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A NOTE ON SEROLOGIC SURVEY OF CAMEL BRUCELLOSIS IN QUM PROVINCE, IRAN

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Of all the zoonoses that have both; public health and economic implications, brucellosis is the most widespread (Cosivi and Seimenis, 1998). Almost all human cases are acquired from animals (Al-shamahy, 1999; Young, 2000). In humans, it represent a major public health hazard which affects social and economic development in various countries. Furthermore, brucellosis causes great loss in domestic livestock resulting in abortions and birth of non-viable offspring in females, and orchitis and epididymitis in males (Quinn *et al*, 1994; Straten *et al*, 1997).

Brucellosis has been recorded in many different species of animals (Hirsh Dwight *et al*, 2004; Rajkhowa *et al*, 2005). Camel is susceptible to brucellosis and it is characterised by abortion and to a lesser extent by orchitis and infection of the accessory sex glands in males (Abbas and Agab, 2002; Wernery and Kaaden, 2002).

Brucellosis was reported in camels as early as 1931; since then, the disease has been reported from all camel-keeping countries. Camel can be infected by any of the main species of the genus *Brucella* (Abbas and Agab, 2002; Wernery and Kaaden, 2002).

A definitive diagnosis of brucellosis is made by recovering the organism from body organs like placenta, the stomach and lungs of aborted foetuses (Doern, 2000; Wernery and Kaaden, 2002; Young, 2002). Furthermore, a number of techniques for measuring anti-brucella antibodies in sera have been used for diagnosis of camel brucellosis (Hirsh *et al*, 2004; Wernery and Kaaden, 2002; Abbas and Agab, 2002).

In this survey, rose bengal plate agglutination test (RBPT), standard tube agglutination test (STAT) and 2- mercaptoethanol (2ME) tests were used for serological diagnosis of camel brucellosis.

Materials and Methods

Two hundreds and forty blood samples were obtained from one-humped camels (*Camelus dromedarius*) from a slaughter-house in Qum province at the centre of Iran. The sera were separated, numbered and stored at -20°C.

The RBPT was carried out as per Alton *et al* (1988) using *Brucella abortus* coloured antigen obtained from Razi Institute, Tehran, Iran.

The standard tube agglutination test (STAT) was performed according to Alton *et al* (1975) using *B. abortus* plain antigen obtained from Razi Institute. Titres of 1/80 or above in the STAT were considered positive.

The 2-ME test was carried out according to Alton *et al* (1975).

The chi-square test was used to compare seroprevalence relative to sex and age. The McNemar test (Armitage and Berry, 1988) and Kappa statistic (Thrusfield, 2001) were used to certify agreement between Rose Bengal and Wright tests.

Results and Discussion

Out of 240 sera samples tested, 28 were positive in RBPT (Prevalence 11.6%); 27 were positive in STAT (Prevalence 11.2%) and 26 were positive in 2ME (Prevalence 10.8%). The percentage of seropositive animals is shown in table 1.

Table 1. Seroprevalence of brucellosis among camels.

Result / Test type	Positive (%)	Negative (%)	Total
RBPT	28(11.6%)	212(88.4%)	240(100%)
STAT	27(11.2%)	213(88.2%)	240(100%)
2-ME	26(10.8%)	214(89.2%)	240(100%)

The serological differences between male and female camels were non significant. The serological differences between different age groups were non significant (X^2 test).

The observed proportion agreement between Rose Bengal and Wright tests was 96.25%. A more

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rigorous comparison can be made by calculating a statistic, Kappa, which takes account of chance agreement which was 81.6%. Because the calculated kappa values was more than 0.81 therefore the agreement between two tests is almost perfect. Also the result of McNemar's change test indicate no significant difference between the two tests.

Zowghi and Ebadi (1988) with the aid of RBPT, STAT, CFT & 2-ME tests showed serological evidence of brucellosis in 8% of camels in Iran. The sera samples were obtained from Ziaran and Abyek slaughterhouses. Razmyar *et al* (1992) reported 4% of serologically positive cases in the camels in slaughterhouse of eastern Iran. Khadjeh *et al* (1992) with the aid of RBPT, STAT and 2-ME tests reported laboratory evidence of camel brucellosis in 1.93% of camels in Boshehr, south of Iran. Poorjaafar *et al* (2005) reported 1.65% seroprevalence of camel brucellosis in Najaf Abad, Isfahan, central Iran.

In this survey, the seroprevalence of camel brucellosis has been found about 11% that is higher than previous reports. It could be ascribed to the difference between rates of infection to brucellosis in camels in different states of Iran, the rising in prevalence of brucellosis in camels and the difference between keeping pattern of camels. The native camel population in Bushehr was stable, nonmobile and better managed (Khadjeh *et al*, 1999)

The difference correlates with this finding that the seroprevalence of brucellosis in camels is low in extensively kept pastoralist camel, while it is rather high in more intensively kept camels, so seroprevalence ranging between 2 and 5% were reported from most countries where camels are still kept by nomadic or transhumant pastoralist. A higher seroprevalence of brucellosis (8-15%) was reported in intensively kept camels (Abbas and Agab, 2002).

In this study we could not find significant correlation between genus and disease, but in some studies the seroprevalence of camel brucellosis was higher in females compared to males (Abbas and Agab, 2002). Similarly, we could not find significant correlation between age and disease but in some studies the seroprevalence of brucellosis reported three to four- fold higher among adult camels than young ones (Abbas and Agab, 2002).

Present study indicates the high seroprevalence of brucellosis in camels at Qum, central provinces of Iran and it differed from seroprevalence of camel brucellosis in other parts of Iran, therefore, a general survey about camel brucellosis in Iran is needed.

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