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## *Mycobacterium bovis* Infection in an adult dog

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**Abstract**

The present study reports a mycobacterium infection with the rare transmission of *Mycobacterium bovis* infection between an adult male dog and potentially other infected animal through close contact. Clinical signs revealed progressive weight loss, emaciation, chronic diarrhea and loss in condition. Despite receiving earlier supportive treatment, it progressed to death. Post-mortem examinations revealed presence of granulomatous lesions. Ziehl-Neelsen stains demonstrated numerous slender, slightly beaded acid-fast bacilli consistent with mycobacteria in the liver and kidneys confirmed by PCR. Positivity of tuberculosis in a dog poses a risk of transmission of infection between the dog and other animals including humans.

**Keywords:** *Mycobacterium bovis*, dog, granulomatous lesions, Ziehl-Neelsen stain

**1. Introduction**

Tuberculosis (TB) is an infectious chronic disease caused by bacteria belonging to the *Mycobacterium tuberculosis* complex. The bacteria infects wide range of wild and domestic mammals including monkeys, cattle, parrots, cats, dogs, domestic pigs and other animals [1, 2, 3]. *Mycobacterium* falls under the category of Hazard group-III organisms [4]. Canine infections are usually caused by *M. tuberculosis*. *Mycobacterium bovis* infections are rare in dogs although dogs are susceptible to both *Mycobacterium bovis* and *M. tuberculosis* infection. Transmission of infection in dogs is associated with consumption of raw milk or contaminated products/offals. Most mycobacterium infections in dogs run sub-clinically, with pathological lesions localized mainly in the lymph nodes, lungs, small intestine, liver, kidneys and spleen. Clinical signs are usually associated with the respiratory tract, although in rare cases they can be localized in other areas depending on the dissemination of the organism [5, 6]. Ante mortem diagnosis of TB is very difficult in dogs as initial stages may be asymptomatic. Animal may remain asymptomatic for a long period even presenting extensive lesions. However presence of acid-fast bacilli (AFB) or the isolation of the agent in secretions and tissue biopsies are considered definitive for the diagnosis [7]. The amplification of specific DNA sequences by PCR is another useful tool for the diagnosis of TB. This case study describes the unusual identification and isolation of *Mycobacterium bovis* from an adult dog.

**2. Material and Methods**

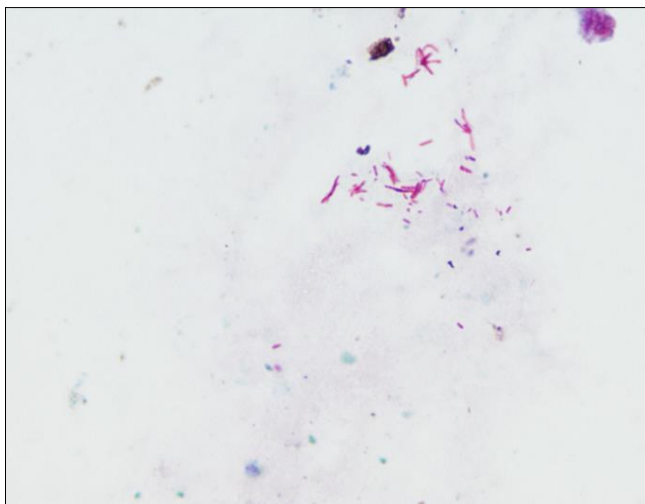
A three and half year old pet male dog (mixed breed) was presented to small animal clinics GADVASU, with the history of progressive weight loss despite regular feeding, emaciation, chronic diarrhea and loss in condition. History revealed contact of dog with other animals including cattle. Previously antibiotic and antihelminthic treatment was given, however, the outcomes were unsatisfactory and it progressed to death. Post-mortem examinations revealed calcified and nodular lesions throughout the liver, lungs and kidneys. Samples from the lesions were collected and preserved in formalin for histopathological analysis. Samples collected were subjected to Ziehl-Neelsen staining. Further samples were screened in Laboratory, for identification of mycobacteria by PCR using TaqMan DNA Micro tissue kit, following the manufacturer's instructions. The extraction of DNA and PCR was performed according to the standard method given [8].

**3. Results and Discussion**

Postmortem and gross examination of all organs revealed calcification in abdominal cavities along with the granulomatous lesions in liver and kidneys. Ziehl-Neelsen stains demonstrated numerous slender,

slightly beaded acid-fast bacilli consistent with mycobacteria in the liver and kidneys, confirmed by PCR. The presence of acid-fast bacilli (AFB) or the isolation of the bacterial agent from the liver and kidney tissues are considered definitive for the diagnosis (Figure 1). Ante mortem TB diagnosis is difficult because clinical signs of the infection are unspecific and easily mistaken for other diseases. Ziehl-Neelsen staining confirmed presence of *Mycobacterium* in liver and kidney samples, confirming the diagnosis of TB [9]. PCR analysis was particularly useful for detecting the presence of mycobacteria in the liver sample. Although PCR is more sensitive than other techniques used for the detection of AFB in tissues, however, amplifications were not obtained in samples from other tissues that were positive. Many cases of mycobacterial infection in dogs have been diagnosed by molecular tests [10]. A treatment option in small animal patients is effective in many cases if the diagnosis is made at earliest [11].

Canine *Mycobacterium bovis* infection is rarely reported, and so far an intra-abdominal localization and successful treatment in a dog has not been documented [12]. The pathological features of tuberculosis (TB) in carnivores often differ from those in cattle. Although in dogs the primary TB complex occurs most frequently in the lungs and associated lymph nodes, lesions in the liver and mesenteric lymph nodes are also frequent [13]. In conclusion, studies suggest that the canines could potentially be a source of mycobacterial transmission to other animals through close contact and should also be tested for the presence of bacteria [14]. The localization of *Mycobacterium bovis* in liver and lungs confirm an oral and aerogenic route of infection. In our study, oral infection was highly probable routine of infection because the dog was fed with the offals and food leftovers. Canines could potentially be a source of *Mycobacterium bovis* transmission between non-infected dogs or other animals through close contact [15].



**Fig 1:** Slender, acid-fast Mycobacterium in Liver tissue

#### 4. Conclusion

Thus it was concluded that routine examination of farm pet animals should be performed in order to prevent transmission of infection between animals even to human beings which are in close contact with the animals.

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