Trypanosomosis complicated with fasciolosis in an intensively managed dairy farm in Niger state

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ABSTRACT

A study was carried out to assess the effect of mixed infection of *Trypanosoma vivax* and *Fasciola* spp. in an intensively managed dairy farm. Twenty lactating Friesian cows were screened, 25% (5/20) had concurrent infections of *T. vivax* and *Fasciola* spp., while 20% (4/20) had mixed infections of *T. vivax* and strongyle infection, 15% (3/20) had mixed infections of *Theileria mutans* and strongyle infection. Only 10% (2/20) has single infection of *T. vivax* and *T. mutans* respectively. Anemia, submandibular edema, reduce milk production emaciation and epiphora are the major clinical signs presented by the animals.

Key words: Dairy; Friesian; *Trypanosoma vivax*; *Fasciola* spp.; mixed infection

INTRODUCTION

Ruminant trypanosomosis is caused by 3 main pathogenic trypanosome, *Trypanosoma vivax, Trypanosoma congolense* and *Trypanosoma brucei*, transmitted in nature by tsetse flies (*Glossina* spp.). The disease occurs wherever tsetses are prevalent, but may also be transmitted mechanically by other hematophagous flies (Maudlin *et al*., 2004). The disease represents a major obstacle not only for increased food production, but also to the agricultural and socioeconomic development endeavors of the communities in tsetse infested areas (Stephen, 1986). It is also characterized by fever, continuous drop in the hematocrit value (anemia), emaciation, drop in milk production, reproductive disorders such as irregular oestrus, abortion, and retained placenta, neonatal death and infertility (Seifert, 1996).

Fasciolosis is a parasitic disease of cattle, sheep and goats caused by *Fasciola hepatica* and *F. gigantica*. It causes significant morbidity, mortality, liver damage and loss of weight (Okewole *et al*., 2000; Nonga *et al*., 2009).

According to Schillhorn Van Veen (1979), fasciolosis is mainly observed in the chronic form, either in young animals during the rainy season due to recently acquired infections or in the dry season in order animals which are in poor condition and may not be able to withstand the effect of relatively small number of flukes.

In Nigeria, acute liver fluke infections are rarely seen in cattle, but have been reported in small ruminants (Ogunrinade and Adegoke, 1982). The disease is characterized by anemia due to the severe liver damage caused by the immature fluke tunneling through the liver parenchyma with extensive tissue damage and hemorrhage that culminate in severe clinical disease (Biffa *et al*., 2006). Several complication include weight loss, drop in milk production, submandibular edema and diarrhea (Radostits *et al*., 2000), considerable economic losses through mortality, liver condemnation at meat inspection and lowered resistance to other concurrent infection.

Mixed infection of trypanosomosis and fasciolosis continue to be one of the major constraints to

livestock production in sub-Saharan Africa (Ogunrinade and Adegoke, 1982). The additional problem of immunosuppression in trypanosomosis (Holmes *et al*., 1974; Scott *et al.*, 1997) renders the animals more susceptible to secondary infection (Nantulya *et al*., 1982). Single parasitic infection in a host are not uncommon in nature, however, mixed infection with various species or with several different types of parasites is the rule (Sharma *et al*., 2000).

This paper reports mixed infection of bovine trypanosomosis and fasciolosis in Friesian cows under intensive management system in Minna, Niger state.

MATERIALS AND METHODS

The study was carried out in Niger state of Nigeria fall within the derived Savannah region (8º 20´- 11º 30´ North, 3º 30´-7º 20´ East), where there is perennial feed for livestock. The state is known to be an endemic zone for both animal and human trypanosomosis (NITR, 1980).

The annual rainfall varies between 1,200 mm and 1,600 mm, 85% of the precipitation occurring between the months of May and November.

Within a period of 6 months, 45 lactating Friesian cows died out of 120 lactating animals in the farm. The ambulatory clinic unit of the Veterinary Teaching Hospital, Ahmadu Bello University, Zaria was invited to investigate the cause(s) of the death of those animals and to suggest treatment/preventive measures in the farm. Clinical signs observed on physical examination were emaciation, pale ocular mucus membrane, fever, submandibular edema, bilateral ocular discharge and profuse diarrhea. Blood and fecal samples were taken from randomly selected 20 cows. Thin and thick blood films were made using hematocrit centrifugation technique (HCT) as described by Woo (1969) for the detection of *Trypanosoma* species. Packed cell volume was equally determined using microhematocrit method. Sedimentation technique as described by Benedeck (Munguia-Xóchihua *et al.*, 2007) was used in analyzing fecal samples for *Fasciola* and strongyles eggs.

RESULTS

Of the 20 lactating Friesian cows screened, 25% (5/20) had concurrent infections of *T. vivax* and *Fasciola* spp., while 20% (4/20) had mixed infections of *T. vivax* and strongyles eggs; while 15% (3/20) of the animals had mixed infections of *Theileria mutans* and strongyles eggs. Only 10% (2/20) has a single infection of *T. mutans* and *T. vivax* (Tables 1, 2 and 3). Animals with mixed infections of *T. vivax* and *Fasciola* spp. showed marked anemia with PCV of 18.5-20.0% (Table 1) and 23-31% for a mixed infections of *T. mutans* and *Strongylus* spp.; while animal with single infection had PCV of 20.0-29.0% (Table 3). Emaciation, submandibular edema, epiphora, agalactia and anestrous (reduced calving rate) were the major presenting clinical signs observed.

