



Tehran University of Medical
Sciences Publication
<http://tums.ac.ir>

Iran J Parasitol

Open access Journal at
<http://ijpa.tums.ac.ir>



Iranian Society of Parasitology
<http://isp.tums.ac.ir>

Short Communication

Seroepidemiological Study of Toxocariasis in the Owners of Domestic Cats and Dogs in Mashhad, Northeastern Iran

*Fariba BERENJI¹, Ali POURYOUSEF¹, Abdolmajid FATA¹, Mahmoud MAHMOUDI²,
Maryam SALEHI^{3,4}, Javad KHOSHNEGAH⁵

1. Dept. of Parasitology and Mycology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
2. Immunology Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
3. Dept. of Community Medicine, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
4. Research Center for Patient Safety, Mashhad University of Medical Sciences, Mashhad, Iran
5. Dept. of Clinical Sciences, Faculty of Veterinary of Ferdowsi University of Mashhad, Iran

Received 25 Oct 2015
Accepted 10 Feb 2016

Keywords:
Toxocariasis,
Visceral larva migrans,
Dog,
Cat,
ELISA,
Iran

***Correspondence**
Email:
Berenjif@mums.ac.ir

Abstract

Background: Toxocariasis is the clinical terms applied to infection of human with Ascarid nematodes in the order Ascaridida, named *Toxocara canis* and *T. cati*. Because in recent years in Iran many people desire to keep pets (cats and dogs), and lacking of seroepidemiological study of toxocariasis in Mashhad, we decided to determine the seroprevalence of toxocariasis among people who own cats and dogs in comparison with control group.

Methods: A serological study for detection antibodies to *Toxocara* in two groups (93 cat and dog owners and 93 healthy people as control group) was conducted from Feb 2013 to Dec 2013. An ELISA method was employed using determination of IgG antibodies against *Toxocara*. The serum samples were evaluated for anti-*Toxocara* antibody, using ELISA technique at Parasitology and Immunology Lab of Imam Reza Hospital of Mashhad. Using a questionnaire, epidemiological factors associated with infection were examined. Data were analyzed using Chi-square test.

Results: The seroprevalence of *Toxocara* antibodies in the pet owners and control group was respectively 20.43% and 1.07%. 47.3% of pet owners were female.

Conclusion: Presented data showed the significant difference between seroprevalence of toxocariasis among pet owners and control group. Education of society and in particular pet owners consisting of preventing contamination of the environment with *Toxocara* eggs is advised.

Introduction

Toxocariasis is a parasitic disease common with human and animals such as dog and cat. People are affected by ingestion of the infected eggs of *Ascaris* of cat and dog named *Toxocara cati* and *T. canis*. Larva in the human body migrate to different organs through blood and make syndrome of visceral larva migrans and then some skin lesions like urticaria, eczema and itching occur. The most involved organs are liver, brain, lung or eye. The symptoms of this disease are fever, headache, stomach upset, coughing, asthma and pneumonia. Human infection with larva has been seen many times in human but infection with adult worm is rarely (1).

Because toxocariasis is a life threatening infection survey about this disease is necessary in all over the world. Today in the most part of Iran, particularly in big cities of Iran, keeping cats and dogs as pet is increased and because many people do not aware about this disease, they would be in danger of getting toxocariasis. In Iran, there are millions of herding, guardian, and stray dogs and cats, which can cause environmental contamination through their feces so that it may increase the risk of people's contact with contaminant eggs. In different areas of Iran, the rate of dog infection has been reported as 14% to 76% (2). In Caribbean communities in people who own dog, seroprevalence of toxocariasis was higher (77%) than those without dog (3).

Therefore, awareness of the safety status of pet owners, as one of the high-risk groups for toxocariasis, can provide useful information for these individuals and community health-care. This study was performed with the aim of determining and comparing the rate of seropositivity of toxocariasis in cat or dog owners and those with no history of keeping these animals at home.

Materials and Methods

In this descriptive-analytical study, 186 subjects were evaluated in Mashhad, Iran. Accordingly, 93 cat or dog owners (case group)

and 93 individuals with no previous history of keeping these animals (control group) were studied. After explaining about parasites and the associated risks, informed consents were obtained from the subjects. Interviews were performed and questionnaires, including demographic characteristics were completed. After blood sampling the serum samples were separated, collected, and transferred to the laboratory of Imam Reza Hospital, Mashhad, Iran.

