Serological survey of Brucellosis in some areas of Baghdad city

S. S. Salman, I. A. Al-Samarrae and A. K. Mahmood
College of Veterinary Medicine/ University of Baghdad

Abstract

A serological survey for brucellosis was conducted in some farm animals, farmers and veterinarians in Baghdad city during the period from October, 2012 to April, 2013. A total of 140 serum samples were taken from farm animals 24 cows, 14 sheep and 102 goats and 26 human serum samples were randomly collected from different ages and sexes in different area in Baghdad (Abo-Graib, Al-Radwania, Al-Gehad and Al-yosefia). Serological tests (Rose Bengal and tube agglutination test) were done on these serum samples and the prevalence in farm animals was 30% (12.5% in cattle, 28.57% in sheep and 34.31% in goats) by rose Bengal test and 19.28% (8.33% in cattle, 21.42% in sheep and 21.56% in goats) by tube agglutination test. The prevalence of brucellosis in human was 26.92% by rose Bengal test and 19.33% by tube agglutination test. The highest titers of antibodies were recorded between 1/80-1/640 in goats, while in human the titers were between 1/160-1/320. The high prevalence of brucellosis in human and animals indicates that the disease is endemic in this area and control programs should be implemented to reduce or eradicate brucellosis.

مسح مصلي لداء البروسيلات في بعض مناطق بغداد

سفيان صالح سلمان، إكرام عباس السامرائي وعلاء كامل محمود
كلية الطب البيطري/ جامعة بغداد

الخلاصة

اجري مسح مصلي لداء البروسيلات في بعض الحيوانات والمزارعين والأطباء البيطريين في مدينة بغداد خلال الفترة من تشرين الثاني 2012 وحتى نيسان 2013. جمعت بشكل عشوائي 140 عينة مصل من حيوانات المزرعة 24 أبقار و14 أغنام و102 ماعز و26 عينة مصل من أناس وبأعمار وأجناس مختلفة وفي مناطق مختلفة من بغداد (أبو غريب والرضوانية والجهاد واليوسفية). أجريت الاختبارات المصلية (اختبار الروزبنجال واختبار التلازن الأنبوبي) على هذه العينات وكانت نسبة الإصابة بالحيوانات اعتمادا على اختبار الروزبنجال هي 30% (12.5% في الأبقار و28.57% في الأغنام و34.31% في الماعز) أما باختبار التلازن الأنبوبي فكانت نسبة الإصابة 19.28% (8.33% في الأبقار و21.42% في الأغنام و21.56% في الماعز). كانت نسبة الإصابة في الإنسان 26.92% باختبار الروزبنجال و19.33% باختبار التلازن الأنبوبي. كانت النسب العالية للمعيار الحجمي للاجسام المضادة بالماعز وتراوحت بين 80/1 و640/1 اما في الانسان فكان المعيار الحجمي للاجسام المضادة يتراوح بين 160/1 و320/1. ان النسبة العالية للاصابة بداء البروسيلات في الانسان والحيوانات تشير الى ان المرض مستوطن في هذة المناطق ويجب تطبيق برامج السيطرة للحد من انتشار هذا المرض.

Introduction

Brucellosis is an important zoonotic and endemic disease in human and various animal species, although several control and eradication programs have been established, the disease continues to produce a large economic losses especially in cattle and small ruminants (1, 2). The major economic importance of brucellosis includes loss of production, abortion, preventive programs and restriction in internal trade in animals and their products (3). Brucellosis is prevalent in some middle-eastern countries such as Iran, Iraq, Saudi Arabia, Egypt and Syria (4). Farmers, veterinarians and others involved in animal handling are at a higher risk of direct infection and individuals who ingest unpasteurized dairy products especially from area of endemic infection are at risk of food-borne brucellosis (5). Diagnosis of clinical brucellosis in humans and animals is made by the use of an appropriate serological tests such as Rose Bengal plate test (RBPT), tube agglutination test (TAT), ELIZA test, coombs test and complement fixation test (CFT) (6, 7). In this study, we aimed at determining the seroprevalence of brucellosis in some areas of Baghdad city due to the importance of this disease in both human and farm animals.

Materials and Methods

A total of 140 blood samples were taken from farm animals 24 cows, 14 sheep and 102 goats and 26 human blood samples from farmers and veterinarians. All samples were randomly collected from animals of different ages and sexes in different area in Baghdad city (Abo-Graib, Al-Radwania, Al-gehad and Al-yosefia) during the period from October, 2012 to April, 2013. Serum then separated from each blood sample and kept at -20c until serological test were performed. Rose Bengal plate test (RBPT) was done on all serum samples according to (8) by using antigen prepared from *B. abortus* (Omega diagnostic company). All positive serum samples to RBPT were tested with tube agglutination test (TAT) according to (9) by using antigen supplied by (Snbiotic Corporation, France).

Results

Prevalence of brucellosis in farm animals was 30% by RBPT 12.5% in cattle, 28.57% in sheep and 34.31% in goats and it was 19.28% by TAT 8.33% in cattle, 21.42% in sheep and 21.56% in goats as in table (1).

