

Pathoepidemiological Study of Tuberculosis in *Panthera Pardus*

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Introduction

Tuberculosis in wild and captive animals is a very important zoonotic disease of veterinary and public health significance. Tuberculosis is a chronic infectious granulomatous disease observed in humans as well as in animals. Several cases of tuberculosis have been reported among the bovines, but a very few studies on tuberculosis in wild animals have been reported in India (Harish, *et al.*, 1983 and Das & Jayarao, 1986). The present study is the description of pathology and related epidemiology of a very rare case of tuberculosis in a captive leopard (*Panthera pardus*) with chronic renal failure.

Materials and Methods

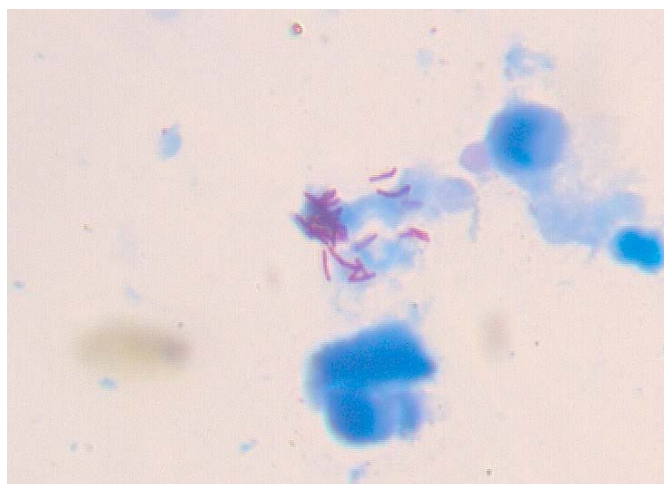
A 22 years old male leopard (*Panthera pardus*) kept at Bannerghatta Biological Park, Bangalore, exhibited the symptoms of weakness, lethargy, inappetance, chronic weight loss, emaciation and respiratory distress. Whole blood with EDTA for analysing the hematological values and without EDTA for serum biochemistry studies was collected and analysed at Wild Animal Disease Diagnostic Laboratory (WADDL), Bannerghatta Biological Park, Bangalore. The haematological values were analysed as per the procedures outlined by Benjamin (1998). Serum chemistry parameters were estimated by using standard reagent kits (Erba, Trans Asia biomedical limited, Damn, Mumbai) and the procedures provided by the company along with the kits, on semi-automatic serum chemistry analyzer (Model No: 093004 Erbachempro). The animal was treated for chronic renal failure, however, it died without responding to the treatment. A detailed post mortem was conducted; impression smears from lung, kidney, liver and heart were collected. Lung and kidneys were collected for a detailed histopathological study as per standard procedure.

Observation and Discussion

Haemogram of the animal revealed severe leukocytosis (24000/ μ l) accompanied by neutrophilia with left shift, which was indicative, some bacterial infection. On serum chemistry, Blood urea nitrogen value and serum Creatinine were highly elevated as 54mg/dl and 7.3mg/dl respectively. Total protein, Albumin, Globulin, Albumin Globulin ratio, Alanine amino transferase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase and Blood Urea values were 5.3g/dl, 2.3g/dl, 3g/dl, 0.7, 109U/L, 53U/L, 18U/L, and 115.5 respectively.

On post mortem examination, the gross lesions on lungs were featured by the presence of multiple nodules of varying sizes distributed throughout the parenchyma (Fig.1). These nodules when cut

showed a cavity in the center filled by thick caseous pus with occasional calcification. The bronchial and mediastinal lymph nodes were enlarged with nodular areas of caseous necrosis and calcification. Liver had petichial haemorrhage. Kidneys were hard and degeneration of both cortex and medulla was observed. Impression smears from the cut surfaces of lung also had clear enormous bundles of pink stained *Mycobacterium* species of organism on staining with Ziehl Neelson's method of staining (Fig.2) which were morphologically similar to *Mycobacterium bovis* (Carter *et al.*, 1995).



