

COPROLOGICAL AND SEROLOGICAL FINDINGS IN DOGS AND CATS WITH GIARDIOSIS AND CRYPTOSPORIDIOSIS

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Abstract

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Giardia intestinalis and *Cryptosporidium* spp. findings in the faeces in dogs and cats, were compared with the incidence of specific antibodies in their blood sera. A total of 458 dogs and 135 cats were examined. *Giardia intestinalis* cysts and *Cryptosporidium* spp. oocysts were excreted by 25 (5.5 %) and 21 (4.6 %) dogs, respectively. Only 1 (0.8 %) cat excreted *Giardia intestinalis* cysts. *Cryptosporidium* spp. oocysts were excreted by 8 (5.9 %) cats. Specific *Giardia intestinalis* and *Cryptosporidium* spp. antibodies were detected in 167 (36.5 %) and 266 (58 %) dogs, respectively. In cats *Giardia intestinalis* and *Cryptosporidium* spp. antibodies were detected in 77 (57 %) and 58 (43 %) animals, respectively.

Dog, cat, Giardia, cryptosporidia, cysts, oocysts, antibody, opportunistic infections

Giardiasis and cryptosporidiosis are parasitic diseases of protozoan origin which occur as opportunistic infections and, less frequently, as primary diseases. Their common characteristic is a low host specificity. Transmission between different animal species (Taminelli 1989, Pavlásek 1983) and man (Archibald et al. 1991; Casemore 1990) has been demonstrated and the diseases have been classified among zoonoses. The parasites are spread all over the world but their incidence varies from region to region, being particularly high in young subjects. In the human population the incidence of giardia was reported to amount to 2 to 6 % in adults and to 10 to 15 % in children in Central Europe (Giboda 1988). In subtropical and tropical areas it was found to be higher (Gilman et al. 1985; Eckert 1989). The incidence of cryptosporidia in humans was reported to be about 1 to 2 % in adults and 4 % in children in developed countries and may reach 30 % or even more in developing countries (Casemore 1990). In dogs and cats positive findings of giardia were found to range between 0.5 and 18 % and between 2 and 3 %, respectively (Wolf and Eckert 1979; Jungmann et al. 1986; Swan and Thompson 1986). In our country Svobodová et al. (1987) and Vokoun (1988) recorded the incidence of cysts in faeces of dogs in 5.6 % of the animals examined.

Cryptosporidium spp. oocysts were found, on average, in 2 % of dogs (El-Ahraf et al. 1991) and 3.8 % of cats (Uga et al. 1989, Arai et al. 1990). The spontaneous infection of cats with cryptosporidia was first confirmed in Japan (Iseki 1979). In our country the oocysts of cryptosporidia in cats were first diagnosed by Pavlásek (1985). The common feature of the two infections is that they affect particularly young subjects and are markedly related to the immune status. They are often asymptomatic and are the cause of long-standing disturbances of the gastrointestinal tract in young animals and immunodeficient patients.

The present study was focused on the incidence of giardiasis and cryptosporidiosis in dogs and cats because these animals live in close contact with humans and their families and may

therefore come into account as potential sources of infection particularly for children and weakened subjects (Egger et al. 1990; Green et al. 1990; Svobodová et al. 1988).

Materials and Methods

A total of 458 dogs and 135 cats were subjected to coprological and serological examination. The animals under were either treated or hospitalized at the 1st Department of Internal Medicine of the University of Veterinary and Pharmaceutical Sciences, Brno. The dogs represented 49 breeds and crosses, the majority of them being German sheep-dogs, dachshunds and poodles. They were between 7 days and 16 years of age. About 71 % of them came from urban environment (mostly Brno) and the remaining 29 % were kept in the country. Included in this group were also police dogs, mainly German sheep-dogs. The cats represented 5 breeds and crosses, the majority of them being European short-haired cats and Persian cats. They ranged from 1 day to 12 years of age. The proportions of cats kept in urban environment (mostly Brno agglomeration) and in the country were 94 and 6 %, respectively.

Clinical examination was focused on detection of main symptoms with particular reference to digestive disorders. Results of supplementary examinations and diagnostic conclusions were taken over from case history notes recorded at the 1st Department of Internal Medicine. Faecal samples for parasitological examination were either obtained during hospitalization or brought along by the owners or taken by means of rectal rods. Coprological examination was carried out with the flotation method using saccharose solution of specific gravity of 1.150. The samples were examined with an optical microscope at the magnification of 200× and 630×. For accurate differentiation of *Cryptosporidium* spp. oocysts use was made of differential staining according to M i l á ě k and V í t o v e c (1985).