Table (1) Prevalence of brucellosis in farm animals by RBPT and TAT

Animal species	Total no. of animals	RBPT	TAT
Cattle	24	3 12.5%	2 8.33%
Sheep	14	4 28.57%	3 21.42%
Goat	102	35 34.31%	22 21.56%
Total	140	42 30%	27 19.28%

There was a fluctuation in antibodies titers recorded in farm animals and humans by using TAT and a high titers were found in cattle between 1/160 to 1/320, in sheep between 1/320 to 1/640 while in goats was the highest titers between 1/80 to 1/640, but in human the titers were 1/160-1/320 Table (2).

Table (2) Titers of brucella antibodies in farm animals and human by TAT

Species	No. of serum samples	No. of positive	Titers				
			1/40	1/80	1/160	1/320	1/640
Cattle	24	2	-	-	1	1	-
Sheep	14	3	-	1	-	1	1
Goat	102	22	3	4	6	4	5
Human	26	5	-	-	4	1	-

The prevalence of brucellosis in human by RBPT was 26. 92% while it was 19.23% by TAT as in table (3).

Table (3) Prevalence of brucellosis in human by RBPT and TAT

No. of samples examined	Tests	No. of positive samples	Percentage%
26	RBPT	7	26.92%
	TAT	5	19.23%

Discussion

In general, the susceptibility to brucellosis depends on various factors such as immune status, routes of infection, size of the inoculums and the species of brucella (8). Also there is a positive association among population density, grazing, strategy and disease prevalence (10). In addition, the seroprevelance of brucellosis is characterized by considerable geographical variability, these factors may reflex the variations in the prevalence between animals and also in humans between our results and results recorded by (11) 7.9% and (12) 23.3% in Baghdad province, also (13) who referred that the infection in rams was higher than ewes 12.1%, 11.7% respectively, while (14) mentioned that morbidity rate in rams was 65,6%. On the other hand, (15) recorded 1, 4% morbidity rate in rams and 1.68% in ewes. Our results in sheep disagreed with (16) who recorded morbidity rate by RBPT 10.31%. This may be due to breeding age (17) or increasing animal exposure to the bacteria (10) Also, sexually mature animals are more prone to infection than sexually immature animals of both sexes due to sex hormones and erythritol present in males and in females allountic fluids stimulate the growth and multiplication of brucella organism and tend to increase concentration with age and sexual maturity (15). Due to the factors mentioned above our results disagree with (18) who found the seroprevelance rates in cattle, sheep and goats was 0.58%, 6.26% and 7.24% respectively and (15) who found morbidity rate 2.5% by RBPT in sheep and (19) who found that prevalence rate by RBPT in cattle, sheep and goats 1.8%, 3.5% and 2.4% respectively and (20) found brucella prevalence in cattle, sheep and goats were 5.3%, 7.6% and 15% respectively. Our results disagree with (21) in Iraq who found high morbidity rates in cattle by RBPT and TAT which was 54% and 32% respectively, Also disagreed with (16) who found that the infection rate in sheep by TAT was 49, 35% which was higher than our results and also disagreed with his findings about the antibodies titer, which was in his study between 1/40 to 1/160. The differences between results of both tests in this study may be due to that animals were in incubation period of disease or after incubation or during the chronic stage of the disease which the serum agglutinating tend to wane, Also IgG1 produced in some sera has the ability to block agglutination by other immunoglobulin, Particularly IgM, therefore IgG1 fail to agglutinate while IgM is far most efficient (22). The appearance of low antibodies titers may be due to decline antibodies level after recovery from the disease and the agglutination occurred due to residual immunoglobulin's especially IgG which persist for several months or for one year (23). Our results in humans agreed with (24) who found the prevalence of brucellosis in human in Iran was 19.1% and disagreed with (25) that indicated a 4,8% prevalence of brucellosis in Ethiopia, it also disagreed with (5) who found the prevalence of brucellosis in human in Turkey was 13.2%. The detection of a higher rate of sero-positive serum from farmers comparing with other studies indicates that exposure to brucellosis is more common and people involved in this study consume dairy products such as butter, white cheese and cream made of raw or insufficiently heated milk or through direct contact with infected animals and their aborted fetus and discharges. It's concluded that brucellosis is prevalent in human and farm animals in Baghdad city due to the lack of control and vaccination programs for animals and the consuming of contaminated animal products for humans, so preventive

and control programs should be implemented to protect animals and humans from brucellosis.

References

1. Teske, S.; Huang, Y.; Tamrakar, S.; Bartrand, T. & Haas, C (2011). Animal and human dose response models for Brucella spp. Risk analysis: an international J., an official publication of society for risk analysis. 31(4).

2. Sathyanarayan, S.; Suresh, D.; Furesh, B.; Mariraj, J. & Ravikumar, R. (2011). A comparative study of agglutination tests, blood culture and Elisa in the laboratory diagnosis of human brucellosis. Int. J. Biol. Med. Res., 2(2): 569-572.

