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Bovine Trypanosomosis and Tuberculosis in a Nomadic Herd in Sabon Gari Local Government Area of Kaduna State, Nigeria

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Abstract: Thirty two nomadic Bunaji cows in Sabon Gari Local Government Area (L.G.A.) of Kaduna State were presented for screening with history and signs of persistence coughing, emaciation, superficial lymphadenopathy, fever, anaemia and drop in milk production. The animals were screened for Bovine Trypanosomosis (BT) and Tuberculosis (BTB) using Standard Trypanosome Detection and concentration Method (STDM) and One-Step Anigen® Rapid Bovine Tuberculosis Antibody Test (IQRT), respectively. The result revealed that 40% (13/32) were positive for *Trypanosoma vivax* and 12.5% (4/32) positive for antibodies to *Mycobacterium bovis* (*M. bovis*). Animals positive for trypanosomosis were treated with homidium chloride (Novidium®) at 1 mg kg^{-1} body weight, while those positive for *M. bovis* antibodies were culled. Post mortem examinations conducted on culled animals revealed no gross lesions for BTB. This study showed that coughing and emaciation in BT due to immunosuppressive activity of the trypanosomes may obscure or mimic BTB, this may result in the unnoticed spread of BTB to susceptible animals and humans through aerosol droplets and the possible consumption of unpasteurized milk, respectively thereby constituting a public health hazard.

Key words: Bovine trypanosomosis, bovine tuberculosis, immunosuppression, bunaji cows, body weight, antibodies

INTRODUCTION

Trypanosomosis caused by trypanosomes of different species is the most important haemoparasitic disease of ruminants in the tropics (Sackey *et al*., 2008). In Nigeria, trypanosomosis is said to cause menace in the livestock industry (Qadeer *et al*., 2008). Infected animals have been shown to have high abnormal amounts of immunoglobulin and this has lead to the occurrence of immunosuppression in the infected animals thereby exposing them to secondary bacteria infections with the attendant clinical signs of coughing, dyspnoea and diarrhoea (Nantulya *et al*., 1982; Brown *et al*., 1990).

Anaemia is the predominant symptom and a reliable indicator for the severity of haemoparasitic infections in animals (Anosa, 1988). Bovine tuberculosis caused by *M. bovis* is a chronic and progressive bacterial disease of animals and humans with clinical signs appearing only in the advanced stage of the infection which may include coughing, dyspnoea, emaciation and enlargement of the regional lymph nodes depending on the route of the infection (Radostits *et al*., 2000). Cases of BTB in both organized resident farms and nomadic Fulani herds have been previously reported in different parts of Nigeria (Cadmus *et al*., 2004; Akam *et al*., 2008). Nigeria has an estimated cattle population of over 20 million with Zebu breeds (Bunaji or White-Fulani, Sokoto Gudali and Rahaji) constituting over 90% of the total national herd. Bunaji breeds makes up about 7.7 million heads of the entire cattle population. Majority of these cattle are for dairy and beef production. However, because of the inadequate disease control, monitoring and surveillance systems, these animals are constantly been exposed to diseases some of which are zoonotic. These diseases affect their productivity and performance resulting in economic loss and public health hazard. This study reports bovine trypanosomosis and tuberculosis antibody in Bunaji dairy cows.

MATERIALS AND METHODS

Thirty two Bunaji dairy cows of various ages were presented for screening with history and signs of persistence coughing, emaciation, anaemia, superficial

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lymph nodes enlargement and drop in milk production. About 8 mL of whole blood was collected from each animal by jugular venipuncture, 5 mL of the blood was transfered into test tubes without anti-coagulant and allow to clot in order to obtain serum, while the remaining 3 mL of blood was decanted into Bijou bottles coated with EDTA as anti-coagulant, transported on ice packs to Microbiology and Protozoology laboratories for IQRT and STDM analysis, respectively.

