Seroprevalence of Toxoplasmosis in ewes in north Basrah province

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ABSTRACT

The present study were conducted to evaluate *Toxoplasma gondii* antibodies in local breed ewes in north Basrah province, using ELISA indirect test. Ninety tow serum samples were collected randomly from ewes with a different physiological status (22 pregnant, 30 non-pregnant, and 40 aborted), 1-8 years old. Results showed that 85.8% were positive for *T.gondii* ABs. The percentage in pregnant and non-pregnant ewes was 100% and in aborted ewes was 67.5%. High percentage of *T. gondii* antibodies in ewes were detected in (AL-Huwer,AL- Mzeraa, AL-Qurna, AL-Neaem , and AL-Dayr) 100**%**, whereas low percentage in Hoor Al-Saad was 40 %. Results were also indicated that high percentage of *T.gondii* antibodies was registered in ewes whom aborted in the last month of gestation 100%, and in ewes which aborted in 4^{th} and 3^{rd} month of gestation 77.8%, 45% respectively.

Moreover high percentage of *T. gondii* antibodies titer were detected in ewes aged 1-3 years old 100% in addition ewes of 5-8 years old and ewes of 3-5 years old were 86.7%, 77.5% respectively. The differences were statically significant.

In conclusion, the Toxoplasmosis was observed in studied north Basrah ewes, there by all other ewes in that places must be screened for the presence of Toxoplasmosis.

Keywords: Seroprevalence; Toxoplasmosis; ELISA

INTRODUCTION

Toxoplasmosis is a parasitic disease caused by the protozoan *Toxoplasma gondii*(1). The parasite infect most genera of warm-blooded intermediate hosts, including humans and sheep. The family Felidae (including domestic and feral cats) were the definitive hosts of *T. gondii*. Moreover cats are the primary source of infection to human hosts (2,3). The primary infection in pregnant sheep may result in placental and fetal infection lead to fetal death and resorption, abortion (in mid- gestation) or result in stillbirth (4).The placental cotyledons appear bright to dark red and speckled with white foci of necrosis 2-3 mm in diameter, however the intercotyledonary allanto-chorion appears normal(5). During acute infections, cats excrete unsporulated (non-infectious) oocysts in their feces, after several days to several weeks, depending on environmental conditions, the oocysts sporulate and become infectious, under favorable conditions (in warm, moist soil), oocysts can remain infectious for approximately 1 year. They do not survive well in cold climates and can be destroyed by heating (6). The protozoan had a complex life cycle consisting of three stages, tachyzoite (during the acute stage of infection), bradyzoite (during the latent infections), and sporozoite, this form of the parasite is found in oocysts (sexuale cycle), which are environmentally resistant (7).

In humans, the congenital toxoplasmosis causes abortion, mental retardation, blindness, or hydrocephalus in addition to congenital anomalies in children (8,9).

The present study were aimed to evaluated seroprevalence of *Toxoplasma gondii* antibodies in ewes in North Basrah, Basrah, Iraq.

MATERIALS AND METHODS

The study was conducted on 92 ewes (22 pregnant, 30 non-pregnant, and 40 aborted) in north Basrah province (AL-Huwer, Hoor Al-Saad ,AL-Mzeraa, AL-Qurna, AL-Neaem , and AL-Dayr) at the period from (October, 2014- January, 2015). Approximately 5-10 ml of blood sample from each animal, these samples used to get of serum samples which were latter used in the ELISA testing. The age, regions, presence and absence of abortion, and number of abortions were reviewed from each selected ewes. Using of Enzyme Linked Immunosorbent Assay (indirect ELISA) kit was performed on 92 serum samples according to the information of manufacturer (Life technologies^{TM}).

The prevalence for *T.gondii* was statistically analyzed by Chi-square test (10).

RESULTS

Table (1), show the percentage of *T. gondii* antibodies estimated in ewes with different physiological status, pregnant and non-pregnant 100%, and the percentage in the aborted ewes 67.5% and there was highly significant difference $P<0.01$between different animals.

Table (1) : sero-positive of *T.gondii* and percentage in ewes using indirect ELISA test

Physiological status of ewes	**Total**	**Sero-positive**	**Percentage**
Pregnant ewes	22	22	100%
Non-pregnant ewes	30	30	100%
Aborted ewes	40	27	67.5%
Total	92	79	85.8%

X^2= 19.681 P<0.01

The Present study include different regions in north Basrah province, highest percentage of *T. gondii* antibodies in ewes was seen in (AL-Huwer,AL- Mzeraa, AL-Qurna, AL-Neaem , and AL-Dair)100%, while low percentage in Hoor Al-Saad was 40 %, there was highly significant differences P<0.01% as shown in table (2).