3. Donev, D. (2010). Brucellosis as priority public health challenge in south eastern European countries. Croat. Med. J., 51: 283-284.

4. Samadi, A.; Ababneh, M.; Giadinis, N. & Cati, S. (2010). Ovine and caprine brucellosis *(Brucella melitensis)* in aborted animals in Jordanian sheep and goat flocks. Vet. Med. Int., 1-7.

5. Otlu, S.; Sahen, M.; Atabay, I. & Unver, M. (2008). Serological investigation of brucellosis in cattle, farmers and veterinarians in the Kars district of Turkey. ACTA. Vet. Brno., 77: 117-121.

6. Hegazy, Y.; Moawad, A.; Osman, R.; Ridler, A. & Guitian, J. (2011). Ruminant brucellosis in the Kaft El-Sheikh governorate of the Nile Delta, Egypt: Prevalence of a neglected zoonosis. PLOS. Negl. Trop. Dis., 5(1): 944.

7. Jamaayah, M.; Heu, J. & Norazah, A. (2011). Sero-prevalence of brucellosis among suspected cases in Malaysia. Malaysian J. Pathol., 33(1): 31-34.

8. OIE (office International des Epizootic) (2009). Caprine and ovine brucellosis. Chapter 2.7.2. In: OIE Terrestrial manual.

9. Alton, G.; Jones, L.; Angus, R. & Verger, J. (1988). Techniques for the brucellosis laboratory diagnosis Paris: INRA.

10. Radostitis, O.; Hinchliff, K. & Gay, G. (2010). Veterinary Medicine: A textbook of diseases of cattle, sheep, pigs, horses and goats 9th. Ed. Bailliere tindall, London, PP. 966-994.

11. Al-Izzi, S. & Barhoom, S. (1988). Prevalence of brucellosis among sheep and goat in Baghdad, Iraq. Iraqi j. Vet. Sci., 1(1-2): 108-115.

12. Al-Izzi, S.; Al-Bassam, L. & Al-Delaimi, A. (1985). A study on ovine brucellosis in Baghdad. The Iraqi J. Vet. Med., 9: 19-27.

13. Al-Abdaly, I. (2005). Infection of brucellosis in Ninevah province with some biochemical aspects. Ph. D. thesis, College of Vet. Med., Mosul University.

14. Saleem, M.; Boyle, S. & Sriranganathan, N. (2010). Brucellosis: A re-emerging zoonosis. Vet. Microbiol. The Institute for critical technology and applied science, Virginia Polytechnic, Institute and state university, Blacksburg, VA. 2406/ USA. 140(3-4): 392-398.

15. Yesuf, M.; Alema, S.; Temesgen, S.; Mazengiac, H. & Negussie, H. (2010). Sero-prevalence of ovine brucellosis in south Wollo, northeastern Ethiopia. American-Eurasian J. Agric. and Envir. Sc., 9(3): 288-291.

16. Al-Tae, A. (2012). Sero-prevalence of brucellosis in sheep and man in Al-Anbar governorate. M.Sc. thesis, Vet. Med. College, Baghdad University.

17. Wang, Y.; Bai, W.; Guo, H. & Kang, Q. (2012). Sero-prevalence of brucellosis in sheep in the Aksu region of xinjiang Uygur autonomous region, Peoples Republic of China between 1990 and 2010. Afr. J. Microbiol. Res., 6(10): 2512-2516.

18. Jackson, R.; Pite, L.; Kennard, R.; Ward, D.; Stack, J.; Domi, X. & Dedushaj, J. (2004). Survey of the seroprevalence of brucellosis in ruminants in Kosovo. Vet. Rec., 154: 747-751.

19. Nagi, S. (2009). Brucellosis in Yemen and Sudan. Seroprevalence, causative agent and evaluation of different methods of diagnosis. Ph.D. thesis, Faculty of Vet. Med., University of Khartoum.

20. Montasser, A.; Atti, M.; El-Bayomy, E. & Mohammad, H. (2011). Efficiency of serological tests for detection of brucellosis in ruminants at south province of Egypt Global Veterinaria, 6 (2): 156-161.

21. Salman, S. & Jasem, D. (2013). Prevalence of brucellosis and salmonellosis in cattle in Baghdad. Al-Qadisiya J. of Vet. Med. Sci., 12(1): 6-10.

22. Quinn, P.; Carter, M.; Markey, B. & Carter, G. (2006). Clinical Microbiology Elsevier Limited.

23. Smith, R. (2006). Veterinary Clinical Epidemiology Taylor and Francis group, LLC 3rd. ed., PP. 33- 50.

24. Mohammadi, A.; Rashidi, A.; Motaharinia, Y. & Rahmani, M. (2012). Seroprevalence study of brucellosis among high-risk groups in comparison with other people of the population in Sanaudaj (western of Iran). Afr. J. Microbiol. Resch., 6(9): 1985-1989.

25. Kassahum, J. (2003). Sero-epiemiological study of brucellosis in human and dairy cattle in Addis Aaba. M.Sc. thesis, College of Biology, Addis Ababa University.