

PREVALENCE OF ANTI-TOXOPLASMA GONDII ANTIBODIES IN ABORTED EWES IN KUWAIT

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Abstract

Serum samples from 528 aborted ewes from different sheep flocks in Kuwait were tested for *Toxoplasma gondii*. The indirect hemagglutination test (IHAT) was used with a titer of 1:80 considered positive. Antibodies to *T. gondii* were found in 94 (17.8%). The highest number of positive ewes (23; 24.5%) had a titer of 1:640. Only one aborted ewe had a titer of 1:2560.

This study is the first to report *Toxoplasma* infection in sheep which may pose risk to humans who consume under cooked mutton. The detection of *Toxoplasma* antibodies in aborted ewes refers to the implication of toxoplasmosis in abortion among sheep in Kuwait.

Key words: Kuwait, Toxoplasmosis, Sheep, Abortion, IHAT

Introduction

Toxoplasma gondii is a protozoan parasite widespread all over the world. It is an increasing zoonosis of the worldwide distribution concern hazards in both human health and veterinary medicine. The disease is caused by an obligate intracellular protozoan parasite (Halonen and Weiss, 2013). Although the final host is the cat, *T. gondii* infects all mammals including man (Edwards and Dubey, 2013). The most common sources of human infection are ingestion of tissue cysts in raw meat or of food or water contaminated with oocysts shed by felids and transplacental transmission (Pfaff *et al*, 2014). It is a significant cause of abortion to livestock and domestic animals (Haridy *et al*, 2010). The parasite has significant impact not only on animal production but also on public health throughout the world (Sudan *et al*, 2013). This may pose a threat to farm animals, including sheep and goats as well as the farmers (Elsheikha, HM, Morsy, TA, 2009). Worldwide, about six billion people are infected with this parasite (Ferroglia *et al*, 2014).

The aim of this study was to carry out a preliminary study to explore the potential role of toxoplasmosis as a cause of abortion in sheep in Kuwait.

Material and Methods

A total of 528 blood samples were collected from the aborted ewes in different sheep flocks and sent in ice boxes to the laboratory where the sera were separated and stored at -20°C until tested. Ewes, which lost their feti, were included in this study, but no other information was available regarding sex, age breed of sheep. Also, sheep were not tested for other diseases, which might cause abortion in these animals.

For determination *T. gondii* antibodies, sera were tested using indirect hemagglutination test (IHAT). The serologic testing was performed according to the manufacturer (Fumouze diagnostics, France). Sera were initially screened at 1:80 and 1:160 dilutions. Seropositive sera were end titrate using 4-fold dilutions. Sera with doubtful results were retested. Positive and negative controls as well as serum control were included in each test, whereas reagent control was set up only per assayed series.

Results

Using a titer of 80 as the criterion for being seropositive, antibodies to *T. gondii* were found in 94 (17.8%) out of 528 sera of aborted ewes: in titers of 1:80 in 14, 1:160 in 21, 1:320 in 25, 1:640 in 23, 1:1280 in 10 and 1:2560 in only one animal.

Discussion

The estimated *T. gondii* seroprevalence rate of 17.8% in the aborted ewes in Kuwait was considerably lower than the estimated seroprevalence rate of the 92.3% and 51.7% reported by Sanad and Al-Ghabban (2007) for the samples of aborted ewes and goats respectively in Saudi Arabia using the same serological technique (IHAT). These marked differences are probably due to the source of samples. In the present study, the samples were representative from different various sheep flocks, while the samples used in the studies in Saudi Arabia were only from one flock of sheep or goats during an abortion outbreak. Although, the risk factors of toxoplasmosis on the sheep and goat farms was not mentioned, including the presence of cats, yet it seemed that these animals were frequently exposed to *Toxoplasma* oocysts. This was indicated by the high levels of antibody titers in the studies in Saudi Arabia where 22.8% and 28.6% of aborted ewes had titers of 1:1024 and 1:4069 respectively. High levels of IHAT antibody titers against *T. gondii* reflect an active infection (Silva *et al.*, 1997).

For human, the diagnosis of abortion, stillbirth, premature labour, or neonatal death due to *Toxoplasma* infection needs careful and laborious evaluation. The use of ELISA (IgG & IgM) is a must, as it is more sensitive and specific than IHAT (Soliman *et al.*, 2001).

