Seroprevalence of ovine brucellosis in Baghdad province

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Abstract

This study was conducted to detect the seroprevalence of ovine brucellosis in Baghdad province by the use of some serological tests which include Rose Bengal plate test (RBPT) and enzyme linked immunosorbant assay (ELISA). 300 serum samples were collected randomly from sheep (61 rams and 239 ewes) in herds with a history of abortion and located in different areas of Baghdad (Abo graib, Al-Amerya, Al-Shula, Tagi, Al-Bakria, Al-Mahdia, Mahmodia, Al-Swaib, Al-biaha, Hay jehad and Abo desher) between September 2014 to February 2015. Serum samples were summited to serological tests to detect brucellosis. The study showed the seroprevalence of ovine brucellosis according to RBPT was 42.33% with a significant difference ($p<0.05$) between different areas in Baghdad were the highest prevalence was in Abo graib 68% and Al-Shula 60%, while the lowest was in Al-Bakrya 28%. Prevalence was recorded as 45.18% in ewes and 31.14% in rams and also the age group (1-3 years) recorded the highest prevalence 44% with a significant difference ($p<0.05$). ELISA test gave a seroprevalence 32.66% in sheep. It was concluded that brucellosis is highly prevalent in Baghdad province.

Keywords: Ovine brucellosis, Prevalence, RBPT, ELISA
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نسبة الإصابة المصلية بداء البروسيلات في الأغنام بمحافظة بغداد

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الخلاصة

أجريت هذه الدراسة لتحديد نسبة الإصابة بداء البروسيلات في الأغنام في محافظة بغداد باستخدام بعض الاختبارات المصلية (اختبار وردية البنجال والاليزا). جمعت 300 عينة مصل عشوائيا من الأغنام (61 كبش و239 نعجة) في قطعان حدثت فيها إجهاضات ومتواجدة في مناطق مختلفة من بغداد (أبو غريب–العامرية–الشعلة–التاجي– البكرية–المهدية–المحمودية–السويب–البياع–حي الجهاد وأبو دشير) في الفترة بين سبتمبر 2014 و فبراير 2015. أجريت الاختبارات المصلية على عينات المصل للكشف عن داء البروسيلات في الأغنام. أظهرت الدراسة نسبة الإصابة بداء البروسيلات 43.33% باختبار وردية البنجال وبفرق معنوي ($p<0.05$) بين المناطق المختلفة في بغداد حيث كانت النسبة الأعلى للإصابة في أبو غريب 68% والشعلة 60% بينما كانت أوطأ نسبة في البكرية 28%. كانت نسبة الإصابة في النعاج 45.18% وفي الكباش 31.14% إما نسبة الإصابة في الفئة العمرية(1–3سنوات) هي الأعلى 44% وبفرق معنوي ($p<0.05$)، أما اختبار الاليزا فقد أعطى نسبة إصابة بلغت 32.66%. استنتج ان نسبة الإصابة بداء البروسيلات في الأغنام كانت عالية بمحافظة بغداد.

كلمات مفتاحية: داء البروسيلات، نسبة الإصابة، وردية البنجال، الاليزا.

Introduction

Brucellosis is an infectious disease of domestic and wild animals with a zoonotic importance in human and remain uncontrolled problem in high endemic area especially in medittariaen, middle-east, Africa and Asia *Brucella* infect all domestic animals except cats and it may cause a considerable economic losses especially reducing

productivity and lead to abortion and retained placenta that result some times in temporary or permanent infertility and when the acute period of brucellosis is over, all clinical signs will disappear and chronic form will develop and the bacteria localized in mammary gland and lymph nodes which will lead to secretion of *brucella* in body fluids (1). Diagnosis of brucellosis can be done either directly by bacterial isolation or indirectly by the use of serological tests such as RBPT, Tube agglutination test (T.A.T.), Comlement fixation test (C.F.T.) and ELIZA (2). Many detailed studies has documented the problem of ovine brucellosis in different provinces of Iraq such as (3, 4, 5, 6, 7, 8, 9) which identified brucellosis as an endemic problem in Iraq with a variable prevalence at different times and locations. Due to the lack in studies on the present prevalence of brucellosis in many areas in Iraq this study was designed and aimed to study Seroprevalence of ovine brucellosis in some areas of Baghdad province.

