Surveillance of Brucella Antibodies in Camels of the Eastern Region of Abu Dhabi, United Arab Emirates

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ABSTRACT

A study of the prevalence of camel brucellosis has been carried out in the eastern region of Abu Dhabi Emirate (Al Ain) from 1991 up to 1996. An extensive sample scheme sufficient to estimate the sero-prevalence with defined precision of ± 1% at 95% confidence interval was applied. Rose Bengal Plate Test (RBPT) was used to screen all serum samples. The positive samples were subjected to confirmation by both tube serum agglutination test (SAT) and complement fixation test (CFT). Some positive samples were reconfirmed by FAO/WHO center for reference and Research on Brucellosis, Central Veterinary Laboratory (CVL), England.

The number of monitored sera were 1794, 11323, 1900, 1433, 3145 and 7899 in the years 1991, 1992, 1993, 1994, 1995 and 1996, respectively. The estimated prevalence of camel brucellosis which in 1991 was 5.8% has declined to 0.1% in 1995 and 1996. This reduction in antibodies incidence might be attributed to the effective eradication regimen adopted by the government in the region.

Key Words: Brucella, Antibodies, Camel, United Arab Emirates.

INTRODUCTION

Prevention and control of animal brucellosis depends on the establishment of an efficient national surveillance program and the presence of an active reporting system (Anon, 1993). The complexity of disease epidemiology and the lack of detailed demographic data concerning the camel population are among the major factors that have constrained disease control in the UAE.

There is a dilemma concerning the incidence of camel brucellosis in United Arab Emirates (UAE). Shalabi *et al.,* (1994) reported an incidence of 0.2% in Al Ain region whereas, Wernery and Wernery, (1990) recorded an incidence of 2% among breeding camels and 6.5% among racing camels. Meanwhile, Afzal and Sakkin, (1994) mentioned that the incidence of camel brucellosis among racing camels in Abu Dhabi was 1.5%.

An eradication campaign for brucellosis control was established in the eastern region of Abu Dhabi Emirate, Al Ain region in 1991 and the surveillance of disease prevalence was annually conducted. This work tried to estimate the actual incidence of camel brucellosis in Al Ain region using highly complicated sampling protocol to achieve the proper sample size that was proportionate with the real camel population.

MATERIALS AND METHODS

The total camel population in Al Ain is listed in Table 1 (Anon, 1993 and 1994). All animals are extensively reared as a contiguous population around 16 veterinary clinics, and distributed in the desert between the populated areas.

Table 1: Prevalence of camel Brucellosis in Al Ain region

Year	Camel population	Sample size	No. of positive cases	Prevalence Percent
1990/1991	89,410	1794	04	5.8
1991/1992	88,870	11323	26	0.2
1992/1993	98,003	1900	7	0.37
1993/1994	94,719	1433	3	0.2
1994/1995	107,846	3145	3	0.1
1995/1996	111,201	7899	8	0.1

The sample size was computed following the statistical formulae and tables described by Thrusfield, (1991). The preliminary study on camel brucellosis showed that the crude incidence of camel brucellosis was 0.2% (Shalaby *et al.,* 1994). So the computed sample size at the former incidence at 95% degree of confidence should not be less than 1,485 animals. A similar value (1,457 animals) was obtained when the authors conservatively assumed that the prevalence of camel brucellosis was as high as 4% and at 1% maximum acceptable variation at 95% level of confidence. The assayed sample sizes in relation to the annual total camel population are listed in table 1.

The sampling protocol conducted in Al Ain region followed one-stage cluster sample for proportion, with finite correction factor (Thrusfield, 1991). A list of camel owners was prepared for every clinic, which belongs to the Department of Agriculture. The total number of owners was estimated as 558. The number of owners per clinic was randomly selected as a surrogate for proportional allocation of animals on the assumption that the average number of camels per owner in the various localities is similar. The number of owners sampled from each clinic was calculated by multiplying the obtained proportion allocation of each clinic by the total number of owners that should be sampled.