Blood samples for serological examination were withdrawn from the vena cephalica antibrachii or vena saphena in dogs and from the vena jugularis or vena cephalica antibrachii in cats. The sera were stored at -20 °C in plastic test-tubes. Serological examination was carried out with the indirect immunofluorescence method using freeze-dried antigammaglobulin conjugate for dogs and cats labelled with fluoresceinisothiocyanate prepared in cooperation with BIOVETA, Ivanovice na Hané. Corpuscular *Cryptosporidium* spp. antigen was obtained from positive calf faeces by repeated washing in buffered saline. Corpuscular *Giardia intestinalis* antigen was obtained from positive human faeces in a similar way. After being applied to slides, antigen was fixed with acetone and stored at -20 °C. For the serological examination itself the sera were subjected to serial dilution starting at the titre of 10. Reliability of the serological reaction was checked by inclusion of the following controls: negative - without serum and with repeatedly negative sera; positive - with repeatedly positive sera. The reactions were evaluated under an immunofluorescence microscope at the magnification of 630×.

Results

The dogs were found to be affected mostly with infectious diseases (distemper, parvovirus). Parasite findings are shown in Table 1. *Giardia intestinalis* cysts were found in 25 (5.5 %) dogs and *Cryptosporidium* spp. 21 (4.6 %) dogs. Concurrent infection with the two parasite species was recorded in 7 (10.6 %) cases. *Giardia intestinalis* antibodies were detected in 167 (36.5 %) dogs at titres of 10 to 160. The highest proportion of positive

Table 1
Survey of parasites found in the faeces of dogs (n = 458)

Parasite species	Positive findings	
	No.	%
<i>Giardia intestinalis</i>	25	5.5
<i>Cryptosporidium</i> sp.	21	4.6
<i>Isospora ohioensis</i>	55	12.0
<i>Hammondia heydorni</i>	4	0.9
<i>Sarcocystis</i> sp.	2	0.4
<i>Toxocara canis</i>	74	16.2
<i>Toxascaris leonina</i>	3	0.7
<i>Trichuris vulpis</i>	5	1.1
<i>Ancylostoma caninum</i>	1	0.2
<i>Taenia</i> sp.	3	0.7
Total	193	42.3

Table 2
Survey of parasites found in the faeces of cats (n = 135)

Parasite species	Positive findings	
	No.	%
<i>Giardia intestinalis</i>	1	0.7
<i>Cryptosporidium</i> sp.	8	5.9
<i>Isospora felis</i>	14	10.4
<i>Isospora rivolta</i>	5	3.7
<i>Toxoplasma gondii</i>	9	6.7
<i>Sarcocystis</i> sp.	4	3.0
<i>Toxocara cati</i>	24	17.8
<i>Toxascaris leonina</i>	1	0.7
Total	66	48.9

findings (60.9 %) was found in the basic dilution of 1:10. *Cryptosporidium* spp. antibodies were found in 266 (58 %) dogs at titres of 10 to 1 280. The highest proportion of positive findings (29 %) was found in the basic dilution of 1:10. Comparison of the parasitological and serological findings is shown in Table 3. The relation between positive *Giardia intestinalis* and *Cryptosporidium* spp. findings in the faeces and specific antibody findings in the blood sera of dogs is shown in Fig. 1.

Table 3
Comparison of parasitological and serological findings in dogs (n = 458)

Parasite species	Parasitological examination	Serological examination	No.	%
<i>Giardia intestinalis</i>	-	-	316	69.2
	-	+	117	25.4
	+	-	18	3.9
	+	+	7	1.5
<i>Cryptosporidium parvum</i>	-	-	188	41.0
	-	+	249	54.4
	+	-	4	0.9
	+	+	17	3.7

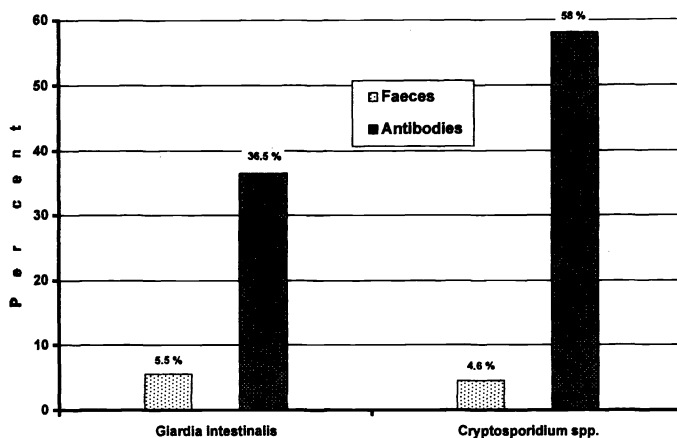


Fig. 1. Parasitological and serological findings in dogs

The cats were affected mostly with diseases of parasitic origin. A survey of parasite findings is presented in Table 2. *Giardia intestinalis* cysts were found in 1 (0.8 %) cat and *Cryptosporidium* oocysts in 8 (5.9 %) cats.

Giardia intestinalis antibodies were detected in 77 (57 %) cat blood serum samples at titres of 10 to 320. The highest proportion of positive findings (29.9 %) was found in the basic dilution of 1:10. *Cryptosporidium* spp. antibodies were detected in 58 (43 %) cats at titres of 10 to 160. The highest proportion of positive findings (47 %) was recorded in the basic dilution of 1:10. Comparison of the parasitological and serological findings is shown in Table 4. The relation between positive *Giardia intestinalis* and *Cryptosporidium* spp. findings in the faeces and specific antibodies findings in the blood sera of cats is presented in Fig. 2.

