الجمعية المصرية لأمراض الماشية

EGYPTIAN SOCIETY FOR CATTLE DISEASES

المؤتمر العلمي الرابع

٧-٩ ديسمبر ١٩٩٧

جامعة أسيوط

PROCEEDING II

FOURTH SCEINTIFIC CONGRESS
7-9 DECEMBER, 1997
ASSIUT UNIVERSITY
ASSIUT-EGYPT

Dept. of Animal Medicine,
Faculty of Veterinary Medicine, Zagazig University, Egypt

SEROPREVALENCE OF TOXOPLASMOSIS IN SHEEP AND GOATS

(With 4 Tables)

By

M. Esmat

SUMMARY

Toxoplasmosis is an important cause of abortion, stillbirth and neonatal mortality in sheep and goats. Serum samples of 343 sheep and 186 goats of both sexes were collected from three flocks at different localities of Sharkia Governorate during the period from March, 1996 to March, 1997. Sera were examined for antibodies to *Toxoplasma gondii* by use of latex agglutination test (LAT) and indirect haemagglutination test (IHAT). Antibodies to *T. gondii* were found in 93 (27.11%) Sheep and 43 (23.1%) goats by LAT and in 87 (24.36%) sheep and 40 (21.5%) goat by IHAT. Smears from brain, liver, spleen and lymph nodes of aborted fetuses were examined microscopically. Results indicated that *T. gondii* infection in sheep and goats is widespread.

INTRODUCTION

There is no doubt that toxoplasmosis is an important subject. It is the second most commonly diagnosed form of ovine abortion (Hoghooghi and Afrasa, 1993). The most obvious effect of toxoplasmosis in sheep is abortion, often with mummified fetuses though there is evidence that infection can also result in a high proportion of barren ewes (Paull *et al*., 1986). The course of infection depends on the age of the fetus at the time of infection so that infection in early pregnancy causes fetal death and resorption, in late pregnancy, the fetus become infected but is born normally and is subsequently immune, but infection in mid-pregnancy results in a very high abortion rate (Blewett and Watson, 1983).

Blewett (1980) discussed possible methods of infection for sheep, at least that the scientific evidence was in favour of cat oocysts as the sole method of infection, and just few oocysts are needed to cause abortion in ewes, young susceptible cats produce oocysts up to 10^7 per days (Hutchinson, 1986). When susceptible sheep ingest stored grain hay or straw contaminated with cat faeces, a palaestinema occurs when oocysts multiply in the reticulo-endothelial cells for 2 or 3 weeks then invade tissues and become tissues cysts, producing a mild illness with a rise in temperature and a temporary inappetance, which are usually not noticed. Multiplication occurs in various body organs, specially the brain and muscles and in the placenta of pregnant ewe, and an antibody response occurs. Surveys showed that the higher the antibody titre, the higher the percentage of sheep from which cysts can be recovered from the tissues (Meggigan and Buxton, 1986).

Serologic diagnosis can aid in the diagnosis of clinical toxoplasmosis. Several serologic tests are available for detection of ovine *T. gondii* antibodies, H.I. test and IFA test are considered the most specific and sensitive for detection of *T. gondii* antibodies (Lindsay and Dubey, 1989). The commercially available latex agglutination test and indirect haemagglutination test were also used but less sensitive than the ELISA (Dubey *et al*., 1992).

Little is known about the prevalence of *T. gondii* infection in domestic animals specially to sheep and goats, so the purpose of this study was to carry out a large scale survey of *T. gondii* infection in sheep and goats.

MATERIALS and METHODS

History of examined animals:

Abortion during the last 4 weeks of pregnancy and neonatal death as well as general weakness, emaciation and debilitation accompanied with mild systemic signs (fever,

dyspnea and general tremors) were the common findings in 3 flocks in Sharkia Governorate, during the period from March, 1996 to March, 1997. A total of 343 sheep and 186 goats consisting these flocks were intensively investigated clinically and serologically for toxoplasma infection (Table I)

Blood samples:

Blood samples were collected from both sexes of 343 sheep and 186 goats during March, 1995 to March 1997 in clean, dry vials with a rubber stopper (Table 1). The clots and captine sera were separated and stored at -20°C until use.

