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The Prevalence of Leishmaniasis in Dogs in the Districts of Yerevan

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ABSTRACT

Leishmaniasis is a transmissive parasitic disease of dogs that poses a great danger to humans. The aim of the current study was to determine the prevalence of leishmaniasis in dogs in the districts of Yerevan. The results of the research are described and considered in the article. Several recommendations have been developed to prevent the spread of this disease.

Introduction

Visceral and cutaneous leishmaniasis is a transmissive parasitic disease of dogs and humans caused by parasites of Protozoa group, genus Leishmania and family Trypanosomidae (Lobzin, 2008, Fioretti, et al., 1994). Leishmaniasis is transmitted through the bite of phlebotomine sandflies (Phlebotomus). Leishmania parasitize in the organism throughout their lifetime (Tsachev, 2009, Gallego, 2004). The main carriers of leishmaniasis under natural conditions are field rodents, dogs and other mammals (Jazic, et al., 1998).

When bitten by animals with leishmaniasis, the pathogen enters certain stages of development in sandflies and is subsequently transmitted through bites to other mammals, such as humans (Alvar, 2001, Sotira, 2000, Baneth, et al., 1998, Garifallou, et al.,1989).

There are two types of leishmaniasis: cutaneous and visceral. The cutaneous form is manifested with the formation of nodules on the skin of animals, which later develop into unhealable ulcers and such adverse effects like hair loss, skin itching and scars are observed. The visceral form has more severe course and is accompanied with dry skin, peeling, rhinitis, conjunctivitis, infection of the liver, spleen, bone marrow, lymph nodes, as well as with blood and digestive disorders, paresis, paralysis and emaciation of animals (Boutsini and Ptakakis, 2001, Carlotti, 2003, Faghih, et al., 2002).

Materials and methods

The aim of the study was to investigate the prevalence of leishmaniasis in dogs in different districts of Yerevan. The study was carried out in 11 administrative districts of Yerevan (Shengavit, Center, Erebuni, Nork-Marash, Arabkir, Nor-Nork, Avan, Ajapnyak, Kanaker-Zeytun, Nubarashen, Davtashen). The studies were conducted in the “Republican Center of Veterinary and Phytosanitary

Laboratory Services" SNCO. Animals with suspected visceral leishmaniasis showed weakness, depression, dry skin, peeling, conjunctivitis, rhinitis, signs of anemia, pneumonia, infection signs in liver and lymph nodes, vomiting, diarrhea and emaciation. Blood samples were taken from these animals to further confirm the diagnosis. To diagnose the disease, rapid tests were performed to determine the presence of antibodies to visceral leishmaniasis in dogs (rK39 (RDTs), IT LEISH, BIO-Rad). Express immunochromatographic testing (rK39) was performed according to the manufacturer's instructions: a positive test result was recorded if the control and test lines were colored red.

Results and discussions

Dogs and canines are known to be natural deposits for visceral leishmaniasis and have a very high infection rate.

Table 1. Results of immunochromatographic examinations*

Yerevan districts	Number of tested animals	Number of detected animals with leishmaniasis infection	Disease percentage, %
Shengavit	20	6	30
Center	30	5	16.6
Erebuni	20	6	30
Nork-Marash	25	8	32
Arabkir	15	6	40
Nor-Nork	15	5	33.3
Avan	15	6	40
Ajapnyak	25	8	32
Kanaker-Zeytun	25	9	36
Nubarashen	25	8	32
Davtashen	35	8	22.8

Table 3. Infection of animals with leishmaniasis per age group*

Age groups	Number of tested animals	Number of infected animals	Infection rate, %
From 3 months to 1 year old	50	10	20
From 1 to 6 years old	125	45	36
Over 6 years old	75	20	26.6

*Composed by the author.

From September 2020 to October 2021, 250 dogs were tested in 11 districts of Yerevan. Seventy-five cases of leishmaniasis were detected. The results of the study are presented in Table 1.

Thus, as a result of serological examination conducted in the dogs' blood, 30 % infection of Leishmaniosis was detected in Shengavit district, 16.6 % – in Kentron, 30 % – in Erebuni, 32 % – in Nork-Marash, 40 % – in Arabkir, 33.3 % – in Nor-Nork, 40 % – in Avan, 32 % – in Ajapnyak, 36 % – in Kanaker-Zeytun, 22.8% – in Davtashen and 32 % – in Nubarashen disticts.

As shown in Table 2, there were 25 infected animals (33.3 %) in spring, 40 (53.3 %) – in summer, 10 (13.3 %) – in fall, and no infected animals (0 %) in winter. The data in the table show that the most intensive infection of animals occurred during the warm seasons, which is associated with high activity of sandflies that transmit pathogens during these seasons.

As shown in Table 3, 50 of the 250 examined dogs belonged to group 1 (from 3 months to 1 year old), 125 – to group 2 (from 1 to 6 years old) and 75 dogs – to group 3 (over 6 years old). According to the results of the examination, 10 cases (20 %) of leishmaniasis were registered in the first group, 45 cases (36 %) – in the second group, and 20 cases (26.6 %) – in the third group.

Table 2. Seasonality of the infection of animals with leishmaniasis*

Total number of infected animals	Number of infected animals detected in spring	Infection rate, %	Number of infected animals detected in summer	Infection rate, %	Number of infected animals detected in autumn	Infection rate, %	Number of infected animals detected in winter	Infection rate, %
75	25	33.3	40	53.3	10	13.3	0	0

*Composed by the author.

Conclusion

Studies have pointed out the high occurrence rate of dogs in various districts of Yerevan. The disease of dogs leishmaniasis is recorded in animals of all age groups and is widespread in various districts of Yerevan. The infection rate grows up during warm periods of the year due to the high activity of sandflies - transmitters of the pathogens.

To get a complete insight into the disease source, the following directives should be observed to:

1. Carry out registration of all dogs with owners.
2. Develop an appropriate reporting form and require that veterinarians, treating dogs, should report cases of dog leishmaniasis infection.
3. Vaccinate dogs against leishmaniasis, if possible.
4. Test the dogs of the settlements where leishmaniasis has been reported in recent years, (with rK39 immunochromatographic rapid tests) to identify the source of infection.
5. If the result is positive, put the dogs down (use insecticide-treated collars, as a last resort).
6. Activate the fight against stray dogs.
7. Possibly minimize the accumulation of organic wastes to reduce the population of disease-transmitting sandflies, keep dog kennels and habitats clean, and conduct treatments with long-acting (residual) insecticides in the areas where cases of leishmaniasis have been recorded.

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