STUDY ON THE PREVALENCE OF TRICHIUROSIS IN DIFFERENT CATEGORIES OF DOGS AND WILD CARNIVORES

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Summary


In the period between 2003 and 2005, the prevalence of trichurosis in various categories of dogs and wild carnivores was studied. To this end, 508 coprological samples from dogs aged from 6 months to 14 years from different populated areas in North-east, Central, and South Bulgaria were studied using the flotation method of Fuleborn. Partial helminthological autopsies of the large intestine were performed in 113 foxes and 56 jackals.

Trichuris vulpis infection was found in all studied categories of dogs. The highest extensity of infection was observed in hunting dogs (30%), followed by dogs used as guards of village yards (21.8%), dogs bred in kennels (9%), and home pets (6%).

In the studied wild carnivores, T. vulpis infestation was found in 30.7% of the jackals, and in 12.2% of the foxes.

The results showed that trichurosis is one of the commonest intestinal helminthoses in dogs and jackals.

Key words: dog, fox, jackal, Trichuris vulpis, trichurosis

INTRODUCTION

Trichuris vulpis Froelich, 1789 is a nematode from the Trichuridae family, which abides in the large intestine of dogs and wild canids (jackals, wolves, and foxes).

Previous studies in a number of European countries show that trichurosis is among the commonest intestinal helminthoses in dogs, affecting from 0.2% to 60% of the populations in different countries, depending on the category and age of the animals (Matov, 1958; Tassi & Widenhorn, 1977; Turner & Pegg, 1977; Haralabidis et al., 1988; Vazquez Valdez et al., 1989; Gothe & Reichler, 1990; Prunaux & Guignard, 1991; Vanparijs et al., 1991; Epe et al., 1993; Franc et al., 1997; Overgaauw & Boersema, 1998; Georgieva et al., 1999; Fok et al., 2001; Barutzki & Schaper, 2003; Epe et al., 2004; Le Nobel et al., 2004).

Differences in the results are due to the fact that the studied dogs belonged to different categories and age groups.

The T. vulpis species was found in wild canids in Bulgaria (Georgieva & Kamenov, 1993), Great Britain (Richards et al., 1995; Smith et al., 2003), Italy (Poglayen et al., 1985), Spain (Gortazar et al., 1998; Segovia et al., 2001), and France (Petavy et al., 1990).

Even though trichurosis in humans is caused by Trichuris trichiura, so far, more
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than 60 cases of *T. vulpis* infection in people between the ages of 4 and 80 have been described (Hall & Sonnenberg, 1956; De Carneri *et al.*, 1971; Kenney & Eveland, 1978; Kenney & Yermakov, 1980; Kagei *et al.*, 1986). In some people, a combined infection with *T. trichiura* and *T. vulpis* was found (Singh *et al.*, 1993). It has been reported that *T. vulpis* participates in the etiology of the Larva migrans syndrome in people (Sakano *et al.*, 1980; Coulter *et al.*, 1981; Masuda *et al.*, 1987).

Due to lack of sufficient information for our country, we aimed at determining the prevalence of trichurosis in dogs and wild canids, as well as their role in contaminating the environment and infection of humans.

**MATERIALS AND METHODS**

In the period of 2003–2005, coprological samples from a total of 508 dogs (319 male and 189 female) at ages varying from 6 months to 14 years, originating from various regions of the country, were studied through the flotation method of Fuleborn. The animals were bred in different conditions – as home pets in apartments, as guards or hunting dogs in village yards, and in breeding places. In the last month before the tests, the animals were not treated with any antiparasitic medications.

We determined the extensity of infection (EI), using the following equation:

$$ EI = \frac{\text{Number of infected animals}}{\text{Total number of tested animals}} \times 100\% $$

The intensity of infection in dogs was quantified by the number of eggs in a gramme of faeces, using the Mc Master method, while in foxes and jackals – by counting of the trichurids found in the large intestine.

Partial helminthological autopsies of large intestines and examination of rectal contents using the method of Fuleborn were carried out in 113 foxes and 56 jackals from the area of the Sredna Gora Mountain.

The presence of other intestinal helminthes and protozoa found during the coprological studies was also taken into consideration.

