Vet. Med. J. Giza, 39, No. 2, 267-272 (1991)

COMPARISON BETWEEN BRUCELLA ABORTUS AND BRUCELLA MELITENSIS ANTIGENS IN AGGLUTINATION TESTS FOR BRUCELLA DIAGNOSIS

By

S.F. SALEM and M. REFAI

Serum and Vaccines Research Institute, Abbassia and
Department of Microbiology, Fac. Vet. Med.,
Cairo University

(Received:11.3 .1991)

INTRODUCTION

Brucellosis is still one of the most important diseases which seriously affect animals and man alike. In Egypt, *Br. abortus* was the commonly isolated species until the beginning of the 1970s (Zaki, 1943, Roushdy 1944, Kamel 1965, El-Gibaly 1969 and Sayour et al. 1970). In the following years, *Br. melitensis* became increasingly isolated (Shawkat, 1973; El-Olemy 1974; Awad et al., 1975; El-Gibaly et al. ,1977, Nada, 1982 and Refai et al. ,1988). Serological tests are performed using *Br. melitensis* biovar 1 (which is A.antigen dominant)in many countries ; while brucellosis infection is caused by M-antigen dominant *Br. melitensis* biovar 3 in our country.

From that point of view, antigens were prepared from both *Br. abortus* and *Br. melitensis* and used in the present study to evaluate their efficiency in the diagnosis of the disease in animals.

MATERIAL AND METHODS

Br. abortus biovar 1 strain 99 and *Br. melitensis* biovar 3 (Field local strain) antigens were prepared after Alton et al. ,(1988).

Serum agglutination test (SAT) and Rose Bengal plate test (RBPT) were performed with each antigen according to Alton et al. ,1988 on 288 sera from herds in which infection with *Br. melitensis* biovar 3 was confirmed by isolation and identification of the causitive organism.

RESULTS

The results obtained by SAT using *Br. abortus* and *Br. melitensis* antigens are summarized in table (1).

It was found that out of 288 serum samples 128 (44.5%) were positive, 124 (43 %) were suspicious and 36 (12.5%) were negative by using *Br. abortus* antigen. Whereas by using *Br. melitensis* antigen, the corresponding results were 145 (50.3 %), 130 (45.2 %) and 13 (4.5%) respectively.

The results of RBPT (Table 2) showed that RBPT (A) revealed 220 positive in comparison with 249 in case of RBPT(M). Moreover, it was notable that agglutination was most evident in RBPT(M) with a reduction in the degree of agglutination in RBPT(A)in positive sera.

DISCUSSION

The control of brucellosis depends mainly upon the use of efficient diagnostic procedure. The agglutination tests using *Br. abortus* biovar 1 S99 in which A antigen is dominant are used for routine diagnosis of brucellosis in many countries.

In Egypt, *Br. melitensis* biovar 3 is the most prevalent strain and it is preferable to use M antigen dominant brucella strain as antigen for proper diagnosis of brucella melitensis infection as stated by other authors (Alton, 1971 and Ruckerbauer et al. , 1984). This

Table(1): Results of SAT with B abortus and B melitensis antigens.

No.of samples tested	B.abortus antigen			B.melitensis antigen		
	+ve	suspicious	-ve	+ve	Suspicious	-ve
288	128	124	36	145	130	13
	44.5%	43%	12.5%	50.3%	45.2%	4.5%

Table(2): Results of RBPT with B.abortus and B.melitensis antigens.

No.of samples tested	B.abortus antigen		B. melitensis antigen	
	+ve	-ve	+ve	-ve
288	220	68	249	39
	76.4%	23.6%	86.5%	13.5%

possibility was examined using 288 sera from herds in which infection with *Br. melitensis* biovar 3 had been confirmed by isolation of the organism.

Our results illustrated that SAT using *Br. melitensis* antigen was effective in detecting all the positive sera which did not react with other commonly used S99 antigen. Thus by employing *Br. melitensis* antigen 5-8 % more reacting sera have been detected. Furthermore, RBPT with *Br. melitensis* antigen was more sensitive than that with *Br. abortus* antigen. That was observed by higher efficacy of melitensis antigen in detecting more positively reacting sera 10 %.

In addition, much larger aggregates particles were noticed in RBPT(M), in contrast to RBPT(A) which showed small aggregates in the antigen serum mixture.

