The occurrence of liver flukes in cattle and sheep slaughtered in Sokoto abattoir, Northwestern Nigeria

¹Alayande, M.O., ¹Lawal, M.D., ¹Mohammed, A.A., ¹Ibafidon, M., ¹Ibrahim, N. and ^{2,3}Talabi, A.O.

¹Department of Veterinary Parasitology and Entomology, ²Department of Veterinary Medicine, Faculty of Veterinary Medicine, Usmanu Danfodiyo University Sokoto, Nigeria. ³Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, Federal University of Abeokuta, Nigeria

*E-mail of Corresponding Author: musolade2000@yahoo.com

Abstract

This study was carried out to determine the occurrence of liver fluke infections in cattle and sheep slaughtered in Sokoto metropolitan abattoir, northwestern Nigeria using bile samples. A total of 170 cattle and 126 sheep of different local breeds were randomly selected and examined at the abattoir and the gall bladder of such animals were collected, sliced open and the entire content washed into a beaker and allowed to stand for up to 6 hours after which the sediments were examined for eggs of *Fasciola* spp. and *Dicrocoelium* spp. 17.06% and 4.76% of cattle and sheep respectively were infected with *Dicrocoelium* spp., but egg of *Fasciola* spp. was not found in the animals sampled in this study. Eggs of *Dicrocoelium* spp. were found to be highest in female cattle (18.75%) and female sheep (5.88%). It was concluded that liver flukes are present in the study area; therefore regular monitoring of ruminants for liver flukes and a comprehensive study encompassing the epidemiology of the intermediate hosts for effective control is recommended.

Keywords: Occurrence, Liver Flukes Cattle, Sheep, Sokoto, Abattoir

Introduction

Liver fluke disease is helminthosis caused by parasitic flat worms of the genera *Fasciola* and *Dicrocoelium* (Ulayi *et al.*, 2007) which infest the livers of various animals, especially sheep and cattle. Fasciolosis is distributed throughout the world but *Fasciola gigantica*, is restricted to warmer regions including parts of Africa and Asia (Radostits *et al.*, 2007). The disease is enzootic in Nigeria and is of great economic importance especially in northern Nigeria where stagnant water and 'fadamas' are used as watering and grazing sites in the dry season (Oladele-Bukola and Odetokun, 2014). In tropical Africa, fasciolosis and dicrocoeliosis are caused by *Fasciola gigantica* and *Dicrocoelium hospes* respectively and they are of considerable economic importance in ruminant livestock production and thus

constitute significant impediments to global food production (Ulayi *et al.*, 2007). The chronic form is common and the major cause of anaemia in the tropics, where the disease causes considerable economic loss through mortality, organ condemnation at meat inspection, reduced productivity (weight gain, milk yield and traction power) and lowered resistance to other concurrent infections (Mathewos *et al.*, 2001). Chronic fasciolosis does not become apparent until several weeks after the danger of acute disease has receded. The course of the disease often take long as 2 to 3 months in those that may die; many may survive but will remain in poor condition for longer periods (Radostits *et al.*, 2007) with signs of anaemia and diarrhoea. Okaiyeto *et al.*, (2012) examined the gross and histopathological changes associated with chronic fasciolosis infection in a dairy

farm and observed liver enlargement and pin-point haemorrhages on the parietal surface of the liver which was partly due to the inflammatory changes and later fibrosis that took place in the liver parenchyma. They also observed fibroblasts mixed with lymphocytes and few mononuclear cells in areas previously migrated by the young flukes and thickening, fibrosis of the portal area and calcification of the bile duct.

These pathological changes cause enormous economic losses in livestock (Sinclair, 1967) due to cost of liver condemnation during post-mortem inspection, production loss due to mortality, lower production of meat, milk and wool, reduced weight gain, metabolic diseases and impaired fertility. The value of the losses resulting from this disease runs into millions of naira and there is an additional cost of control in terms of medication costs, veterinary fees, and labour costs aimed at reducing parasitism (Oladele-Bukola and Odetokun, 2014).

Grossly, both occur in the bile duct and gall bladder; the adult fully matured *Fasciola* is leaf-shaped, grey-brown in colour and is around 7.5 cm in length with a conical anterior end while, *Dicrocoelium* on the other hand, is less than 1.0 cm in length, distinctly lanceolate and semi-transparent (Urquhart *et al.*, 1996). A diagnosis of fasciolosis can be confirmed by the detection of large numbers of characteristic, operculated, thin-walled and yellow-brown coloured fluke eggs in the faeces; or presence of immature or adult flukes in grossly enlarged and thickened bile ducts and liver (Radostits *et al.*, 2007). Although bovine fasciolosis has been widely reported in several parts of Nigeria (Ogunrinade *et al.*, 1981), the occurrence of fasciolosis and dicrocoeliosis in cattle and sheep in Sokoto has not been well documented, in spite of the enormous contribution of the area to the

livestock sector in the country.