Table (2) : sero-positive of *T. gondii* and percentage according to regions in north Basrah

Region	Total	Sero-positive	Percentage
Al-Huwer	18	18	100%
Hoor alsaad	22	9	40%
Al-Mzeraa	14	14	100%
AL-Qurna	10	10	100%
AL-Neaem	12	12	100%
AL-Dayr	16	16	100%
Total	92	79	85.86%

X^2=48.17 P<0.01

The Present study reveal that the sero-positive of *T. gondii* in different physiological status in each region in north Basrah. Results show that all animal in different physiological stage (pregnant, non-pregnant, and aborted ewes) in (AL-Huwer, Hoor AL-Saad, AL- Mzeraa, AL-Qurna, AL-Neaem, and AL-Dayr). Show positive for present of antibodies against *T. gondii*, except in Hoor AL-Saad. The non-pregnant ewes show 100% sero-positive while the percentage in aborted ewes 27.8%, there was significant differences P<0.05%, show in table (3).

Table (3) : No. of the sero- positive of *T. gondii* and percentages in different animals and regions in north Basrah.

Regions \ Animals		Pregnant ewes	Non-pregnant ewes	Aborted ewes	Total
AL-Huwer	Total	2	12	4	18
	Sero-positive	2	12	4	18
	Percentage	100%	100%	100%	100%
Hoor-Al-saad	Total	-	4	18	22
	Sero-positive	-	4	5	9
	Percentage	-	100%	27.8 %	40.9%
Al-Mzeraa	Total	1	9	4	14
	Sero-positive	1	9	4	14
	Percentage	100%	100%	100%	100%
AL-Qurna	Total	5	3	2	10
	Sero-positive	5	3	2	10
	Percentage	100%	100%	100%	100%
ALNeaem	Total	10	2	-	12
	Sero-positive	10	2	-	12
	Percentage	100%	100%	-	100%
AL-Dayr	Total	4	-	12	16
	Sero-positive	4	-	12	16
	Percentage	100%	-	100%	100%

X^2=4.39 P<0.05%

Percentage of sero-positive during gestation period reveal that the high percentage of *T.gondii* antibodies was seen in ewes which aborted in the last month of gestation 100%, and in ewes which aborted in 4th and 3ed month of gestation 77.8%, 45% respectively, and there was highly significant differences p<0.01%, table (4).

Table (4) : sero-positive of *T. gondii* and percentages in ewes according to time of abortion

Time of abortion	Total	Sero-positive	Percentage
3rd month	20	9	45%
4th month	9	7	77.8%
5th month	11	11	100%
Total	40	27	67.5%

X^2=10.345 P<0.01

Whereas the percentage of sero-positive among different age groups, show the high percentage of *T.gondii* antibodies was seen in ewes between 1-3 years old 100%, in 5-8 years old 86.7%, while 77.5% in ewes between 3-5 years old, and there was not significant differences P>0.05, table (5).

Table (5) : sero-postivie of *T. gondii* and percentages according to age of ewes.

Age of ewes	Total	Sero-positive	Percentage
1-3 years	22	22	100%
3-5 years	40	31	77.5%
5-8 years	30	26	86.7%
Total	92	79	85.8%

X^2=5.945 P>0.05

DISCUSSION

Toxoplasmosis is a zoonotic disease caused by *Toxoplasma gondii* and has been known in many countries since 1908 (11).

The current results revealed that the ratio of *T. gondii* seropositivity was 85.8% according to indirect ELISA test which was performed on the 92 serum samples of ewes in six different regions in north Basrah province.

T. gondii in sheep is distributed worldwide, with high prevalence rates in different countries (11).

The prevalence of (85.8%) for *T. gondii* antibodies found in this study is higher than those found in Italy (77.8%), Turkey (65.08%), Ethiopia (56%), Saudia Arabia (52.2%), according to Latex Agglutination Test (LAT) in sheep (12,13,14,15).

Also, this results were higher than other local studies, as the study of (16) who reported (19.6%) in sheep of Diyala province, (17) recorded seropositivity rate of *T. gondii* (16.66 and 22%) in sheep of Baghdad and Diyala province respectively, beside that (18) who showed that (25, 18.63,16.06, and 12.71%) in aborted ewes of Mysan, Al-Basrah, AL-Muthanna, and Thiqar province respectively, these studies using ELISA test.

