Evidence of Venereal and Transplacental Transmission of Canine Visceral Leishmaniasis in Southern Brazil

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ABSTRACT

Background: Zoonotic visceral leishmaniasis is a vector-borne disease caused by obligate intracellular protozoan parasites of the genus *Leishmania*. In South America, dogs are the primary domestic reservoir host and control measures for this disease are focused on vector-control and euthanasia of seropositive dogs. The infection occurs usually between the invertebrate host and vertebrate host; however, transmission in the absence of the vector has been reported. Ticks as the vectors of the parasite *L. infantum* have been mentioned and investigated by researchers. Researchers have reported new mechanisms of transmission of canine visceral leishmaniasis, such as venereal and transplacental transmission. In October 2010, a veterinary clinic of Santa Maria received one canine, female, Doberman bred, two years old, *L. chagasi* positive. According to the authors, this would be the first case of autochthonous leishmaniasis in the State of Rio Grande do Sul (RS), Brazil. Therefore, through epidemiological surveys, this study had the aim to clarify how the dog was infected by the parasite.

Case: During the epidemiological survey was discovered that this canine positive for *L. chagasi* had never left the city of Santa Maria, place where it was born. However the parents of this animal were born in São Borja, RS, where they lived for about two months. According to the owner, both animals (male and female Doberman) were brought to Santa Maria as puppies in 2006 and since then never returned to the city of origin. Both animals were bought from different dog breeders in São Borja. Once in Santa Maria, the animals mated and the female gave birth to eight puppies. The owners of the puppies kept only one and the other puppies were sold to neighbors and other buyers. The canine male Doberman, four years old, had skin lesions that did not heal (especially in the hip region), difficulty in gaining weight, and nodules on the face. In the cytology of the skin lesions was observed in forms which resembling to amastigotes of *Leishmania* sp. Then blood was collected from the animal, aiming to perform serological tests, which confirmed the leishmaniasis. Serologic test was also performed in the female Doberman and in the puppies which were asymptomatic, but in direct contact with a symptomatic male. Serologic tests showed three animals as positive for the parasite, and they were euthanized as recommended by the Ministry of Health.

Discussion: Based on data obtained we suggest that the male Doberman has came from São Borja town already infected with the parasite *Leishmania* sp., as well as it might have occurred to the female Doberman. The female may was infected during copulation (venereal infection), and then the puppies were infected. The possibility of venereal transmission in dogs was reported by researchers, when the presence of *Leishmania* amastigotes in testicular of symptomatic and asymptomatic dogs was observed, and in semen associated with genital lesions caused by the parasite. Since in Santa Maria there was not recorded the presence of the vector *L. longipalpis*, we hypothesized that the two puppies were infected with the parasite transplacentally. Researchers recently showed that canine visceral leishmaniasis has vertical transmission, because a female pregnant dog and infected with *L. infantum* bore positive puppies to the disease. Based on the survey and the results of epidemiological literature we concluded that this is the first case of autochthonous canine leishmaniasis recorded in Santa Maria (RS), with evidences of transplacental and venereal transmission.

Keywords: *Leishmania infantum*, dog, transmission form.
INTRODUCTION

*Leishmania chagasi* (syn. *Leishmania infantum*), an important zoonotic agent, is well established as the agent of visceral leishmaniasis in Brazil [1]. The main form of transmission, in the Americas, occurs through the bite of the vector insects *Lutzomyia longipalpis*, which is infected when it feeds on blood in an infected animal or even a man, ingesting amastigotes forms of parasites present in the dermis and transmitting them when it feeds in another healthy animal [1,7]. However, in some endemic areas in Brazil, the density of *L. longipalpis* is not correlated with a profile of transmission of leishmaniasis to humans and canines. In addition, there are reports of transmission in the absence of vector [5]. Ticks as the vectors of the parasite *L. infantum* have been mentioned and investigated by researchers [4]. Recently researchers have reported new mechanisms of transmission of canine visceral leishmaniasis, such as venereal and transplacental transmission [2,3,6,8].

