

## Retrospective Study of Tuberculosis in Slaughtered Cattle at Maiduguri Abattoir, Nigeria

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**Abstract:** Result of a study describing the magnitude and distribution of gross lesions compatible with bovine tuberculosis at Maiduguri abattoir encountered during routine meat inspection between 2000 and 2009 was determined. A total of 403,317 cattle were slaughtered during a 10 year period. Among those examined, 11,006 had gross lesions compatible with bovine tuberculosis. The distribution of suspected gross bovine TB lesions in different organs shows (67.8%) in the lungs, (13.9%) in the lymph nodes, (8.6%) in the liver, (3.8%) in the intestines, (4.0%) in the kidneys and (1.9%) accounted for generalised TB. There was no significant difference between two different season of the year and sex of cattle ( $p>0.05$ ). This study highlights the importance of meat inspection. Measures for control are also been suggested.

**Key words:** Retrospective, meat inspection, bovine, public health, Maiduguri, Nigeria

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### INTRODUCTION

Bovine Tuberculosis (bTB) is a chronic infectious and contagious zoonotic disease of domestic animals, wild animals and humans (Radosits *et al.*, 2007). It is characterized by the formation of granulomas in tissues especially in the lungs, lymph nodes, intestines, liver and kidney (Shitaye *et al.*, 2007).

It is caused by *Mycobacterium bovis* which is a member of *Mycobacterium tuberculosis* complex (Collins and Grange, 1983; Pfeiffer, 2003). Bovine tuberculosis is widely distributed throughout the world with serious effect on animals and is also of significant public health importance (O'Reilly and Daborn, 1995). In a developing country like Nigeria where bovine tuberculosis in cattle and other animals is an endemic problem and very little known about the true epidemiology of the disease in the country (Alhaji, 1976; Ayanwale, 1984; Shehu, 1988; Dusai and Abdullahi, 1994; Cadmus *et al.*, 2004; Abubakar, 2007) and where there is no control or eradication policy on animal tuberculosis (Cosivi *et al.*, 1998), its zoonotic importance constitutes an important public health problem (Thoen *et al.*, 2006). Human tuberculosis of animal origin, particularly that caused by *Mycobacterium bovis* has become more important since the emergence of HIV/AIDS (O'Reilly and

Daborn, 1995; WHO, 2006) and its associated potentiating of this disease. It is therefore, imperative that simple and inexpensive method for diagnosis of bovine tuberculosis in the local abattoir and slaughter houses be considered. One of the most efficient and practical way of doing this is through study meat inspection to detect the gross suspected tuberculous lesions.

Adequate palpation of lesions at PM with production of gritty sound on incision of some of the lymph nodes and other visceral organs, form the basis of tentative diagnosis of bovine TB in cattle. This form of diagnosis, though not confirmatory, helps to a great extent in reducing the extent of the disease in cattle and its potentials for spread to humans and other animals in this country. This becomes useful since most of the abattoir and slaughter houses do not have diagnostic facilities to confirm bovine TB and when meat inspection procedures are properly carried out, 95% of cattle with visible lesions compatible with bovine TB can be identified (Corner, 1994).

This study is a 10 year retrospective study of bovine TB lesions detected during routine meat inspection in Maiduguri abattoir. This study was carried out in order to contribute to the knowledge on the epidemiology of the disease as a prelude to designing effective control measures.

**MATERIALS AND METHODS**

This study was conducted at Maiduguri abattoir, Maiduguri is located in Borno state. The state is located between latitude 9°30' and 12°30N and longitude 8°45' and 11°45'E and share boundaries with the republic of Niger to the North, Chad Republic to the North-east and Cameroon to the East.

**Data collection and analysis:** Records of gross TB lesions detected during routine meat inspection between 2000-2009 were obtained from Maiduguri abattoir and data were compiled and analysed using proportional (percentage) presentation. Chi-square ( $\chi^2$ ) was used to analyse the relationship between two different season of the year and sex of cattle slaughtered.

**RESULTS AND DISCUSSION**

This study provides, a 10 years retrospective study for bovine tuberculosis detected during routine meat inspection at Maiduguri abattoir, Borno state. The annual distribution of bovine tuberculosis from 2000-2009 is shown in Table 1; out of 403,317 cattle slaughtered 11006 (2.7%) were grossly suspected to have lesions compatible with bovine TB during the routine meat inspections. During that period suspected bovine gross TB were found (2.31%), in 2000 (2.36%), in 2001 (2.42%), in 2002 (2.88%), in 2003 (3.43%), in 2004 (2.50%), in 2005 (2.72%) in 2006 (3.03%) in 2007 (2.81%) in 2008 and (2.87%), in 2009. The result from this study are as shown in Table 2; The distribution of suspected gross TB lesions in different organs of affected cattle shows that the lungs has the highest number of suspected gross TB lesions with 776 (67.8%), followed by lymph nodes with 160 (13.9%) while liver, intestines kidneys and generalized TB were having 98 (8.6%), 43 (3.8%), 46 (4.0%) and 22 (1.9%), respectively (Table 2).