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The hematological findings were in correlation with Fowler & Miller, (2003), who have reported leucocytosis, along with neutrophilia, (shift to left), hyperalbuminemia and hyperglobulinemia are suggestive of tuberculosis along with chronic renal failure.

Histopathological examination of lungs revealed areas of typical granulomatous reaction with caseation and aggregation of inflammatory cells predominantly neutrophils and severe thickening of interalveolar septa due to deposition of fibrin, inflammatory cells and RBCs (Fig.3) were in correlation with earlier work on tuberculosis (Harish, *et al.*, 2002). Histopathology of kidneys revealed necrotic changes in tubules and glomeruli with loss of nephrons (Fig.4). Severe fibrous tissue proliferation and infiltration of inflammatory cells in interstitial tissue were the other cellular changes noticed in kidney.

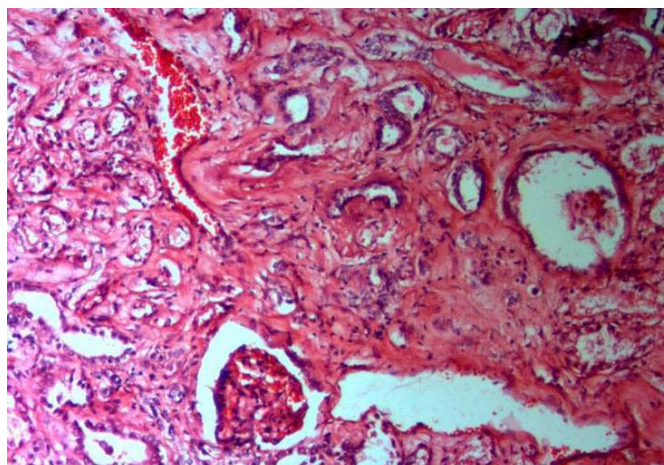
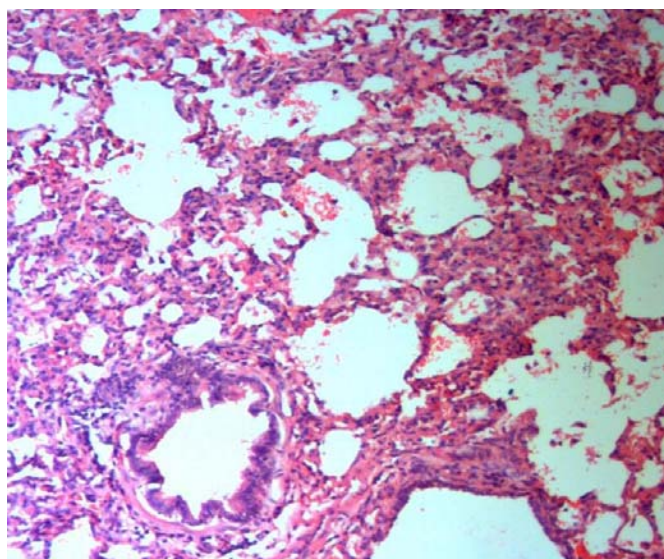
Majority of the *Mycobacterium* isolated in carnivores are of *Mycobacterium bovis* type (Fowler & Miller, 2003), which is mainly attributed to ingestion of infected prey (in wild) or meat (captivity) (Bengis, 1999). In some cases, however, no clear source of infection could be determined (Helman *et al.*, 1998)

In this present study the source of infection could be feeding of infected meat, or transmission by continuous association of Tuberculosis infected animal handlers, or a remote chance could be, through visits of Tuberculosis affected tourists, because about 3.9% human tuberculosis in the world is due to *Mycobacterium bovis*. Keeping in view the source of infection in this study, the suggests control strategies in captive felines; feeding of well-inspected, healthy meat, periodic testing of animal handlers, and to provide / create sufficient distance between the animal and the visitors.

. The renal failure could be attributed to old age and intake of high protein diet.

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Acknowledgement

The authors are thankful to the authorities of Bannerghatta Biological Park for having provided all the necessary facilities to carry out the study.