

PREVALENCE OF *TOXOPLASMA GONDII* ANTIBODIES IN CATS IN URMIA, NORTHWEST OF IRAN

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ABSTRACT

Toxoplasma gondii is a zoonotic protozoan parasite found worldwide and cause a disease known as toxoplasmosis. Cats are the natural reservoir of *Toxoplasma gondii* and excrete the resistant oocysts in the environment. Toxoplasmosis is an important disease in neonates and immune disorder patients. In the present study, the presence of *T. gondii* antibodies was examined in 130 stray and household referred cats to private animal clinics and veterinarian hospital in Urmia, center of west Azerbaijan province, from October-2008 to January 2010 by modified agglutination test (MAT). *T. gondii* antibodies were detected in 46 (35.3%) cats. The antibody titers in positive animals ranged from 1:20-1:1280. No statistically significant difference was observed between male & female cats and there was relationship between seropositivity and age. Only 3 cats were shedding *T.gondii*-like size oocysts that they were seronegative with MAT. This study suggested that *T.gondii* was widespread in stray and household cats in Urmia, therefore, it is essential to control the cats and use an integrated sanitary approach.

Keywords *Toxoplasma gondii*. Cat. MAT. Urmia. Iran.

INTRODUCTION

Toxoplasmosis caused by *toxoplasma gondii*, is an endemic parasitic zoonosis that occur throughout the world. It can infect almost all the warm blooded animals, including human beings (Dubey, 2004). The disease is of economic importance with regard to animal production, and it has become a public health concern since it leads to abortions and neonatal complications in humans. The definitive host for *T. gondii* is cat and the intermediate hosts are mammals and birds.

The infection is acquired mainly by eating food or drinking water contaminated with oocysts or tissue cysts of *T. gondii* (Montoya and Liesenfeld, 2004). Cats excrete around 20 million oocysts between 3 and 18 days after infection (Dabritz *et al.*, 2007). Serological surveys for the detection of anti-*T. gondii* antibodies in cats was used to assess the degree of environmental contamination (Miro *et al.*, 2004). There is even evidence of unexpected oocyst shedding by cats fed *T. gondii* tachyzoites (Dubey, 2005).

Urmia, situated in north-west of Iran, There were large number of stray cats roaming the streets and public areas with free feeding. Cats have lived in association with humans in this region and it is important in *Toxoplasma* infection. The modified agglutination test (MAT) has proved to be the most sensitive and specific assay for the serological diagnosis of feline toxoplasmosis (Dubey and Thulliez, 1989).

The present study was designed to determine the seroprevalence of *T.gondii* infection in domestic and stray cats in Urmia (northwest of Iran), by using the MAT.

MATERIALS AND METHODS

A total of 130 cats (100 household and 30 stray) of various ages and of both sexes that referred to private animal clinics and veterinary hospital of Urmia, center of west Azerbaijan province, from October 2008 to January 2010 for various ailments. Their blood samples were collected from Jugular veins. These blood samples were left for about an hour for blood clotting to occur. The clotted blood was then separated with a fine loop immediately and was centrifuged at 3500 rpm for 10 minutes. The separated sera were stored at -20°C until assayed.

Rectal contents of 130 cats were collected and were subjected to a fecal flotation technique. Feces (1-2 g) of each animal were emulsified in sucrose solution (sp. gr.1.203), filtered through gauze, and centrifuged in a 15 ml tube at 400g for 10 minutes. A drop of the float from the meniscus was examined microscopically at 400× magnification for the presence of *T. gondii*-like oocysts (Pena *et al.*, 2006).

Sera from cats were diluted two-fold starting at 1:20 to 1280 and assayed for *T. gondii* antibodies with the modified agglutination test (MAT) as described by Dubey and Desmonts (1987) and Desmont and

Remington (1980). The χ^2 test was used to determine cat seropositivity *T. gondii* association with sex and age of the host.

