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PREVALENCE OF *DIROFILARIA REPENS* - CAUSE OF ZOONOSIS IN DOGS

SUMMARY

Systematic research of zoonosis caused by species *Dirofilaria repens* have not been performed till now in Serbia, so that this is the first such study.

The aim of the paper was to detect and identify the presence of *Dirofilaria repens* microfilariae in the canine peripheral blood, covering the territory of Serbia (territory of the City of Nis and Vojvodina). The examination comprised a total of 45 dogs from the territory of the City of Nis and 193 dogs from the territory of Vojvodina. For detection of microfilariae in the canine peripheral blood, a modified Knott's test was used. Identification of *Dirofilaria repens* microfilariae was performed according to their morphological and morphometric characteristics. All morphometric parameters were obtained using a modern automatic television system for picture analysis Lucia M (NIKON, 3.51 ab).

By diagnostic technique application, the species *Dirofilaria repens* was identified in 95 dogs (49.22%) at the territory of Vojvodina, which is a significant district area for canine filarioses and transitional hosts for filariae. At the territory of the City of Nis, microfilariae of *Dirofilaria repens* were not found in any of the examined dogs.

Key words: *Dirofilaria repens*, zoonosis, canine filariosis

INTRODUCTION

Filariae of the genus *Dirofilaria*, the cause of zoonosis in nature, are frequent parasites of various animal species worldwide. For these filariae's life cycle development, two hosts are needed, a mosquito or some other transient host, as well as a man who gets infected by the infected insect's bite (1,2).

The important filaria, which can cause infection in humans, is certainly *Dirofilaria repens*. Mostly, this filaria resides in the cutaneous and subcutaneous tissue of animals, usually dogs. Infection in humans occurs sporadically, but so far, the cases of superficial and visceral forms of human dirofilariases have been described (1-4).

The whole larval development of this

parasite up to the infective stage III goes on in the appropriate transient host without multiplication. After being ingested with the blood meal taken from the infected host, microfilariae further migrate into the inner organs of mosquito, where they terminate their larval development in the course of 14-21 days. Infective stage III larvae migrate into the thorax and labium, from where they are inoculated into the dog by mosquito or some other transient host (5-9).

At the moment when the infected mosquito or some other transient host bites the dog, the labium bursts into small larvae, which reside in it, and go into the wound on the skin, made by biting. In the subcutaneous and fatty tissue, and musculature of the dog, the larvae spend 85-120 days, during which they attain the length of 5 cm, approximately. Then, they

penetrate into the blood and lymphatic vessels (5-9). The adult forms reside in the subcutaneous tissue and lymphatic vessels, whereas microfilariae can be detected in the blood and skin.

Some papers stress the importance of filariasis in medicine by presenting 56 cases of human ocular filariasis (4,10,11). Only in six cases, the extirpation from the eye, description and identification of parasites were successful. In three cases, the cause was *Dipetalonema sp.*, and in one case *Dirofilaria sp.*

Dirofilariasis in dogs is an endemic disease, spread in the tropics, inclining to spread into the regions with moderate climate.

With geographical spreading of infection caused by *D.repens* in dogs, more frequent infections in humans caused by these species of parasites should be expected. Therefore, an appropriate importance should be attached to continuous control and follow-up of the occurrence and distribution of filariasis in dogs as a health problem.

Dirofilaria repens, the cause of zoonosis in Europe, have been discovered at the territory of Serbia, too. Until our investigation conducted in 2004, Vojvodina was suspected of being endemic region with canine filariosis, since it abounds with great areas of stagnant waters and big plain rivers with slow water currents. Some identified sporadic cases of canine and human dirofilarioses in this region illustrate this (2,3,10,11).

The aim of this paper was to identify the presence of *Dirofilaria repens* microfilariae in the canine peripheral blood, covering the territory of Vojvodina, some regions that represent mosquito districts, and the territory of the City of Nis.

MATERIAL AND METHODS

The samples of peripheral blood taken from dogs living at the territory of Vojvodina and the City of Nis were investigated in this paper.

Examination comprised 193 dogs from Vojvodina and 45 working dogs from Nis, which were kept under the regime of controlled life conditions (standardized conditions of accommodation, nutrition, care, training, work, health protection, and veterinary-sanitary protection). These dogs had not left our country until the moment of examination. Immediately before blood sampling, a general clinical examination of every single dog was performed. For detection and identification of microfilariae in the canine peripheral blood in this research, the modified Knott's test was used (8).