Materials and Methods

Location of Study

This study was carried out in Sokoto located at the extreme north-western part of Nigeria between July and October at the Sokoto metropolitan abattoir, where various breeds of cattle and sheep are brought for slaughter. Sokoto is one of the major livestock producing areas in the country and lies within the Sudan savannah vegetation belt, the rainy season starts in June and ends in September, the mean annual rainfall ranges between 500mm and 1300mm with average humidity of below 40% in most times of the year (Alayande *et al.*, 2012) and located between latitude 12°-14°N and longitude 4°-6°E.

Sample collection and Laboratory identification

A total of 170 cattle and 126 sheep of different local breeds were randomly selected and examined at the abattoir. After slaughter and evisceration, the gall bladder of such animals were collected, sliced open and the entire content washed into a 500 ml beaker with tap water. The content of the beaker was allowed to stand for up to 6 hours after which the supernatant fluid was decanted in the Veterinary Parasitology Laboratory, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto. The sediments were examined for eggs of *Fasciola* spp. and *Dicrocoelium* spp. using a stereomicroscope at x40 magnification.

Results

The prevalence of fasciolosis and dicrocoeliosis in cattle and sheep in Sokoto metropolitan abattoir is presented in Table 1. Of the 170 heads of cattle and 126 sheep sampled, 29 (17.06%) and 6 (4.76%) were infected with *Dicrocoelium* spp.

Table 1: Prevalence of fasciolosis and dicrocoeliosis in cattle and sheep in Sokoto metropolitan abattoir

Parasites	Cattle (170)	Sheep (126)
	Number Positive (%)	Number Positive (%)
<i>Fasciola</i> spp.	0 (0.00%)	0 (0.00%)
<i>Dicrocoelium</i> spp.	29 (17.06%)	6 (4.76%)

respectively. Egg of *Fasciola* spp. was not found in the animals sampled in this study.

The prevalence of dicrocoeliosis in relation to breeds of cattle and sheep sampled in the abattoir is presented in Table 2. The eggs of *Dicrocoelium* spp. were found in 19.75% of the Red Bororo, 15.38% of White Fulani and 14.47% of Sokoto Gudali cattle; 6.35% of Yankassa and 3.77% Ouda sheep but none of the Balami had egg of *Dicrocoelium* spp.

The prevalence of Dicrocoeliosis in relation to sex in cattle and sheep is presented in Table 3. Eggs of *Dicrocoelium* spp. were found highest in female animals; 18.75% and 5.88% in female cattle and sheep respectively.

Discussion

The results obtained in this study showed that the prevalence of dicrocoeliosis of cattle and sheep in Sokoto metropolitan abattoir during the rains was 17.06% and 4.76% respectively. These findings revealed the occurrence of only dicrocoeliosis in cattle and sheep, with fasciolosis not occurring in any of the species of these ruminants in the study area. Various studies on the prevalence of liver flukes abound in the literature. In a retrospective study in Ibadan involving 1,640,095 heads of cattle slaughtered over a period of 11 years, Oladele-Bukola and Odetokun (2014) found a prevalence of 2.31% for bovine fasciolosis. In a study in Onitsha involving 1,580 heads of cattle, Ekwunife and Eneanya (2006) reported an

Table 2: Prevalence of dicrocoeliosis in relation to breeds of cattle and sheep sampled from Sokoto metropolitan abattoir

Species	Breed	No examined	Number Positive (%)
Cattle	Sokoto Gudali	76	11 (14.47%)
	Red Bororo	81	16 (19.75%)
	White Fulani	13	2 (15.38%)
Sheep	Yankasa	63	4 (6.35%)
	Ouda	53	2 (3.77%)
	Balami	10	0 (0.00%)

Table 3: Prevalence of Dicrocoeliosis in relation to sex in cattle and sheep

Species	Sex	No examined	Number Positive (%)
Cattle	Male	58	8 (13.79%)
	Female	112	21 (18.75%)
Sheep	Male	58	2 (3.45%)
	Female	68	4 (5.88%)

infection rate of 10.51% for *F. gigantica*. Uduak, (2014) reported an incidence of 1.72% for bovine fasciolosis in a study in Port-Harcourt involving 22,259 heads of cattle. In another study in Zaria involving 350 gall bladders, Ulayi *et al.*, (2007) encountered *Fasciola gigantica* and *Dicrocoelium hospes* in 37.1% of the cattle in Zaria.