The differences between the results of *Br. abortus* and *Br. melitensis* antigens may have been attributable to the presence of specific epitopes. The cellular surface of brucella species is complex and dissimilarity has been reported in the composition of the outer membrane proteins of strains of *Br. abortus* and *Br. melitensis* (Santos et al. ,1984).

So far, evidence to date suggests that the basic structure of M antigen dominant strain of *Br. melitensis* (perosamine polymer) is branched or substituted with an additional component, possibly a 6- deoxyhexose (Corbel, 1985).

Accordingly, it was emphasised from the pattern of results that applying M.dominant *Br. melitensis* as antigen in serological tests would possess diagnostic advantages. Anyhow, further investigations are needed to collect more data on the differences in titre shown by the two types of antigen in routine tests.

SUMMARY

A total of 288 serum samples from infected herds with brucella were collected. SAT and RBPT using *Br. abortus* and *Br. melitensis* antigens were employed in a trial for assessment of the two antigens in the diagnosis of brucellosis. It seems advisable from the present results to use *Br. melitensis* antigen for detecting animals infected with *Br. melitensis*.

REFERENCES

1. Alton, G.G. (1971): Standardization of agglutinating antigens for diagnosis of brucellosis. Research in Veterinary Science 12, 330.

2. Alton, G.G.; Jones, L.M.; Angus R.D. and Verger, J.M. (1988): Techniques for Brucellosis laboratory INRA, Paris, ISBN, France.

3. Awad, F.I.; Hafeez, M.A.; Salem, A.A. and Shawkat, M.E. (1975): Studies on brucellosis in sheep and goats in Egypt. Egypt. J. Vet. Sci., 12, (2) 95-105.

4. Corbel, M.J. (1985): Recent advances in the study of brucella antigens and their serological cross-reactions. Vet. Bull. 55 . 12, 927-938.

5. El-Gibaly, Samira, M. (1969): Studies on brucellosis in dairy animals in U.A.R. Ph.D. Vet. Thesis (Vet. Hygiene) Fac. Vet. Med. Cairo Univ.

6. El-Gibaly, Samira M. Goda, F.F.M., Nada, S.M. and Sayour, E.M. (1977): Preliminary studies on epidemiology of brucellosis as a Zoonotic disease in an infected area in Egypt. 1st Arab Biologist Congress, Alexandria, p. 12.

7. El-Olemy, G.E. D.M. (1974): Incidence of brucellosis among sheep and goats with regard to human infection in Menofia, Egypt. Ph.D. (Zoonoses) Fac. Vet. Med. Cairo Univ.

8. Kamel, H.M. (1965): Studies on the cultivation of Brucella abortus in the developing chick embryo. 6th Annual Veterinary Congress.

9. Nada, S.M.M. (1982): Further studies on caprine and ovine brucella microorganisms. Ph.D. Thesis (Microbiology), Fac. Vet. Med., Cairo Univ.

10. Refai, M. , El-Gibely, S. and Salem, F. (1988): Studies on brucellosis in cows and buffaloes in Egypt. Proceedings of the International Buffalo Congress, New Delhi, India.

11. Roushdy, A. (1944): Incidence of pathogenic bacteria in market milk of Cairo. M.V.Sc. (Vet. Hyg.) Fac. of Vet. Med., Fouad 1st Univ.

12. Ruckerbauer, G.M.; Garcia, M.M. Rigby, C.E., Robertson F.J.; Samagh, B.S. and Stemshorn B.W. (1984): An hemolysis in gel-test for bovine brucellosis. Developments in Biological Standardization 56, 513.

13. Santos, J.M.; Verstreate, D.R.; Perera, V.Y. and Winter A.J. (1984): Outer membrane proteins from rough strains of four brucella species. Infection and Immunity 46, 188.

14. Sayour, E.M.; El-Gibaly, S. and El-Naasan, A.A. (1970): Investigation on the common brucella strains in U.A.R. J. Egypt. Vet. Med. Ass. 30, 109-120.

15. Shawkat, M.E. (1973): Studies on brucellosis in sheep and goats in Egypt. M.D. Vet. (Infectious diseases). Fac. Vt. Med., Cairo Univ.

16. Zaki, R. (1943): Br. abortus infection in buffaloes, ewes and Camels. Isolation of the organisms from milk, M.V.Sc. Thesis Fac. Vet. Med. Fouad 1st. University.