The samples were stored in a Freezer (-70 °C) until performing the tests, and then, the tests were performed using ELISA technique. After the serum samples were stored at laboratory temperature for 30 min, they were studied using the kit (*Toxocara canis* IgG ELISA (RE58721)). Finally, the results were reported using ELISA Reader. Statistical analysis was performed by SPSS software (Chicago, IL, USA) and Chi-square test.

Results

One hundred eighty-six serum samples, 93 samples from pet owners and 93 samples from non-pet owners (control group) were studied. Overall, 19(20.43%) of the case group were positive for anti-*Toxocara* IgG antibodies and only 1(1.07%) sample from non-pet owners had anti-*Toxocara* antibodies. A significant difference was observed between the prevalence of *Toxocara* seropositivity in case and control groups ($P<0.001$). Between seropositive case group 9 (47.3%) were female. No significant difference was observed between the prevalence of *Toxocara* infection in male and female groups.

Discussion

Because people like to have pet in recent years in Iran and there is no such a research in Mashhad, we decided to study the relationship between pet keeping and seropositivity of this infection.

After examination sera with ELISA method, we found a significant difference between the prevalence of antibody of toxocariasis in case and control group. In developed countries and developing countries different prevalence of *Toxocara*, infection in human has been reported (3). In a study, 39% of 100 patients were seropositive for toxocariasis who had contact with dog (4). The prevalence of toxocariasis in different region is reported as follows; Colombia 47.5%, Ireland 31%, and North Carolina 23.1% (5). In Austria in pregnant women the prevalence of infection considered 1.38% but in Sweden, it was 7% of young adult and 14.3% among children between 3 to 6 yr old (6). Garcia-covde in Salbankely, Spain reported 7% of seropositivity of toxocariasis and Abo-shehada in Jordan examined people between 5 to 24 yr old that 10.9% of them were positive (6, 7).

This study shows a lower percentage of seropositivity of toxocariasis than Brasilia, Colombia, Ireland and USA but higher than other countries like Austria, Sweden, Spain or Jordan. These findings may be in part due to differences in level of personal and community hygiene or cultural habits among different countries. In some countries, the level of awareness of the mode of transmission of toxocariasis was high and a better prevention program was in place. Religious practices may influence the findings, for example in Jordan, where the majority of its population is Muslim, contact with dog, is prohibited and is against their religion rules so that it may be the reason that prevalence of this disease is lower. The authors believe that the prevalence of toxocariasis varies depending on climatic conditions and the mean age of population can affect the results of seropositivity.

Different prevalence of toxocariasis was reported in previous studies in Iran. A study in Tabriz in a group of 558 between 2 to 20 years of age showed the prevalence of 29.03% out of which 94 with contact and 68 without cat or dog (8). These results are in agreement with the present study. Multiple studies in different

parts of Iran reported 2%-25% seropositivity among children of various age (9-12).

In Trinidad and Mexico, also there is a significant relation between having dogs and toxocariasis (13, 14). In Serilanka keeping dogs and cats was an important risk factor for toxocariasis in children (15). In Mashhad, Iran, the seroprevalence of *Toxocara* antibodies in patients with hyper-eosinophilia was 22.5% versus 1% in control group. These results were in accordance of present paper in both case and control groups (16). There were some case reports of visceral larva migrans in Iran (17).

In present research, there was no relation between gender and the seroprevalence of toxocariasis. The seropositivity in male subjects was 52.7% and 47.3% in female subjects, which was in agreement with other studies in Iran (8, 9, 11).

The rate of cat and dog infection is also of significance. Emamapour et al. in Mashhad found the infection rate of 20% in stray dogs (18). In domestic dogs in Tehran the rate was 19.2% while in stray dogs and herding dogs was 33% and 46% respectively (19, 20). Berenji et al. reported the prevalence of *Toxocara* spp. ova in Mashhad Parks as 9.2% (21).

According to these results keeping cats or dogs, increases the risk of getting toxocariasis.

Conclusion

For the first time, we found the seroprevalence of toxocariasis in pet owners in Mashhad, Iran as 20.43%. Cats and dogs can be a potential source of infection for their owners, as our study showed the significant difference between seroprevalence of *Toxocara* among pet owners and control group. Educational measures, in particular for the pet owners are essential for preventing environmental contamination with *Toxocara* eggs.

Acknowledgments

The authors greatly acknowledge the Research Council of Mashhad University of Medical Sciences (MUMS), Mashhad, Iran, for

their financial grant. The results presented in this work have been taken from Ali Pouryou-sef thesis, with the ID number “502.” The authors declare that there is no conflict of interests.

