Ovine trypanosomosis: a seroepidemiological survey in coastal Guyana

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INTRODUCTION

The trypanosomes, Trypanosoma vivax and Trypanosoma evansi, are vector-transmitted hemoparasites commonly found in livestock in Africa and Latin America. Trypanosoma vivax is found in cattle, sheep, goats and wild ruminants in Africa, where it is spread by the tsetse fly, Glossina sp. It causes Nagana in African cattle and sheep, a disease complex characterized by fever, anaemia, reduced fertility, weight loss and mortality (3, 12). In the New World, T. vivax infection has been recorded in cattle, buffalo, sheep and goats (15). The tsetse fly is not found in the Americas. Infection is probably mechanically transmitted by biting flies. Three species of Tabanids have been proven to be experimental vectors of T. vivax infection in cattle in South America, Cryptotylus unicolor (8), Tabanus importunus (14) and Tabanus nebulosus (13). However, the experimental transmission of trypanosomes by biting insects does not necessarily imply that they play a significant role in the field (9). Suggested reservoirs of T. vivax in the New World include cattle and deer (15).

Trypanosoma evansi is found in the Middle East, Asia, the Far East, Central and South America and Africa. It has clinical significance in horses, donkeys, camels, bufaloes, cattle and dogs, causing a disease called surra (12). This disease is characterized by intermittent fever, anaemia, dependent oedema, lethargy, loss of condition, nervous signs and eventually death (11). Natural infection has been found in several species of wild animals including the capybara (Hydrochoerus capybara), a large rodent found in South America, which has been suggested to be the reservoir (16). Cattle and buffalo in endemic areas can be subclinically infected and may act as reservoirs for other animals (15). In Africa and Asia, the incidence of surra is associated with wet seasonal conditions which increase the population of biting flies, resulting in “surra seasons” (15). The vector in Central and South America has been postulated to be biting flies (4) or the vampire bat, Desmodus rotundus (10).

In March 1992, a baseline survey of ovine health on small farms was conducted in Region 5, Mahaica/Berbice, a coastal area of Guyana. The objectives of this study were to evaluate the presence, significance and frequency of selected diseases in target sheep flocks in order to develop appropriate, effective and economical preventive medicine recommendations. As part of this survey, serological testing was done for Trypanosoma evansi and Trypanosoma vivax.

MATERIALS AND METHODS

In March 1992, demographic data and blood samples were collected from a systematic random sample of sheep on twenty-two farms. Sheep were categorized as owo, nursing lamb, weaned lamb or ram. Farm of origin,
The youngest seropositive lamb was 3 months old. Of 43 samples from lambs under 1 year of age, 29 (67%) were positive to Trypanosoma sp. were positive for both. Of 43 samples from lambs under 1 year of age, 29 (67%) were positive to Trypanosoma sp. and T. evansi from infected mice. The smears were air dried at room temperature, fixed in acetone and stored at -20°C. Smears were thawed at room temperature for 15 min, then divided into 3 rows of 7 wells with permanent marker. The test sera, diluted to 1:160 concentration, were incubated for 30 min in humid chambers at 37°C, washed for 10 min in a PBS bath, then incubated with conjugated goat anti-ovine IgG L+H and Evans blue. Slides were then covered with Indirect Fluorescent Buffer mountant, air-dried and examined under a 10x eyepiece with 50x objective on a fluorescent microscope. Fluorescence was graded as 0 (negative), 1+ (very weak), 2+ (weak), 3+ (strong) or 4+ (very strong). Samples were considered to be seropositive if any fluorescence was observed (>0).

**RESULTS**

Age at time of sampling varied between 3 months and 7 years of age, with a mean of 2.2 years. One hundred and eleven (69%) were female and fifty (31%) were male. Most (90%) sheep were Creole or mixed breed, with the rest considered to be mainly of Barbados Blackbelly type. Mean recorded body condition score was 3; however, these data were considered unreliable as the scoring method was not sufficiently standardized between scorers.

Trypanosoma serology results were received for one hundred and sixty-one (161) samples. One hundred and three (64%) sera were sero-positive for Trypanosoma sp. on Indirect Fluorescent Antibody test. Of these, 38 (23.6%) sera were positive to T. evansi only, eleven (6.8%) were positive to T. vivax only and 54 (33.5%) were positive for both. Of 43 samples from lambs under 1 year of age, 29 (67%) were positive to Trypanosoma sp. The youngest seropositive lamb was 3 months old.

**DISCUSSION**

The overall seroprevalence rate of 64% for Trypanosoma sp. suggests that trypanosomosis is endemic in sheep in coastal Guyana. As cross reactions occur between T. vivax and T. evansi, it was difficult to determine the true species of exposure for the sera which tested positive in both species. This seroprevalence result corroborates the finding of APPLEWHAITE, who found a seroprevalence rate of 63.4% of T. vivax in sheep in Guyana using an ELISA (Enzyme Linked Immuno Sorbent Assay) procedure. The same study found trypanosomosis infection in 4.6% of sampled sheep, based on examination of stained thick blood films (2). In a survey of cattle in Guyana in 1975, CRAIG found 5 samples out of 1019 (0.6%) to be positive for T. vivax, using examination of stained thick blood films. All infected cattle were from coastal regions (6).

The pathogenicity of New World T. vivax is variable but tends to be lower than of African strains (15). Studies in cattle, sheep and goats have demonstrated that T. vivax infections may be acute, subacute or chronic (1). Trypanosoma susceptibility varies between ruminant species, between breeds and between individuals within a breed (6). Asymptomatic infections and mixed infections with Babesia and Anaplasma are common. In symptomatic domestic ruminants, clinical signs include intermittent fever, anaemia and loss of condition (15). Bovine trypanosomosis has been associated with clinical disease, abortion and high mortality in Colombia (17) and Venezuela (5). Recent evidence in French Guiana has associated ovine T. vivax infection with abortion and mortality (7). In sheep in Africa, hair loss from the back, tail and scrotum and peripheral lymphadenopathy have also been associated with T. vivax infection (6). Control measures for T. vivax in Africa include the use of insecticides, trypanocides and tsetse fly trapping. Research is currently underway in Africa in the areas of vaccine development and breeding trypanosome resistant cattle and sheep (12).

This was the first serological evidence of T. evansi in sheep in Guyana. Strains of T. evansi from different geographic areas vary greatly in virulence and economic importance for domestic animals (15). The clinical significance and economic importance of T. evansi infection in sheep in South America are not clearly understood.

**CONCLUSION**

Further studies are necessary to evaluate the clinical significance and economic impact of T. vivax and T. evansi infection in sheep in Guyana. If these studies determine trypanosomosis to be an important constraint to productivity, research to identify the vectors and reservoirs in Guyana would be justified.

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REFERENCES