Table 1. Mixed infections of *T. vivax* and *Fasciola* spp. with PCV

Animal No.	Blood Parasite	GIT Parasite	PCV (%)
815	*T. vivax*	*Fasciola* eggs ++	19
9870	*T. vivax*	*Fasciola* eggs +	20
248	*T. vivax*	*Fasciola* eggs +	19
861	*T. vivax*	*Fasciola* eggs ++	18.5
908	*T. vivax*	*Fasciola* eggs ++	20

GIT = Gastro Intestinal Tract

Table 2. Mixed infections of *T. vivax* and *Strongylus* spp. with PCV

Animal No.	Blood Parasite	GIT Parasite	PCV (%)
875	*T. vivax* ++	*strongyle* eggs +	21
5484	*T. vivax* +++	*strongyle* eggs +	20.5
282	*T. vivax* +	*strongyle* eggs +	22

GIT = Gastro intestinal Tract

Table 3. Single infections of *T. vivax*, *Fasciola* spp. and *Strongylus* spp. with PCV

Animal No.	Blood Parasite	GIT Parasite	PCV (%)
256	*T. vivax* ++	NPF	20
3608	*T. vivax* ++	NPF	23
257	*T. mutans* +	NPF	29
3607	*T. mutans* +	NPF	27
526	NPF	*strongyle* egg+	28
366	NPF	*Fasciola* egg+	26

GIT = Gastro-Intestinal Tract.
NPF= No parasite Found.

DISCUSSION

The clinical diagnosis of bovine trypanosomosis in an intensively managed dairy farm strongly suggest the activities of biting flies that plays a major role in the mechanical transmission of the trypanosome parasites. This finding is agreement with where he reported that the disease is transmitted in nature by hematophagous insect (Tabanidae, Culicidae and sometimes Muscidae) and that the trypanosome ingested by these vectors from an infected host survive only 15 minutes inside the hypostome.

The fasciolosis observed in this study is attributed to feeding the animals with fresh irrigated maize from a dam that was heavily contaminated with *Lymnaea* snail, the intermediate host of the disease. According to Radostits *et al.* (2000), land frequently irrigated is a suitable source of infection for animals, also, Kimura and Shimizu (1978) reported in their findings that metacercaria of *Fasciola gigantica* can survive for up to 4 month on rice straw kept in barn were relative humidity is more than 60%. In this study, the findings strongly suggest that concurrent infection due to *Trypanosoma* and *Fasciola* spp. is the most pathogenic parasitic disease of animals within the area of study, this observation agrees with the reports of Kaufmann *et al.* (1992) and Dwinger *et al.*(1994) where they described an increased pathogenicity when helminthosis infection is superimposed on trypanosome. The marked anemia observed in this study in animals with dual infections of *Trypanosoma* and *Fasciola* spp. (Table 1) could be attributed to the destruction of the red blood cells by the trypanosomes, according to the anemia could be as a result of phagocytosis by an activated and expanded mononuclear phagocystic system. In fasciolosis, anemia is also a major clinical signs; it could be due to the activity of the migrating larvae through the liver parenchyma

leading to extensive destruction and marked hemorrhage. The resulting hemolytic crisis leads to progressive weakness, anemia and enlargement of the liver. Marked anemia was observed in animals with mixed infection of *Trypanosoma* and helminthosis (Table 2), this finding agrees with the report about anemia in mixed infection of *T. congolense* and *Haemonchus contortus* experimental infection in sheep. There was a slight anemia (Table 3) in animals with single infection, this is in agreement with the report of Anosa (1988) that anemia is a single reliable indicator for the severity of hemoparasitic infection.

Submandibular edema was observed in animals with mixed infections of *Trypanosoma* and *Fasciola* spp., this finding is in agreement with the findings of Katunguka-Rwakishaya *et al*. (1997), they reported that the degree of hypoalbuminaemia was related to the level of parasitaemia and/or the disease. It has previously been indicated (Holmes, 1974) that hypoalbuminaemia may arise due to increased catabolism of albumin, its uptake by trypanosome or as a result of heamodilution. The fall in total serum protein level (hypoalbuminemia) may also be due to reduced protein synthesis arising from liver dysfunction or as a result of excessive protein breakdown arising from reduced feed intake as observed in all infected animals. In this study decreased milk production, reduce calving rate was observed though not quantified, this is probably the direct and indirect effects of bovine trypanosomosis on production. This finding is similar to the observation made by Samdi *et al* (2010) where they reported 20% reduction in meat and milk production and with 20% decreased in calving rate.

Fraser *et al.* (1991) reported that reduction in migration and activity of the juvenile flukes through the liver parenchyma is associated with hepatic fibrosis, which inhibit intra-parenchyma migration, and calcified cholangitis, which deters flukes in their hemorrhagic activities, both of these lesion-associated phenomena help cattle to resist chronic fasciolosis. Beside the fact the liver possesses considerable functional reserve and regenerating capacity help animals to survive without any significant impairment of hepatic function even until two-third of the liver is damaged (Carlton and McGavin, 1995), this probably explain why some of the animals manifested chronic fasciolosis with submandibular edema and low level of anemia especially in animals with single infection as major clinical sign, and it is also believed that the high level of mortality experienced in this report may be attributed to the pathogenic activities of trypanosome parasite.

The post-treatment clearance of parasitaemia and flukes parasite in all the animals, indicated that isometamidium chloride and albendazole are highly effective trypanocidal and flukicides drugs in cattle when used as therapeutic agent against sensitive a population.

CONCLUSION

The potentials for dairy production in Nigeria can be realized if the animals are protected against adverse effects of parasitic diseases such as bovine trypanosomosis and fasciolosis. The profitability of dairy farm demands an efficient husbandry management system as diseases still remain a factor in limiting profits that would have been realized in this sector of the Nigerian economy. In this study area trypanosomosis and fasciolosis must be control if livestock production is to succeed.

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