

Prevalence of *Toxocara* spp. and other Parasites in Dogs and Cats in Halifax, Nova Scotia

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ABSTRACT

Several cases of visceral larva migrans syndrome in children led to an investigation of the ova of *Toxocara* spp. and other species in stool specimens from stray dogs and cats in Halifax, Nova Scotia. Fecal samples from 474 stray dogs and 299 stray cats were examined. Ova of *Toxocara canis* or *cati* were present in stools from 26.6% of the dogs and 25.1% of the cats. In dogs the prevalence of *Toxocara canis* was noticeably greater in puppies (56.1%) than in mature animals (11.9%).

RÉSUMÉ

Le diagnostic du syndrome: "Larva migrans viscérale", chez les enfants, incita la recherche d'oeufs de *Toxocara* spp. et d'autres parasites dans les fèces de 474 chiens et de 299 chats errants, à Halifax, en Nouvelle-Écosse. On décéla des oeufs de *Toxocara canis* ou *cati* dans 26.6% des échantillons canins et 25.1% des félins. Chez les chiens, 56.1% des jeunes rece-laient des oeufs, comparativement à seulement 11.9% des adultes.

INTRODUCTION

The second stage larvae of certain ascarid worms that infect cats and dogs, namely *Toxocara cati* and more especially *Toxocara canis*, are generally accepted as the most common cause of visceral larva migrans (VLM). Clinical VLM, which occurs mainly in young children, results from the ingestion of infective ova after either handling infected animals or ingesting soil contaminated with infective eggs. The clinical implications have been well reviewed by Woodruff (14).

Because of cases of VLM encountered in children admitted to The Izaak Walton Killam Hospital, Halifax, Nova Scotia and in view of the limited available information about the prevalence of *Toxocara* sp. in Canada, we undertook an examination of stool samples from stray dogs and cats in Halifax, Nova Scotia.

MATERIALS AND METHODS.

Staff members of the Halifax branch of the Society for the Prevention of Cruelty collected feces from dogs and cats captured from October 1971 to the end of November 1972. The sex of the animals and their estimated ages were noted as follows:

1. Puppies and kittens: apparently less than six months old.
2. Young animals: apparently six months to two years old.
3. Mature animals: apparently over two years old.

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Individual stool samples were stored in a solution of thimerosal (Merthiolate, Eli Lilly and Co.) and iodine formaldehyde (MIF) prepared according to the method of Saper and Lawless (7) and maintained at 5°C until examination. Within 72 hours of being passed, each was examined using the concentrated brine flotation technique described by Willis (13). We examined fecal samples from 474 stray dogs and 299 stray cats.

RESULTS

Ova of *Toxocara canis* or *cati* were present in stools from 26.6% of the dogs and 25.1% of the cats (Table I). In dogs, prevalence of *T. canis* was noticeably greater in puppies (Table II). In cats *Toxocara* infection was greatest in the next age group (Table III). It should be noted, however, that the kitten samples totalled only 13.

Ova of *Toxascaris leonina* were observed in specimens from both dogs and cats, most frequently in those from young dogs (Table II). In addition, hookworms were found in stool samples from young and mature dogs (Table II) and *Isospora* spp. in those from younger groups of dogs and cats.

DISCUSSION

In this study the highest prevalence of *Toxocara canis* occurred in stools from puppies (strays apparently less than six months old), a finding similar to that in a survey of animals in Indian settlements in northwestern Canada (11). One study in Montreal in 1975 showed that the incidence of *Toxocara canis* in dogs examined was 43.5% (8), whereas, a more recent study (4) in 35 veterinary clinics in the Montreal metropolitan area reported an overall incidence of 34% and an incidence of 50% in puppies. In an earlier report (3) from northern Canada and Newfoundland it was stated that *T. canis* occurs in sledge dogs but no data were given.

The overall prevalence of *Toxocara cati*

in mature cats in our study (14.3%) is comparable to that in the Glasgow study (13.7%) of Hutchison (5). We found a different prevalence for males (11.0%) and females (17.7%) but other investigators did not differentiate the sexes. The lowest prevalence (8%) was reported from London, England (6). Findings as high as 85% in various parts of the world were alluded to by Sprent and English (10) and 84.7% was reported in eastern Kansas (1). Since few reports have differentiated kittens from young cats we grouped them together for comparison. The lowest prevalence of *T. cati* traced by us was 17.9%, reported from Bermuda (12). Sprent and English (10) indicated a high of 60% but gave no details.

