

Prevalence of suspected tuberculous lesions in cattle slaughtered in Cross River State Abattoirs

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Abstract

Granulomatous lesions in liver, intestine, spleen, lung and lymph nodes (mediastinal, bronchial, retropharyngeal and mesenteric) were collected from slaughtered cattle in each of the main abattoirs in Bakoko, Ikom and Ogoja respectively in Cross River State South, Central and North senatorial zones during a one year (April, 2002 – March 2003) study period. 8,990 cattle were slaughtered and examined during the period. Of this number, tuberculous organs collected from 120 (1.3%) of the slaughtered cattle tested positive by the Ziehl-Neelsen (acid-fast) technique. There was no significant difference ($P > 0.05$) between the prevalence of tuberculous lesions during the dry and rainy seasons, although a slightly higher prevalence was found during the former (1.5%) than the later (1.1%) season. Of the 120 tuberculous lesions found 71 (1.6%) occurred in females while 49 (1.1%) occurred in males. The organs affected most were the lungs 73 (55.7%) and lymph nodes 40 (30.58%) while the least affected organ was the diaphragmatic muscle 1 (0.76%). It was concluded that the overall prevalence of 1.3% of tuberculous lesions in organs of slaughter cattle in the state is of epidemiological importance and further studies are needed to isolate and type the acid-fast organisms in order to properly assess their public health significance.

Keywords: Tuberculosis, slaughtered cattle, Cross River Nigeria.

Introduction

Robert Koch first discovered the organism that causes tuberculosis in 1882 and ever since, the diagnosis of the disease had been dependent on clinical and pathological examinations, supported by the isolation of the tubercle bacilli (Pritchard, 1988). When the tubercle bacilli were first classified into human, bovine and avian types and subsequently named *M. tuberculosis*, *M. bovis* and *M. avium* respectively, it was believed that each type was specific for the class of host in which it was prevalent (Boughton, 1969). While *M. tuberculosis* is known to be the most frequent cause of human tuberculosis, many

cases are also caused by *M. bovis* and to a lesser extent *M. avium*, (Kolo, 1991).

Studies on tuberculosis have shown a global increase in the incidence of the disease especially in third world countries (Cookson, 1985). This increase has been associated with the worldwide epidemic of Human Immunodeficiency Virus (HIV) infection (Dolin *et al.* 1994); poor control and eradication methods adopted by developing countries, certain risk factors such as age; immunodepressive drug abuse, alcoholism, and nutritional problems among others. On the other hand, it has been claimed that due to programmed eradication and control measures such as thorough professional meat inspection, milk

pasteurization and test and slaughter policy among others, the incidence of bovine tuberculosis in man is now low in the developed countries (Cook *et al.*, 1996).

The reactivation of the Obudu cattle ranch coupled with the increase in established livestock farms in Cross River State especially in the north senatorial district imply that there is an increase in livestock (cattle and goats) farming in the area. As a result of this recent development, meat consumption rate may increased. Consequently, the risk of exposure to meat/milk-borne zoonotic infections may equally increase. Livestock related workers such as butchers and other abattoir workers, dairy workers and veterinary personnel are among the population with the highest risk potential.

In Nigeria, especially Cross River State, there is a dearth of information on the prevalence of the various types/species of the causative agents of bovine tuberculosis (Daborn *et al.*, 1997). It is against this background that this study of the prevalence of suspected tuberculous lesion in slaughter cattle in Cross River State was designed and carried out.

Materials and Methods

Identification of suspected tuberculous cases was based on presence of typical tubercles/ granulomatous and caseated lesions. Although there was no thorough postmortem examination of the individual animals at the lariate due to unco-operative attitude of the butchers, some obvious clinical signs of the suspected animals observed before slaughter include gross emaciation, coughing and weakness. By visual examination, incision and palpation specimens of liver, intestine, spleen, lung and lymph nodes (mediastinal, bronchial, retropharyngeal and mesenteric) with tuberculous lesions were collected from cattle slaughtered in Ogoja, Ikom

and Bakoko (Calabar) abattoirs in Cross River State. Each sample was collected in separate polythene bag labelled and packed in transport flask. These specimens were carried to the Department of Veterinary Public Health and Preventive Medicine, University of Nigeria Nsukka, where they were kept at -20°C until processed. Specimens were collected thrice weekly for 12 months (April, 2002 - March, 2003). Each tissue was decontaminated in sodium hypochloride solution for 4 hours. Fat was trimmed off and the tissue ground in sterile mortar in glass chamber to reduce spread of the disease and protect the personnel. Phenol red was used as an indicator. The tissue was then treated with equal volume of 2% NaOH for ten minutes and neutralized with 6N HCl. Finally, the tissue was centrifuged and the supernatant decanted. Two smears of the homogenates of each specimen were made and stained by the Ziehl and Neelsen (Z-N) method as described by Elmer (1992). Presence of acid-fast bacilli was suggestive of bovine tuberculosis infection. Positive samples were analysed for sex, season and organ distribution and differences tested by the Chi square method (Steel and Torrie, 1980).

