

# TUBERCULOSIS IN CAMELS : CASE REPORT

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Tuberculosis (TB) is a chronic infectious disease of animals and man caused by *Mycobacterium tuberculosis*, *Mycobacterium bovis* and *Mycobacterium avium* and characterised by the formation of tubercles which have tendency to undergo caseous necrosis. This report is based on post-mortem findings of 2 dromedary camels which died of a condition suggestive of tuberculosis.

**Anamnesis :** Two camels reported to be sick for last 3 months with clinical signs of fever, loss of appetite, docile than normal but still bright and alert, were losing body weight which rendered them to a cachectic body condition. Laboratory investigations revealed haemoglobin concentration to be normal. Stained blood smear and rabbit inoculation examinations revealed the animals to be free from *Trypanosoma evansi* infection. Antibiotic, trypanosocidal and supportive treatment did not improve the condition of the camels which ultimately died.

**Gross pathology :** Following gross lesions were observed on necropsy examinations.

- a) Widespread lesions of tuberculosis in form of miliary tubercles (Fig 1), pearl like nodules (Fig 2) and bunches of tubercles resembling grapes (Fig 3) in lungs.
- b) Caseous lymphadenopathy
- c) Pleurisy
- d) Several litres of straw coloured fluid in abdominal cavity and
- e) Haemorrhagic enteritis

Liver, kidney, spleen, GI tract and other organs were unaffected.

**Histopathology :** Histopathological investigations conducted on liver, lung and kidney tissues revealed caseous necrosis of lung alveoli (Fig 4), congestion in

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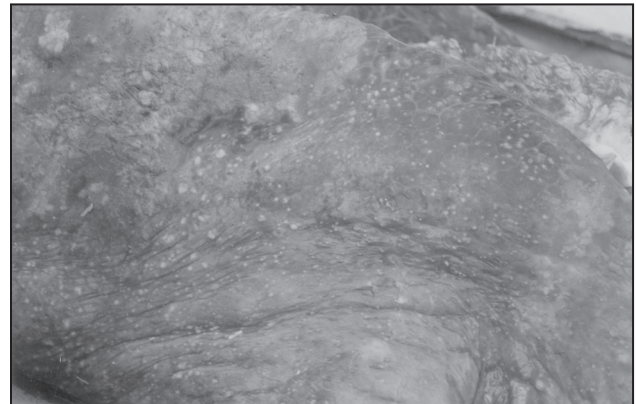


Fig 1. Miliary tubercles in lungs.

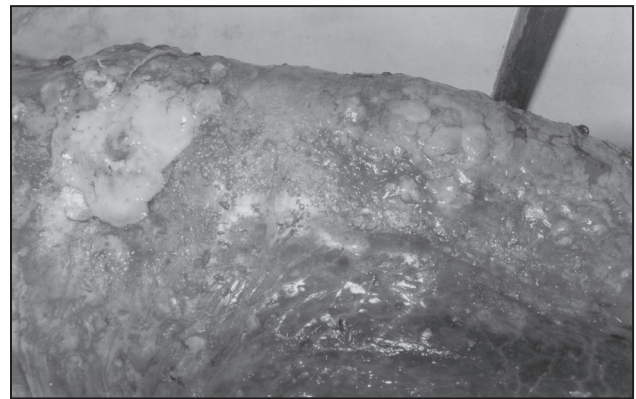
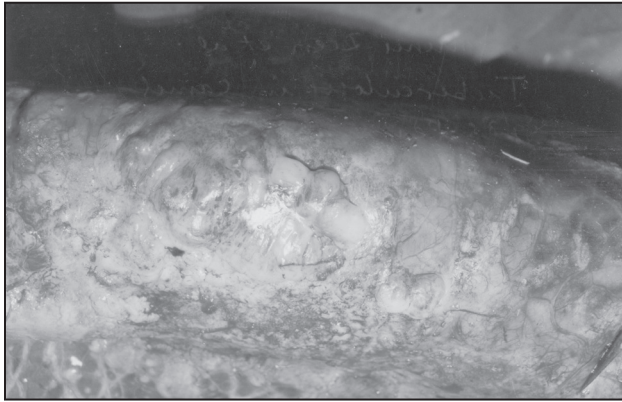


Fig 2. Pearl like nodules in lungs.