This study refers to the potential risk implication of toxoplasmosis in abortion in sheep flocks in Kuwait; the situation which may have adverse effect on the development and reproduction of these animals. Also this study reports toxoplasmosis in food animals for the first time, the situation which could pose threat to the consumers of ill-cooked mutton. Antibodies to *Toxoplasma* have been reported in humans (Behbehani and Al-Karmi, 1980; Iqbal and Khalid, 2007) as well as from desert rodent, *Meriones crassus* (Al-Karmi and Behbehani, 1980). Reporting of *Toxoplasma* antibodies in stray cats' sera

and oocysts in their faeces indicate that cats contaminate the environment and are source of infection to humans and animals (Abdou *et al.*, 2013).

Abroad, Morsy *et al.* (1994) in Riyadh reported antibodies in commensal rodents, and al Dakhil and Morsy (1996) detected natural *Toxoplasma* infection sought in the Indian grey mongoose (*H. edwardsi*, Greffroy, 1818) trapped in the eastern region, Saudi Arabia. Dubey *et al.* (2003) isolated *Toxoplasma* from chickens and ducks in Egypt and Barakat *et al.* (2012) proved the zoonotic role of chickens in transmission of toxoplasmosis. Besides, El Behairy *et al.* (2013) in Egypt isolated and characterized *T. gondii* from stray dogs. el-Moukdad (2002) in Syria reported sero-prevalence of *Toxoplasma gondii* in Awassi sheep. Abu-Dalbouh *et al.* (2012) reported ovine and caprine toxoplasmosis in aborted animals in Jordanian goat and sheep flocks.

Generally speaking, toxoplasmosis ranged from 7.5-95% worldwide: 7.5% in Scotland (Jackson and Hutchinson, 1987), 22.5 up to 37.4% in Saudi Arabia (Shoura *et al.*, 1973; Abbas *et al.*, 1986), 50% in USA (Stagno, 1980), 54.0% in Kenya (Griffin and Williams, 1983), 37.5% in Libya (Kassem and Morsy, 1991), 47% in Nigeria (Onadeko *et al.*, 1992), 37% in Jordan (Morsy and Michael, 1980), and 95.5% in Kuwait (Behbehani and Al-Karmi, 1980).

On the other hand, Alonso *et al.* (1984) stated that patients with AIDS developed up to 50% cerebral toxoplasmosis. Bazaco *et al.* (2008) stated that to avoid nosocomial toxoplasmosis one of the duties the nurse is to offer well cooked meat and well washed green salad to the pregnant women to prevent them from acquiring toxoplasmosis and to delivery infants with congenital infection. Besides, *T. gondii* antibodies were reported in the Egyptian blood donors associated the risk factors for the blood transmission (Elsheikha *et al.*, 2009). Anwar *et al.* (2013) reported that the presence of coenurosis and toxoplasmosis are serious parasitic problems that play a significant role in sheep management in Egypt, as a

result of close contact between livestock and dogs and cats, which play a critical role in the life cycle of these parasites. Alanazi (2013) examined serum samples from 891 sheep, 555 goats and 182 camels slaughtered for food and human consumption from three main municipal abattoirs in Riyadh City. He concluded that *T. gondii* antibodies were wide-spread in the animal populations for human consumption and welfare, and that toxoplasmosis is a widely spread zoonotic infection. Moreover, the persistence of *T. gondii* in the raw sausages using in-house developed and validated real time-PCR, the *T. gondii* survived in relation to the raw-sausage-manufacturing-process included the different ripening processes were reported (Abdulmawjood *et al*, 2014).

Conclusion

Toxoplasmosis is a common infectious protozoan disease of man and animals with worldwide zoological and geographical distribution including Kuwait. The outcome results showed that the *T. gondii* specific antibodies against sheep, and consequent the risk of acquiring toxoplasmosis by the consumption of the sheep meat and milk. Besides, acquired human toxoplasmosis is due to the contaminated sources such as fresh milk, home prepared cheese/sausage.

So, the health authorities must consider the integrated strategies, including efficient management measures for prevention and control *T. gondii* infection in sheep and no doubt other edible and stray animals. The implementation of the integrated control strategies as well as measures for prevention and control of *T. gondii* infection within edible animals is recommended.

The study of toxoplasmosis infection in edible animals rather than sheep in Kuwait is ongoing and will be published by the present author in due time.

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