Antigens:

Sera were assayed for *T. gondii* antibodies by the latex agglutination test antigen (LAT) (Pronosan Ltd. Italy) and indirect haemagglutination test antigen (IHAT) (Wellcome, UK)

Serological testing:

* Latex agglutination test: Sera were thawed and screened at 1:8 for antibodies against T gondii using commercial latex agglutination test in U-well microtiter plates. Sera which gave positive reaction were titrated to the end point using doubling dilutions. Known positive and known negative sera control were indicated in each test. This test was done according to (Samad *et al*., 1982).

* Indirect haemagglutination test: Sera were diluted two fold from 1:64 to 1:4096. The antigen was added to diluted serum, the positive serum and the negative serum. The serum and antigen were throughly mixed by shaking. The plate was kept at laboratory temperature for 1 hours until the cells were settled into a distinct pattern and then evaluated. The techniques adopted were essentially the same as described by Morsy and Michael (1980).

Results were analysed statistically using the chi-square test for significance (Gupta, 1982)

Examination of fetuses for *T. gondii* infection:

Smears from brain, spleen, liver and lymph nodes from aborted fetuses (10 sheep and 3 goats) were stained by Giemsa then examined by light microscope according to Hashem-Pesharki (1996)

RESULTS and DISCUSSION

Toxoplasmosis is a true zoonosis occurring naturally in man and documentated as well as wild animals it occurs in most parts of the world and surveys of its distribution indicate that a high prevalence may occur in particular areas (Dubey and Beattie, 1988).

During the past 25 years a rapidly increasing interest has been focused on toxoplasmosis. Toxoplasma infection occurs in man and animals throughout the world (WHO, 1969). In sheep and goats *T. gondii* is an important cause of abortion, stillbirth and neonatal mortality (Dubey and Beattie, 1988). The present study demonstrated the importance of the disease in Sharkia Governorate. *T. gondii* antibodies in titre ≥ 1:64 were found in 27.11% of sheep and 23.1% of goats by LAT (Table 2), while IHAT gave titre in 25.36% of sheep and 21.5 of goats (Table 3)

These results are nearly similar to those obtained by Rodriguez *et al* (1995), Hashem-Pesharki (1996) and Manar *et al* (1996), but differ from those reported by Samad *et al*. (1982), who found IHA antibodies to *T. gondii* only in 3.09% of sheep in United States, survey data based on serological findings included an incidence of 48% in sheep and similar data are available for Denmark (Blood and Radostits, 1989). An australian survey showed that 41% of all sheep farms are infected, and a higher prevalance rate is also recorded in canadian sheep as 65% of tested sheep were seropositive (Savio and Nieto, 1995). However, the results are not comparable because of different serological tests and difference in the types of sheep and goats sampled

This investigation revealed that there is no difference in the susceptibility of both male and female sheep and goats to toxoplasmosis as the antibodies were found in 23 (26.74%) and 6 (21.42%) of males sheep and goats, respectively and 64 (24.9%) and 34 (21.5%) in females (Table 4)

These results agree with those obtained by Samad *et al*. (1982) and Manar *et al*. (1996)

Although LAT and IHAT are not sensitive compared with other serological tests as IFA and

ELISA, the results of this investigation showed that at least 20% of sheep and goats have antibodies to *T. gondii*

T. gondii was not found by direct microscopic examination of fetal tissues

Further studies on the epidemiology of toxoplasmosis, its potential transmission to humans, and losses due to clinical toxoplasmosis in live stock are needed

REFERENCES

Blewett, D.A. (1980) Some epidemiological aspects of ovine toxoplasmosis Proceedings of sheep veterinary society, 4 23-25.

Blewett, D.A. and Watson, W.A. (1983) The epidemiology of ovine toxoplasmosis II- Possible sources of infection in outbreaks of clinical disease British Vet J., 139 546-555.

Blood, D.C. and Radostitis, O.M. (1989) Veterinary Medicine. A text book of the diseases of cattle, sheep, pigs, goats and horses 7th ed Published by Bailliere and Tindall, London

Dubey, J.P. and Beattie, C.P. (1988) Toxoplasmosis of Animal and Man CRC Press. Boca Raton, fl, pp 1-220

Dubey, J.P.; Peters, D.; and Brown, C. (1992) An unidentified Toxoplasma like tissue cyst-forming coccidium in the brain of cat Parasitol Res 78 39-42

Faull, W.B., Clarkson, M.J. and Winter, A.C. (1986) Toxoplasmosis in a flock sheep some investigations into its source and control Vet Rec., 119: 491-493

