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PREVALENCE OF *GIARDIA* SPP. AND OTHER ENDOPARASITES IN SHELTER DOGS IN TIMIS COUNTY

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Abstract

This study was conducted to determine infection with endoparasites, in dogs from Timiş County and to analyze the potential risk factors that support this infection. Study was conducted in October 2009 – April 2011. There were collected 183 faecal samples. The examination of the samples was accomplished using flotation method (Willis), direct smear examination using Lugol solution and by rapid tests (Giardia Antigen Test Kit IDEXX). Samples were collected from dogs from shelters. Parasitic fauna of dogs was represented by Giardia spp. (24.59%), Toxocara spp. (4.37%), Ancylostoma/Uncinaria spp. (1.63%), Trichocephalus spp. (0.54%) identified as single parasites. Also, associations of parasites were identified. Age up to six months is an important risk factor. The breed and gender did not represent any considerable risk factors. Of the dogs with Giardia spp., 76.92% reported symptoms and 23.07% were asymptomatic.

Key words*: Giardia spp., dogs, parasitic fauna, prevalence.*

INTRODUCTION

The prevalence of *Giardia* spp. in dogs varies according to the diagnostic technique, area of study, and also according to the susceptibility of the individual host (Capelli, 2003; Carlin et al, 2006).

Geurden et al (2006) found in dogs and cats the presence of specific symptoms like: anorexia, mild diarrhea deviation and soft feces, discolored typical appearance of "oatmeal" and mucus. Also, puppies and kittens showed delayed growth and weakness. The mechanism that causes malabsorption and diarrhea is confusing. Epithelial cell injuries attract a turnover and shorten the villi (Geurden et al, 2006).

Giardia spp. infection can evolve as unique pathogen agent or associated with other enteropathogen agents (Hamnes et al, 2007).

The aim of this study was to conduct epidemiological surveillance of giardiasis in dogs in Timiş County due to lack of sources for information.

MATERIALS AND METHODS

The study period started in October 2009 and ended in April 2011. This study included 183 stray dogs of different age.

For an accurate epidemiological evaluation of the cases studied, records were kept in order to help in data interpretation. The age of the dogs attending the study varied, ranging from two months to nine years old.

The animals were divided into three age groups to be statistically interpreted the correlations of age with state-riding factor. The **group I** was composed of dogs up to three months of age, **group II** was made up of dogs aged three to six months, **group III** consisted of dogs over six months of age.

The dogs introduced in this study originated from Timiş County and were examined in the Clinic of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine Timişoara.

The samples were collected and examined by us and the positive samples were preserved with potassium dichromate.

Examination of the samples was carried out by flotation method (Willis), direct smear examination using Lugol solution and by rapid tests (Giardia Antigen Test Kit IDEXX). Analysis of samples using rapid tests (Giardia Antigen Test Kit) was accomplished as follows:

- homogenize faeces after which the stick is inserted even at the end of which is conjugate solution,
- break the plastic valve stem inside the reagent bulb to pass the conjugate solution in the bulb to the swab tip,
- use the swab/bulb as a pipette,
- dispense 5 drops of the sample/conjugate solution into the sample well of the SNAP device,
- push the activator button firmly until it is flush with the device body,
- wait 8 minutes, then read the results.

RESULTS AND DISCUSSIONS

The situation of parasitism by age is shown below.

Group one, consisting of 38 dogs, had 21 positive samples and 17 negative samples respectively. From the positive samples, 15 were infected with *Giardia* spp. (39.47%) and 10 of them were positive only for *Giardia* spp. (26.31%). The other five positive samples were associated as follows: *Giardia* spp. with *Ancylostoma/Uncinaria* spp. (2.63%), *Giardia* spp. with *Toxocara* spp. (10.52%).

Other species have been identified than *Giardia* spp. as well: *Toxocara* spp. (7.89%), *Toxocara* spp. with *Trichocephalus* spp. (5.26%), *Toxocara* spp. with *Ancylostoma/Uncinaria* spp. and *Trichocephalus* spp. (2.63%).

In the **second group** which had 60 dogs involved, 26 samples were found positive for parasites and 34 were negative. From the positive samples, 20 were infected with *Giardia* spp. (33.33%) and 16 of these were identified as single parasite (26.66%), the other four being associated with other parasites (6.66 %). Within the four samples next poliparasitism was found: *Giardia* spp. associated with *Trichocephalus* spp. (3.33%), *Giardia* spp. with *Toxocara* spp. (3.33%).

The remaining positive samples (six samples) were identified with other association of parasites: *Ancylostoma*/*Uncinaria* spp. (5%), *Toxocara* spp. with *Trichocephalus* spp. and coccidia (3.33%), *Trichocephalus* spp. (1.66%).

