

**Research article****Prevalence of paratuberculosis among cattle with diarrhea in Ninawah, Iraq**

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Article history Received: 13 Nov, 2017 Revised: 28 Dec, 2017 Accepted: 30 Dec, 2017	Abstract A serodiagnosis of bovine paratuberculosis in diarrheic cattle was carried out in Ninawah governors, Iraq. A total of 184 sera (diarrheic 92 and apparently healthy animals 92) was collected from local breed animals over a period of 1 year from November 2012 to March 2014. The age of the animals ranged from 3 to 7 years. All the sera were analyzed by indirect ELISA. Antiparatuberculosis antibodies were found in 19 (10.32%) of the 184 analyzed sera. The prevalence was significantly higher in the diarrheic cattle 16.3% (n=15/92) than in the nondiarrheic or apparently healthy animals 4.34 % (n=4/92). According to these results, cattle may be considered a reservoir host for paratuberculosis in the study area. Keywords: Paratuberculosis, Bovine, Indirect ELISA, <i>Mycobacterium avium ssp. Paratuberculosis</i>
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To cite this article: Al-Farwachi M, KA AL-Jubory and AN Flayyih, 2018. Prevalence of paratuberculosis among cattle with diarrhea in Ninawah, Iraq. Res. Opin. Anim. Vet. Sci., 8(1): 1-3.

Introduction

Johne's disease ("yo-nees") or paratuberculosis is a chronic wasting disease of domestic and wild ruminants, caused by *Mycobacterium avium ssp. paratuberculosis* (Stevenson et al., 2009). Clinically, the diseased animals suffer emaciation and in some species, diarrhoea is followed by eventual death. The major economic losses of paratuberculosis are caused by decreased milk production, increased cow-replacement costs and shorter life expectancy of animals (Richardson and More, 2009). Cows with subclinical infection frequently have problems of infertility and mastitis (McKenna et al., 2006). Diagnosis of Johne's disease is made on clinical and necropsy findings confirmed by the demonstration of *M. avium ssp. paratuberculosis* in the faeces and tissue by microscopy and bacteriological culture (OIE, 2000), or by the polymerase chain reaction techniques (Ikiz et al., 2005). The serological tests commonly used for

Johne's disease are complement fixation, absorbed enzyme-linked immunosorbent assay and agarose gel immunodiffusion (Vural and Atala, 1988, Shin et al., 2008). The ELISA has been most widely used for screening herds (Shin et al., 2008). Absorption of serum samples using *M. phlei* is done to remove most non-specific antibodies to related bacteria, such as other *Mycobacteria*, *Nocardia asteroides* and other closely related bacteria (Bech-Nielsen et al., 1992).

A recent study on the bovine paratuberculosis in different countries reported that seroprevalence for the infection was 15.1% and 21.7% in Atlantic Canada and Maine, respectively (McKenna et al., 2004), 3% to 20% in several European countries (Nielsen and Toft, 2009), 2.7-4.3% in Turkey (Vural et al., 1998) and 4.2-7.7% in Iran (Sadati et al., 2012). In Iraq, the disease was serologically diagnosed in sheep (Ahmed, 2010) and in goats (Al-Kass, 2009). The purpose of this study was to find the prevalence of paratuberculosis in Ninawah, Iraq.

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Materials and Methods

Sera were collected from 184 local adult cows: 92 from diarrheic cattle and 92 from non diarrheic or apparently healthy animals. The age of the animals ranged from 3 to 7 years during the period from November 2012 to March 2014 to be screened for the presence of antiparaterculosis antibodies. All examined animals were brought to the Veterinary Teaching Hospital of College of Veterinary Medicine, Mosul University, Ninavah governorates (a northern city in Iraq located about 400 km northwest of Baghdad).

All sera were tested by a commercial ELISA kit ID Screen® Paratuberculosis Indirect ELISA kit (ID VET diagnostics, Montpellier, France). The Results were interpreted according to manufacturer's instructions. According to the test protocol, sero positive (S/P) of greater than or equal to 70% S/P were regarded as positive for paratuberculosis.

Statistical analysis

The prevalence rate among the cattle were analyzed using SPSS-version 10.1. Significant differences among the variables was calculated using Pearson's Chi-square test. A P value less than 0.05 was considered as significant.

Results

The results of study showed that the total percentage of seropositive of *M. avium ssp. paratuberculosis* antibodies was 10.32 (Table 1). The prevalence was significantly higher in the diarrheic cattle 16.3% (n=15/92) than the nondiarrheic or apparently healthy animals 4.34 % (n=4 /92). The percentage of seropositive values (S/P%) were significantly higher in the diarrheic cattle than in other animals (Table 2).

Table 1: Prevalence of bovine paratuberculosis in diarrheic cattle

Animal category	Number of positive	Percentage
Diarrheic animals N= 92	15	16.3*
Non diarrheic animals N= 92	4	4.34
Total N= 184	19	10.32

*Statistically significant p<0.05

Table 2: Distribution of the percentage of serum/positive values for *M.avium sub sp. paratuberculosis* in cattle

Origin of examined sera	% of serum/positive
From diarrheic animals	162.9±2.2*
From non diarrheic animals	86.2±2.0

*Statistically significant p<0.05.

Discussion

This is the first serological surveys of bovine Paratuberculosis in the Ninavah governorates, Iraq. Sero diagnosis of bovine paratuberculosis have been reported in some previous studies in Iraq using ELISA (Ahmed, 2010, Al-Kass, 2009).

In this study, antibodies against *M. avium sub sp. paratuberculosis* was detected in the 19 of 184 sera (10.32%). Serological surveys indicate wide spread exposure to *M. avium subsp. paratuberculosis* in dairy and beef cattle and sheep in many parts of the world (McKenna et al., 2004- Sadati et al., 2012).

Although there is no published information on the prevalence of bovine paratuberculosis in Iraq, there are many studies of bovine paratuberculosis in the local countries as Turkey (Vural et al., 1998) and Iran (Sadati et al., 2012). In our study, the levels of infection are higher than those reported by Vural and Atala (1998) and Sadati et al. (2012) for cattle in Turkey and Iran respectively. We consider that the differences in prevalence values may have arisen from the geographic location and the use of different detection tests. The prevalence of paratuberculosis can be affected by the factors such as climate, nutrition, age, region, housing conditions and diagnostic methods (Sorensen et al., 2003; McKenna et al., 2004; Nielsen and Toft, 2009). Therefore, it is difficult to compare prevalence estimates derived from different populations using different sampling methods and tests (NcNab et al., 1991).

In this study, the percentage of seropositive values were significantly higher in the diarrheic animals than in other animals which reflect the high concentration of antibodies against paratuberculosis. Such differences could be due to different courses of the disease, which could influence the histopathological findings and serological results (Perez et al., 1997, Dubash et al., 1995). Detection of infection by ELISA techniques appears to be dependent upon the diseased state of the tested animal. ELISA sensitivity for clinical cases has been reported to be 85%, while the sensitivity is about 15% of subclinical cases (Hermel, 1998).

Acknowledgements

The study was supported by the College of Veterinary Medicine, University of Mosul, Iraq.

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