Although there is no definite evidence implicating *Toxascaris leonina* as an etiological agent in the human visceral larva migrans syndrome several investigators have examined stools for ova of this parasite. We found the ova in 2.4% of specimens from male dogs but in only 0.4% from females and in an even lower percentage (0.3%) of cat stools (Table I). It is of interest to note that the data of Unruh *et al* (11), from a more northerly part of Canada, show a high prevalence of this parasite in dogs, particularly in puppies less than six months old (44.3%). This contrasts with their negative findings of *Toxocara canis* which led them to suggest that the visceral larva migrans syndrome is probably related to *Toxascaris leonina*. Ghadirian *et al* (4) found *T. leonina* in 11.4% of dogs studied in the Montreal area.

The highest reported incidence of *T. leonina* in dogs is 47.4% in males surveyed by Al-Saffar *et al* (2) in Iraq where only 10.5% of females were infected. Additional high rates are 46.1% reported by Skrijabin (9) in the Don region of Russia (neither

TABLE I. Parasite Ova and Protozoa Identified in Stool Specimens from Stray Dogs and Cats in Halifax, Nova Scotia

Parasite	474 Dogs	299 Cats
<i>Toxocara canis/cati</i> . . .	126 (26.6%)	75 (25.1%)
<i>Toxascaris leonina</i> . . .	6 (1.3%)	1 (0.3%)
Hookworms	38 (8.0%)	—
<i>Trichuris</i> sp.	6 (1.3%)	—
<i>Dipylidium caninum</i> . . .	3 (0.6%)	—
<i>Capillaria hepatica</i> . . .	—	1 (0.3%)
<i>Isospora</i> spp.	14 (3.0%)	19 (6.4%)
<i>Otodectes cyanotis</i>	—	5 (1.7%)
Total positive	193 (40.7%)	101 (33.8%)

TABLE II. Percentages for Prevalence of *Toxocara*, Hookworms and *Isospora* sp. in Dogs, by Sex and Age^a

Number =	Puppies			Young dogs			Mature dogs		
	M 31	F 62	Total 107	M 42	F 75	Total 124	M 149	F 94	Total 243
<i>Toxocara canis</i>	74.2	48.4	56.1	35.7	26.7	29.8	12.8	10.6	11.9
<i>Toxascaris leonina</i>	0	0	0	7.1	1.3	3.2	1.3	0	0.8
Hookworms.....	3.2	0	0.9	9.5	4.0	8.1	13.4	7.5	11.1
<i>Isospora</i> spp.....	3.2	1.6	4.7	2.4	5.3	4.0	0	4.3	1.7

^aThe sex was not stated for 14 puppies and seven young dogs

TABLE III. Percentages for Prevalence of *Toxocara cati*, *Toxascaris leonina* and *Isospora* sp. in Cats, by Sex and Age^a

Number =	Kittens			Young cats			Mature cats		
	M 4	F 9	Total 13	M 49	F 75	Total 125	M 82	F 79	Total 161
<i>Toxocara cati</i>	0	44.4	30.8	40.8	36	38.4	11	17.7	14.3
<i>Toxascaris leonina</i>	0	0	0	0	0	0	1.2	0	0.6
<i>Isospora</i> sp.....	0	0	0	10.2	12	11.2	3.7	2.5	3.1

^aThe sex of one young cat was not recorded

sex nor age stated) and 44.3% reported by Unruh *et al* in northwestern Canada (11). The highest prevalence in cats was reported from Glasgow by Hutchison who noted *T. leonina* in 15.3% of animals surveyed (5).

Our study confirms the findings of others that the reported prevalence of *Toxocara* spp. in dogs and cats is extremely varied. Although absolute comparisons cannot be made among available data it is obvious that the high worldwide prevalence of these parasites should not be ignored. The present prevalence of household pets with its impact on sanitation requires that public health authorities, pet owners and veterinarians in crowded urban centres give more attention to this phenomenon. A program of public education in the hazards involved is indicated.

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