Group three consisting of 85 dogs had 62 positive samples for parasites and 23 negative. From the positive samples, 43 were infected with *Giardia* spp. (50.58%), and of these, 24 were identified as single parasite (28.23%). In the remaining 19 samples were associated: *Giardia* spp. with *Ancylostoma/Uncinaria* spp. (1.17%), *Giardia* spp. with *Toxocara* spp. (12.94%), *Giardia* spp. associated with *Trichocephalus* spp., *Toxocara* spp. and *Ancylostoma/Uncinaria* spp. (1.17), *Giardia* spp. with *Angiostrongylus* spp. (1.17%), *Giardia* spp. with *Trichocephalus* spp., *Ancylostoma/Uncinaria* spp. and coccidia (5.88%).

In 19 samples were found other associations of parasites: five samples with *Toxocara* spp. (5.88%), four samples with *Toxocara* spp. associated with *Ancylostoma/Uncinaria* spp. (4.70%), six samples with *Trichocephalus* spp. associated with *Ancylostoma/Uncinaria* spp. and coccidia (7.05%), one sample with *Toxocara* spp. associated with *Ancylostoma/Uncinaria* spp. and coccidia (1.17%), three samples were found with *Toxocara* spp. associated with *Trichocephalus* spp. (3.52%).

Measuring the results found in the three groups divided by age, the prevalence of the *Giardia* spp. infection was 39.47% in the first group, 33.33% in the second group and 50.58% in the third group.

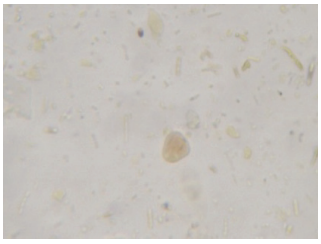
After the origins of faecal samples from dogs the parasite fauna shown in Table1 and Figure 1 was identified.

Table 1. Parasite fauna at dogs in the study

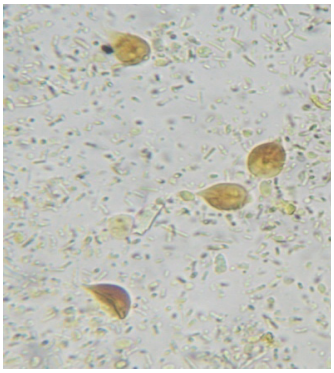
Parasite fauna	Shelter (183 dogs)	
	No.	%
Giardia spp. total	78	42.62
Giardia spp. single parasite	45	24.59
Giardia spp. with *Ancylostoma/Uncinaria* spp.	2	1.09
Giardia spp. with *Toxocara* spp.	17	9.28
Giardia spp. with *Toxocara* spp. and *Ancylostoma/Uncinaria* spp.	5	2.73
Giardia spp. with *Toxocara* spp., *Ancylostoma/Uncinaria* spp. and *Trichocephalus* spp.	1	0.54
Giardia spp. with *Ancylostoma/Uncinaria* spp., *Trichocephalus* spp. and coccidia	5	2.73
Giardia spp. with *Angiostrongylus* spp.	1	0.54
Giardia spp. and *Trichocephalus* spp.	2	1.09
Toxocara spp.	8	4.37
Toxocara spp. with *Ancylostoma/Uncinaria* spp.	4	2.18
Ancylostoma/Uncinaria spp.	3	1.63
Ancylostoma/Uncinaria spp. with *Trichocephalus* spp. and coccidia	6	3.27
Toxocara spp. with *Ancylostoma/Uncinaria* spp. and coccidia	1	0.54
Toxocara spp. with *Trichocephalus* spp. and coccidia	2	1.09
Toxocara spp. with *Trichocephalus* spp.	5	2.73
Toxocara spp. with *Trichocephalus* spp. and *Ancylostoma/Uncinaria* spp.	1	0.54
Trichocephalus spp.	1	0.54

Regarding the gender factor, among the 183 samples examined, 123 belonged to males and 60 belonged to females. From the samples derived from males, 48 were identified positive with *Giardia* spp. and from the females 30 were positive with *Giardia* spp.
Regarding the diagnostic method, *Giardia* spp. was found 42.62% (78/183) positive by Lugol method, 42.07% (77/183) by rapid tests and one sample was doubtful but positive thoroughly examination with Lugol solution.

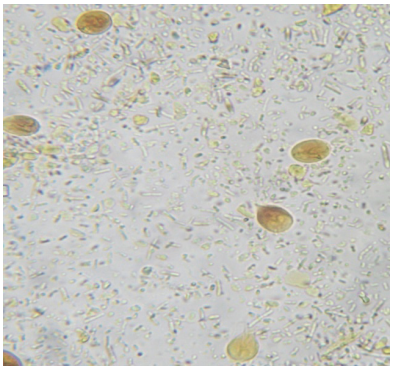
B.



C.



A.



