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Dirofilariasis: An ignored parasitic zoonosis

Dirofilariasis: Zoonosis parasitaria ignorada

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ABSTRACT

Dirofilariasis is caused by Dirofilaria *immitis*, or dogworm, is a disease of worldwide distribution transmitted by mosquitoes of the genera *Aedes, Anopheles, Culex and Taeniorhynchus*; in humans, this filaria causes skin and lung lesions mainly, although cases have been reported with different locations such as large mesenteric vessels, peritoneal, spermatic cord and right side of the heart. In the human, unlike the dog, there is no filaremia. Symptoms in canines are inapparent and nonspecific, even asymptomatic. In humans, it is identified on chest x-rays as a coin-shaped lesion which tends to be confused with neoplastic lesions, infectious diseases, or granulomas. In veterinary medicine of our country the cases of dirofilariasis mentioned were isolated, so it is important to highlight that in the last 10 months the presence of microfilaria nematodes was identified by blood cytology in 10 canines residing in Asunción with nonspecific clinical symptoms, which were subjected to specific treatment and favorable therapeutic response. It is important to reiterate the increase in cases identified lately, which is relatively alarming because of the viable zoonotic. For this reason, the objective of the work is to communicate the exponential presence of cases of canine dirofilariasis to be included in the range of human differential diagnoses due to its zoonotic potential.

Keywords: Dirofilaria, Zoonosis, Canine, Asunción.

1 INTRODUCTION

Canine filariasis is the disease that gives its name to the infestation by the parasite Dirofilaria in dogs, also known as dirofilariasis, cardiac verminosis, heartworm disease, heartworm disease (1). In the world there are two species of heartworm of interest for human and veterinary medicine Dirofilaria *repens* (D. *repens)* and Dirofilaria *immitis* *(*DI) (2). The D. *repens* is a disease present in Europe, Africa and Asia; on the other hand, DI or heartworm present in mammals, mainly carnivores and primates: dogs, cats, foxes, coyotes, ferrets and sea lions (1). DI is a cosmopolitan nematode, originally considered to be of strict veterinary importance; Later it was recognized as zoonotic; In humans it causes skin and lung lesions. Cases of heartworm disease have been reported in large mesenteric vessels, peritoneal, spermatic cord and "right" heart (3)(4)(5).

Clinically ill animals show few signs of infestation; although these depend on the severity

of the disease, the location of the filaria, the length of time it has been present (6), and the amount of damage caused to the heart; as well as to the lungs, liver and other organs; but always the affected animal will show less and less tolerance to exercise (5). Adult worms, in the canine, form a mass in the right ventricle causing congestive heart failure in the pulmonary artery; while microfilariae circulate in the blood (1). The microfilaria circulates in the bloodstream, but cannot develop adult worms without passing through an intermediate host and transmitter, hematophagous "mosquito" belonging to the Phylum Arthropoda, Family Culicidae (1) (2) and the genera: *Aedes*, *Anopheles*, *Culex* and *Taeniohynchus*; the family has 3,000 species included in 34 genera, receptive as intermediate hosts and biological vectors of ID (6) (7). For the biological cycle to occur in the mosquito, it is necessary that in the infected mosquito it passes a series of transformations in larval stages (L1, L2 and L3),

On the other hand, development in the host mammal occurs after 2 days to 3 months, reaching lengths of 3.2 to 11 cm (L4 and L5) (2) (5). The number of adult worms housed varies from 1 to more than 250 in the dog (6). Survival of ID in the dog is 3 to 8 years (6). Blood testing is the most practical and simplest method for diagnosing ID; Although it is a qualitative test, it does not indicate the number of microfilariae and the severity of the lesions. Indeed, the diagnosis is generally established from ordinary blood tests (5), such as blood biometrics, serum concentration method, immunological methods to detect antigens and the modified Knott technique (6) (9). In cases of chronic cough in individuals living in endemic areas and to perform detection of adult worms in the heart through radiographic plates, especially in cases of vena cava syndrome (1) (10).

It has been shown that D. *Immitis* can also be transmitted to man by the bite of infected mosquitoes. Most human infections go unnoticed as the parasites are eliminated in the subcutaneous tissue; But in some cases, immature worms reach a branch of the pulmonary artery, where after their destruction they produce a benign pulmonary nodule. However, if the person goes to a medical consultation for causes unrelated to heartworm, the discovery of a nodule in the lung leads to suspicion of a malignant cause, so that in many cases unnecessary and very aggressive surgical interventions are performed (11).

In Paraguay, no epidemiological studies have been conducted to determine the presence and prevalence of ID in dogs, this is the first report of cases in Asunción. Taking into account all the above, it should be noted that the interactions between human and animal health are not a novelty, so it is essential to know the existence of this parasite in humans, to include it in the differential diagnosis of pulmonary nodules caused by pulmonary dirofilariasis.

2 OBJECTIVE

To communicate the exponential presence of cases of canine dirofilariasis to be included in the range of human differential diagnoses due to its zoonotic potential.

3 MATERIALS AND METHODS

10 cases of Dirofilariasis are reported in canines of Asunción and Gran Asunción. During the months of August 2022 to June 2023. Dogs with age range from 2 to 8 years, indistinct sex, with nonspecific clinical symptoms. Table 1.

Table 1. Canine clinical symptoms reported.

