CARBON IMMUNO ASSAY: A SIMPLE AND RAPID SERODIAGNOSTIC TEST FOR CAPRINE TOXOPLASMOSIS *

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Abstract

The efficacy of carbon immuno assay in the diagnosis of Toxoplasma gondii in goats was studied by subjecting 152 blood samples of goats maintained in the Government goat farms of Attapady, Kommeri and KAU and of those brought to the slaughter houses of Thrissur and Ernakulam. The antigen required was prepared from the peritoneal exudates of T. gondii infected mice. Antigen coated slides were allowed to remain in contact with the serially diluted suspected sera at 37° C for 30 min followed by staining with India-ink. Antibodies to T. gondii could be detected in 44.07 per cent of samples. It was indicated by more than 50% staining in sera with titres ≥ 4. CIA is a simple and easy test and very cost effective in the diagnosis of toxoplasmosis in any species of animal.

Key words: *Toxoplasma gondii, goats, carbon immuno assay*

Toxoplasmosis is recognized worldwide as a cause of abortion, still birth and neonatal mortality in goats (Dubey, 1987). Although a number of sero diagnostic tests have been developed for the diagnosis of this disease, they are costly, time consuming and demand special sophisticated equipments. The utilization of carbon particles in India-ink for the immunological diagnosis was first done by Geck (1971) for the detection of human enteropathogens. This India-ink immuno reaction was modified for the diagnosis of human toxoplasmosis by Chalupsky (1981). Pakes and Lai (1985) and Arias *et al.* (1995) also opined that the carbon immuno assay was a simple and rapid sero diagnostic test for the detection of feline and bovine toxoplasmosis.

The present paper reports on the efficacy of carbon immuno assay (CIA) in the diagnosis of Toxoplasma in goats.

Materials and Methods

Collection of samples

Blood samples were collected from bucks, kids, healthy does and does with a history of abortion belonging to the Government Goat farms, Attapady and Kommeri and the Kerala Agricultural Goat farm and from the slaughter houses at Thrissur and Ernakulam. The sera were separated and stored at -20° C till use.

Preparation of antigen

The CIA antigen was prepared as per the procedure outlined by Kellet and Bywater (1980).The peritoneal exudates harvested from infected mice containing + + + + infection were used for this purpose. The intracellular parasites were released by repeated passage of the exudates through a 27 gauge needle. It was washed three times in phosphate buffered saline (PBS) by centrifugation and then resuspended in formalin-PBS (one percent) for 90 min at room temperature. The organisms were again recovered by centrifugation at 10,000 rpm for

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30 min and 25 µl of this material was charged onto clean glass slides. The tachyzoite coated slides were then air dried at room temperature and stored at 4°C until further use.

Test proper

The methodology described by Arias *et al.* (1995) was followed. Fifty µl of the test sera both undiluted sample as well as two fold serial dilutions from 1 to 8 were charged onto the tachyzoite coated slides. The fixed tachyzoites on the slides were allowed to remain in contact with the serum at 37°C for 30 min.The slides were then washed with PBS three times. Undiluted India-ink was applied on the slides and allowed to react for 5 min.The slides were then flushed with PBS and rinsed in distilled water. The air dried preparations were examined microscopically under oil immersion objective.

Interpretation

More than 50 percent staining was considered as the final end point. Sera with titres ≥ 4 giving the reaction were considered as positive.

Results and Discussion

The results of the presence of *T.gondii* antibodies in the goat sera are furnished below in table.

The prevalence of *T. gondii* in 152 samples of goat sera was found to be 44.07 percent by the CIA. Among the 45 and 35 sera collected from the Government Goat farms of Attapady and Kommeri respectively, 18 (40 %) samples each showed positive reaction, whereas from the 20 sera of the KAU Goat farm, Mannuthy 10 (50 %) were sero positive with titres ≥ 4.The slaughter houses at Thrissur and Ernakulam revealed 12(44.4%) and 9 (36 %) to be seropositive out of 27 and 25 samples respectively. The present work confirms the findings of Pakes and Lai (1985) and Arias *et al.* (1995) who applied CIA for the diagnosis of *T. gondii* in feline and bovine sera and reported that it could effectively be used as a diagnostic test for toxoplasmosis in any species of animal. Although CIA requires a continuous maintenance of *T. gondii* strain, it is the test of choice in the serological surveys of caprine toxoplasmosis, if effective preservation of *T. gondii* is maintained in the laboratory for the supply of the organisms.

Table. Antibody titres ≥ 4 in goat sera against *T. gondii* by CIA

Location	Number examined	Number positive	Percent positive
Govt. goat farm, Attapady	45	18	40.00
Govt. goat farm, Kommeri	35	18	51.42
KAU goat farm	20	10	50.00
Slaughter house, Thrissur	27	12	44.40
Slaughter house, Ernakulam	25	8	36.00
Total	152	67	44.07

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