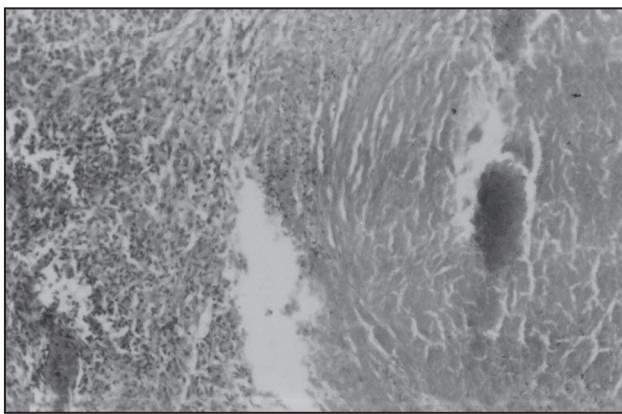
liver and kidney. Giant cells were observed in affected lung tissue and Ziehl-Nielson stained impression smear revealed presence of acid fast organisms.

## Discussion

Gross lesions and histopathological findings were suggestive of tuberculosis. This disease is reported to be rare among camels kept under nomadic conditions. The disease is reported to occur most frequently when camels are kept in close association with other camels or in close contact with cattle (Mason 1917 a, b and 1918; Elmoossalami *et al*, 1971;



**Fig 3.** Pearl nodules bunched together like grapes in lungs.



**Fig 4.** Caseous necrosis of alveoli of lung.

Donchenko *et al*, 1975a, c). Prevailing beliefs in the literature regarding this disease in this species are worth discussing. Lingard (1905) and Leese (1918) have reported prevalence of this disease in India and Mason (1917a, b and 1918) have reported it in Egypt. Donchenko *et al* (1975b) isolated *M. bovis* strains from 46 pooled milk samples from 712 lactating camels in Russia.

The signs of tuberculosis in animals usually vary with the distribution of tubercle in the body. Clinical evidence of disease may not become apparent in chronic cases until the terminal stages of the disease. In cases with progressive pulmonary disease, the animals may show signs of dyspnoea with an associated cough. The alimentary form is unusual and there are few signs, but diarrhoea and bloat may occur occasionally. Involvement of mammary tissue may result in induration of udder and enlargement of supramammary lymph node. Uterine form of tuberculosis may be associated with lymphadenopathy and occasional abortions.

A generalised form of tuberculosis is characterised by a progressive loss of body

weight with a variable appetite, elevated rectal temperature, animals are more docile than normal but still look bright and alert. Similar sort of generalised symptoms were observed in these 2 camels but despite progressive lesions in lungs, signs of dyspnoea and coughing were not observed. Since lesions of tuberculosis were not spread in alimentary, mammary, uterine and other tissues in these animals, associated symptoms were not observed. Payeur (1999) has appropriately suggested that due to the chronic nature of the diseases and the variable localisation of the infection, which causes a multiplicity of signs, tuberculosis is difficult to diagnose clinically and is normally found only at necropsy.

Gross lesions of caseous, calcified and purulent granuloma observed in these camels on lungs in form of miliary tubercles, dry and cheesy caseous masses, pearl like nodules, grapes like bunches of tubercles, enlarged caseous lymph nodes and histopathological lesions of caseous necrosis of lung alveoli are indicative of tuberculosis.

When tubercle bacilli enter the body, they are usually immediately phagocytosed by neutrophils. Subsequent destruction of the neutrophils by multiplying mycobacteria stimulates the accumulation of epithelioid cells that engulfs the neutrophils and mycobacteria. The bacilli are not destroyed, they multiply within the epithelioid cells and apparently produce a toxic substance that destroys adjacent cells. This causes an area of caseous necrosis and the beginning of a tubercle. More epithelioid cells encircle the necrotic area, and in the centre of the tubercle, the cellular nuclei disappear and structural detail is lost. A number of epithelioid cells fuse to form multinucleated giant cells. Acid-fast bacilli may be demonstrated throughout a lesion within epithelioid cells, giant cells and in necrotic debris.

Camel milk is reported to have bactericidal and viricidal properties and have been used in sanatorium to treat cases of tuberculosis (Yagil, 2000). Camel milk is also claimed to destroy *Mycobacterium tuberculosis* (Donchenko *et al*, 1975a) and inhibits other pathogenic bacteria (Barbour *et al*, 1984). Similarly, supplementation in diet with camel milk to multiple drug resistant tuberculosis human patients has been reported to be beneficial over cow milk (Annual report, NRCC, 1999-2000). If these claims are considered to be true, then camel should have been resistant to this disease. In light of the present findings and those mentioned above

regarding prevalence of this disease, the claims of beneficial effects of milk in human TB patient need to be reexamined. Donchenko *et al* (1975a, c) reported that 9.1% camels of their herd in which *M.bovis* was recovered in milk, were reactive to tuberculosis test. But this test has some inherent deficiencies and cannot be relied upon as positive tuberculosis reactors in Austrian dromedaries were found to have no indicative lesions after slaughter (Schillinger, 1987). To conclude upon, the lesions observed on lungs and lymph node and histopathological findings are suggestive of prevalence of tuberculosis in camel. Reliable test method needs to develop to control and eradicate this disease.

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