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CROSS SECTIONAL STUDIES ON OESOPHAGOSTOMOSIS IN SLAUGHTER CATTLE IN MAIDUGURI, NIGERIA

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ABSTRACT
This study was conducted in Maiduguri municipal abattoir between June and August 2009 to determine the prevalence of bovine oesophagostomosis by post mortem examination of the intestine of each slaughter cattle in relation to age, breed and sex. Out of the 400 cattle examined, a prevalence of 4(1.0%) was recorded with no significant difference ($p = 0.9539 > 0.05$) among age groups, sex and breed. Pimply nodules were predominantly abscesses filled with caseous necrotic material suggestive of dead larvae. Nodular burden of between 2 and 200 per intestine was graded as intermediate degree of infection.
Keywords: *Cross sectional studies, Oesophagostomosis, Cattle, Nigeria.*

INTRODUCTION
Cattle are the most single important livestock species in Nigeria in terms of supply of animal protein, value and biomass. They provide meat and milk, hide, bones, blood, horns and draught-usage; and are of great genetic diversity being adapted to stressful environmental conditions of poor nutrition, inclement weather and a myriad of diseases (Raji *et al.,* 2007).
The disease oesophagostomosis, also called nodular worm disease affects the intestinal tract of domesticated animals and man, and is caused by the genus *Oesophagostomum* of the family *Strongyloidae*. It is worldwide and has been found to be transmitted via the faeco-oral route due to ingestion of contaminated water, food/pasture or soil (Ziem *et al*., 2006; GIDD, 2009); and also classified as a zoonotic disease (Sun, 1999), with approximately 250,000 infected human cases worldwide and 1 million more at risk. Economic losses due to oesophagostomosis are attributed to morbidity, mortality, condemnation of "runners", and cost of medication (Love and Hutchinson, 2003). There is paucity of information on the disease oesophagostomosis in cattle in this study area, which is the capital city of Borno State, the largest cattle producing area in Nigeria, accounting for 33.3% of the National cattle population (Biu and Babagana, 2004). Hence, this research was conducted to determine the prevalence of oesophagostomosis in Maiduguri with a view to proffer feasible preventive and control measures.

MATERIALS AND METHODS
Study Area and Population: This study was conducted in Maiduguri, the capital and largest urban centre in Borno State. It lies within the semi-arid zone of northeastern Nigeria with low rainfall between late June and early October, followed by a prolonged dry season for the rest of the year (Hess *et al*., 1995). Cattle population examined were trade stock from pastoral herds brought for slaughter at the Maiduguri central abattoir. Breeds were identified based on phenotypic characters of coat colour, horn shape and size, as described by Herrera

et al., (1996). Sex was determined as male or female based on the appearance of the external genitalia, testes and udder; and age using rostral dentition as described by Lasisi *et al.,* (2002).

Sample Collection and Examination: The entire intestine (small and large) of each slaughter cattle was examined for typical pea- shaped nodules usually visible from the serosal surface, or palpated where they were not visible. Infected intestinal segments were collected and preserved in 2% formalin (Kauffman, 1996) and transported to the Veterinary Parasitology Laboratory, University of Maiduguri for further examination. The length of each infected intestine was measured with a centimeter rule and the total number of pimply nodules enumerated and recorded as nodules/ length of intestine so as to determine the nodular density as an index of severity of infection. Each intestine was graded as harbouring few (1-100 nodules), moderate (101-500 nodules) or numerous (> 500 nodules) as described by Nwosu *et al.,* (2012). Nodules were also sliced open to examine for larvae, while some were collected and fixed in 10% formalin, later processed, embedded in paraffin wax, sectioned at 5µ thick and stained with haematoxylin and eosin (H & E) as described by Drury and Wallington (1976). Stained tissue sections were examined for histological lesions under a light microscope.

Data Analysis: Data was recorded as prevalence and nodular density as mean ± standard deviation with variations among sex, age group and breed of cattle examined analyzed statistically using the students' t-test at 5% confidence interval (Graph Pad Instat, 2000).

RESULTS

Table 1shows the prevalence of bovine oesophagostomosis in Maiduguri. An overall prevalence of 4(1.0%) was obtained with 2(0.7%) and 2(1.5%) as male and female respectively ($p > 0.05$). Age-wise prevalence indicated 1(0.8%) and 3(1.2%) groups of $1\text{-}2^1/_2$ and $3\text{-}4^1/_2$ years respectively ($p>0.05$). Breed-wise, only the Wadara was infected with 4 (3.7%) prevalence. Table 2 shows the mean ± SD of nodules based on age and sex of slaughter cattle in Maiduguri. The age group of $1\text{-}2^1/_2$ had the highest nodular density of 367.4 compared with $3\text{-}4^1/_2$ year age group with 287.4 ($p < 0.05$). Also infected female had a higher nodular density of 265.5 than male with 247.6 ($p > 0.05$).

