

Studying Serologic incidence of toxoplasmosis using ELISA in sheep and goats in Tabriz city and its relation to abortion

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ABSTRACT

Toxoplasmosis is one of the most common zoonotic diseases causing abortion in sheep and goats. Two Hundred blood samples were obtained from sheep and goats slaughterhouses of Tabriz city to conduct ELISA Test in order to determine the slaughterhouses infection rate as well as the presence of IgG antibody. Serological results showed that infection with Toxoplasma Gondii was 20 percent, which 14.5% and 5.5% were related to sheep and goats, respectively. The Results indicate a significant difference between the infection rate of the sheep and goats of the region, which may suggest the vulnerability of sheep against the disease compared with goats. Based on the obtained results, females had more infection rate than males, which was 26% and 13% in ewes and rams, and 11% and 10% in goats and Billy goats, respectively. Statistically, the difference of infection rate between the sexes was significant in sheeps, but it wasn't so significant in goats.

Keywords: Sheep, Toxoplasmosis, Tabriz

INTRODUCTION

Toxoplasmosis is one of the most common zoonotic diseases. The cause of the disease is a protozoan parasite called *Toxoplasma gondii* which in the phylum of Apicomplexa and order Coccidia. The disease has been reported for the first time in 1908 by Nicole and Manso in Algeria. Toxoplasma is an obligate intracellular parasite that cats are its final host and humans and other mammals is its intermediate host [14, 7, 11].

The disease can be transmitted to humans by eating raw or undercooked meat infected with the parasite or swallowing or ingestion of material contaminated with cat feces. Toxoplasmosis can also be transmitted from mother to fetus through the placenta, leading to spontaneous abortions, stillbirths and infants born with mental or physical retardation. The major complication of toxoplasmosis in sheep and goats is also abortion, which is an indicator of the economic and health importance of the parasite. Annually, large populations of humans and animals in the world afflicted with this disease due to lack of sanitation and contact with infected cats as well as infected tissue transplantation. Given the importance of abortion among sheep in Iran and zoonotic importance of this disease, this study aimed at better understanding of the epidemiologic aspects of the parasite and the disease in the area of Tabriz city [1, 2, 9, 11].

MATERIALS AND METHODS

Serum samples of sheep and goats were obtained at different times from industrial slaughterhouse of Tabriz; so, blood samples of 200 sheep and goats were obtained randomly from the jugular vein using a vacuum tube. The animals' age and sex were recorded, too. The tubes containing blood samples quickly and beside ice were transported to the laboratory. The samples were centrifuged (using the Model Behdad system) in the laboratory to separate serum from blood clot, then the sera were collected into sterile micro tubes using sterile samplers and

finally they were labeled. The sera were stored in the -20°C freezer until testing. The control sample (positive control) was obtained from protozoology section of Razi Serum and Vaccine Institute. ELISA kit was used for ELISA test according to the instructions.

RESULTS AND DISCUSSION

In this study, 160, 4, 18, and 18 of 200 samples were negative, suspected, infected, and infected along with clinical symptoms, respectively. Table 1 shows the results of ELISA test on sera obtained from sheep and goats in terms of *Toxoplasma gondii*.

Table1. The results of ELISA test on sera obtained from sheep and goats in terms of *Toxoplasma gondii*.

S/P>200%	50%<S/P<200%	40%<S/P<50%	S/P<40%
Positive with Clinical Signs	Positive	Suspect	Negative
18	18	4	160

As seen in Table two, 20% of samples were identified as infected and 80% as free of infection.

Table 2. Frequency and percentage of the negative and positive samples

	Positive	Negative	Total
Numbers	40	160	200
percent	20	80	100

In table 3, the rate of disease incidence between sheep and goats suggested that 25% and 12.5% of sheep and goats were infected, respectively.

Table3. The incidence of the disease between sheep and goats

	Total animal	healthy	infected	Infected percent
Sheep	120	90	30	25
Goat	80	70	10	12.5
Total	200	160	40	20

Table 4 shows the incidence of the disease among age groups of under and over two years old was 33, 23, 57, and 18 percent, but the percentage of infected animals was not found.