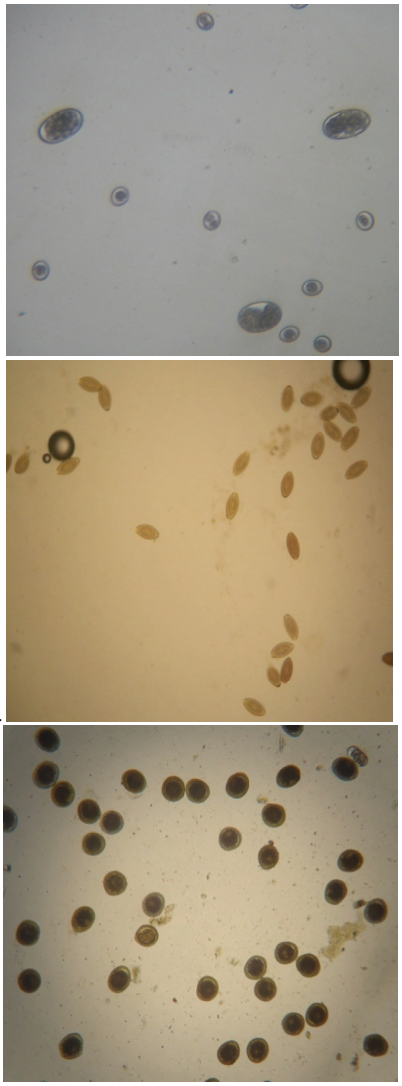


Figure 1. Parasitic elements: A. *Giardia* spp. (cyst and trophozoite form) (ob.x40), B. *Giardia* spp. (form eschizoit) (ob.x40), C. *Giardia* spp. (trophozoite form) (ob.x40), D. *Ancylostoma*/*Uncinaria* spp. and coccidia (ob.x10), E. *Trichocephalus* spp. (ob.x10), F. *Toxocara* spp. (ob.x10) (original)

Of the 78 dogs with *Giardia* spp., 60 (76.92%) showed symptoms such as diarrhea with blood stripes with foul-smelling, yellowish-green, gelatinous appearance, vomiting, potbelly and anorexia. The remaining 18 (23.07%) were asymptomatic.

In Romania, Jarca et al (2008) identified *Giardia* spp. in dogs from seven localities in Satu – Mare County, estimating a prevalence of 51.08%.

A study by Mircean et al (2012) in Romania estimated 8.5% positivity in dogs (52/614) of *Giardia* by Willis method and 34.6% (144/416) by ELISA. Also, of the 52 samples *Giardia* 37 was associated with other parasites (Mircean et al, 2012).

Giardia spp. infections were reported in dogs in different areas of the world: Germany (Epe et al, 2004), Italy (Berrilli et al, 2004; Papini et al, 2005), Czech Republic (Dubna´ et al, 2007), Poland (Zygner et al, 2006), Finland (Rimhanen-Finne et al, 2007), Australia (Caccio, 2005; Thompson, 2004), Canada (Lefebvre et al, 2006), USA (Carlin et al, 2006; Thompson and Robertson 2003; Thompson 2003), Brazil (Mundim et al, 2007), Japan (Abe et al, 2003; Itoh et al, 2005), Korea (Lee et al, 2006), India (Traub et al, 2004), and Thailand (Inpankaew et al, 2007).

In a study conducted in Penssylvania, USA, the prevalence was 4.7% (O'Handley et al, 2000). In central and northern Italy, 21.3% of dogs were infected with *Giardia* (Capelli, 2003) and in Japan positivity was 14% (Mohammed et al, 2008).

Regarding age groups, animals aged 0-6 months were more receptive to infection. At three months, the puppies are separated from their mothers. Therefore, we know that at this stage various factors may contribute to the onset of infection, such as immunological status, environmental sanitation and drinking water source (Lallo et al, 2003; Mundim et al, 2007).

As reported by Mundim et al (2007), the disease is clinically more common in young animals. Also Lallo et al (2003) stated that the onset of the disease depends on factors related to the host (immune response) and parasite-related factors (Lallo et al, 2003; Mundim et al, 2007). In Italy, Paoletti (2006) reported a 26.6% prevalence of *Giardia* spp. infections in dogs tested.

CONCLUSIONS

The prevalence of *Giardia* spp. in dogs from Timiş County was 42.62%.

The *Giardia* spp. infection developed as single parasitic infection or as a multiple parasitic infection, being associated with other protozoa and nematodes. During the study cestodes were not identified.

It is a proven fact that the age up to six months is an important risk factor.

The gender did not represent any considerable risk factor.

Of the 78 dogs with *Giardia* spp., 60 exhibited symptoms (76.92%) and 18 were asymptomatic (23.07%).

Considering the diagnostic methods a positivity of 42.62% by Lugol method and 42.07% by rapid tests has been found.

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