Exposure to larva migrans syndromes in squares and public parks of cities in Chile

Exposição para síndromes de larva migrans em praças e parques públicos em cidades do Chile

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Keywords
Larva migrans, transmission. Feces, parasitology. Dogs.

Abstract
Between November 2001 and December 2002, 600 dog fecal samples were collected in main squares and public parks of 13 cities in Chile, from the extreme north to the extreme south of the country. The samples were processed in the laboratory by centrifugal sedimentation and the Harada-Mori methods. *T. canis* eggs were found in 12 cities. Detection rates ranged from 1.9 to 12.5% with an average of 5.2%. Seven percent of the samples had eggs and 9.5% had rhabditoid and/or filariform larvae of *Ancylostomatidae*. *Strongyloides stercoralis* were not found. Squares and public parks in Chile pose a potential risk of exposure to visceral, ocular, and/or cutaneous larva migrans syndromes.

Descritores
Larva migrans, transmissão. Fezes, parasitologia. Cães.

Resumo
Entre novembro de 2001 e dezembro de 2002, 600 amostras de fezes de cão foram coletadas nas principais praças e parques públicos de 13 cidades do Chile, localizadas nas regiões norte ao estremo sul da nação. No laboratório, as amostras foram processadas mediante os métodos de sedimentação por centrifugação e de Harada-Mori. Ovos de Toxocara canis *foram encontrados em 12 cidades em freqüências que variaram entre 1,9 a 12,5% por cidade, com média de 5,2%. Sete por cento das amostras apresentaram ovos e 9,5% larvas rabditóides ou filarióides de* Ancylostomatidae. Strongyloides stercoralis *não foi encontrado nas amostras estudadas. Praças e parques públicos do Chile apresentam riscos potenciais para aquisição de larva migrans visceral, ocular ou cutânea.*

Larva migrans syndrome is mainly caused by the ingestion of larval eggs or skin penetration of larvae from intestinal nematodes of dogs and cats. *Toxocara canis* is the major causative agent of visceral larva migrans (VLM) and ocular larva migrans (OLM). Cutaneous larva migrans (CLM) is mainly produced by *Ancylostomatidae* larvae and *Strongyloides stercoralis* larvae, also originated in dogs, and can cause cutaneous lesions in humans. Clinical pictures of VLM and OLM vary from asymptomatic infections to severe liver, lung or eye involvement (Beaver & Jung, [2] 1985).

In Chile (population: 15,200,000), the proportion of domestic canine population is 1 per 7 people. The country's biogeographical conditions range from arid desert in the northern regions through moderate and agriculture climate in central regions to cold in the last three regions. These climatic differences may affect the transmission of zoonotic diseases to humans.

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The finding of *Toxocara canis* eggs spread by dogs is an indicator of the transmission risk of VLM or OLM in a certain biogeographical area (Mizgajka,[4] 1995).

The aim of the present study was to establish the transmission risk of VLM, OLM and CLM in public recreational green areas of Chilean cities and the role of dogs in the transmission of *S. stercoralis* to humans.

From November 2001 to December 2002 dog fecal samples were collected in 13 cities in Chile (Arica, Antofagasta, Illapel, Viña del Mar, Valparaíso, San Felipe, Santiago, Rancagua, San Fernando, Concepción, Temuco, Valdivia, and Punta Arenas), covering nearly the whole country. Dog fecal samples were collected directly from the grass of main squares or other public green areas in each city. All feces collected were considered as derived from dogs because they are the only quadruped domestic animals frequently seen defecating in urban public places in Chile. The minimum sample size to be collected (N=27) in each city was determined according to a previous study and it was widely achieved in most cities. Each sample was processed in the laboratory by centrifugal sedimentation and the Harada-Mori (H-M) method (Beaver & Jung,[2] 1985). Statistical significance was determined using Epi Info 6.0 program's Chi-square test.

A total of 126 (21.0%) samples processed by centrifugal sedimentation and 72 (12.0%) by the H-M method presented eggs or larvae of intestinal helminthies, respectively.

Positive samples corresponding to species, genera or families of intestinal helminthes detected by means of the observation of eggs in 600 samples processed by centrifugal sedimentation method were as follows: 31 *T. canis* (5.2%), 9 *T. leonina* (1.5%), 2 *Dipylidium caninum* (0.3%), 31 *Trichuris* sp. (5.2%), 1 *Ascaris* sp. (0.2%), 42 *Ancylostomatidae* (7.0%), and 10 *Taenidae* (1.7).

