



First Report of *Mycobacterium bovis* Isolation from a European Fallow Deer (*Dama Dama Dama*) in Iran

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Abstract

At present, most of Iran is free of bovine tuberculosis (TB). The strategy of control and eradication in Iran involves a tuberculation test and slaughter of reactors, a procedure transformed the present-day prevalence of TB into a sporadic occurrence. This paper describes the first report of bovine tuberculosis in a European fallow deer (*Dama dama dama*) in Iran. The deer was emaciated and found dead in the Hoveize Provincial Zoo Park. Post-mortem examinations revealed multifocal granulomatous and suppurative abscesses in the lungs and mesenteric lymph nodes. These post-mortem indicators led the authors to suspect TB, and the PCR test and bacteriology tests confirmed it as an infection by the *Mycobacterium bovis*. This survey discusses the important implications of such findings for wildlife, especially livestock, as well as for human TB disease control, because deer are often conserved in public zoos and humans often come into contact with them.

Keywords: *Mycobacterium bovis*, Tuberculosis, European fallow deer, Iran

Introduction

Tuberculosis is an infectious and contagious zoonotic disease caused by different types of mycobacterium. Bovine TB, caused by the *Mycobacterium bovis*, primarily affects cattle and other warm-blooded animals (e.g. cattle, bison, deer and goats), and can be transmitted to humans as well. Transmission between deer and cattle can occur via either direct or indirect contact. Direct transmission implies proximity contact. Wild animals, in most cases, become infected following contact with infected cattle or contaminated pastures through inhalation or ingestion of infectious organisms (1, 2).

This paper describes the first report of bovine tuberculosis in a European fallow deer (*Dama dama dama*) in Iran.

Case report

The female European fallow deer in the Hoveize Provincial Zoo Park (in south-west Iran) was found emaciated and dead. Necropsy lesions, suppurative abscesses and diffuse severe granulomatous pneumonia in the lungs were observed. In addition, the pharyngeal parotid and mesenteric lymph nodes (enlarged to 2–5cm in diameter)

contained pus and calcified materials (Figs. 1, 2, 3). The other internal organs such as heart, liver, spleen, kidneys, intestine and rumen, reticulum and omasum appeared to be normal.

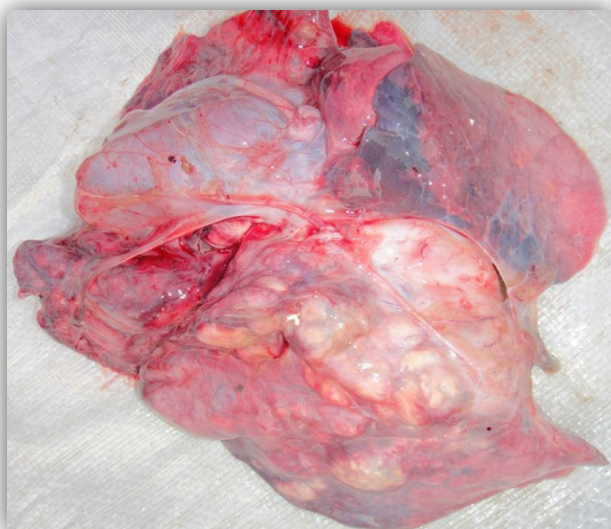


Fig. 1: Diffuse severe granulomatous pneumonia due to bovine tuberculosis in the lungs of a European fallow deer (*Dama dama dama*)



Fig. 2: Bovine Tuberculosis suppurative abscess in European fallow deer (*Dama dama dama*) lung

The dental examination showed that the European fallow doe belonged to a species of *Dama dama dama* and was three yr old.

The bacteriology tests and samples of lymph nodes were kept in a 10% formalin buffer, embedded in paraffin, sectioned at 5 μ m, and stained with Ziehl-Neelsen and in turn revealed numerous acid-fast organisms resembling *Mycobacterium*.



Fig. 3: Bovine Tuberculosis suppurative abscess in European fallow deer (*Dama dama dama*) mesenteric lymph node

Besides, a PCR test was carried out on the fresh tissue samples prepared from the lungs and mesenteric lymph nodes homogenated, as well as for the DNA extraction, using the NucleoSpin Tissue kit (Macherey-Nagel). The UltraClean Forensic DNA kit (Tuberculin Department of Vaccine and Serum Laboratories of the Iran Razi Institute) was used to isolate high-quality DNA from the tissue samples. The primers were used to identify the *M. bovis*, which amplified a 123 bp fragment of insertion sequence IS6110 (3)

Discussion

The detection of TB reservoirs in different varieties of domesticated and wild animals is very important, particularly in areas which have low incidence of the TB disease in domestic animals and where plenty of money is spent for test and eradication of TB. TB cases in European fallow deer

have never been reported. This survey is the first report from Iran. This survey discusses the important implications of such findings for wildlife, especially livestock, as well as for human TB disease control, because deer are often conserved in public zoos and humans often come into contact with them. Such surveys can also expose the new reservoir of TB in Iran or any other country that has or conserves deer. This report also elucidates the epidemiology of mycobacterial infection in this species.

TB in deer caused by *M. bovis* has been reported in countries where deer is kept as a domestic species grazing in common pastures (4). However, tuberculosis in deer has never been reported in Iran. All deer and other animals kept in the Hoveize Zoo were TB tested, and the result was negative. In recent years, most areas in Iran are free from bovine tuberculosis. Therefore, in this report, applying the strategy of control and eradication in Iran reservoirs where bovine TB is present is considered.

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