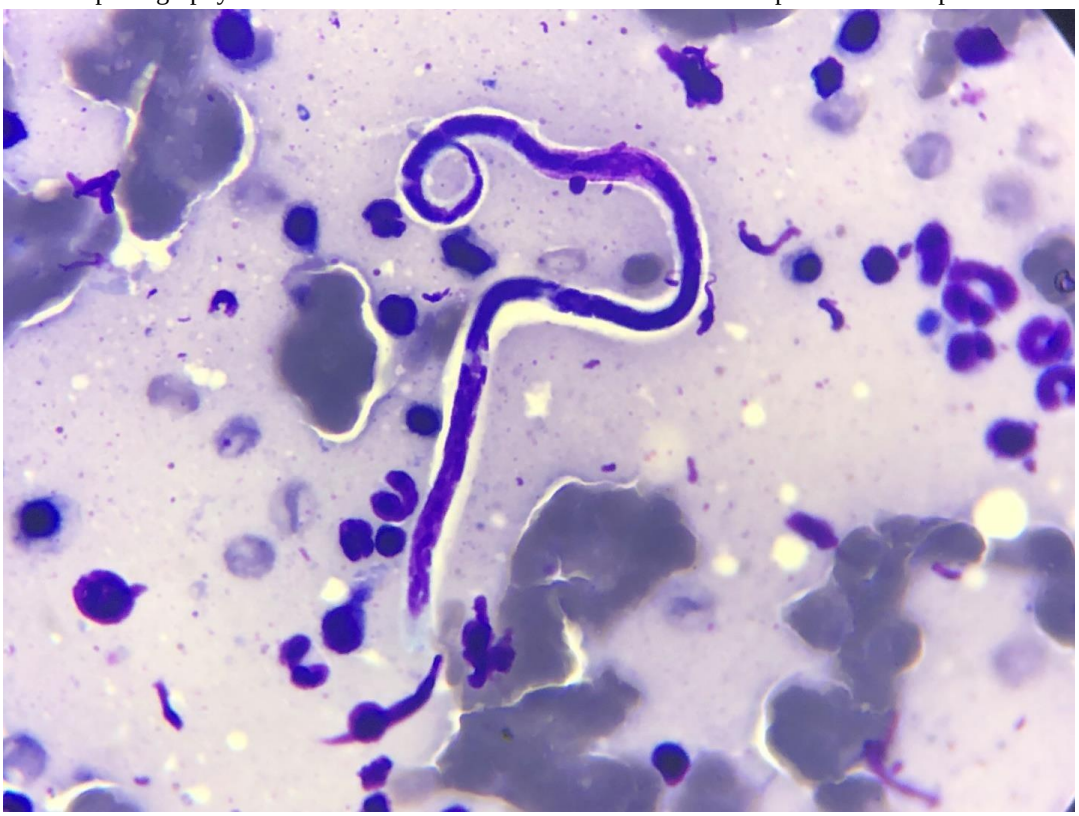
Canine	Fever	Decay	Weight Loss	Anorexia	Seizures	Dyspnea	Pale mucous membranes
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Capillary blood samples were taken from the pinna. Prior to blood collection, the respective antisepsis was performed for subsequent puncture with 21G needles. The material was collected with capillary tubes with heparin. Subsequently, a blood smear was performed for cytological evaluation. Fixation with methanol and staining with Giemsa 10% coloring.

4 RESULTS

Blood cytologies showed the presence of microfilaria spp. in the canines analyzed. Fig. 1. Which were submitted to therapeutic protocol according to responsible veterinary clinician with total remission of the symptoms manifested without evidence of any symptomatological relapse to date.

Fig. 1. Microphotography of microfilaria in extended blood in 40 x view in optical microscope. Giemsa stain.



5 DISCUSSION AND CONCLUSIONS

The D. *Immitis* is a potentially zoonotic parasite, especially in optimal environmental conditions for the existence of vectors, in terms of climate and humidity; It is important to mention that they were considered isolated findings in veterinary medicine in our country, and the exponential increase in cases in recent months is striking.

Considering that dirofilariasis is a disease that can be related to other pathologies due to its symptoms. The literature reports that during the 6 to 7 months of the prepatent period there are no clinical signs, since worms migrate and molt without causing any harm (12). Many dogs can be infected with D. *immitis* without presenting any other clinical signs. Therefore, it is of great importance the different diagnostic methods to reach a definitive diagnosis, even more worrying in human medicine where parasitemia is not common, where diagnosis is a real challenge.

Canine heartworm disease has been recognized for over 300 years, human heartworm disease has received relatively little attention. Although humans are dead-end hosts, they can become infected and develop lesions associated with infection. Although these lesions are usually benign, they can be misdiagnosed as a more important disease and lead to unnecessary diagnostic procedures with consequent cost, discomfort, and morbidity. (13). In highly endemic areas,

human heartworm disease should be considered as a differential diagnosis for solitary "coin" lung lesions. For this reason, in human pulmonary heartworm disease it is essential to know the existence of this parasite to include it in the differential diagnosis of pulmonary nodules. It is a benign disease, but with very alarming clinical symptoms and radiological signs, which should enter the differential diagnosis of primary and metastatic lung neoplasms (11) (14).

Prevention of this disease in humans consists of treating and preventing infestation in dogs. Avoid mosquito bites; Protect yourself, and protect dogs, with protectors, insect repellents, as well as eliminate mosquitoes. In addition, national epidemiological studies are recommended to determine the true extent of this zoonotic infection.

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