**RESULTS**

During the performed coproovoscopic study, we found that 48% of all dogs were infected with 1 or more of intestinal parasitic species. Of all tested dogs, 32% were infected with only one species, 13% with two, and 2.6% with 3 parasite species.

The extensity of *Ancylostomidae* infection, was the highest, followed by *T. vulpis* and *T. canis* (Table 1). Combined infection with *Ancylostomidae* and *T. vulpis* was found in 5.6% of the tested subjects, of *T. vulpis* and *T. canis* – in 1%, of *T. vulpis* and other parasites – in 2.1%, while single infection with *T. vulpis* was found in 5.6% of the dogs.

The percentage of infected dogs was the highest in hunting dogs – 30%, followed by village dogs – 21.8%. In dogs bred in breeding places and apartments, the percentages of infection were 9.4% and 6%, respectively (Table 2). Only three (4.2%) of *T. vulpis*-infected dogs were within the age range of 6 to 12 months. The youngest affected dog was 6 months old. In affected dogs, the intensity of infection varied from 100 to 5600 epg – being 1033 on the average.

We discovered *T. vulpis* infection in 113 foxes and 56 jackals. Partial helminthological autopsy of large intestine showed infection with *T. vulpis* in 12.2% of foxes and 30.7% of jackals (Table 3).
The intensity of infection in foxes exhibited an average value of 7.6 (1–27 specimens), while in jackals it was 12.8 (1–156 specimens).

**DISCUSSION**

Our results showed that the eggs of *T. vulpis* could be found in faecal samples of all categories of dogs. The average extensity of *T. vulpis* infection in Bulgaria was...
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The highest percentage of infection was observed in dogs categories with more frequent contacts with the outside environment. That is explainable with regard to the fact, that the subject of this study is a geohelminthosis. The high resistance of *T. vulpis* eggs allows them to persist in the soil or the rooms where the dogs are kept. Home pets, through their walks outside can also come in contact with the eggs, which is proved by the discovery of infection in this specific dog category. A high extensity of *T. vulpis* infection (22.2%) was found in home pets in France (Prunaux & Guignard, 1991). According to the authors, the reason for that is the resistance of *T. vulpis* towards a large part of antihelminthic drugs.

Trichurosis is a problematic disease even for dogs in breeding kennels, where strict preventive antiparasitic treatments are performed, and cells are cleaned on a daily basis. In dogs bred in conditions of high sanitation, *T. vulpis* infection was found in 4.9% of the animals (Le Nobel *et al.*, 2004). In the Netherlands, a study on 286 adult and 159 young dogs from 32 kennels determined a *Trichuris* infection in 29% and 0% respectively of the test subjects (Overgaauw & Boersema, 1998).

Table 4. Extensity of infection with *Trichuris vulpis* in dogs throughout Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Categories of dogs</th>
<th>EI (%)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>Various</td>
<td>8.2</td>
<td>Vazquez Valdez <em>et al.</em>, 1989</td>
</tr>
<tr>
<td>France</td>
<td>Home pets</td>
<td>22.2</td>
<td>Prunaux &amp; Guignard, 1991</td>
</tr>
<tr>
<td></td>
<td>Home pets</td>
<td>28.0</td>
<td>Franc <em>et al.</em>, 1997</td>
</tr>
<tr>
<td>Italy</td>
<td>Home pets</td>
<td>10.0</td>
<td>Tassi &amp; Widenhorn, 1977</td>
</tr>
<tr>
<td>Greece</td>
<td>Home pets</td>
<td>2.6</td>
<td>Haralabidis <em>et al.</em>, 1988</td>
</tr>
<tr>
<td>Germany</td>
<td>Breeding kennels</td>
<td>6.0</td>
<td>Gothe &amp; Reichler, 1990</td>
</tr>
<tr>
<td></td>
<td>Various</td>
<td>4.0</td>
<td>Barutzki &amp; Schaper, 2003</td>
</tr>
<tr>
<td></td>
<td>Various</td>
<td>0.2</td>
<td>Epe <em>et al.</em>, 2004</td>
</tr>
<tr>
<td></td>
<td>Various</td>
<td>2.5</td>
<td>Epe <em>et al.</em>, 1993</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Breeding kennels</td>
<td>29.0</td>
<td>Overgaauw &amp; Boersema, 1998</td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Young</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Breeding kennels</td>
<td>4.9</td>
<td>Le Nobel <em>et al.</em>, 2004</td>
</tr>
<tr>
<td>Belgium</td>
<td>Stray dogs</td>
<td>7.0</td>
<td>Vanparijs <em>et al.</em>, 1991</td>
</tr>
<tr>
<td></td>
<td>Breeding kennels</td>
<td>25.0</td>
<td>Vanparijs <em>et al.</em>, 1991</td>
</tr>
<tr>
<td>Britain</td>
<td>Home pets</td>
<td>3.0</td>
<td>Turner &amp; Pegg, 1977</td>
</tr>
<tr>
<td>Hungary</td>
<td>Stray dogs</td>
<td>20.4–23.3</td>
<td>Fok <em>et al.</em>, 2001</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Stray dogs (V. Tarnovo)</td>
<td>56.0</td>
<td>Matov, 1958</td>
</tr>
<tr>
<td></td>
<td>Stray dogs (Sofia)</td>
<td>28.8</td>
<td>Matov, 1958</td>
</tr>
<tr>
<td></td>
<td>Stray dogs</td>
<td>60.0</td>
<td>Georgieva <em>et al.</em>, 1999</td>
</tr>
</tbody>
</table>