DISCUSSION

The findings in this study were suggestive of a low prevalence amongst slaughter cattle for pimply gut in northeastern Nigeria. However, most of the infected slaughter cattle had moderate nodular burdens (101-500). This however does not correspond to Okoli *et al*., (2002) who reported zero prevalence for cattle in Imo State, Nigeria. Occurrence of bovine oesophagostomosis is dependent on climate and ecology, with rainfall, temperature and humidity playing a vital role, where free living stages i.e. eggs and third stage larvae (L_3) are intolerant to desiccation as experienced in this semi-arid study area, hence parasites have virtually disappeared from tropical and sub-tropical areas with low rainfall and prolonged dry periods (Nwosu *et al*.,1996; Okoli *et al*., 2002; Love and Hutchinson 2003). In this study,

there was no significant difference ($p > 0.05$) in the prevalence of infection based on age groups, sex and breed. This contrasts the findings by Gasbarre and Canals, (1989) that older cattle usually possess a higher prevalence than young, since nodules do not develop in previously infected cattle. Kusiluka and Kambarage, (1996) reported that females are generally more prone to helminthiasis especially during hormonal changes of pregnancy or lactation that lowers their resistance, which results into establishment of higher worm burdens compared with the males. Molina *et al*., (2008) reported significant breed differences attributed probably to genetic differences where animals express protective immune responses. The mean ± SD of nodular density was higher in adult than young cattle ($p<0.05$) and also in female than male (though not significant) and pimply nodules were predominantly abscess filled with caseous necrotic material suggestive of dead larvae. This agrees with the findings of Nwosu *et al*., (2012) that the formation of nodules is an immunologically mediated phenomenon initiated by high levels of antibodies which trigger the inhibition of growth and growth of newly arriving larval worms in the host tissue; leading to the formation of intestinal nodules; and the absence of parasitic stages within the nodules in this study results from their death and disintegration due to immunological and other host responses, while the presence of caseous necrotic materials could be due to secondary pyogenic bacteria which are thought to contribute to the clinical manifestations and sometimes death in oesophagostomosis (Nwosu *et al*., 2012). In conclusion, economic losses due to oesophagostomosis are mainly related to condemnation of "runners" affected with *Oesophagostomum* associated pimply gut (Loyacano *et al*., 2002); morbidity, mortality and cost of medication (Love and Hutchinson, 2003), as such regular deworming with levamisole (drug of choice) as a drench or subcutaneous injection is recommended as treatment (Neils *et al*., 2006).

Table 1: Prevalence of bovine oesophagostomosis in Maiduguri.

	No. Examined	**No.(%) Infected**
Overall	400	4(1.0)
Sex wise:		
Male	270	2(0.7)
Female	130	2(1.5)
Age wise:		
1 - $2^1/_2$	118	1(0.8)
3 – $4^1/_2$	242	3(1.2)
5 – $6^1/_2$	40	0(0)
Breed wise:		
Adamawa gudali	15	0(0)
Ambala	120	0(0)
Bunaji	38	0(0)
Kuri	13	0(0)
Rahaji	27	0(0)

Sokoto gudali	20	0(0)
West African Dwarf	4	0(0)
Wadara	163	4(3.7)

Table 2: Mean±SD of nodules based on age and sex of slaughter cattle in Maiduguri

	Mean ± SD of length (cm) of large intestine	Mean ± SD of nodules per large intestine	Nodular burden of infected cattle intestine
Age group (years):			
1 – $2^1/_2$	63.9±28.3	23.0±16.3	367.4
3 – $4^1/_2$	109±29.7	13.0±9.2	446.1
Sex:			
Male	78.2±38.9	19.0±5.7	247.6
Female	72.4±31.1	5.5±4.9	265.5

REFERENCES

Biu, A.A. and Babagana, M. (2004). Fasciolosis: post mortem worm count and faecal analysis in cattle of Borno State, Nigeria. *Journal of Science and Technology Research* **3(3**): 4-6

Drury, R.A.B. and Wallington, E.A. (1976). *Carleton's histological techniques*, 4th ed. Oxford University Press, London. Pp 392-398.