RESULTS AND DISCUSSION

The overall seroprevalence of *Toxoplasma gondii* in cats was 35.38 percent. One of the cats tested was seropositive at the screening dilution of 1:20, 9 at 1:40 (6.9%), 11 at 1:80 (8.4%), 11 at 1:160, (8.4%) 7 at 1:320 (5.3%) 6 at 1: 640 (4.6%) and 1 at 1:1280 (0.76%). Of the cats screened, 32 (42.1%) male and 14 (25.9%) female had *toxoplasma gondii* antibodies and statistical difference was observed. The seropositivity rate of *toxoplasma gondii* in young and adult cats showed that there is a relationship between seropositivity and age (P= 0.001). The seropositivity rate of *toxoplasma gondii* increased with age. In nutshell, the stray cats were more prone to infection than indoors. The results have confirmed that stray cats had tendency to have higher seroprevalance than cats kept indoor. This may be due to the reason that stray cats could have licked up the infection through catching of wild rodents, birds, reptiles, raw food scraps etc as reported by Dubey (2004). In the present study some indoor cats were affected. This may be due to eating raw contaminated meat containing tissue cyst. The seroprevalence of *T.gondii* in cats varied and depending on living places, age, method of testing and geographic location (Dubey, 2005). Food source of these animals is important in the transmission and for the completion off the life cycle and cats are definitive host, play a pivotal role in the epidemiology of toxoplasmosis (Dubey *et al.*, 2006).

The MAT method was chosen for this study, because of its high specificity and sensitivity, as well as its simple application and usage with no cross-reactivity with other infective organism of cat (Dubey *et al.*, 1993), also this test is used to get comparative serological data on naturally infected cats (Dubey *et al.*, 2004, Pena *et al.*, 2006).

In this study the prevalence of *T. gondii* infection in referred cats to private veterinary clinics in Urmia- northwest of Iran- is 35.38%. Other studies from Iran showed 40% seropositivity in north of Iran and 86% in center of Iran -Kashan- from stray and household cats (Sharif *et al.*, 2009 , Hooshyar *et al.*, 2007). Also world wide toxoplasma prevalence ranges in cats between 5.4% to 90 % (Maruyana *et al.*, 2003, Hadadzade *et al.*, 2006). However, the prevalence of IgG antibody of *T. gondii* is comparable to other studies from Iran and other regions of the world, this may be due to difference in time and season of sampling and differences of sensitivities and specificities of used tests.

Serological surveys are good indicators of the occurrences of *T. gondii* infection in cats because seropositive cats probably shed oocysts (Dubey and Thulliez 1989). In this study, oocysts of *T.gondii* were found in excretion of three cats, that two cats was juvenile, possibly because the period of oocysts shedding is short, there is no chance to find them in excretion of other cats (Sharif *et al.*, 2009). Having acceptable antibody titers means shedding period of oocysts in cats has been limited, in that case MAT was negative in three positive oocysts shedding cats (Sumner and Ackland 1999).

From the data analyzed, it is epilogued that although infection to this zoonotic agent is common, clinical disease is unusual except in very young or immuno compromised individuals. The chances of contracting toxoplasma through ingestion of oocysts is very high as the percentage of cats in the recent infective stage is very high. Keeping in view these findings, it is recommended that pets should be confined inside to prevent hunting and should be fed only dry canned or cooked food. Litter box should be changed daily, preferably not by pregnant women. Used pets litter should not be disposed off in yard or garden. Human should eat only well cooked meat products. Hands should be washed thoroughly after handling meat, vegetables and cats and also after gardening.

Table 1. Prevalence of *T. gondii* antibody and the MAT titers in stray and household cats in Urmia Iran

Sex	No. examined	No. (%) positive	No. of samples showing the antibody titers at						
			1:20	1:40	1:80	1:160	1:320	1:640	1:1280
Male	76	32(42.1)	0	6	8	9	4	4	1
Female	54	14(25.9)	1	3	3	2	3	2	0
Total (%)	130	46(35.38)	1(0.76)	9 (6.9)	11 (8.4)	11 (8.4)	7 (5.3)	6 (4.6)	1 (0.76)

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