SEROPREVALENCE OF *Toxoplasma gondii* IN STRAY CATS (*Felis domesticus*) IN KHARTOUM AREA

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المستخلص

اجريت هذه الدراسة للكشف عن الأجسام المضادة لتوكسوبلازما جونديايي في 50 من القطط الضالة في (محلية الخرطوم)، وذلك باستخدام اختبار تراص اللاتكس بإستعمال الشرائح. اظهرت النتائج أن12عينة كانت إيجابية لتوكسوبلاما جونديايي وتمثل24%.كان معدل الانتشار المصلي للحالات الإيجابية في الإناث8من أصل 33 من القطط (24.2%), في حين تم الكشف على 4حالات إيجابية المصل من اصل 17من الذكور(23.5%). من جهة اخرى كان معدل الانتشار المصلي من الحالات الإيجابية في البالغين 7 من أصل 29 من القطط (24.1%), في حين تم الكشف على 5 حالات إيجابية من اصل 21قطط صغيرة (23.8%).اوضحت الدراسة ان لا فرق ملحوظ في الإنتشارالمصلي لتوكسوبلازما جونديايي بين الجنسين من القطط البالغة والصغيرة

Abstract

This work was conducted to detect*Toxoplasma gondii* antibodies in 50 stray cats inKhartoum, using the Latex Agglutination Test LAT (slide usage).The result showed that 12 samples,representing 24% were positive to *Toxoplasma gondii* antibodies.The seroprevalence of the positive cases in the females was 8 out of the 33 cats(24.2%), while 4 cases were seropositive out of the 17males(23.5%).The seroprevalence of the positive cases in the adult cats was **7** out of the 29(24.1%), while 5 cases were positive out of the 21 juvenile and kitten examined(23.8%).The study indicated no noticeable difference in prevalence between the two sexes and between adults and juvenile cats.

Introduction

T. gondii is an obligate intracellular apicomplexan protozoan parasite of worldwide distribution. It has a heteroxenous life cycle with felidae as definitive host and warm-blooded animals including humans as intermediate hosts (Soulsby,1986). *T. gondii* infection is prevalent and it is a major zoonotic agent in humans which affect up to one-third of the world population (Sharif et. al, 2009). The infection could become severe and even fatal especially in immunocompromised individuals and in neonates when contracted transplacentally. People can become infected with *T. gondii* by ingesting raw or undercooked meat containing tissue cysts or by ingesting cat-shed oocysts via contaminated food, water and soil .

Animals toxoplasmosis causes heavy economic losses to sheep industry worldwide (Dubey and Beattie, 1988; Buxton et al., 2007).It has regularly been indicated as one of the major causes of reproductive disorders in ovine such as abortions, stillbirth, or weak neonates that result in death in several countries. Also other animals such as horses, birds, pets, captive zoo animals and marine animals can be infected by *T. gondii*(Duby.2010)

Felids are the key animal species in the life cycle of this parasite and play an important role in the epidemiology of toxoplasmosis because they are the hosts that can excrete the environmentally- resistant stage(oocysts). *T. gondii* infection in cats is both of epidemiological and clinical significance. There has been no published report on investigation of the disease in cats in Khartoum state, nor a nation-wide survey on the prevalence of *T. gondii* in cats in Sudan.

This study aims to investigate the seroprevalence of *T.gondii* in stray cats in Khartoum state using Toxo-Latex serodiagnostic test.

Materials and Methods

This study was carried out in Khartoum Locality between May and July 2012. Fifty stay cats, composed of 33females and 17 males were collected, these were 29 adults (1-3 kg) and 21 juveniles(1kg or less) . 3.0 ml of blood were collected from cephalic vein, or intracardiac form of each cat using 5ml disposable syringes and plain vacutainer tubes. Some cats were aggressive and for that they were anesthetized using xylazine 2% at a dose of 0.5 ml subcutaneously, blood was allowed to clot over night at room temperature. The collected serum samples were tested for the presence of *Toxoplasma* antibodies by latex agglutination test **(LAT**), (Linear chemical. S. L., Spain), developed for direct detection of anti-*Toxoplasma* antibodies in serum.Toxo-Latex test is a rapid slide agglutination procedure. The assay was performed by testing a suspension of latex particles coated with antigenic extract of *T. gondii* against serum samples. The presence or absence of a visible agglutination indicates the presence or absence of anti-*Toxoplasma* antibodies in the sample tested(Fig. 1)

