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Serological and Histopathological study of Toxoplasmosis among Women at child bearing age and Animals in Diyala province

A Thesis

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1. Introduction

Toxoplasmosis is the result of infection by *Toxoplasma gondii*, is an obligate intracellular protozoan pathogenic parasite that infects humans and a broad spectrum of warm-blooded vertebrates (Dubey, 2010) and a wide range of mammalians and birds (Smith and Reduck, 2000).

Infections in pregnant women can cause serious health problems in the fetus if the parasites are transmitted. Although congenital Toxoplasmosis is not a nationally reportable disease, extrapolation from regional studies indicates that an infection with *T. gondii* during early pregnancy may frequently lead to many intrauterine malformations (Montoya and Remington, 2000).

Toxoplasma gondii is capable of causing severe disease in animals other than humans. It is one of the major causes of abortion in sheep and goats in many countries. It is important to diagnose Toxoplasmic abortion to distinguish it from other causes of abortion, because congenital transmission of *T. gondii* occurs only during the initial infection of the mother and the animal is safe for breeding thereafter. Cats, dogs, and many other pets can die of pneumonia, hepatitis, and encephalitis due to Toxoplasmosis (Dubey, 1996b).

Toxoplasmosis was reported in many parts of Iraq, in different animals, in sheep and goats (Mcleod and Remington, 2000), in cat (Potasman *et al*., 1986), in rodent (Bakir, 2002) and in cattle (Singh, 2003).

Serodiagnosis for antibody detection has been reported as an adequate tool to diagnose Toxoplasma infection in both human and

animals, such as latex agglutination test (LAT) (Holliman, 1995), and Enzyme Linked Immunosorbent Assay (ELISA) (Yacoub *et al*., 2006).

The different distribution of antibody titers among animal spp. which was recorded by the researchers may be ascribed to variance in periods exposer of different animals to the source of infection (Abd-AL Hameed, 2007).

The diagnosis of (*Toxoplasma gondii*) could be made by detecting the parasite in the tissue of the host through biopsy or necropsy. Infection also can be rapidly diagnosed through using impression smears of lesions on glass slides and stain with Giemsa stain (Remingtone and Desmonts, l990). In most cases, the diagnosis will be made by histological examination (Dubey, 2002). Diagnosis of Toxoplasmosis infection is seldom made by the recovery of the parasite; usually it is done by serological tests (Markell *et al*., 1999).

In Diyala, our knowledge about Toxoplasma prevalence among human and animals, either in latent or clinical form is scanty.

1.2. Aims:

1- Determining the sero-prevalence of Toxoplasma infection through examination of Anti Toxoplasma antibodies in sera of women and some animals including ewes, doe goats, rabbits, pigeons and stray cats in Diyala province.

2- Comparing the sensitivity of the common tests used in the diagnosis of Toxoplasma infections, LAT, ELISA and Cassette test.

3- Comparing the results of serological examinations with histopathological examinations of samples from liver and brain.

Abstract

Blood samples from 454 marriage women at child bearing age suffered from pregnancy troubles, 120 ewes and 79 does goat in flocks suffered from abortion, and 28 rabbits, 28 pigeons and 20 stray cats were collected randomly from different places of Baquba city and the cities surrounding of Baquba (Buhriz, Al Muqdadia, Khalis, Kanaan, Al Khan, Khanakin, Kernabat, Qarataba), Diyala province, Iraq, during the period from 1st July 2016 to 30th April 2017.

Latex agglutination test (LAT), Enzyme Linked Immunosorbent Assay (ELISA) and Cassette test, were depended to evaluate the presence of anti-Toxoplasma IgM and IgG antibodies, in addition to liver and brain samples which were obtained from cats, rabbits and pigeons and stained with Eosin - Hematoxylin stain for histopathological examinations, while the smears from the same organs were stained with Giemsa – stain, in searching for any of the three infective stages of the parasite (tissue oocyst, tachyzoites and bradyzoites).

The results showed differences in seropositivity to anti-Toxoplasmosis antibodies between, LAT [172/343 (50.15%)], ELISA [96/494 (19.43%)], and Cassette test [52/123 (42.28%)].

The results showed that the percentage of Toxoplasmosis infection by LAT was [57/68 (83.82%)] in women, [30/120 (25%)] in ewes, [50/79 (63.29%)] in does goat, [10/20 (50%)] in cats [19/28 (67.86%)] in pigeons and [6/28 (21.43%)] in rabbits, while by ELISA [68/494 (13.77%)] in women, [8/494 (1.62%)] in ewes and [20/494 (4.05%)] in does goat. Meanwhile by Cassette test the percentage was (0/20 (0%) in women, [(0/10

(0%)] in cats, [24/33 (72.72%)] in ewes, [(16/22 (72.72%)] in does goat, [(8/20 (40%)] in rabbits and [4/18 (22.22%)] in pigeons.

The highest percentage of positive reactors were recorded by LAT in women (83.82%), ELISA in does goat (100%) and Cassette test in ewe (72.72%). The lowest percentage was recorded by LAT (21.43%) in rabbits, ELISA (14.98%) in women and by Cassette in women and cats (0%).

The antibody titers detected by LAT were ranged between 1/2 -1/256, and the highest number was in ewes, 1/2 [12/110 (10.91%)], in does goat 1/16 [18/110 (16.36%)], in cat 1/2 [2/110 (1.82%)], in rabbits 1/8 [5/110 (4.55%)] and pigeons 1/8 [2/110 (1.82)].

The histological and smears examinations of brain and liver samples showed that in cats [9/16 (56.25%)], [2/8 (25%)], rabbits [28/38 (73.68%)], [3/21 (14.29%)] and pigeons [4/18 (22.22%)], [8/25 (32%)] respectively were positive and detected either tachyzoites and/or bradyzoites.

In conclusion, the tests showed a variable percentage of the seropositive reaction to anti-Toxoplasma antibodies, as the highest percentage was given by LAT in women, ELISA in goats and Cassette test in ewes. In histological and smear examinations of brain and liver, the brain samples were given the highest number of findings the infective stages in cats and rabbits, while the liver was given the highest number in pigeon.

We can conclude that the depended serological test was showed a variable percentage of seropositive reaction to anti-Toxoplasma antibodies. The most cases submitted to the examination with the serological test were either carrier cases are suffered from chronic infection. The histopathological and smear examination of brain and liver can be considered as confirmative diagnosis to the serological test.