In October 2010, a veterinary clinic of Santa Maria received one canine, female, Doberman breed, two years old, *L. chagasi* positive [5]. According to the authors, this would be the first case of autochthonous leishmaniasis in the State of Rio Grande do Sul (RS), Southern Brazil. Therefore, through epidemiological surveys, this study had the aim to clarify how the dog was infected by the parasite.

CASE REPORT

During the epidemiological survey was discovered that this canine positive for *L. chagasi* [5] had never left the city of Santa Maria, place where it was born. However the parents of this animal were born in São Borja, RS, where they lived for about two months. According to the owner, both animals (male and female Doberman) were brought to Santa Maria as puppies in 2006 and since then never returned to the city of origin. Both animals were bought from different dog breeders in São Borja. Once in Santa Maria, the animals mated and the female gave birth to eight puppies. The owners of the puppies kept only one and the other puppies were sold to neighbors and other buyers.

The canine male Doberman (Figure 1-A), four years old, had skin lesions (Figure 1-B) that did not healed (especially in the hip region), difficulty in gaining weight, and nodules on the face. In the male Doberman has come from São Borja town already infected with the parasite *Leishmania* sp., as well as it might have occurred to the female Doberman. The female may was infected during copulation (venereal infection), and then the puppies were infected. The possibility of venereal transmission in dogs was
Recyotology of the skin lesions was observed in forms which resembling to amastigotes of Leishmania sp. (Figure 1-C), which made this case be notified by the veterinarians to the Secretary of Health of the Santa Maria town. Then blood was collected from the animal, aiming to perform serological tests, which confirmed the leishmaniasis. Serologic test was also performed in the female Doberman and in the puppies which were asymptomatic, but in direct contact with a symptomatic male. Serologic tests showed three animals as positive for the parasite, and they were euthanized as recommended by the Ministry of Health. The remaining puppies were not investigated, however in October of 2010 one of them (living in another part of town) showed clinical signs of leishmaniasis and it was euthanized [5]. After this event the secretary of health of the city carried blood collection of the dogs that lived near of the residence of the animal which serum test was positive to Leishmania sp. and the results were negative for these animals. Traps were also installed in attempting to capture the vector (L. longipalpis), without success, since none of the mosquitoes of this genus were captured.

**DISCUSSION**

Based on data obtained we suggest that the male Doberman has came from São Borja town already infected with the parasite Leishmania sp., as well as it might have occurred to the female Doberman. The female may was infected during copulation (venereal infection), and then the puppies were infected. The possibility of venereal transmission in dogs was reported by researchers [2,6,8], when the presence of Leishmania amastigotes in testicular of symptomatic and asymptomatic dogs was observed [2], and in semen associated with genital lesions caused by the parasite [6,8].

Since in Santa Maria there was not recorded the presence of the vector L. longipalpis, unlike São Borja where it was present during the outbreak of leishmaniasis [9] and as other canines of the neighborhood were serologically negative for the Leishmania sp., we hypothesized that the two puppies were infected with the parasite transplacentally. Researchers recently showed that canine visceral leishmaniasis has transplacental transmission [3,8], because a female pregnant dog and infected with *L. infantum* bore positive puppies to the disease, which were analyzed 24 h (8 puppy) and 3 months (4 puppy) postpartum [3]. The first hint of transplacental transmission for visceral leishmaniasis in a newborn came from an infected mother described in 1926 and since then, other human cases were recorded.

Based on the survey and the results of epidemiological literature we concluded that this is the first case of autochthonous canine leishmaniasis recorded in Santa Maria (RS), with evidences of transplacental transmission. Probably, the leishmaniasis was originated in São Borja, a currently endemic area for the disease. Also there is strong evidence of venereal transmission, i.e. male to female during coitus.

**Declaration of interest.** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

**REFERENCES**