among the highest in Europe (Table 4.)
28% of the dogs, with 4.7% of them under the age of one year, and 23.3% were above that age (Franc et al., 1997).

In Poland, eggs of *T. vulpis* were found in 6% of studied soil samples, with a higher number of positive tests from rural areas, in comparison with samples from urban sites (Mizgajska, 1997). During a research on the levels of contamination with zoonoparasites of sand pits in kindergartens in the town of Stara Zagora, Georgieva et al. (2005) discovered *T. vulpis* eggs in 16.7% of the tested samples of sand. Those results showed that a risk for *T. vulpis* infection exists, especially for children, due to lack of proper hygienic habits.

We share the position of Kirkpatrik (1988), that the actual extensity of the infection in dogs is probably higher than those determined in coproovoscopy tests, due to the presence of prepatent infections or intermittent laying of eggs.

The discovery of a *T. vulpis* infection in wild carnivores showed that they are also part from the epizootological chain of this particular nematodosis. Because of their free movement, wild animals are a significant source of *T. vulpis* eggs contamination of the environment. That is a probable cause for the higher extensity of the infestation in sporting dogs, in comparison with the other categories. While studying the helminthic fauna of wild canids in Bulgaria, within the Sredna Gora Mountain region, a *T. vulpis* infection in 6 (13.9%) of the studied 43 foxes and in 6 (18.8%) of the studied 32 wolves was discovered (Georgieva & Kamenov, 1993). Infection with *T. vulpis* in Italy was found in 2.9% of the foxes (Poglayen et al., 1985), in France - in 8% (Petavy et al., 1990), in Britain - in 0.5% (Richards et al., 1995), and in Spain - in 38.8% (Criado-Fornelio et al., 2000). The fox population in the region of Sredna Gora Mountain is stable, while that of jackals has significantly increased over the last 20 years (Raychev, 2002). The observed expansion of jackals underlines their greater role in contaminating the environment with *T. vulpis* eggs.

Infections with *T. vulpis* in people are resulting of continuous contacts with infected dogs (Kenney & Yermakov, 1980; Kagei et al., 1986; Singh et al., 1993). Therefore, together with the sharp increase in the number of dogs and their presence in human home, as guards, hunting dogs, and pets, the risk of infecting people with *T. vulpis* significantly increases as well.

CONCLUSION

In dogs above the age of six months, trichuriosis is among the commonest helminthoses. From the studied categories of dogs, the extensity of infection was the highest in hunting dogs. A high extensity of infection was also found in dogs bred in very good sanitary conditions – as home pets, or in special breeding kennels. The attempts to control the spread of the helminthiosis could be impeded by the high level of infestation among wild canids. Infected dogs and wild canids are a source of environmental contamination with eggs of *T. vulpis*, that is a potential health hazard.

REFERENCES


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* Author’s translation

Paper received 19.10.2005; accepted for publication 20.04.2006

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