

Status of *Mycobacterium bovis* on Cattle Farm of National Animal Breeding and Genetics Research Center of Nepal

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Abstract

The study was conducted to determine the status of *Mycobacterium bovis* in cattle of National Animal Breeding and Genetics Research Center (NABGRC), Nepal Agricultural Research Council (NARC), Khumaltar, Lalitpur. Out of total 41 cattle (Jersey cross, Holstein Friesian cross and Lulu) present in this farm, 10 cattle (one male and nine female) were tested with single intradermal tuberculin test. During the test, only one (10%) cattle was suspected (2 - 3.9 mm) for tuberculosis while the rest (90%) were found confirmed negative (≤ 2 mm). There were no any confirmed positive (≥ 4 mm) cases of tuberculosis. There was no significant association of sex with tuberculosis infection ($p > 0.05$). Out of five Holstein Friesian cross cattle, one was suspected whereas out of two Jersey cross breed and three Lulu breed, all were tested negative. Breed was found to be significantly ($p < 0.05$) associated with tuberculosis infection. NABGRC, NARC do not have any tuberculosis positive cattle. After one month, purified protein derivative (PPD) test was again done on suspected female Holstein Friesian Cross cattle which was found to be negative. Further detailed study is needed in large scale to determine the status of tuberculosis in animal.

Keywords: Bovine Tuberculosis; *Mycobacterium*; Tuberculin Test

Introduction

Bovine tuberculosis is a cosmopolitan animal disease having a great public health concern to the world. It is an important zoonotic disease that can infect wide variety of animal species and can be transmitted from animals to humans [1]. It is a bacterial disease of cattle mainly caused by *Mycobacterium bovis*. Bovine infection can occur through the milk to calves, ingestion of contaminated feed with feces of infected animals, aerosol, contact with each other and other wildlife [2]. The bovine tuberculosis is a contagious debilitating disease of animals associated with progressive weakness/emaciation and tubercle (granuloma) formation, mainly confined to respiratory system (primarily in the lungs) and occasionally in other organs. This study was conducted to determine the status of bovine tuberculosis in animals.

Methodology

A cross-sectional study was conducted. Bovine Tuberculin PPD was brought from Central Agricultural Research Institute (ICAR), Indian Veterinary Research Institute (IVRI), Izatnagar, India. A total of 10 cattle of NABGRC were tested with single intradermal tuberculin test considering various animal factors like breed and sex. Statistical analysis was carried out using the Microsoft Excel-2007 and SPSS-20 version.

Single intradermal tuberculin test (SITT)

The testing procedure was considered as described by Radostits., *et al* [3]. Initially, the skin was clipped and disinfected with 70% ethanol on the cervical area below 12 - 15 cm to the vertebral column. The site of injection was marked with permanent marker. The initial skin thickness was measured by Vernier Calipers. After that, an intradermal injection of 0.1 ml bovine purified protein derivatives (PPD) was done with a tuberculin syringe. The visible, palpable or measurable change in skin thickness was noted. Then, readings of the skin thickness were measured in 48 and 72 hours post injection. The data were compiled. The animals reacting to the tuberculin with the visible edematous change as described by Radostits., *et al.* [3] or enlargement in skin thickness by ≥ 4 mm in 72 hours as described by Chakrabarti [4] were declared positive reactors. Mild reactors were indicated by skin thickness increment of between 2 and 4 mm were also taken positive while increase in skin thickness ≤ 2 mm were declared as negative reactors.

Results and Discussion

Overall one (10%) cattle was suspected for tuberculosis and the rest (90%) of the cattle were confirmed negative. There were no any confirmed positive cases of tuberculosis in cattle of NABGRC. After one month, PPD test was again done on suspected cattle which were found negative which do not match the findings of Joshi., *et al.* [5] according to him tuberculosis prevalence were 6% in cattle, 9% in buffaloes and 9% overall prevalence in cattle and buffaloes. Similarly, the finding of our study do not match the finding of Mondal., *et al.* [6] who did study on prevalence and risk factor of bovine tuberculosis in cattle in Mymensingh Sadar, Bangladesh in which overall prevalence of bovine TB was found 5.9%. Study by Gaire [7] included 50 animals reared by 25 tuberculosis (TB) infected persons were tested by using intradermal cervical tuberculin test. A total of 5 animals (10%) were positive for tuberculin having the change in skin thickness. There was no confirmed positive case found in our study that may be due to small number of cattle selected, type of diagnostic test used and husbandry system adopted in NABGRC.

Species	Sex	Reaction				p- value
		Confirmed Positive (≥ 4 mm)	Suspected (2 - 3.9 mm)	Confirmed Negative (≤ 2 mm)	Percentage	
Cattle	Male	-	-	1	10% (Confirmed Negative)	0.12
	Female	-	1	8	10% (Suspected)	
Total		-	1	9	80% (Confirmed Negative)	

Table 1: Sex wise tuberculin reactions among cattle.

In this research, one male cattle (10%) was found negative (≤ 2 mm) for tuberculosis whereas eight female cattle (80%) were found negative (≤ 2 mm). Similarly, one female cattle (10%) was suspected (2 - 3.9 mm) for tuberculosis as shown in table 1. There were no significant association of sex with tuberculosis infection ($p > 0.05$) that supports the finding of Pandey., *et al.* [8] who did study on status of tuberculosis in bovine animals raised by tuberculosis infected patients in Western Chitwan, Nepal. The similarity between sexes may be due to few males being included in this study. After one month, PPD test was again done on suspected female cattle which was found negative. Similarly, according to Joshi., *et al.* [9] sex-wise prevalence rate of bovine tuberculosis was higher in female (14%) than in male (8%) which do not support our findings.

Species	Breed	Reaction				p- value
		Confirmed Positive (≥ 4 mm)	Suspected (2 - 3.9 mm)	Confirmed Negative (≤ 2 mm)	Percentage	
Cattle	Jersey cross	-	-	2	20% (Confirmed Negative)	0.001
	Holstein Friesian Cross	-	1	4	40% (Confirmed Negative) 10% (Suspected)	
	Lulu	-	-	3	30% (Confirmed Negative)	
Total		-	1	9		

Table 2: Breed wise tuberculin reactions among cattle.

Similarly, one Holstein Friesian cross breed (10%) was found suspected (2 - 3.9 mm) whereas two Jersey cross breed (20%), four Holstein Friesian Cross breed (40%) and three Lulu breed (30%) were found negative (≤ 2 mm) for tuberculosis as shown in table 2. After one month, PPD test was again done on suspected Holstein Friesian Cross cattle which was found negative which do not support the finding of Sripad., *et al.* [10] who did study on bovine tuberculosis among cattle in North Karnataka. In his study, breed wise prevalence was higher in Holstein Friesian breed (HF) (2.66%) than Jersey (1.37%) cattle and there are no positive cases among indigenous breed of cattle. From our study, we can conclude that there was no any tuberculosis on cattle of NABGRC of Nepal [11].

Conclusion

Overall, one cattle (10%) was suspected for tuberculosis and the rest were confirmed negative. There were no any confirmed positive cases of tuberculosis in cattle of NABGRC. After one month, PPD test was again done on suspected female Holstein Friesian Cross cattle which was found to be negative. Cattle farm is free from tuberculosis. Further detailed study is needed in large scale to determine the tuberculosis in bovine and find out prevention and control strategies against zoonotic tuberculosis.

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