PREVALENCE OF TOXOPLASMA ANTIBODIES IN SMALL RUMINANTS IN JORDAN

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ABSTRACT

A serological survey was conducted on 51 sheep flocks and goat herds to assess the prevalence of Toxoplasma infection in sheep and goats in Jordan using the latex agglutination test. The prevalence in sheep was 21 and in goats 18.8 per cent. The prenatal mortality for lambs and kids to seropositive was 20 per cent.

INTRODUCTION

Toxoplasma gondii is recognized world wide as a cause of abortion, stillbirth, infertility and neonatal mortality in sheep, pigs and other domestic animals (WHO, 1969). It has been identified as a cause of perinatal mortality in goats and sheep (Buxton, 1989; Dubey *et al.*, 1986). Infection during the first forty days of gestation leads to foetal death and resorption and apparent barrenness of the ewe (Jacobs and Hartley, 1964). Infection between 40 and 110 days of gestation causes foetal death and subsequent abortion and in some instances retention of the foetus *in utero* (Linklater, 1979). Infection during the latter part of pregnancy may lead to the birth of live lambs accompanied by diseased foetal membrane (Cooke, 1961). In these cases, lambs born may be apparently normal or obviously weak and die within three days after birth (Cook, 1961, Jacobs, 1961).

Buxton and Finalyson (1986) have suggested that a cellular immune response can occur in foetuses following infection *in utero*. In Jordan, our knowledge about its prevalence among sheep and goats is scanty and fragmentary and only a few reports are available. This work investigate toxoplasmosis in sheep and goats in Jordan as a possible cause of ovine and caprine abortion.

MATERIALS AND METHODS

Origin of specimens

Serum samples were collected from 245 aborted sheep and goats between 1.9.1989 and 28.2.1990. Serum samples were taken from 33 flocks of sheep with an average of five aborted ewes per flock.

Serum samples from goats were collected from 18 herds with an average of four aborted does sampled per herd.

Transudates from body cavities were collected from foetuses and presuckled dead lambs and kids that had been admitted to the Division of Veterinary Laboratories, Amman by farmers for a reason of finding proper diagnosis of recent abortion in their animals so they can treat accordingly.

Pathology

Serum samples were stored after collection at -20°C before being tested for the presence of Toxoplasma antibodies.

Latex agglutination test

The latex agglutination test (LAT) used was the Toxoreagent kit (Eitken Chemical Company Tokyo, Japan). According to the manufactures instructions, Latex particles coated with inactivated Toxoplasma antigen form agglutinating patterns in the presence of specific antibodies in the serum of infected animals, the results of which can be read after 12 hours of incubation at room temperature. Positive results were regarded as those tires equal or greater than 1:64 serum dilution for sheep and goats (Trees *et al.*, 1989).

RESULTS

Thirty seven of 176 (21%) sera from aborted ewes and 13 of 69(18.8%) sera from aborted does were positive for Toxoplasma antibodies by LAT. The antibody tires of the positive animals are shown in Table 1.

Table 1 Serological examination of sheep and goats for Toxoplasma antibodies showing titres of positive sera.

Species	No. of Positive	Positive LAT antibody titres					
	Cases	1:64	1:128	1:256	1:512	1:1024	1:>2048
Sheep (n=176)	37	6	3	7	8	6	7
	(21.0)	(3.0)	(1.7)	(4.0)	(4.5)	(3.4)	(4.0)
Goats (n=69)	13	0	2	6	4	1	0
	(18.8)	-	(2.9)	(8.7)	(5.8)	(1.4)	-
Total (n=245)	50	6	5	13	12	7	7
	(20.0)	(2.0)	(2.0)	(5.3)	(4.9)	(2.9)	(2.9)

Sixteen of 33 sheep flocks (48.5%) and 10 of 18 (55.6%) goat herds had animals with positive titres to *T. gondii*.

Positive Toxoplasma antibody titres were found in 11 of 54 (20%) in foetal, still-born and presuckled lambs, whereas one of six (16.7%) foetal or dead precolostral kids.

DISCUSSION

In this investigation, the prevalence of positive Toxoplasma antibody titres in sheep and goats with problems of abortion on 51 farms in and near Amman was 20.4 per cent. This figure is similar to that described by Harps (1990), who reported a prevalence of 20.56 per cent in sheep and goats in a survey for the Veterinary Epidemiology and Ectoparasite Project (VEEP), Ministry of Agriculture, Jordan. He tested 997 sera from 100 sheep flocks and goat herds in 10 districts of Jordan with and without a history of abortion. Fifteen per cent of 550 sera from randomly selected flocks had antibodies to Toxoplasma and 29.6 per cent of 330 sera tested from monitoring flocks, where animals were examined monthly, had antibodies to Toxoplasmosis. However, higher rates of 33 per cent have been reported in sheep in Britain (Little, 1988) and 61.7 per cent in sheep in Australia (Munday, 1975). The level in Jordan is lower than the world average of 31 per cent which varies from 0 to 96 per cent (Fayer, 1981). In this study 28 out of 176 aborted ewes and 11 out of 69 aborted does had titres equal to or greater than 1:256 suggesting that *T. gondii* was the cause of abortion and that Toxoplasma should be routinely considered in the etiology of caprine and ovine abortion in Jordan. It seems that there is no difference in the prevalence of abortion in sheep and goats in Jordan.

The prevalence of Toxoplasma antibody in goat in Jordan (18.8%) is lower than in Southern Ontario in Canada (63%; Tizard *et al.*, 1977) and higher than in Nigeria (15%; Okoh *et al.*, 1981) and in India (11.5%; Sharma and Gantam, 1972).

While in man, paired serum samples, taken at a two week interval which demonstrate a four-fold increase in anti-Toxoplasma antibody titre, indicates acute Toxoplasmosis. In aborted goats acute Toxoplasmosis is not so easy to demonstrate because a similar increase in titre in most infected goats occurs before abortion takes place (Dubey *et al.*, 1985).

Toxoplasma may be excreted in infected goats milk (Riemann *et al.*, 1975). As the consumption of goat milk is increasing in Jordan, the possibility of transmission to man by this mean should not be discontinued.

Cats on some farms in Jordan have been observed eating foetal membranes and this is one possible link in the life cycle of the parasite. Farmers observed cat faeces on bags of grain and in heaps of barely. This may provide a ready source of infection for rats, mice, cats and sheep or goats. Farmers commonly keep cats on farms for rodent control or as pets and the feeding of grain is practised on all farms, even under extensive condition and contaminated grain could be responsible for the spread of the Toxoplasmosis among small ruminants. Therefore, cats should be excluded from feed sheds or stores.

Results of serology performed on the transudates collected from 60 lambs and kids died during the prenatal period, show the usefulness of examining the transudates of precolostral lambs and kids in investigation of perinatal mortality. However, the absence of *T. gondii* antibody does not preclude the possibility of infection, because the development of antibody depends on foetal age when it was infected and the time lapse between infection and examination.

Specific antibody to *T. gondii* may be detected in the foetal circulation 30 days after initial infection of the ewe (Buxton, 1989).

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