Table 4
Comparison of parasitological and serological findings in cats (n = 135)

Parasite species	Parasitological examination	Serological examination	No.	%
<i>Giardia intestinalis</i>	-	-	61	45.2
	-	+	73	54.1
	+	-	0	0
	+	+	1	0.7
<i>Cryptosporidium parvum</i>	-	-	72	53.3
	-	+	55	40.8
	+	-	5	3.7
	+	+	3	2.2

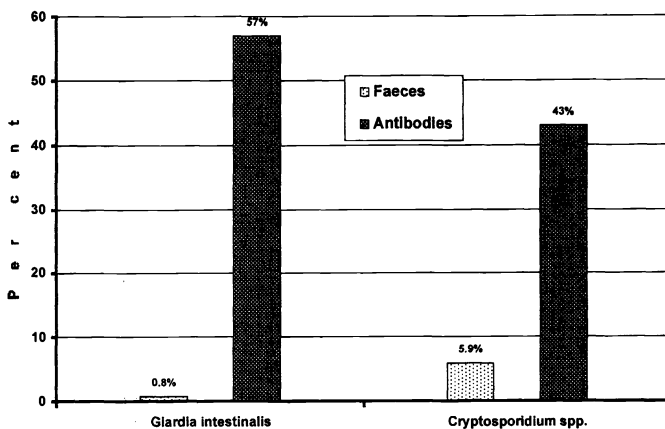


Fig. 2. Parasitological and serological findings in cats

Discussion

The present faecal findings of *Giardia intestinalis* cysts and *Cryptosporidium* spp. oocysts in dogs (5.5 % and 4.6 %, respectively) and cats (0.8 % and 5.9 %, respectively) are in keeping with the observations of Kulda and Nohýnková (1978), Wolf and Eckert (1979), Jungmann et al. (1986), Kirkpatrick (1986), Svobodová et al. (1987) a. o. who found giardia cysts in 0.5 to 18 % of dogs and cats, with the incidence particularly high in the young. In their studies on the excretion of *Cryptosporidium* spp. oocysts from dogs and cats U g a et al. (1989), Arai et al. (1990) and El-Ahraf et al. (1991) found the

oocysts mostly in 2 to 4 % of the animals. Our present findings in dogs and cats are slightly higher for *Cryptosporidium* spp. (4.6 and 5.9 %) and also relatively higher for *Giardia intestinalis*, which can be accounted for by a greater proportion of young and diseased animals in our study. The same explanation can be offered for a higher incidence of *Toxoplasma gondii* oocysts in the faeces of our cats (6.7 %). The prevalence of parasitic infections has been found to increase with the number of animals kept together in reduced space. Hořejš and Koudela (1994) found giardia cysts in as many as 36.2 % of faecal samples from police dogs kept together at a breeding station. In the dogs and cats included in our study giardiasis and cryptosporidiosis were present as typical opportunistic infections accompanying major primary diseases with a number of immunosuppressive factors (distemper, parvovirus, demodicosis, neoplasia). The clinical symptoms were nonspecific, the prevailing signs being diarrhoea and body wasting and, in acute cases, subsequent dehydration. These symptoms were often overlaid by the primary disease. Marked clinical signs may be due to combined effects of further conditionally pathogenic factors. In both dogs and cats included in our study the number of serologically positive animals increased with age which suggests possible repeated infection during their life time. The infection is often latent in form or opportunistic without direct demonstration of *Cryptosporidium* spp. oocysts or *Giardia intestinalis* cysts, with specific antibodies persisting for several months and rising in titre upon reinfection. Our results confirmed that giardiasis and cryptosporidiosis are protozoan infections showing no marked clinical manifestations. Nevertheless, they play a certain role in relation to human population. Their incidence in both animals and man depends particularly on the immune status of the subject.

Koprologické a serologické nálezy při giardióze a cryptosporidióze psů a koček

Srovnávali jsme nálezy *Giardia intestinalis* a *Cryptosporidium* spp. v trusu s výskytem specifických protilátek v krevním séru psů a koček. Celkem jsme vyšetřili 458 psů a 135 koček. Cysty r. *Giardia* vylučovalo 25 psů (5,5 %) a oocysty r. *Cryptosporidium* 21 psů (4,6 %). Pouze 1 kočka vylučovala cysty r. *Giardia* (0,7 %). Oocysty r. *Cryptosporidium* byly zjištěny u 8 koček (5,9 %). Specifické protilátky proti *G. intestinalis* byly detekovány u 167 psů (36,5 %) a proti *Cryptosporidium* spp. ve 266 (58 %) psů. U koček byly protilátky proti *G. intestinalis* přítomny u 77 jedinců (57 %) a proti *Cryptosporidium* spp. u 58 koček (43 %).

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