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STUDY ON PREVALENCE OF TOXOPLASMOSIS IN GOATS IN ORGANISED FARMS IN THIRUVANANTHAPURAM DISTRICT

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Introduction

Toxoplasmosis is an infectious zoonotic disease caused by a protozoan parasite, Toxoplasma gondii. Cats are the only definitive host of Toxoplasma and so the adult stage of the parasite occurs only in cats. The infective stages of T. gondii are tachyzoites, bradyzoites and oocyst. All the three infective stages occur in cats. Goats act as intermediate hosts for Toxoplasma. Goats get the infection by ingestion of feed materials contaminated with oocysts present in faeces of infected cats. Infected goats will not shed the infective oocyst through their faeces, but the bradyzoites may get encysted in the tissues, especially liver, brain and muscles which act as a source of infection when fed uncooked to carnivores and also man.

Abortions and neonatal mortality in sheep and goat is the only significant clinical finding in animals recognized with any regularity in field work. The other clinical syndromes in other animals are less common (Radostits et al. 1994). So a study was conducted to detect the prevalence of toxoplasmosis among goats in Trivandrum district so as to assess the disease status.

Materials and methods

The present study was conducted during the period from Feburary 2008 to April 2008. Goats reared in three organised farms in the district of Trivandrum were included in the study. Blood samples were collected from the goats and serum was separated. The samples were kept frozen at -20°C until testing. The details of the animals like age, sex, history of illness/abortion etc. were also collected. Presence of Toxoplasma antibodies (Ig) in the samples were tested by ELISA using CHEKIT Toxotest kit (Bommeli Diagnostics, IDEXX laboratories)

The serum samples were diluted 1:400 with diluting solution. 100uL each of the diluted samples, positive control and negative control were added to the wells in the micro titre plates pre-coated with inactivated toxoplasma Ag. After incubation for 60 minutes at 37°C, the wells were washed with wash solution to remove all unbound materials. 100uL of peroxidase labeled Anti-Ruminant-Ig-Conjugate was added to each well. The plates were again incubated at 37°C for 60 minutes and wells were washed with wash solution. 100uL of substrate solution containing TMB was added to each well and incubated for 10 minutes at room temperature in darkness. The reaction was stopped by adding 100uL of stop solution. The absorbance of the samples and controls at 450nm were measured using ELISA reader. The optical density (OD) of the sample wells were compared with that in the control wells. The interpretation value was calculated as;

$$\text{Value (\%)} = \frac{OD_{sample} - OD_{negative\ control}}{OD_{positive\ control} - OD_{negative\ control}} \times 100$$

The values were interpreted as; value <20% is negative, 20-30% is ambiguous, 30-100% is weak positive and >100% is positive.

The test was considered valid only if the mean OD_{450} of positive controls was less than 2.0 and that of the negative control was less than 0.5. The difference between the positive and negative control must be $\geq$0.3. Samples which gave results as ambiguous were retested.

The history and health records of the animals were analysed and co-related with the results.

Result

Altogether 121 caprines in three farms were subjected to study, out of which 4 were male animals. Of the 121 animals tested, 47 animals were positive, 19 were weakly positive and 55 were negative for Toxoplasma antibodies.

Of the 4 male animals tested, three were found positive and one was negative while among females, 48 animals (38%) were positive, 19 (16%) were weakly positive and 54 (46%) were negative.

45 animals were less than 2 years of age

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Result	No. of animals		%	
Positive	47	66	39	57
Weakly positive	19		16	
Negative	55		43	

and 76 animals were above 2 years. In the less than 2 year age group, 17 animals (38%) were positive for Toxoplasma antibody, 5 (11%) were weakly positive and 23 (51%) were negative. Among the greater than 2 year age group, 30 animals (39%) were positive, 14 (18%) was weakly positive and 33 (43%) were negative for Toxoplasma Ab.

Seven animals had a history of abortion, of which 4 were positive for toxoplasma Ab and 3 were negative.

Discussion

In the present study, prevalence of toxoplasmosis in goats was evaluated by detection of antibodies by ELISA test. Among the 121 samples tested, 43% were negative and 57% were positive or weakly positive. Literature study on prevalence of toxoplasmosis in goats in India could not be traced out. Seropositivity of toxoplasmosis in goats and sheeps in Stara Zagora region of Bulgaria is 59.8% (Prelezov et. al., 2008).

Toxoplasma infection causes fetal death, abortion and weak newborns in small ruminants. IgG antibodies are detected 2 to 3 weeks after infection and the titre reaches its maximum 6 to 8 weeks after infection, thereafter decreasing slowly and possibly persisting at a lower level for life. (Krauss et al., 2003)

Of the 63 animals found positive, only four had a history of abortion. This indicates that Toxoplasma infection in goats need not be always manifested with abortion. This agrees with the inference of Radostits et al. (1994) that goats which become infected during pregnancy will abort while non-pregnant goats which acquire infection develop sufficient immunity to prevent further abortion.

Toxoplasmosis is a self limiting disease in goats. So itself its significance in goats may be less from an economic point of view. But its zoonotic importance makes this study relevant. The toxoplasmosis in man is likely to be occupational but may occur sporadically after the ingestion of infected milk and meat. Inapparent carriers are the most insignificant source of infection.

There are a number of studies showing high prevalence of toxoplasmosis among humans in Kerala.). According to Shanmugam et.al. (1995), Toxoplasma gondi IgM antibody prevalence in patients suffering from neurological disorders is 32.7%. In Karnataka, seroprevalence of Toxoplasmosis in voluntary blood donors is 20%-40% (Sundar et.al., 2007. Sebastian et al. (2008) have reported that 50.7% of abortions in humans in Malabar region of Kerala are due to toxoplasmosis.

Further study need to be conducted to understand the extend of disease prevalence in other areas of our country. Necessary steps need to be taken to control and contain the disease in goats to reduce its economic impact and further more to reduce its zoonotic impact in humans.

Conclusion

From the present study it is clear that there is high prevalence of toxoplasmosis (57%) among goats in Thiruvanathapuram district of Kerala

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