The difference observed could be due to the sampling techniques husbandry methods used in the different regions, frequency of cats on farms. Also the climatic variation has a role in *Toxoplasma* distribution as the prevalence of toxoplasmosis is higher in warm, moist as compared to cold, dry ones. This is attributed to the longer viability of *T. gondii* oocysts in moist or humid environments (19).

According to physiological status of studied ewes (pregnant, non-pregnant, and aborted) the current study showed that *T. gondii* seropositivity ratio (100, 100, and 67.5%) respectively, these results were higher than other local studies, (20) who recorded the higher percentage in pregnant (79.03%) and in non-pregnant (56.75%) , while recorded (71.4%) in aborted ewes by using Latex Agglutination Test, and recorded high percentage in aborted ewes (83.33%) as a compared with present study, while in pregnant and non-pregnant ewes the percentage was (56.52 and 51.11%) respectively by using ELISA test in sheep of Basrah province. Also (21) who reported 40% in aborted ewes, using of ELISA test, while the ratio of seropositivity of *T. gondii* in aborted ewes was 73.33% followed by pregnant ewes was 65.38% after using of Latex Agglutination test (LAT) in Maysan province. This may relate to climate differences, lack of hygiene and weather in this region which is usually warm and moist, these result could be supported by (22) mention that the higher prevalence rates of toxoplasmosis were in warm and moist areas compared to that in cold areas.

In the present work, that different *T. gondii* seropositivity ratio was observed in differ age group (>1-3, 3-5, and 5-8) years old showed (100, 77, and 86%) respectively, these results were higher than with the results of (23) who reported that highest ratio 38% which observed in ewes of the age group >1-3 years old, and lowest ratio 8.51% was recorded in ewes at >5-8 years old.

Some researchers have attributed this result to presence of recent or chronic infection (24). In Barazil reported higher prevalence rate of *T. gondii* in older animals, and such fact is due to increasing opportunities of exposure to several source of toxoplasmosis with age (25). Also (26) in Turkey reported that the seropositivity rates differ among geographical

regions and factors including age, sex, and breed were significant. High values of antibodies that reported by (27) can be ascribed to active toxoplasmosis as well as reactivation of infection due to immunosuppresser conditions, such as bad storage of feed which create suitable conditions for the growth of fungi secreting of aflatoxin, which is one of the immune inhibitors for predisposing of infection by *T.gondii*. Seroprevalence studies indicate relatively higher prevalence rates of toxoplasmosis in farm animals, the infection is sub-clinical and *T. gondii* has virtually no importance as a cause of clinical disease in farm animals with the exception of that associated with abortion and neonatal disease(28).

Finally, in conclusion according to the results of this study confirm the presence of *T. gondii* antibodies in ewes of north Basrah in higher ratio. Toxoplasmosis among ewes is of great importance, because the infected ewes play a role as a source of human infection.

الإنتشار المصلي للأجسام المضادة للتوكسوبلازما كونداي في النعاج في شمال محافظة البصرة

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الخلاصــة

اجريت هذه الدراسة لتقييم تواجد أضداد التوكسوبلازما كونداي في النعاج في شمال محافظة البصرة بإستخدام إختبار الاليزا غير المباشر, إذ جمعت 92 عينة عشوائية من مصل النعاج في حالات فسلجية مختلفة (22 حامل, 30 غير حامل, 40 مجهضة) في أعمار تراوحت بين 1-8 سنوات, إذ أوضحت النتائج بأن 85,8% كانت موجبة لتواجد الاجسام المضادة للتوكسوبلازما كونداي, في النعاج الحوامل وغير الحوامل كانت النسبة 100% أما في النعاج المجهضة فكانت 67,5%. كشفت الدراسة إن أعلى نسبة للاجسام المضادة للتوكسوبلازما كونداي في النعاج في مناطق الهوير والمزيرعة والقرنة والنعيم والدير, وانخفضت النسبة في منطقة هور السعد 40% , كذلك أشارت الدراسة لأعلى نسبة للاجسام المضادة في النعاج التي اجهضت في الشهر الاخير من الحمل 100% والنعاج التي اجهضت في الشهر الثالث والرابع من الحمل كانت النسبة 77,8% و 45% على التوالي, وكشفت لأعلى نسبة للاجسام المضادة في النعاج بعمر 1-3 سنوات 100%, إضافة الى النعاج بعمر 3-5 سنوات و5-8 سنوات كانت النسبة 77,5%, 85,8% على التوالي.

بالاعتماد على نتائج الدراسة الحالية نستنتج ان داء المقوسات قد لوحظ في نعاج شمال البصرة قيد الدراسة لذلك يجب التحري عن وجود المرض في جميع النعاج المتواجدة في تلك المنطقة.

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