Out of total examined during the period, (2000-2009), 5775 (52%) were males while 5231 (48%) were females. Table 3 also shows that, 6515 (59%) were grossly suspected during dry season while 4491 (41%) were grossly detected during rainy season of the year. The  $\chi^2$ -test of significance between two different season of the year and sex shows there was no statistical significant ( $p>0.05$ ). This study provides, a 10 years retrospective study for bovine tuberculosis detected during routine meat inspection at Maiduguri abattoir, Borno state. The overall percentage which is 2.7% obtained in this study is higher when compared with 1.91% recorded in cattle slaughtered at OKO-OBA abattoir Lagos state by Cadmus *et al.* (2008).

Table 1: Annual distribution of bovine tuberculosis detected during 10-years period (2000-2009) at Maiduguri abattoir

Years	Cattle slaughtered	Gross TB lesions	As % of gross TB lesions
2000	40137.0	928.0	2.310
2001	37142.0	876.0	2.360
2002	38091.0	921.0	2.420
2003	39079.0	1125.0	2.880
2004	36770.0	1263.0	3.430
2005	44890.0	1124.0	2.500
2006	43770.0	1191.0	2.720
2007	41391.0	1248.0	3.020
2008	42135.0	1186.0	2.810
2009	39912.0	1144.0	2.870
Total	403,317.0	11,006.0	2.700
Mean	40331.7	1100.6	2.732

Table 2: Distribution of suspected gross TB lesions in different organs slaughtered

Organ	No. affected	Percentage
Lungs	776	67.8
Lymph node	160	13.9
Liver	98	8.6
Intestine	43	3.8
Kidneys	46	4.0
Generalized TB	22	1.9

Table 3: Chi-square test for the relationship between two different season of the year and sex of cattle detected during meat inspection for (2000-2009)

Sex	Rainy season (April-October)	Dry season (Nov-March, %)	Total (%)	p value
Male	2357 (21)	3418 (31)	5775 (52)	0.997
Female	2134 (19)	3097 (28)	5231 (48)	-
Total	4491 (41)	6515 (59)	11006 (100)	-

( $p<0.05$ ) regarded as significant

The detection of suspected gross TB lesions in slaughtered cattle at abattoir poses great danger of contracting the disease by the public especially abattoir workers and butchers. This is because here in Nigeria cattle are usually slaughtered in abattoirs where the butchers wear minimal protective clothing and process meat with their bare hands. It further, confirmed that control measures are not in place or inadequately applied because in countries where control of tuberculosis is in place, detection of gross lesions at the abattoir during meat inspection is usually very minimal. This finding also agrees with an earlier suggestion that abattoir monitoring could be an essential element in the national tuberculosis campaign and the most effective means of detecting residual infection especially in countries that have achieved control of the disease (Corner *et al.*, 1990). The result from this study shows that 67.8% of the lesions that were found to be positive for suspected gross-TB lesions were from the lungs. This agrees with earlier studies where it was found that 70-90% TB lesions were found in the lungs and lymph nodes of the head or thoracic cavity (Lepper *et al.*, 1973; Neill *et al.*, 1994; Palmer *et al.*, 2002; Philips *et al.*, 2003). It further suggested that the most common route of transmission is through the lungs by aerosol.

Another finding in this study is  $\chi^2$ -test of significance between two different seasons of the year and sex which shows no statistical significance ( $p > 0.05$ ). This is because tuberculosis does not discriminate between sexes, even though, the result shows that there were more males detected during the study period. Abubakar (2007) reported similar findings which could be as a result of the fact that male's cattle were usually subjected to more stressful activities such as harrowing and transportation of farm produce. The detection rate of TB lesions was not influenced by season though, it was slightly higher during dry season (Table 3). This could probably be attributed to the usual problems of inadequate feed and water supplies during the dry season. The reason for the fluctuation of annual detection rates for the entire period was not clear. Inadequacies in capacity and lack of thoroughness of the veterinary staff carrying out the meat inspection could have played major roles. This agrees with Corner *et al.* (1990) and Shitaye *et al.* (2006) who reported that post-mortem surveillances for detection of bovine TB lesions in particular, depended on the work load, time and diligence of the inspector conducting the examination. The study buttressed the fact that bovine tuberculosis is still endemic in Nigeria since, its public health can not be over emphasized. For instance, *M. bovis* had earlier been isolated from the sputum of human patients in Nigeria (Idrisu and Schnurrenberger, 1977; Idigbe *et al.*, 1986).

### CONCLUSION

Although, routine meat inspection is not confirmatory (Isolation and identification of the organism is the gold standard) it is to be noted that the presence of other bacteria like nocardia could present similar nodular lesions. This becomes useful since most slaughter houses and abattoirs here in Nigeria do not have facilities to confirm tuberculosis and similar chronic infections (Cadmus *et al.*, 2008). This call for proper meat inspections procedures which if properly carried out could identify 95% of animal with visible tuberculous lesions (Corner, 1994).

Finally, in the developed countries, the main purpose of meat inspection in relation to bovine TB is to act as an ancillary surveillance system however, in Nigeria and most other developing countries where routine tuberculin testing is not done, proper meat inspection will serve as a ready tool for identifying a large number of slaughtered animals with suspected TB lesions. Proper abattoir hygiene, proper post-mortem meat inspection and clean handling of meat are necessary to reduce zoonotic tuberculosis.

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