The Figure shows the location of the cities studied and the frequency per city of samples with *T. canis* eggs: Arica (2/50) 4.0%, Antofagasta (1/50) 2.0%, Illapel (5/50) 10.0%, Viña de Mar (0/27), Valparaíso (5/40) 12.5%, San Felipe (3/44) 6.8%, Santiago (1/54) 1.9%, Rancagua (2/27) 7.4%, San Fernando (4/50) 8.0%, Concepción (3/49) 6.1%, Temuco (2/50) 4.0%, Valdivia (2/50) 4.0%, and Punta Arenas (1/54) 1.9%.

Ancylostomatidae larvae detected per city by the H-M method were as follows: Arica (1/50) 2.0%, Antofagasta (0/50), Illapel (4/55) 7.2%, Valparaiso (4/40) 10.0%, Viña del Mar (0/27), San Felipe (0/44), Santiago (0/54), Rancagua (2/27) 7.4%, San Fernando (12/50) 24.0%, Concepción (4/49) 8.2%, Temuco (20/50) 40%, Valdivia (10/50) 20%, and Punta Arenas (0/54).

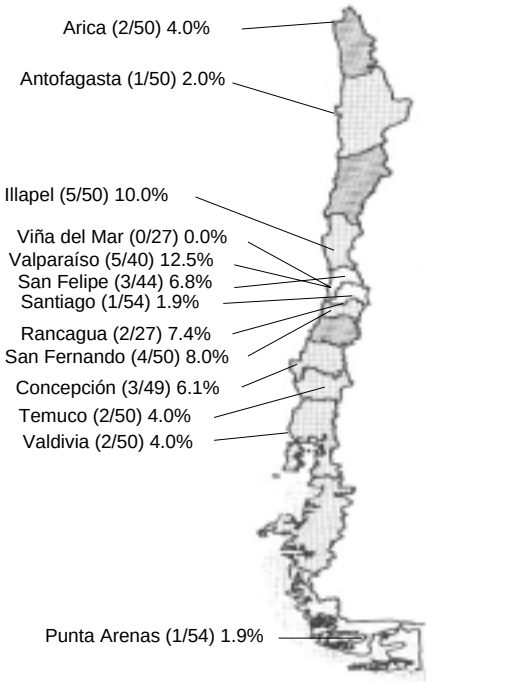

Figure - The 13 Chilean cities studied for transmissible instars of dog intestinal nematodes to humans (positive samples/examined samples and % of *T. canis* eggs detected).

The frequency of samples with *Ancylostomatidae* larvae detected in cities in the northern half of the country (Arica, Antofagasta, Illapel, Viña del Mar, Valparaiso, San Felipe, Santiago) compared to the southern half (Rancagua, San Fernando, Concepción, Temuco, Valdivia, Punta Arenas) were as follows: 9/320 (2.8%) and 48/280 (17.1%), respectively. The cities from the southern region presented a higher frequency of *Ancylostomatidae* larvae ($p<0.01$).

S. stercoralis larvae were not observed in the fecal samples examined.

In all 13 studied cities, with the exception of Viña del Mar, *T. canis* eggs were found in 1.9 to 12.5%, with an average of 5.2%. These findings show that *T. canis* is widely distributed in the whole country. In playgrounds of Campo Grande, state of Mato Grosso do Sul, Brazil, *T. canis* eggs were found in 10.8% of the samples examined (Araujo et al,[1] 1999).

The biogeographical characteristics – basically temperate temperatures and humid soils – of the southern half could facilitate the transmission of *Ancylostomatidae* infection from dogs. On the other hand, the rainless weather of the northern extreme of

the country contributes to reduce the presence of this parasite. In Campo Grande, Brazil, *Ancylostomatidae* eggs were detected in 56.8% of the samples studied (Araujo et al,[1] 1999).

Human strains of *S. stercoralis* can infect dogs and epidemiological observations suggest that dog strains can infect humans (Grove & Northern,[3] 1982). The absence of *S. stercoralis* larvae in the examined samples and in studies of autopsied dogs (Oberg et al,[5] 1979) suggest that recreational areas do not play an important role in the transmission of strongyloidiases to humans in Chile.

T. canis and Ancylostomatidae eggs extensively contaminate recreational areas (squares and public parks) of the studied Chilean cities, being a potential risk factor for transmitting VLM, OLM, and CLM to people who circulate in these playgrounds.

Control measures for dog zoonotic nematodiases should be implemented in Chile to reduce the transmission risk of VLM, OLM and/or CLM in playgrounds throughout the country.

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