Presence of zoonotichelminths in cats (Feliscatus) of condominiums in City of Mexico with special concern to Toxocara cati infection

Ignacio Martínez-Barbabosa1*
Rodrigo de Jesús Pimenta Lastra2
Hilda Ortiz Pérez1
José Rodolfo Marcos Aguilar Venegas1
Ana María Fernández Presas1

1Department of Health Care, Autonomous Metropolitan University-Xochimilco, Mexico
2Department of Politics and Culture. Metropolitan Autonomous University-Xochimilco, Mexico
3Department of Microbiology and Parasitology, School of Medicine, National Autonomous University of Mexico, University City, Mexico

Summary

The toxocariasis is a soil-transmitted helminthiasis (SHT) of worldwide distribution, caused by the intestinal helminths of the dog and the cat Toxocara canis and Toxocara cati, respectively. The toxocariasis by T. cati is little studied worldwide.

Objective: Determine the prevalence of T. cati infection and other intestinal zoonotic parasites in domestic cats that live in condominium apartments in Mexico City.

Material and Methods: With Faust’s method, 121 feces of cats living in apartments in a condominium in Mexico City were analyzed. A questionnaire was applied to the owners to obtain hygienic habits of the animal. The statistical analysis was performed with the Chi-square and Fisher’s exact tests with a confidence level of p <0.05.

Results: The prevalence of T. cati infection was 33.1%. Embryonated eggs were observed in 8.26% p < 0.000; oocysts of Toxoplasma gondii 6.6% and eggs and larvae of angiostrongyliidsins 1.6%. The association of Angiostrongylus spp. and T. gondii sp. was significant (p < 0.004). The highest frequency of infection was found in cats under 12 months of age. However, the presence of T. cati in the different age groups was p < 0.000.

Conclusion: The coexistence with parasitized animals is a risk to acquire different intestinal zoonoses transmitted by the cat as toxocariasis. However, the presence within the home of larvae eggs of T. cati and oocysts of T. gondii increases the risk of infection in younger children and people suffering from some type of immune deficiency.

Keywords

Cats; Toxocarasis; Toxocaracatis; Toxoplasmosisis; Condominiums

Introduction

The toxocariasis is a soil-transmitted helminthiasis (HTS) of worldwide distribution. Its epidemiological clinical importance lies in the fact that its main transmission mechanism involves the profuse contamination of the soil with fecal matter that evacuates two of the pets that closely coexist with the human being, the cat and the dog. Toxocariasis is caused by the intestinal helminths of the dog and the cat Toxocara canis and Toxocara cati, respectively [1-3].

Both animals are infected by different mechanisms such as: ingestion of embryonated eggs, migration through the placenta of larvae that have remained in the tissues of the mother, ingestion of larvae present in breast milk and the consumption of paratenic hosts with the infective larvae [4]. The female of both helminths produces eggs that are eliminated along with their own fecal matter of the host, thus contaminating the ground of streets, parks and gardens, places where young children usually play, thereby facilitating the transmission, infection and dissemination of the parasitosis. In the soil, the eggs of T. cati and other STH must reach their infective form (embryonated eggs) in a period of 3-4 weeks. In this way, human infection is the result of the involuntary ingestion of embryonated eggs or larvae present in the tissues of a range of domestic and wild paratenic hosts [5]. In the small intestine, released larvae penetrate the intestinal wall and via the bloodstream they spread to different tissues, but do not complete their normal migration to the intestine to reach the adult stage; in this way, the larvae, as they wander through the tissues, produce visceral larva migrans (VLM) and ocular larva migrans (OLM) syndromes. Both pathologies constitute a serious public health and diagnostic problem, both for health institutions and for the general practitioner [6-8].

Toxocariasis is mainly a benign infection so the vast majority of those infected is asymptomatic or have very few symptoms, so they are not diagnosed. Infection is suspected due to accidental findings of persistent eosinophilia [9,10]. Visceral toxocariasis occurs
preferentially in children from 1 to 4 years of age with a history of geophagy. Clinically, it is characterized by fever, pulmonary signs and symptoms, hepatosplenomegaly and leukocytosis with marked eosinophilia [11,12]. Cases of neurological alterations have been reported that are manifested by seizures, paralysis, epilepsy and sometimes cause death when the number of larvae in the central nervous system is high [13,14]. In ocular toxocariasis, the larvae produce strabismus, leukocoria, endophthalmitis, chronic inflammation of the tissues of the posterior chamber or chronic granulomas in the retina, alterations that can cause blindness in the affected eye [8,14].

People who live in condominiums do not escape this problem, due to the fecal contamination produced daily by dogs and family cats and vagabonds in the children's recreational areas. However, the danger is not only restricted to fecal contamination of common areas but is also latent in the interior of the department, mainly those in which they live with cats parasitized by T. cati. In these homes the most common way to control cat evacuations is to provide a box containing sand (litter box), in this way the sand is not being changed frequently and becomes a reservoir and source of infection for the residents and the cat itself, due to that T. cati eggs reach their infective form (embryonated eggs) in a period of 3-4 weeks; main characteristic of STH. This way, the risk of acquiring the parasitosis when accidentally ingesting the embryonated eggs is greater, mainly for children under 6 years of age. However, none of the relatives is exempt from developing the aforementioned clinical events. Based on the foregoing and the scarce information that exists in the national and global literature on the role of T. cati as an etiological agent of human toxocariasis, it was proposed to carry out the present investigation oriented to know the frequency of infection by the nematode in domestic cats that live in apartments in condominium in housing units of Mexico City.

