

Pathology of Tuberculosis in Camels (*Camelus dromedaries*) in the Sudan

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Abstract

The study was aimed to investigate the pathological changes of condemned lungs of dromedary camels in the Sudan abattoirs using conventional H & E and Zeihl Neelson (ZN) staining procedures. Proliferative granulomatous reaction was demonstrated in one H & E stained lung section which was characterized by focal fibrosis and infiltration of mononuclear cells resembled to tuberculous lesions. While ZN stained sections demonstrated acid fast rod in one pulmonary associated lymph node. These lesions were evidenced presence of tuberculous mycobacteria in camel tissues and recommended further deep investigation of tuberculosis among camels in the Sudan.

Keywords

Camel, Tuberculosis, Acid Fast Bacteria, Granulomas

1. Introduction

Tuberculosis (TB) is a chronic contagious tuberculous disease having a zoonotic impact and economic potential worldwide [1] [2]. TB remains one of the most prevalent and devastating diseases of man and animals caused by *Mycobacterium tuberculosis* complex. While birds and wild animals participate in epidemiological cycle of the disease as vectors [2].

TB in camelids is not fully investigated, however, few reports were documented it in such resistant animal [3] [4]. The diagnosis of TB in camel depends mainly on the pathology and detection of pulmonary, lymphatic, mastitic and milliary tubercles as well serology and tuberculin skin test as screening tests whereas microscopy, culturing and molecular approaches have a confirmative diagnostic impact [5] [6] [7] [8] [9]. The causative agents of camel tuberculosis were identified as *My-*

Mycobacterium tuberculosis complex agents whereas recent findings reported new *M. bovis* strain incriminated in camel tuberculous infection [2] [8]. This study aims to investigate tuberculous pneumonia in camels using microscopy and histopathological sectioning using H & E and ZN staining procedures.

2. Methodology

2.1. Necropsy and Sampling

In this study a total of 206 lung samples were inspected for different condemnation etiologies in slaughtered camels at both western (Nyala) and eastern (Tamboul) abattoirs in Sudan during 2002-2003. At postmortem lungs and its adjacent bronchial and mediastinal lymph nodes were visually examined and palpated for evident of any pathological caseation or tubercles.

2.2. Ziehl-Neelson Staining

Direct pus smears from caseated lung and mediastinal lymph nodes (n-16) were stained with Zeihl Neelson stain for direct microscopy. Paraffin tissue section also processed and stained with hematoxylin & Eosin and Zeihl Neelson stain for demonstration of acid fast bacteria [10] [11] [12].

3. Results and Discussion

Out of direct examined smears, no acid fast bacteria were detected. While in histopathological sections one lung tissue stained with H & E exhibited a granulomatous reaction with giant cell formation resembled to tuberculous lesions (**Figure 1**). Furthermore, one mediastinal lymph node stained with Zeihl Neelson stain exhibited acid fast rod typical to *Mycobacteria* organism (**Figure 2**). Demonstration of granulomatous pneumonia, acid fast rods in tissue section and masking of the bacteria in direct microscopy indicated the high resistant of

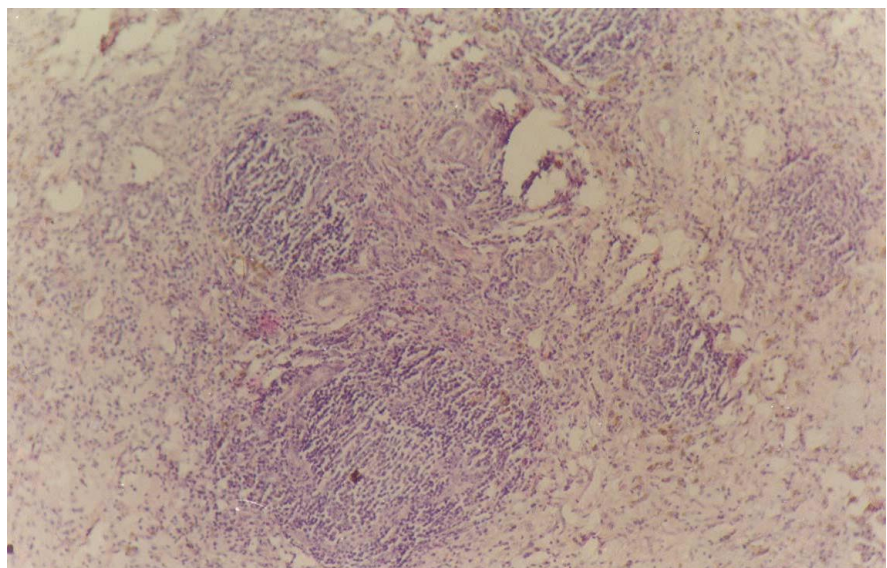


Figure 1. Camel's lung section showing granulomatous reaction (H & E 20×).

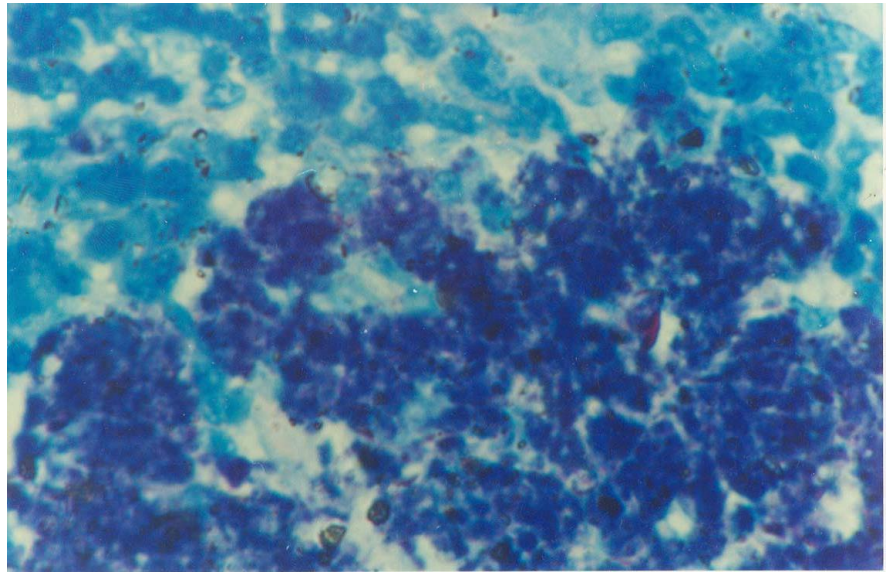


Figure 2. Camel's mediastinal lymph node section showed acid fast bacilli (ZN stain 100×).

camel immune system and its capability to trap such fastidious bacteria. Evidence of acid fast rods in camel tissue proved incidence of tuberculosis in Sudanese camel as the disease was reported before in Sudan and elsewhere [2] [3] [4]. These findings exaggerate the public health potential especially in rural communities of routinely practiced consumption of raw camel liver and lung meat of what so called “Ummarrara”.

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