References

- Garcia LS, Bruckner DA. Diagnostic medical parasitology. American Society for Microbiology (ASM); 1997. ISBN 1555811167.
- Fallah M. *Toxocara canis*: infection of stray dogs and visceral larva migrans risk in Hamedan. J Hamedan Uni Med Sci. 1995; 2(2):18–22.
- Bundy DA, Thompson DE, Robertso BD, Cooper ES. Age-relationships of *Toxocara canis* seropositivity and geohelminth infection prevalence in two communities in St. Lucia, West Indies. Trop Med Parasitol. 1987; 38(4):309-12.
- Moreira –silva SF, Leao ME, Mendonca HF, Pereira FE. Prevalence of anti-*Toxocara* antibodies in a random sample of patient at children’s hospital in Vitória, Espírito Santo, Brazil. Rev inst med trop Sao Paulo. 1998 ;40(4):259-261.
- Worley G, Green JA, Frothingham TE et al. *Toxocara canis* infection: clinical and epidemiological associations with seropositivity in kindergarten children. J Infect Dis. 1984; 149(4): 591-597.
- Conde Garcia L, Muro Alvarez A, Simon Martin F. Epidemiological studies on toxocariasis and visceral larva migrans in a zone of western Spain. Ann Trop Med Parasitol. 1989; 83 (6): 615-20.
- Abo-shehada MN, Sharif L, el-SukhonSN, Abuharfeil N, Atmeh RF. Seroprevalence of *Toxocara canis* antibodies in humans in northern Jordan. J Helminthol. 1992; 66(1): 75-8.
- Fallah E, Mahami-Oskouei M, Safaiyan A, Mirsamadi N, Hamzavi F, Mahami-Oskouei L. The effect of keeping pet dogs and cats on toxocariasis. Yafteh. 2012; 13 (4):65-71.
- Sadjjadi SM, Khosravi M, Mehrabani D, et al. Seroprevalence of *Toxocara* infection in School children in Shiraz, Southern Iran. J Trop Pediatr. 2000; 46(6):327-30.
- Fallah M, Azimi A, Taherkhani H. Seroprevalence of toxocariasis in children aged 1to 9 years in western Islamic Republic of Iran. East Mediterr Health J. 2007; 13(5):1073-1077.
- Akhlaghi L, Ourmazdi H, Sarafnia A, Vaziri S, Jadidian K, Leghah Z. An investigation on the toxocariasis seroprevalance in children (2-12 years old) from Mahidasht area of Kermanshah province (2003-2004). Razi J Med Sci. 2006;13(52): 41-48 .
- Nurian A, Amiri M. Seroprevalence of toxocariasis in children 2 to 15 years who were referred to health centers and hospitals in Zanjan province. Med J Social. 2009; 8:131-134.
- Núñez CR, Mendoza Martínez GD, Arteaga SY, Martha PM, Patricia BM, Ninfa RD. Prevalence and Risk Factors Associated with *Toxocara canis* Infection in Children in the metropolitan area of Mexico City. J Helminthol. 2010;54(3):32-6.
- Baboolal S, Rawlins SC. Seroprevalence of toxocariasis in schoolchildren in Trinidad. Trans R Soc Trop Med Hyg. 2002; 96(2):139-43.
- Iddawela DR, Kumarasiri PV, de Wijesundera MS. A seroepidemiological study of toxocariasis is and risk factors for infection in children in Srilanka. Southeast Asian J Trop Med Public Health. 2003; 34(1): 7-15.
- Berenji F, Haghani M, Fata A, Mahmoudi M, Salehi M. Serological study of toxocariasis in patients with hypereosinophilia referred to educational hospitals of Mashhad University of Medical Sciences. Medical Journal of Mashhad University of Medical Sciences, 2015, 58(1):26-31.
- Rokni MB, Massoud J, Moulavi GH. Report of 10 cases of visceral larva migrans in Iran. Iran J Public Health. 2000, 29(1-4):61-66.
- Emamapour SA, Borji H, Nagibi A. An epidemiological survey on intestinal helminths of stray dogs in Mashhad, Northeast of Iran. J Parasit Dis. 2015; 39(2):266-271.
- Mirzayans A, Eslami H, Anwar M, Sanjar M. Gastrointestinal parasite of dogs in Iran. Trop Anim Health Prod. 1972; 4(1): 58-60.
- Mohebbali M. Parasitism of ownership dogs and public health implications in Iran. Bull Soc Pathol Exot. 1988; 81:94-9.
- Berenji F, Movahedi Roudi A, Fata A et al. Soil Contamination with *Toxocara* Spp. Eggs in Public Parks of Mashhad and Khaf, North East of Iran. Iran J Parasitol. 2015,10(2):286-289.