



Case Report

A CASE REPORT ON BOVINE TUBERCULOSIS

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ABSTRACT

A carcass of 6-year-old female buffalo was brought to Department of Veterinary Pathology, College of Veterinary Science, A.A.U., Khanapara for necropsy examination. The carcass was emaciated with sunken eyes. Gross examination revealed tubercles in lungs, liver and pleura. Lymph nodes were enlarged with caseo-necrotic foci in the cortical region. Microscopically, necrotic granulomas of lungs were characterized by central area of caseous necrosis with calcification surrounded by epithelioid macrophages, Langhans-type multinucleated giant cells and lymphocytes. Special staining with Ziehl-Neelsen stain confirmed the presence of acid-fast organisms in the impression smear as well as tissue sections from the affected lungs. Based on gross, histopathology and Ziehl-Neelsen staining, and identification by targeting Mycobacteria genus specific hsp65 gene with 441bp from ADMAC, college of veterinary science, khanapara gave a straight forward diagnosis of Bovine Tuberculosis was made. -Microscopically, necrotic granulomas of lungs were characterized by central area of caseous necrosis with calcification surrounded by epithelioid macrophages, Langhans-type multinucleated giant cells and lymphocytes. Showing acid fast organism by microscopic examination from direct tissue under 100X oil immersion.

Keywords: TB, bTB, Ziehl-Neelsen, hsp65, Mycobacteria.

INTRODUCTION

Tuberculosis is a persistent communicable disease in animals and humans, resulting from pathogenic mycobacterial organisms. It is characterized by the formation of tubercles eventually leading to caseation and calcification. The term "tuberculosis" originates from the nodules, known as 'tubercles,' which are commonly found in the lungs and lymph nodes, but can also appear in other areas such as the liver, spleen, intestine, peritoneum, meninges, and long bones. Based on the tubercle location in the body, the disease is referred to by various names, including Pearl's disease, Scrofula, Acinitis, Scrofuloderma/Lupus vulgaris, and Pott's disease. Additionally, it is known by other synonyms such as Consumption disease (a common term for the wasting away of the body, especially due to pulmonary TB) and Tuberculous caseous pneumonia (Dubey *et al.*, 2020).

Bovine tuberculosis (bTB) is a chronic inflammatory granulomatous disease that has been extensively reported in cattle and buffalo with significant zoonotic potential. The causative agent of bTB is *Mycobacterium bovis* (*M. bovis*) (Ramanujam and Palaniyandi, 2023). Although the organism primarily affects cattle, various other species such as humans, buffalo, goats, pigs, dogs, and primates are also susceptible. It has been estimated that *M. bovis* contributes to approximately 10% of the overall human tuberculosis cases in developing countries, thereby representing a substantial menace to global health (Srinivasan *et al.*, 2018). In India, the persistence of bovine TB is attributed to the absence of significant disease control programs and the economic implications it entails. The estimated prevalence of bTB in Indian cattle stands at 7.3%. The disease burden is anticipated to grow in the coming years due to various factors, including the rapid expansion of the dairy industry,

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enhanced cattle rearing practices and an increased emphasis on enhancing productivity per animal (Ramanujam and Palaniyandi, 2023). The 'test and slaughter' policy has been proven to be a very effective control measure in developed countries and is not feasible in developing countries where bTB is endemic, due to high cost of tests and associated financial loss to owners by animal slaughtering (Arnot and Michel, 2020).

MATERIAL AND METHODS

In the current study, a buffalo of 6 years old was presented for the post-mortem examination to the Department of Veterinary Pathology, College of Veterinary Science,

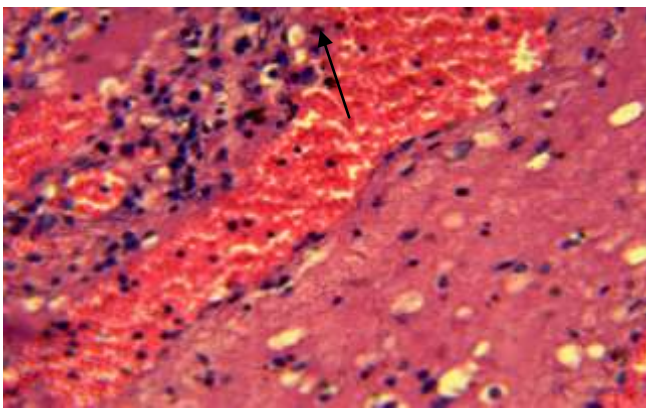


Figure 1. Lung showing stage-IV granuloma and formation of Langhans type of giant cells (denoted by black arrow), H&E x100.

RESULTS AND DISCUSSION

Externally, the carcass was found emaciated with dull body coat and sunken eyes. On gross examination, lungs revealed hard, grayish white nodules/tubercles of various sizes and the nodules were found filled with greenish/yellowish purulent exudate. The lungs affected were observed to be adhering to the ribs. Tuberculous lesions were also found in the lung, liver, and pleura. Swollen lymph nodes exhibited extensive yellowish-white caseo-necrotic foci within the cortical region, along with the presence of a central calcified area. Microscopically, tuberculous necrotic granulomas in lungs were characterized by central area of caseous necrosis with calcification surrounded by epithelioid macrophages, Langhans-type multinucleated giant cells (Figure 1) and lymphocytes. A less developed fibrous tissue capsule surrounded the lesion. In liver, necrosis of hepatocytes was seen. Granulomatous changes were seen in the pleura. The Ziehl-Neelsen special stain confirmed the presence of acid-fast bacilli in both the impression smear and tissue sections from lungs collected from the lesions (Figure 2). Molecular detection revealed positive for hsp65 gene with 441bp. Grossly, tubercular lesions were found in the lungs, liver and pleura and the nodules found in lungs were filled with purulent. Similar gross changes were previously described

A.A.U., Khanapara. External examination was done to record the general body condition of the animal and detailed post mortem examination was conducted by observing and recording gross changes in the tissues. The affected sections of lung, lymph nodes (tracheobronchial, retropharyngeal, mediastinal and mesenteric), liver, spleen and intestine were collected for further examination. The sections were collected and fixed in 10% neutral buffered formal saline. All fixed tissues were further processed for histopathological examination (H & E) as per procedure described by Luna (1968). Ziehl-Neelsen (ZN) staining was also done for detecting acid-fast bacilli along with molecular detection by targeting hsp65 gene with 441bp in the tissue sections from ADMAC, college of veterinary science, Khanapara, Guwahati.



Figure 2. Showing acid fast organisms by microscopic examination from direct tissue under 100X oil immersion.

by Kumar and Swamy (2005), Vural and Alcigir (2010) and Konch *et al.*, (2018). Histopathologically, necrotic pulmonary granulomas were characterized by central core of caseous necrosis with calcification surrounded by epithelioid cells, Langhans-type multinucleated giant cells and lymphocytes similar to the lesions reported by Goswami *et al.*, 2014, Kader *et al.*, 2022. Presence of acid-fast bacilli in lung samples were reported which were also observed by Cadavid *et al.*, 2021 and Kader *et al.*, 2022.

CONCLUSION

Bovine tuberculosis is a zoonotically important disease-causing worldwide health hazard in both human and animal population. At necropsy, presence of tuberculous lesions is more prominent in lungs in comparison with other various visceral organs were observed and on histopathological examination, presence of Langhans-type of giant cells in stage IV granulomas of lungs confirmed bovine tuberculosis in buffalo. ZN staining of lung tissues also confirmed the presence of acid-fast bacilli.

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