Bovine tuberculosis detection: Antigen® RAPID Bovine tuberculosis antibodies test (IQRT) kits specific for *M. bovis* antibodies containing the test devices and specimen droppers procured from Anigen® Animal Genetics Inc. in South Korea were used in detecting *M. bovis* antibodies in the sera collected. The sera samples transported on ice packs were allowed to attain room temperature (15-30°C) before use (Anigen® Animal Genetics, Incorporation, 2005). The procedure was as follows:

- The test kit was removed from the foil pouch and placed on a flat, dry surface to attain room temperature
- Four drops of the test serum were added slowly to the sample hole using the specimen dropper. Where the migration did not appear after 1 min, one more drop of the test serum was added to the sample hole (Fig. 1)
- The test result was interpreted within 20 min. Result interpreted beyond 20 min was invalidated
- A test result was seen as a purple band in the result window of the kit (Fig. 2)
- The right section of the result window indicated the test results. If another colour band appeared in the right section of the result window, this band was the Test line (T) (Fig. 3)

Interpretation of the IQRT result

Negative IQRT result: The presence of only one purple colour band within the result window indicated a negative result (Fig. 3).

Positive IQRT result: The presence of two purple colour bands (T band and C band) within the result window, no matter which band appeared first, indicated a positive result even if the intensity of the purple band colour was faint it was interpreted as positive, if it appeared within 20 min based on the recommendation of the manufacturer (Fig. 2).

Invalid IQRT result: Where the purple colour band was not visible within the result window after performing the test, the result was considered invalid (Fig. I). This is because directions might not have been followed correctly or the test kit might have deteriorated. Based on the manufacturer's recommendation the specimen was re-tested.

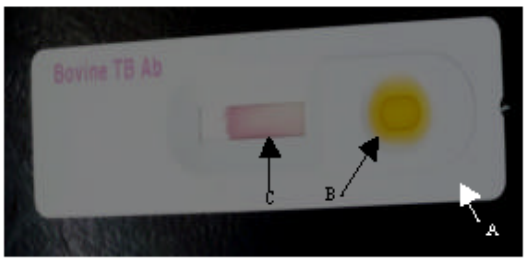

Fig. 1: Migration of the test serum from the sample hole to the result window, (A) IQRT kit, (B) Sample hole, (C) Result Window

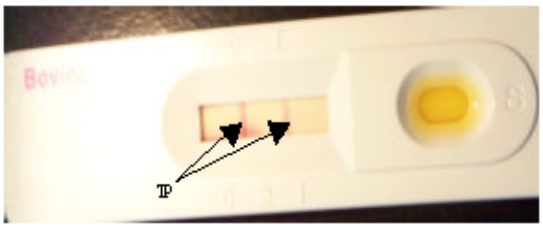

Fig. 2: A positive IQRT result showing two purple bands in the result window. (TP) Two Purple bands

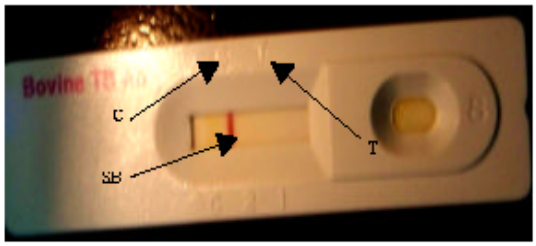

Fig. 3: A negative IQRT result showing a single band (Control) in the result window. C: Control band position; (T) Test band position; (SB) Single Band

The IQRT positive cows were traced, culled and post mortem B TB gross lesion examination was carried out. The results were recorded (Table 1).

Bovine trypanosomosis detection: The 3 mL of whole blood in EDTA collected were screened for *trypanosomes* using standard *trypanosomes* detection and concentration methods (Murray *et al*., 1980; Paris *et al*., 1982). *Trypanosoma species* were identified using morphological differentiation of the parasites on giemsa stained thin blood smear (Paris *et al*., 1982).