The serum samples were tested immediately or kept at -20 °C until tested. The serum samples were screened firstly by Rose Bengal Plate Test (RBPT) then the positive samples were monitored by tube serum agglutination test (SAT) and warm complement fixation test (CFT) as described by Morgan *et al.,* (1978) using *Brucella abortus* antigen. The titers obtained by SAT or CFT were calculated in terms of international units. Camel sera scored titers equal to or greater than 30 IU in SAT and 20 IU in the CFT were considered positive. Reagents for serological tests were purchased from CVL, Weybridge, England.

Nine positive serum samples in addition to five negative samples were submitted to the FAO/WHO center for reference and Research on Brucellosis, Central Veterinary Laboratory (CVL), and Weybridge, England for further confirmation using CFT and enzyme linked immunosorbent assay (ELISA).

Table 2: Serological titers of some camel sera sent by The Al Ain Department of Agriculture to FAO/WHO Center for Reference and Research on Brucellosis.

Case No.	CFT - IU	Percentage towards positive control*		
		Abortus antigen	Abortus PK antigen	Melitensis antigen
1	320	72	87	72
2	651	100*	100*	100*
3	426	68	87	69
4	1702	84	73	71
5	851	83	71	71
6	426	76	70	57
7	851	87	75	98
8	851	80	88	103
9	186	35	22	33
10	- ve	0.4	0.7	0.4
11	- ve	0.08	0.7	0.4
12	- ve	0.26	0.7	0.4
13	- ve	0.17	4.5	0.7
14	- ve	6.5	6.3	0.3

Cases 1–9: Positive by RBPT, SAT & CFT. Cases 10–14: Negative by RBPT, SAT & CFT.

* Highest optic density value (OD); so this sample was considered a positive control and the cut off value was calculated as 10% of the positive control.

RESULTS

The sample size was calculated as described earlier and the authors scored the average camel population in Al Ain at the begning of this study of approximately 95,000 head. The prevalence of brucellosis among camel population over the period from 1990 up to 1996 are listed in Table 1. The obtained data showed that the prevalence of sero-positive cases in 1990/1991 was as high as 5.8% then declined gradually in the following years, to 0.1% in 1994 up to 1996.

All positive cases gave serological titers above the threshold accepted as cut off values for bovine brucellosis. On the lights of lack of universal accepted data concerning the cut off value for camel brucellosis. A randomly selected 9 positive serum samples in addition to a 5 negative one were sent to the FAO/WHO Center for Reference and Research on Brucellosis,England for further confirmation . The data obtained from the CVL (Table 2) confirmed the achieved positive cases .

DISCUSSION

Performing an epidemiological surveillance of animal brucellosis is considered of utmost importance in a brucella control program Anon, (1993). The present study is part of a large scheme applied by the Department of Agriculture and Livestock in Al Ain for eradication of animal brucellosis.

A great concern was given in this study to the applied sampling protocol. The sampling protocol adopted in the current study tried to overcome the problem of underestimation and reflected the difference between and within camel clusters over the 16 Veterinary centers following a proportional allocation of owners.

The recorded prevalence of camel brucellosis in 1990/1991 was 5.8%. This made the authors reconsider the sample size protocol applied as a rule of thumb. Increase the sample size up to 7 times in the 1991/1992 survey yielded 0.2% prevalence percent. In the 1992/1993 survey the sample size decreased to nearly the computed sample size and the recorded prevalence percent was 0.37%. From year 1992/1993 and on the sample size was doubled and the results achieved showed that the disease prevalence percent of camel

164

brucellosis did not exceed 0.1 to 0.2% This concluded that the prevalence of camel brucellosis in Al Ain is less than that reported in Kuwait by (Sultan Al-Khalaf and Abdalla Elkhaladi,1989); as well as in Saudi Arabia (Radwan et al.1992). Also, The obtained prevalence of camel brucellosis is also much less than that previously reported for the UAE (Shalabi *et al.,* 1994, Wernery and Wernery, 1990 and Afzal and Sakkin, 1994). This might be attributed to the sample protocol adopted which give better evaluation of disease prevalence as well as the success of eradication campaign applied to all livestock at the area of study.

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