Table 4. The disease incidence in terms of the age group of under and over two years old

	Total animal	healthy	infected	Infected percent
Under 2 years old	60	50	14	23.33
Over 2 years old	140	110	26	18.57
Total	200	160	40	20

As seen in Table 5, the percentage of infection with *Toxoplasma* among the male and female sheep and goats 29.1, 11.76, 10.29, and 8.33, respectively.

Table 5. Incidence of the disease, according to animal species and their sex

	Total animal	healthy	infected	Infected percent
Ewes	103	73	30	29.1
Ram	17	15	2	11.76
Goat	68	61	7	10.29
Billy goat	12	11	1	8.33
Total	200	160	40	---

Following ELISA test on 200 serum samples from sheep and goats it was revealed that 40 cases of the total samples, that is 20%, were infected with *Toxoplasma gondii*. About half of the positive samples had higher ELISA titer, which suggested the seriousness of the disease and existence of its symptoms. In Iran, sheep and goat meat (especially sheep) is considered as one of the main sources of protein, which increases their importance as a source of toxoplasmosis infection. So, the rate of toxoplasmosis in animals is an important indicator in determining the risk of the disease; so, high titers can be important in terms of the disease transmission [2, 3, 7].

In this study, the incidence of the diseases among sheep and goats was 25% and 12.5%, respectively. These figures show that there are significant differences between the infection of sheep and goats in the region; this can suggest that sheep is more sensitive than the goats against the disease. In studies conducted by Ghazaei (2005) in Ardabil the toxoplasmosis infection rate in sheep and goats, was reported 31% and 17% in sheep and goats, respectively. He

argued that the more susceptibility of the sheep and how to manage them is the cause of the differences in disease incidence in sheep and goats [6].

The obtained results of this research on the impact of gender on the incidence of toxoplasmosis infection suggest that females have more infection than males such that the rams and ewes infection is 11.76% and 29.0% and also the billy goat and goat infection is 8.33% and 10.29% that no significant difference was in the chi-square test.

The findings of this study are relatively consistent with studies conducted by Sevgili (2005) in Turkey in relative harmony. Their study on 300 sheep and reported the infection as 55.67%. They observed toxoplasmosis along with the symptoms in 34% of cases. Although, in statistical analysis, he has not reported any meaningful relationship among serum titers, age, and species [13].

The results obtained in relation to the impact of gender on the incidence of the diseases in sheep and goats are consistent with the results of studies conducted by Assmar et al., in the province of Mazandaran who reported the infection of female and male sheep as 67.09% and 53.46% [2, 4, 9].

There is no statistically significant difference ($p>0.05$) in the results obtained in this research in conjunction with the effect of age on toxoplasmosis incidence that is consistent with results obtained by Sevgili (2005). As the lamb meat is used more in Iran it can be considered especially as a source of *Toxoplasma* infection. Management should be focused to reduce infection in order to create health and prevention of toxoplasmosis [13].

Toxoplasma gondii is a dangerous infectious zoonotic diseases that exert large losses annually due to animals' abortions, animals die, human mortality, complications in those infected and also treatment costs, etc., to the country and people economy [8, 14].

But no serious action has been done so far about controlling the disease and day-to-day new reports of infection with *Toxoplasma* comes with new features that increase concerns. Torrey in 2003, results indicated that patients with neuropsychiatric symptoms such as schizophrenia has already infected with *Toxoplasma* [12, 15]. He believed that *Toxoplasma* leads lesions in brain that cause various diseases such as schizophrenia.

CONCLUSION

Therefore, the monitoring of sheep and goats infection and, sanitation and proper management, public educating on the proper use of food, drug administration in cat and prevent oocyste excretion are great help in disease control and guarantees public health. Based on surveys conducted by Miman et al., in 2010 perhaps there is a possible link between Parkinson's disease and *Toxoplasma* infection occurrence

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