Table 1: Detection of bovine trypanosomosis and tuberculosis using STDM and IQRT respectively in bunaji dairy cows in Sabon Gari L.G.A. of Kaduna state, Nigeria

Animal ear tag no.	STDM status	IQRT status	Postmortem BTB gross lesion
009	*T. vivax*	Positive	No observable lesion
032	Negative	Negative	
012	Negative	Negative	
018	*T. vivax*	Negative	
080	*T. vivax*	Negative	
016	*T. vivax*	Positive	No observable lesion
100	Negative	Negative	
097	Negative	Negative	
001	Negative	Negative	
088	*T. vivax*	Negative	
019	*T. vivax*	Positive	No observable lesion
011	Negative	Negative	
017	Negative	Negative	
025	*T. vivax*	Negative	
028	*T. vivax*	Negative	
010	Negative	Negative	
014	*T. vivax*	Negative	
037	*T. vivax*	Positive	No observable lesion
077	Negative	Negative	
065	Negative	Negative	
015	*T. vivax*	Negative	
003	Negative	Negative	
005	*T. vivax*	Negative	
067	Negative	Negative	
007	Negative	Negative	
044	Negative	Negative	
038	Negative	Negative	
078	Negative	Negative	
089	*T. vivax*	Negative	
069	Negative	Negative	
054	Negative	Negative	
093	Negative	Negative	
Total 32	Total positive 13	Total positive 4	Total positive 0

RESULTS AND DISCUSSION

Of the 32 bunaji dairy cows screened, 40% (13/32) were positive for *T. vivax* (Table 1), while 12.5% (4/32) were positive for antibodies to *M. bovis* (Table 1). The study area fall within the tsetse-fly infested zones of Nigeria (Qadeer *et al*., 2008) and trypanosomosis is a well known disease of cattle to the nomadic Fulani (Pastoralists). At the moment, the control of the disease is only by treatment with trypanocidal drugs.

However, because of the indiscriminate use of the trypanocidal drugs by the Pastoralists themselves (Personal experience) and the high cost of treatment, there has been reported cases of drugs resistance to the trypanosomes parasite and with consequences of immunosuppressive effect, this may lead to secondary bacterial infections which may result in obvious clinical signs of production losses such as persistence coughing, enlargement of the regional lymph nodes emaciation drop in milk production and mortality. Animals in such immunosuppressive condition can easily succumb to secondary bacterial infection like *M. bovis* if exposed. The overall prevalence of 40% observed in bovine trypanosomosis in this study is higher than the earlier report of 8.4% by Enwezor *et al.* (2009) this difference can be attributed to high preponderance of the vectors that transmit the infection, this explained the high dominance of *T. vivax* in this study, this report is in agreement with the findings of Kalu and Uzoigwe (1996), Abenga *et al.* (2004) and Qadeer *et al.* (2008), they reported the dominance of *T. vivax* in the areas of their studies.

The prevalence of bovine tuberculosis observed in this study was 12.5%. This is higher than the 5% reported by Akam *et al.* (2008) in a study of bovine tuberculosis in a dairy farm in Kaduna state using Tuberculin test. The difference in prevalence could be attributed to the sensitivity of the test used during the study. No pathological lesion of tuberculosis was observed during post mortem examination of culled animals, this indicates that the infection was probably at its early stage, this finding agrees with the report of Radostits *et al.* (2000) that bovine tuberculosis gross lesions are seen only in chronic stage of the infection.

CONCLUSION

The result of this investigation clearly indicates that mixed infection of BT and BTB do occur unnoticed with the consequences of low productivity and high mortality in dairy cows kept under the nomadic management system. Veterinary clinicians should make frantic effort to encourage dairy farmers to always screen their herds for tuberculosis which may presents clinical signs similar to bovine tuberculosis as a strategy in minimizing or controlling the spread of BTB to susceptible animals and humans.

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