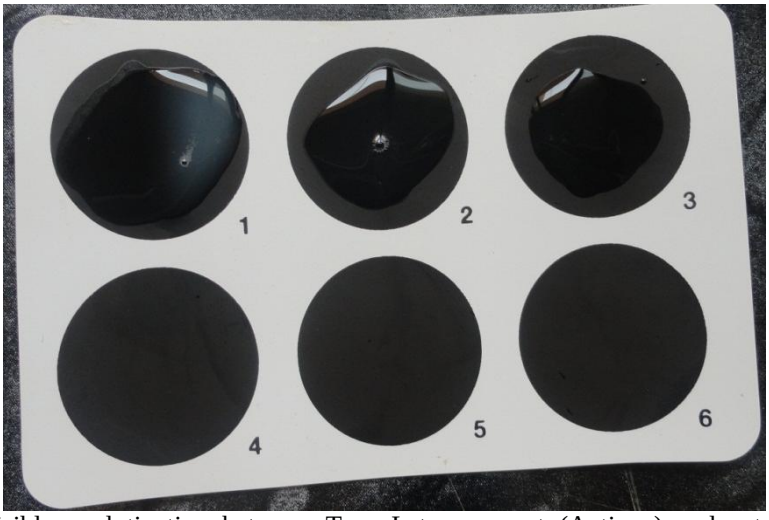

Figure 1: Visible agglutination between Toxo-Latex reagent (Antigen) and cat serum, (Positive sample)

1. Cat serum with Toxo-Latex reagent. (Positive sample), presence of visible agglutination.
2. Toxo-Latex reagent with control Positive (+ve).
3. Toxo-Latex reagent with control Negative (-ve).

Results

As shown in Table 1 the antibodies to *T. gondii* were found in 12 cases of the 50 examined cats sera when tested by latex agglutination test (LAT) representing 24%.The seroprevalence of the positive cases in the females was 8 out of the 33 cats examined (24.2%),while 4 cases were found seropositive out of the 17 males examined (23.5%)Table 2.Table 3 show seroprevalence of the positive cases which were**7** out of the 29 cats(24.1%)in the adults, while5 cases were found positive out of the 21 examined juvenile (23.8%).These results indicated no noticeable difference in prevalence between the two sexes, nor between adults and juvenile cats.

Table 1: Seroprevalence of *Toxoplasma gondii* in Khartoum Locality.

No. Samples	No. Positive	Prevalence %
50	12	24%

Table2: Seroprevalence of *Toxoplasma gondii* in cats of different sex groups.

Sex	No. Samples	No. Positive	Prevalence %
Female	33	8	24.2%
Male	17	4	23.5%
Total	50	12	24%

Table3: Seroprevalence of *Toxoplasma gondii* in cats of different age groups.

Age group	No. Samples	No. Positive	Prevalence %
Adults	29	7	24.1%
Juvenile and kittens	21	5	23.8%

Discussion

There has been no published work to investigate the disease in cats in Khartoum state, nor a nation-wide survey for the prevalence of *T. gondii* in the Sudan. Results of this study indicated the seroprevalence of *T. gondii*in stray cats in Khartoum locality 24%.Compared to other animals in Sudan(Manal2003) using latex agglutination test detected antibodies to *T. gondii* in camels at six locations in Sudan and she found the highest prevalence rate of 68% was in El Gedarif area. Sharif et. al., (2009) found that the prevalence of *T.gondii* IgG antibodies was16% in stray cats in Sari, Northern Iran using latex agglutination.This appeared as diagnostically significant antibody titres in five urban areas . Higher rates were shown by Adriana et. al. (2011) who found 47% of the cats in Romania positive for *T.gondii* antibodies by commercial ELISA. Rates of 39% and32% to 50% were detected by Summer and Ackland (1999) in Australia and Tenter et. al., (1994) in Germany respectively.

The present data indicated no noticeable differences between the prevalence rates in male and female cats or between adults and juvenile. Similar findings were obtained by Mucker (2006) who found that in 14 Pennsylvania counties no significance differences in antibody prevalence for *T. gondii* between males (83%) and females (88%) or between adults (83%) and juveniles (77%), using the modified agglutination test, and also by Wuet. et al., (2011) in China who showed no relationship between seroprevalence and the sex. The results obtained

differ from that by Kim et al.,(2008) who found that the overall infection rate of female stray cats (29.2%) was higher than that of male cats (24.0%). Their study suggested *T. gondii* was widespread in the stray cat population of Gyeonggi-do, Korea. In another study conducted in Korea, positive rate in male stray cats was slightly higher than that of female stray cats, (Lee et. al., 2010).Vollairet. al,.(2005) studies showed that males were more likely than females to be seropositive to *T. gondii* antibodies.

Other pathogens seem to be a risk factor for active *Toxoplasmosis* in infected cats; because they suppress the immunity. In a study in South Eastern Iran by Akhtardanesh et. al., (2010) showed that old adults stray cats are more likely to be seropositive than juveniles for feline immunodeficiency virus (FIV), feline leukemia virus (FeLV), and *T. gondii*. FIV and FeLV are endemic in Iran and are associated with immunosuppression that may be a risk factor for active *Toxoplasmosis* in infected cats.

In conclusion, the results of this study provide information on the prevalence of *T. gondii* infection among stray cats in Khartoum Locality which can be used to estimate the spreading of this agent and allow timely intervention for the control of infection.

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