Gupta, S.P. (1982): Statistical Methods 16th edn., Sultan Chand, New Delhi

Hashemi-Fesharki, R. (1996) Seroprevalence of *Toxoplasma gondii* in cattle, sheep and goats in Iran Vet. Parasitol., 61 (1/2), 1-3

Hoghoughi, Rad, N. and Afraa, N. (1993) Prevalence of toxoplasmosis in domestic animals. South West Iran. J Trop Med Hyg., 96 193-168

Hutchinson, W.M. (1986). Toxoplasmosis and its feline connection Proceeding of the sheep Veterinary Society, 11 72-74

Lindsay, D.S. and Dubey, J.P. (1989) Immunohistochemical diagnosis of Neospora caninum in tissue sections. Am. J. Vet. Res., 50, 1981-1983.

Mainar, R.C.; Cruz, C., Asensio, L.A., Dominguez, L., Vazquez-Boland, J.A. (1996) Prevalence of agglutinating antibodies to Toxoplasma gondii in small ruminants Veterinary Research Communications, 20 (2) 153-159

Meggigan, C. and Buxton, D. (1986) Ovine toxoplasmosis: Immunity and chemo-prophylaxis Proceeding of sheep veterinary Society, 11, 75-77

Morsy and Michael. (1980) Toxoplasmosis in Jordan J. Egypt Soc. Parasitol., 10 457-470.

Rodriguez- Ponce, E., Molina, J.M., Hernandez, S. (1993) Seroprevalence of goat toxoplasmosis on Grand Canary Island (Spain) Preventive Veterinary Medicine, 24 (4) 229-234

Samad, M.A.; Chhabra, M.B. and Gautam, O.P. (1982) Note on the prevalence of Toxoplasma gondii antibodies in cattle in Bangladesh. Indian J. Anim. Sci., 52 601-603.

Savio, E. and Nieto, A. (1995) "Ovine toxoplasmosis" Vet. parasitol., 60 (3/4), 241-247

World Health Organization (1969) Toxoplasmosis Report of WHO meeting of investigators. Wld Hlth Org. techn. Rep Ser., No. 431 Geneva.

Table (1): Localities, number, sex of tested sheep and goats

Localities	Sheep			Goats		
	Number	Male	Female	Number	Male	Female
El-Salhia	176	26	150	122	19	103
El Khatara	113	11	102	64	9	55
Belbis	54	49	5	-	-	-
Total	343	86	257	186	28	158

Table (2): Latex agglutination test antibodies to *T. gondii* in sera of sheep and goats

Localities	Sheep			Goats		
	No. of tested sera	No. of positive	%	No. of tested sera	No. of positive	%
El-Salhia	176	46	26.14	122	28	22.95
El Khatara	113	34	30.08	64	15	23.43
Belbis	54	13	24.7	-	-	-
Total	343	93	27.1	186	43	23.1

TR = positive titre > 1:64

Table (3): Antibodies titres of *Toxoplasma gondii* in sera of sheep and goats by IHAT

Localities	Sex	No. of tested sheep sera	IHA titre in sheep sera							No. of tested goat sera	IHA titre in goat sera						
			1/8	1/64	1/128	1/256	1/512	1/1024	No of Positive		1/8	1/64	1/128	1/256	1/512	1/1024	No of Positive
El Salhia	male	26	9	3	2	2	0	0	7	49	6	3	1	0	0	0	4
	Female	150	42	22	9	3	1	0	35	103	27	11	6	4	1	0	22
	Over all	176	51	25	11	5	1	0	42	122	33	14	7	4	1	0	26
El Khatara	male	11	7	0	2	1	0	0	3	9	3	1	0	1	0	0	2
	Female	102	30	13	11	4	0	0	28	55	16	6	4	2	0	0	12
	Over all	113	37	13	13	5	0	0	31	64	19	7	4	3	0	0	14
Selbus	male	49	17	6	3	4	0	0	13	0	0	0	0	0	0	0	0
	Female	5	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0
	Over all	54	19	6	3	5	0	0	14	0	0	0	0	0	0	0	0
Total									49 28.26%								40 21.9%

Table (4): Toxoplasmosis and its relation to sex in sheep and goat

Test	Sheep sera						Goats sera					
	male			female			male			female		
	number	positive	positive%	number	positive	positive%	number	positive	%	number	positive	%
LAH	86	25	29.06	257	68	26.45	28	7	25.0	158	35	22.15
IHAT	86	23	26.74	257	64	24.9	28	6	21.42	158	34	21.5