tip of the ear and exfoliative dermatitis. Biochemistry tests and ECG showed the following results: creatine kinase (CK) 138.1 U/L; creatine kinase-MB (CK-MB) 66 U/L; aspartate transaminase (AST) 30U/dL; lactate dehydrogenase (LDH) 366U/L; P wave 52ms; QRS complex 76ms; PR interval 120ms; QT interval 200ms; ST segment 148ms; QT interval 519.875ms.<sup>3</sup> Additionally, necropsy revealed large amount of long white/cream filarial worms in the heart identified as *Dirofilaria immitis*. Heartworms mainly occur in the right ventricle and pulmonary artery (Figure 1).

*Leishmania infantum* is the main causative agent for visceral leishmaniasis in Brazil, where it is considered as an endemic disease. *D. immitis* and *L. infantum* share not only the same geographic distribution but also endemic foci. Over recent decades, many authors have demonstrated heart injury related to Visceral Leishmaniasis in humans and dogs.<sup>4,5</sup> Based on biochemistry analysis of the blood (except AST) and ECG, which indicated left atrioventricular overload, increased ventricular electrical activity and myocardial hypoxia and/or hydroelectrolytic imbalances, we confirm the diagnosis of myocarditis, possibly due to coinfection of *L. infantum* and *D. immitis*.



**Figure 1** *D. immitis* inside the heart of the dog.

## Conclusion

Heartworm disease and leishmaniasis are parasitic diseases caused by the nematode *Dirofilaria immitis* and by the protozoan *Leishmania infantum* respectively. These two vector-borne parasitoses share not only the same geographic distribution as coincident foci of endemicity. In this case, a dog co-infected with both parasites was reported. Therefore, it is very important to actively combat the responsible vectors, since the diseases mentioned above are zoonoses.

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## Conflicts of interest

Author declares there is no conflict of interest.

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