In the current study, dicrocoeliosis was highest in Red Bororo (19.75%), 15.38% in White Fulani and lowest in Sokoto Gudali (14.47%) cattle; 6.35% in Yankassa sheep and 3.77% Ouda sheep; none of the Balami had eggs of *Dicrocoelium* spp.; and eggs of *Dicrocoelium* spp. were found highest in female animals; 18.75% and 5.88% in female cattle and sheep respectively, which is at variance with the reports from Ibadan and Zaria. In a retrospective study on fasciolosis in Ibadan involving 1,640,095 heads of cattle slaughtered over a period of 11 years, Oladele-Bukola and Odetokun (2014) reported an incidence of 4.24% and 3.73% among male and female animals respectively. In another study, Ulayi *et al.*, (2007) encountered liver flukes in 24.1% and 52.8% of the sampled male and female cattle in Zaria respectively.

The absence of fasciolosis in the study area, contrary to its prevalences of 2.31% in Ibadan (Oladele-Bukola and Odetokun, 2014), 10.51% in Onitsha (Ekwunife and Eneanya, 2006) and 37.1% in Zaria (Ulayi *et al.*, 2007) may not be unconnected to the period and the number of animals sampled. During this current period of study, feeds and water were numerous and available for grazing livestock.

The presence of dicrocoeliosis in this study is somewhat not surprising considering the geographical location of Sokoto, a place in Sudan savannah, with environmental factors that favour the existence of mollusc and ant populations which are the first and

second intermediate hosts respectively. Nevertheless no partial and total condemnation of livers due to these infections was observed during this study.

In conclusion, liver flukes are present in the study area. It is therefore recommended that regular monitoring of grazing ruminants against liver flukes should be carried out and a comprehensive study encompassing the epidemiology of the intermediate hosts for effective control is desirable.

References

- Alayande, M.O., Edungbola, L.D., Fabiyi, J.P., Faleke, O.O., Awosan, K.J., Fadeyi, A. and Suleiman, N. 2012. Sero-prevalence of *Toxoplasma gondii* infection among abattoir workers in Sokoto, Nigeria. *Sahel Medical Journal* 15:80-84
- Ekwunife, C.A. and Eneanya, CI. 2006. *Fasciola gigantica* in Onitsha and environs. *Animal Research International* 3(2):448-450
- Mathewos, Z., Getachew, A. and Yilma, J. 2001. Observations on the effects of concurrent natural bovine *Trypanosome* and *Fasciola* infections in Kone area, western Ethiopia. *Revue Méd. Vét.* 152(12):851-858
- Ogunrinade, A.F., Okon, E.D. and Fasanmi, E.F. 1981. The prevalence of bovine fascioliasis in Nigeria. *Bulletin of Animal Health Production in Africa* 29: 381-387
- Okaiyeto, S.O., Salami, O.S., Dnibirni, S.A., Allam, L. and Onoja, I.I. 2012. Clinical, gross and histopathological changes associated with chronic fasciolosis infection in a dairy farm. *Journal of Veterinary Advances* 2(8):444-448
- Oladele-Bukola, M.O. and Odetokun, I.A. 2014. Prevalence of bovine fasciolosis at the Ibadan municipal

- abattoir, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development* 14(4):9055-9070
- Radostits O.M., Gay C.C., Hinchcliff K.W. and Constable P.D. 2007. *Veterinary Medicine: A Textbook of Diseases of Cattle, Sheep, Pigs, Goats and Horses*. 10th ed. Saunders Elseviers, Spain. Pp. 1576-1580
- Sinclair, K.H. 1967. Pathogenesis of *Fasciola* and other Liver Flukes. *Helminthological (Abstracts)* 36 (part 2)115-134
- Uduak, A. 2014. Incidence of Bovine Fasciolosis and its Economic Implications at Trans-Amadi Abattoir Port-Harcourt, Nigeria. *Acta Parasitologica Globalis* 5 (3): 206-209
- Ulayi,B.M., Umaru-Sule, B. and Adamu, S. 2007. Prevalence of *Dicrocoelium hospes* and *Fasciola gigantica* infections in cattle at slaughter in Zaria, Nigeria. *Journal of Animal and Veterinary Advances* 6(9):1112-1115
- Urquhart, G.M., Armour, J., Duncan, J.L., Dunn,A.M. and Jennings, F.W. (1996). *Veterinary Parasitology*, Second Edition, Published by Blackwell Science Limited, 307pages