The objective of this study was to determine the prevalence of T. cati infection and other intestinal zoonotic parasites in domestic cats that live in condominium apartments in the Tlalpan Delegation, Mexico City.

Material and Methods

Study area

The Dr. Ignacio Chávez housing unit is located in the Coapa Farms Colony in AlcaldiaTlalpan, Mexico City. In the limits between the Goyoacan and Xochimilco mayoralities. The climate is temperate sub-humid, average annual temperature 12 ° C. It has a population of 650,567 inhabitants [15].

Study design

During the month of October 2017, a cross-sectional descriptive exploratory study was carried out with the purpose of knowing the prevalence of T. cati and other enteroparasites transmitted by the domestic cat in the Dr. Ignacio Chávez housing unit.

Study Population

A housing unit located in the Tlalpan municipality was selected for the ease of access and the proximity to the UAM-X facilities. Through a direct interview, the study protocol was explained to each condominium owner and was invited to participate. Simultaneously, for the ease of access and the proximity to the UAM-X facilities.

The data obtained was organized and codified in a database in SPSS (Statistical Package for Social Science) version 21.0 for Windows (SPSS Inc., Chicago IL, USA) From the variables used in data processing (age, gender, race presence of enteroparasites, disposition of excreta) association relations, graphs and tables were created which allowed to have a quantative description of the studied population. In the search for association between variables, the Chi-square and Fisher exact statistical tests were used with a level of significance of 0.05%.

Results

For the study of transmission-infection risk factors towards man by T. cati, the study included the analysis of fecal matter of 121 domestic cats from 2 to 96 months of age. Table 1 shows the distribution of the cats analyzed by sex and age groups, 62.8% males and 37.2% females. The highest frequency of animals was found in the group of more than 12 and less than 36 months of age (55.4%). Table 2 shows the finding and level of general infection by parasites diagnosed in the feces analyzed. The prevalence of T. cati infection was 33.3%. Embryonated eggs of T. cati were observed in 8.26% of the feces; oocysts of T. gondii 6.6% and eggs and larvae of ancylostomatids 1.6%. Table 3 records the frequency of T. cati infection in the age groups, 21 cats were less than 12 months of age. Table 4 shows the association between the identified parasite species. The association of Ancylostoma spp and T. gondii was significant (p < 0.004). The presence of embryonated eggs of T. cati p < 0.000. The infection by T. cati in the different age groups was significant p < 0.000.

Discussion

In urban areas of developing countries, the possibility of environmental contamination by human and animal fecal matter is relatively controlled, due to the accelerated urbanization process that provides basic services of drinking water, sewerage and garbage collection among others. However, environmental pollution caused by fecal matter from pets (dogs and cats) is directly related to the cultural habits of the population, which favors the dispersal of feces in public and private places. In this way, people who live in condominiums in any city in the world can acquire parasitic diseases such as toxocariasis transmitted by the dog and the cat, or toxoplasmosis caused by the protozoan T. gondii transmitted by the cat. Both parasites are considered worldwide as the main parasitic zoonoses transmitted by the dog and the cat [18,19].

However, toxocariasis caused by T. cati in Mexico is a poorly studied helminthiasis despite the indiscriminate increase in feline population. Because people who live in apartments in condominium use cats as pets, and not as natural predators of rodents.

| Age | Percentage |
|-----|------------|
| 12 months or less | 28.1 |
| More than 12 and less than 36 | 55.4 |
| More than 36 meses | 16.5 |
| Total | 100.0 |

Table 1: Distribution by sex and age group of the 121 cats analyzed from the Dr. Ignacio Chávez Housing Unit.
### Table 2: Frequency of infection by parasites in analysed cats from the Dr. Ignacio Chávez Housing Unit.

| Parasite          | Negative | Positive | Total | Percentage |
|-------------------|----------|----------|-------|------------|
|                   | Negative | Positive |       |            |
|                   |          |          |       |            |
|                   |          |          |       |            |
| *Toxocara cati*   | 81       | 40       | 121   | 66.9%      |
| *Anclylostomatidos* | 119     | 2        | 121   | 98.3%      |
| *Toxoplasma gondii* | 113     | 8        | 121   | 93.4%      |

### Table 3: Distribution by age group of infected cats by *T. cati*.

| Age                        | Negative | Positive | Total |
|---------------------------|----------|----------|-------|
| 12 months or less         | 13       | 21       | 34    |
| More than 12 and less than 36 | 52      | 15       | 67    |
| More than 36 months       | 16       | 4        | 20    |
| Total                     | 81       | 40       | 121   |

### Table 4: Association found between parasites using the Chi-square and Fisher exact statistical tests.

| Variables            | Estimate | Chi-square | Fisher |
|----------------------|----------|------------|--------|
| *Anclylostomatids*   | Toxoplasma gondii | 0.000 | 0.004 |
| *T. cati*            | embryonated eggs | 0.000 | 0.000 |
| Mites                |           | 0.002     |        |

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