

SEROPREVALENCE OF *TOXOPLASMA GONDII* IN CANINES

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ABSTRACT

A serological survey for Toxoplasmosis in dogs (n = 305) was conducted using a Latex agglutination test (LAT). The overall seroprevalence of *Toxoplasma gondii* in canines was 46.88 per cent. A total of 59 dogs were found seropositive by LAT at 1:256 titre giving an evidence of presence of infection. The seroprevalence of toxoplasmosis was inversely related to the age i.e. 52 % at 6 months and 32.5 % at 4 years and above. Non significant difference was observed in seropositivity between males (40%) and females (53.12) % and between exotic (46.15%) and local (57.14%) breeds. However significant variation in seropositivity was found between stray dogs (83.33%) and pet dogs (37.95 %) and between dogs having close contact with cats (55%) and with out cats (24.34%). Out of the tested bitches 60% were seropositive, mostly at 1:16 titre indicating residual immunity.

Key words: Ananine, Latex agglutination test, seroprevalence, seropositive, toxoplasmosis, AIDS

INTRODUCTION

Infection by the protozoan parasite, *T. gondii*, is wide spread in humans and many other species of warm blooded animals (Anganga *et al.*, 1981). Although the course of disease is generally begun, it can cause significant morbidity and mortality in the developing fetus and in immunocompromised individuals, including humans with Acquired immunodeficiency syndrome-AIDS. (Burney, 1996). Toxoplasmosis is a major zoonotic disease and is a major cause of abortion; the infection does not usually cause clinical symptoms. The organism is cosmopolitan in distribution. It is estimated that over one third of the world population have contracted the infection (Kean, 1972).

After ingestion by any host the organism escape from its cyst and penetrate intestinal wall and emerge either as tachyzoites or sporozoites. In an immunocompetent individual, the organism will encyst itself in the brain, muscles and eyes as a bradyzoites (Burney, 1996). However, if the host becomes immunosuppressed, the organism may reactivate and cause disease. Toxoplasmosis causes respiratory, alimentary and neurological disturbance in canines in conjunction with viral infection and stress factors. Polymyositis-polyradiculitis has been reported due to toxoplasmosis (Suter *et al.*, 1984).

No much local informations on canine toxoplasmosis are available except Ahmed *et al.* (2001) conducted a serological survey of toxoplasmosis in dogs but sample size was very small. The present study was designed to record the seroprevalence of toxoplasmosis in canines having reasonable number.

MATERIALS AND METHODS

Collection of samples: A total of 305 (245 pet and 60 stray dogs) serum samples were collected from dog hospital University of Veterinary and Animal Sciences, Lahore as well as from stray dogs. History of the pet dogs (245) was noted especially with regards to their access to out side. The age of stray dogs was estimated on the basis of their general appearance, but the age of pet dogs was inquired from the owners. All other relevant information was recorded on performa regularly.

Under aseptic measures, 6-8 ml of blood was drawn by vein puncture with the help of disposable syringes and was transferred to a screw capped sterile clean test tubes slowly to avoid haemolysis.

Separation of serum: All the blood samples were labeled with the species, outdoor registered number and the date of collection. The samples were left for about an hour for blood clotting to occur and were further processed as described by Samaha *et al.* (1993). Repeated freezing and thawing was avoided.

Analysis of serum samples: All the serum samples were analyzed for specific IgG anti-Toxoplasma Antibodies using Latex Agglutination Test (LAT). Commercially available *Toxoplasma Latex* test kit was used manufactured by Quimica Clinica Apelicada, SA Amosta, Spain.

Interpretation of results: The following interpretation were made

- a) Negative 1:16 sera indicate absence of immunity
- b) Positive titers from 1:32 to 1:128 are due to acquired or evolving immunity.

- c) Positive titer equal or higher than 1:256 suggest possible recent contact.

It was recommended that a new determination should be done three weeks later in case “d” and “c”, then the titer rise of at least 3 dilutions suggest a positive diagnosis.

Seroprevalence: The data, thus obtained were subjected to calculate the percentage seropositivity of toxoplasmosis in dogs.

RESULTS AND DISCUSSION

Seroprevalence of *Toxoplasma gondii*: The overall prevalence of anti *Toxoplasma* antibodies in canines was recorded as 46.88 percent (Table 1). LAT might give false positive results due to interfering factors, rheumatoid factors and IgG class antibodies, so it is not a gold standard test for the concrete diagnosis of toxoplasmosis.

Many workers from different parts of the world have recorded the prevalence of anti *Toxoplasma* antibodies by using various diagnostic techniques i.e. Pan *et al.* (1997) recorded 46.95% in 5 dogs from China, Bernstein *et al.* (1999) reported an overall prevalence of 44.6%, but in stray dogs prevalence was 39.1%. Ogunrinade (1978) 58 % in 40 dogs from Nigeria. These findings are in agreement with the present study. However, lower prevalence 35.1% was recorded by Silva *et al.* (1997) in 40 dogs. The variation in infection rate may be due to different environmental and managerial conditions in various parts of the World. It is higher in warm moist areas of the World than in cold or hot dry area, a feature conducive to the survival of oocysts shed by the cat family. The results confirmed that the rate of seropositivity among the canines was higher 83.33 % almost double in stray dogs regardless of their age and sex as compared to pet dogs (3.95 %). This may be due to the fact that the stray dogs eat dead birds and rodents and contract infection. On the other hand the pet dogs enjoy good hygienic conditions and balanced food.