Identification of microfilariae was performed based on their morphological and morphometric characteristics, following the

literature criteria (8,12). All morphometric parameters were obtained using a modern automatic television system for picture analysis Lucia M 1996 (NIKON, 3.51 ab).

RESULTS

Using the aforementioned diagnostic methods, microfilariae were determined in the peripheral blood in total of 95 (49.22%) examined dogs from Vojvodina (Table 1, Figure 1). At the territory of the City of Nis, microfilariae of *Dirofilaria repens* were not found in any of the examined dogs, as presented in Table 1.

Table 1. Finding of microfilariae in canine blood at the territory of Vojvodina and Nis

Locations	Examined dogs	Dirofilaria repens number/%
Vojvodina	193	95/49.22%
Nis	45	0



Figure 1. Microfilaria of species *Dirofilaria repens* in canine blood

DISCUSSION

Human infections caused by dirofilariae are rare in Serbia and Montenegro, and so far, some sporadic cases of visceral and superficial filariosis caused by species *D. repens* have been described (4,11).

Systematic researches of this parasitosis of dogs in our country have not been performed until now, so this is the first study of that kind. In recent years, several epidemiological studies have been performed in different countries. Parasites are widely distributed in Africa, Asia, Australia, Latin America and Mediterranean counties (13-15).

In Croatia (former republic of Yugoslavia), *D. repens* infection of dog sporadically reported in the past are now being reported with quite high prevalence (6%) (16). Increased prevalence and infection spread was also found for *D. repens* in other European countries, such as Spain and Greece (16,17).

Results of the investigations indicated that examined dogs from the territory of Vojvodina were significantly infected by *D. repens* (95 /49.22%), which thoroughly coincided with results of numerous authors who investigated filariosis spreading in Europe (17-21).

Since the territory of Vojvodina abounds with great stagnant water areas (marshes, swamps, canals, effluents, stagnant tributaries) and great plain rivers with slow water currents, it can be regarded as

a district area for a great number of different kinds of potential transient hosts for different species of filariae.

This survey also included our region, but contrary to Vojvodina, not a single infected dog was registered at the territory of the City of Nis.

CONCLUSION

The prevalence of infection in 95 dogs (49.22%) with *D. repens* at the territory of Vojvodina indicates that this zoonosis deserves special attention in the sense of further investigations and undertaking appropriate measures, so as to diminish the possibility of infection. The territory of the City of Nis is not the region with canine filariosis.

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PREVALENCA DIROFILARIA-E REPENS KAO UZROČNIKA ZOONOZE KOD PASA

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SAŽETAK

Studija predstavlja prvo istraživanje u ovoj oblasti u našoj zemlji jer do danas, sistemska ispitivanja vezana za zoonoze izazvane vrstom *Dirofilaria repens* na teritoriji Srbije nisu urađena.

Cilj rada bio je utvrditi prisustvo i identifikovati mikrofilarije vrste *Dirofilaria repens* u perifernoj krvi pasa na teritoriji Srbije (Niš i Vojvodina).

Istraživanjem je obuhvaćeno 45 pasa iz našeg regiona i 193 sa teritorije Vojvodine. Za detekciju mikrofilarija u perifernoj krvi pasa korišćen je modifikovani Knott test. Identifikacija vrste *Dirofilaria repens* izvršena je na osnovu njihovih morfoloških i morfometrijskih karakteristika. Svi morfometrijski parametri utvrđeni su korišćenjem modernog automatskog televizijskog sistema za analizu slike Lucia M (NIKON, 3.51 ab).

Primenom dijagnostičkih tehnika, vrsta *Dirofilaria repens*, identifikovana je kod 95 (49,22%) pasa na teritoriji Vojvodine što ukazuje da ovo područje predstavlja distrikt za filarioze pasa i prelazne domaće filarije. Na teritoriji grada Niša, ni kod jednog ispitivanog psa nije utvrđeno prisustvo mikrofilarija vrste *Dirofilaria repens*.

Ključne reči: *Dirofilaria repens*, zoonoze, filarioze pasa