Gasbarre, L.C. and Canals, A. (1989). Induction of protective immunity in calves immunized with adult *Oesophagostomum radiatum* somatic antigens. *Vet. Parasitol.,* **34(3)**: 223-228.

Gideon's Infectious Diseases Database (2009). http://web. Gideononline.com/web/epidemiology/index.php? Gdn- form = ZGIZZWFZZTOXMTY1MA retrieved 5th February 2009.

Herrera, M., Radero, E., Guteiriez, M.J., Pena, F. and Rodero, J.M. (1996). Application of multifactorial discrimination analysis in the morphostructural differentiation of Aadulusian caprine breeds. *Small Rum. Res*. **22**: 39-47.

Hess, T.M., Stephens, W. and Maryah, U.M. (1995). Rainfall trends in Northeast arid zone of Nigeria (1961-1990). *Agric. Forest. Meteorol*. **74:** 87 – 97.

Kauffman, J. (1996). *Parasitic infections of domestic animals: a diagnostic manual*. 1st ed Birkhauser, Verlag, Berlin, 423pp.

Graph Pad (2000). Graph Pad Instat, version 3.0 for windows. Graph Pad Software Inc. San Diego, California, USA. 2000. www.graphpad.com

Kusiluka, L. and Kambarage, D. (1996). *Diseases caused by helminthes*. Epidemiology in diseases of small ruminants. A handbook of common diseases of sheep and goats in sub Saharan Africa. http://www.small stock. Info/research/reports/R5499/ch-helminths.htm. retrieved 15th August, 2011.

Lasisi, O.T., Ojo, N.A. and Otesile, E.B. (2002). Estimation of age of cattle in Nigeria using rostral dentition. *Trop. Vet*. **20(4)**: 204-208.

Love, S.C.J. and Hutchinson, G.W. (2003). Pathology and diagnosis of internal parasites of ruminants. Proceeding 350, postgraduate foundation in Veterinary Science, University of Sydney, Sydney **16**: 309-338.

Loyacano, A.F., William, J.C., Gurie, J. and Derosa, A.A. (2002). Effects of gastrointestinal nematodes and liver fluke infections on live weight gain and reproductive performance of beef heifers. *Vet. Parasitol*. **107(3):** 227-230.

Molina, E.C., Skerrat, L.F. and Campbell, R. (2008). Paenology of fasciolosis in large ruminants. Overcoming liver fluke in Southeast Asia. *Trop. Anim. Hlth. Prod.* **38**: 210-218.

Neils, J.S., Nzalak, J.O. and George, J.B.D. (2006). Effectiveness of levamisole® in the treatment of natural multiple helminth infection of ruminants in Zaria: A case report. *Trop. Vet*. **24(1 & 2)**: 23-31.

Nwosu, C.O., Ogunrinade, A.F. and Fagbemi, B.O. (1996). Prevalence and seasonal changes in the gastrointestinal helminthes of Nigerian goats. *J. Helminthol.* **70**: 329-333.

Nwosu, C.O., Okon, E.D., Chiejina, S.N., Igbokwe, I.O., Mbaya, A.W., Columbus, P.K., Chagwa, L.L. and Daniel-Igwe, G. (2012). Natural *Oesophagostomum columbianun* infection of Sahel goats in northeastern Nigeria. *Comp. Clin. Pathol*. 8pp.

Okoli. I.C., Nwokoecha, J.R., Okoli, C.G. and Ogundu, E. (2002). Prevalence of fasciolosis and oesophagostomosis among slaughter animals in Imo State, Nigeria and their correlation with emaciation diagnosed at ante-mortem. *Trop.Vet*. **20(3):** 139-148.

Raji, A.O., Olutogun, O., Alade, N.K. and Okoro, V.M.O. (2007). Phenotypic characterization of Bunaji cattle breed in Oyo State, Nigeria. *Sahel J. Vet*. Sc. **6 (1)**: 51-55.

Sun, T. (1999). *Parasitic disorders: pathology, diagnosis and management*. Williams and Wilkins 2nd ed. Baltimore 508pp.

Ziem, J.B., Magnussen, P., Olsen, A., Horton, J., Asigri, V.L. and Polderman, A.M. (2006). Impact of repeated mass treatment on human *Oesophagostomum* and hookworm infections in Northern Ghana. *Trop. Med. Internl. Hlth*. **11(11):** 1764-1772.