Results and Discussion

Out of the 8,990 cattle slaughtered during the 12-month study period, organs from 120 were positive for tuberculous lesions, giving overall prevalence rate of 1.3%. This is relatively less than the 2.1% reported in Maiduguri abattoirs (Anon, 1976) but higher than the 0.4%, 0.5% and 0.7% of tuberculous lesions in cattle slaughtered in Sokoto abattoirs (Dusai and Abdullagi, 1994; Ajogi *et al.*, 1995; Sonfanda and Garba, 2000). Although apparently greater number of bovine tuberculous lesions were found in cattle slaughtered during the dry (n=72; October-March) than rainy (n=48; April - September) season periods, their prevalence rates were similar (Table 1). However, the relatively higher

prevalence of tuberculous lesions in the dry season than the rainy season showed that there is a strong association between the occurrence of tuberculous lesions and season among the 120 cattle affected ($\chi^2 = 5.72$, $P < 0.05$). This is because most livestock owners do sell their aged animals and the sick ones at the beginning of the dry season to enable them invest in crop farming and avoid the stress of the dry season due scarcity of food. The sex distribution of cases is shown in Table 2. A greater proportion of the cases occurred in females (1.6%) than in males (1.1%). There was a strong association between the occurrence of tuberculous lesions and sex, among the 120 cattle affected ($\chi^2 = 4.02$, $P < 0.05$). This is probably because females stay longer in the herd for purpose of reproduction than the male cattle. The incidence of tuberculous was

more in the rural areas because livestock buyers from the rural areas especially Ogoja and Ikum where there are no veterinarians prefer to buy sick and cachexic female cattle at low prices in order to make more profit. Most of these cattle at postmortem had tuberculous lesion.

The distribution of the lesions in various organs showed that the lung was the most affected followed by the lymph nodes, liver, spleen, intestine/oesophagus and diaphragmatic muscle in that order (Table 3). From the results pulmonary tuberculous lesions with a prevalence rate of (55.73%) was more common probably because of the rapid spread of this form of the disease and because transmission in the herd is primarily by inhalation.

Table 1: Seasonal prevalence of suspected bovine tuberculous lesions in cattle slaughtered in Cross River State abattoirs (April, 2002 – March 2003).

A	Rainy Season	No. slaughtered	No. positive	Prevalence (%)
1.	APRIL	787	12	1.5
2.	MAY	733	8	1.1
3.	JUNE	778	7	0.9
4.	JULY	736	6	0.8
5.	AUGUST	781	4	0.5
6.	SEPT.	756	11	1.5
	SUB-TOTAL	4571	48	6.3
	Average	761.8	8	1.1
B	Dry season			
7.	OCTOBER	766	7	0.9
8.	NOV.	751	5	0.7
9.	DEC.	730	11	1.9
10.	JAN.	760	13	1.7
11.	FEB.	772	10	1.3
12.	MARCH	730	16	2.2
	Sub-total	4419	72	8.7
	Average	736.5	12	1.5
	? Total	8,990	120	1.3

Table 2: Sex Distribution of suspected tuberculous lesions among 120 positive cases in cattle slaughtered in Cross River State abattoirs (April, 2002 – March, 2003).

Sex	Total No. of cattle examined	No. with gross lesions	No. Positive (Z.-N)
I Male	4,488	64 (1.43%)	49 (1.1%)
F Female	4,502	87 (1.93%)	71 (1.6%)
F Total	8,990	151	120

Table 3: Organ distribution of suspected tuberculosis lesions among 120 cases observed in Cross River State abattoirs (April, 2002 – March, 2003)

SN	Organs	Male	Female	Total	% Prev
1.	Lungs	31	42	73	55.73
2.	Lymph nodes	18	22	40	30.58
3.	Liver	3	7	10	7.63
4.	Spleen	1	2	03	2.29
5.	Intestine	1	1	02	1.53
6.	Oesophagus	-	2	02	1.53
7.	Diaphragmatic Muscle	-	1	01	0.76
	Total	54	77	131	100%

Bovine tuberculosis is a zoonotic disease of public health significance that requires global attention. The obvious implication of the prevalence recorded in this study is the potential risk of exposure for cattle herders, butchers, veterinary workers and meat consumers in the state. Though bovine tuberculosis infects human, man to man transmission is rare, but there are reports of transmission from man to cattle (Cook *et al.*, 1996; Michalak *et al.*, 1998). Recently the upsurge in infection of tuberculosis associated with HIV may suggest an increase in bovine tuberculosis in human (Kiching, 1993). It has been reported that about 90% of the human population in Africa is exposed to tuberculous cattle or their products (WHO 1994).

Conclusion

The results indicate that bovine tuberculosis, Which is a serious zoonosis, is prevalent in the area of study albeit at low level. Further studies are therefore, needed in order to establish the type/species of acid-fast organisms responsible for the tuberculous lesions encountered in this study. This will enable a full assessment of the public health implication of the cases and the role of cattle in the epidemiology of human tuberculosis. Tuberculosis is a serious human disease and government and other donor agencies should give priority to this disease by providing field practitioners, laboratories and researchers with facilities for its detection, diagnosis and treatment both in animals and man.

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