Age wise prevalence indicated that the puppies below one year age were more susceptible 62.5 % than adults (32 %) (Table 2), similar results were also reported by Frenkel (1973) and Fan *et al.* (1998). The present study further supports the observations of Ogunrinade (1978) who found 52.6 % of dogs below one year seropositive.

The seropositive rate in females was 53.12 % (85 out of total 160) compared to that in males (40 %) Table 2. therefore, no significant difference was observed between the proportion of seropositive male and female dogs. This agrees with the findings of Ogunrinade (1978). Anganga *et al.* (1981) also observed that the epidemiology of the disease does not appear to put either

of the sex at a disadvantage as far as acquisition of infection is concerned.

Considering the breed titer relationship, local breeds were 57.14 % seropositive, where as exotic breeds were found to be 46.15 % seropositive (Table 3). Ogunrinade (1978) reported different results than present study.

The seropositivity rate was found to be 50% in the dogs which have close association with cats. On contrary, it decreased significantly to 24.34% on the dogs, where owners do not let their dogs to have contact with cats (Table 4). This may be due to the reason that dogs living in association with cats eat food contaminated with oocysts of *T. gondii* shed by cats.

From the 80 aborted bitches the 60 % were found to be seropositive, majority (n =27) of which gave anti-*Toxoplasma* anti bodies titer of 1: 16 which indicated residual or non specific immunity. Whereas 37.5% seropositivity was found in the cases of normal parturition (Table 5). The study revealed a significant difference between the proportion of seropositivity in the cases of abortion and normal parturition in bitches. The results are similar to that of Okoh *et al.* (1981).

It is epilogued that the Seroprevalence of *T. gondii* in dogs is inversely related to age and that the sex and breed difference of seropositive is negligible. However, the percentage seropositivity was found higher in roaming dogs and those having close contact with cats.

Table I: Prevalence of anti-toxoplasma antibodies in stray & pet dogs by LAT

| Dog Habitats | No. Tested | No. of dogs antibody Titers (Reciprocal) | | | Sero-positive No. | Sero-positive % |
|--------------|------------|--|-----------|-----------|-------------------|-----------------|
| | | 16 | 128 | 256 | | |
| Stray dogs | 60 | 10 | 20 | 20 | 50 | 83.33 |
| Pet dogs | 245 | 23 | 31 | 39 | 93 | 37.95 |
| Total | 305 | 33 | 51 | 59 | 143 | 46.88 |

Table: II Distribution of anti-toxoplasma antibodies in dogs in relation to their age and sex using LAT

| Age groups | No. Tested | No. of dogs antibody Titers (reciprocal) | | | Sero-positive No. | Sero-positive % |
|---------------------|------------|--|-----------|-----------|-------------------|-----------------|
| | | 16 | 128 | 256 | | |
| 7 months and less | 125 | 16 | 20 | 29 | 65 | 52.0 |
| 7 months-1 year | 80 | 14 | 16 | 20 | 50 | 62.50 |
| 2-3 years | 60 | 2 | 8 | 5 | 15 | 25.0 |
| 4-5 years and above | 40 | 1 | 7 | 5 | 13 | 32.50 |
| Total | 305 | 33 | 51 | 59 | 143 | 46.88 |
| Sex | | | | | | |
| Females | 160 | 23 | 28 | 34 | 85 | 53.12 |
| Males | 145 | 10 | 23 | 25 | 58 | 40.00 |
| Total | 305 | 33 | 51 | 59 | 143 | 46.88 |

Table III: Seroprevalence of *Toxoplasma gondii* in dogs in relation to their breed with LAT

| Breed | No. tested | No. of dogs antibody Titters (reciprocal) | | | Sero-positive No. | Sero-positive % |
|--------------|------------|---|-----------|-----------|-------------------|-----------------|
| | | 16 | 128 | 256 | | |
| | | Local | 125 | 13 | | |
| Exotic | 180 | 20 | 25 | 26 | 90 | 46.15 |
| Total | 305 | 33 | 51 | 59 | 143 | 46.88 |

Table IIII: Seroprevalence of *Toxoplasma gondii* in dogs in relation to their association with cats using LAT.

| Association with Cat | No. Tested | No. of dogs antibody Titters (reciprocal) | | | Sero-positive No. | Sero-positive % |
|----------------------|------------|---|-----------|-----------|-------------------|-----------------|
| | | 16 | 128 | 256 | | |
| | | Contact | 130 | 18 | | |
| No contact | 115 | 5 | 5 | 18 | 28 | 24.34 |
| Total | 245 | 23 | 31 | 39 | 93 | 37.95 |

Table IV: Relationship between antitoxoplasma antibodies & mode of delivery in bitches using LAT.

| Mode of delivery | No. Tested | No. bitches antibodies titres(reciprocal) | | | Sero-positive No. | Sero-positive % |
|------------------|------------|---|-----------|-----------|-------------------|-----------------|
| | | 16 | 128 | 256 | | |
| | | Abortion | 80 | 27 | | |
| Normal | 40 | 8 | 4 | 3 | 15 | 37.5 |
| Total | 120 | 35 | 13 | 15 | 63 | 52.5 |

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