Martials and Methods

A total number of (300) local breed sheep from all ages and both sexes were selected randomly from different herds suffering from abortion in many areas of Baghdad (Abo-griab, Al-Amerya, Al-shula, Al-bakria, Al-mahidia, Mahmodia, Al-Suwaib, Al-Biaha, Hai-jehad and Abo-desher) for the period from October, 2014 to March, 2015 for investigating the prevalence of brucellosis. All animals were examined clinically (Temperature, pulse rate, respiratory rate, lymph nodes…. etc). Blood sample (10 ml) were collected from the jugular vein of each animal using disposable syringe after sterilizing the puncture area with 70% alcohol and blood was put into sterile test tubes. Serum was obtained by centrifugation of blood sample and transferred into small tubes (eppendrof) and kept in -20 C until use. Serum was tested by serological tests which included Rose Bengal Plate Test (RBPT) that was performed as described by (10) using the RBPT antigen supplied by (Spain company) and 2-Mercaptoethanol test (2-ME) which was conducted according to the European methods described by (11), and ELISA test that was done and the result were interpreted according to the instructions of the manufacture (IDEXX Switzerland) AG Brucellosis kit provides a rapid, simple, sensitive and specific method for detecting antibodies against *Brucella abortus* in individual serum and in pools of up to 10 individual serum samples from ruminants.

Results and Discussion

Out of 300 sheep serum tested 127 gave positive results by RBPT with a percentage 42.33% and 98 were positive to ELISA with a percentage of 32.66% as showed in table (1) This result agreed with (5) in Iraq; (6) in Baghdad; (12) in Nineveh and (13) in Egypt in a percentage of 53.3%; 28. 75%; 56% and 26.66% respectively, But our results disagreed with (3) in northern Iraq;(6) in Nineveh province; (7); (8) in Wassite; (14) in Sudan; and (15) in Sudan which recorded a percentages of 1.1%; 13.3%; 8.77%; 14.05%; 6.5%; 6.47%; 2.31%and 5.3% respectively. The variations in the results between this study and other studies may be due to many factors such as the geographical location of the study; type of the serological test used and its efficacy; size and type of sample taken; Breed of animal; grazing strategies and population density (8). (16) indicated several factors that affect the prevalence of brucellosis such as bad management; nutritional deficiency; uncontrolled restriction of diseased animal movement from infected area; faulty disposal of infected animals and aborted fetus and placental membrane; ignorance of zoonotic importance of brucellosis and its economic losses and the type of the study performed on aborted or healthy animals. Our results were different from some studies because the sera was collected from flocks suffering or had a history of abortion and also the samples were taken from sexually mature animals, while in the other studies collected from immature and mature animals (8, 17) and also due to the geographical variation and number of tested animals (7,15). ELISA

gave less positive results than RBPT and this variation is due to many factors such as false positive results with RBPT that is described as a highly sensitive but not specific test and can give positive results due to non-specific antibodies or infection with other bacteria such as Yersinia, while ELISA is a confirmatory test that has a higher sensitivity and specificity than other tests(18). ELISA is capable of detecting class A,G and M immunoglobulin which allows better interpretation of clinical results and helps in detecting chronic cases and distinguishing between infected and vaccinated animals more efficiently than other serological tests(19). The results of this study agreed with. (7, 20, 21) with a percentage of 24%; 28.3% and 23.6%, But it disagreed with the results of (8, 12, 15) with a percentage of 91.93%; 56% and 5.4% respectively. All the positive samples that gave positive results by RBPT were distributed in (11) administrative regions in Baghdad province. The higher seroprevalence of ovine brucellosis was in Abograib 17(68%); Al-Shula 15(60%) and Al-Baiha 14 (58. 33%) and all of them were significant at ($p<0.05$), While the lower prevalence was recorded in Al- Bakria 7(28%) and Abodesher 7 (30.43%) as shown in table (2).

Table (1) Seroprevalence and antibodies titer of ovine brucellosis in Baghdad

No. of tested serum	Test	Positive	Negative
300	RBPT	127	173
		42.33%	%57.66
	ELISA	98	202
		32.66%	%67.33

The differences in prevalence between districts may be due to difference in animal breeding density, geographical location, ignorance of the owners about the importance of brucellosis, the speed of its spreading among animals and failure in the control of stray animals that carries the disease (22, 23).

Table (2) Seroprevelance of ovine brucellosis in different area of Baghdad by RBPT

Location	No. of tested sera	Positive sera	Percentage (%)
Abo-graib	25	17	68*
Al-Amerya	53	23	43.39
Al-Shula	25	15	60*
Tagie	25	8	32
Al-Bakria	25	7	28
Al-Mahdia	25	9	36
Mahmodia	25	8	32
Al-Suwaib	25	11	44
Al-Biaha	24	14	58.33*
Hay- Jehad	25	8	32
Abo-Deshier	23	7	30.43
Total	300	127	42.35

A total of 61 rams tested with RBPT 19(31.14%) were positive, While out of 239 ewes tested only 108(45.18%) gave positive results with a significant differences according to gender ($p<0.05$) as indicated in table (3).

Table (3) Seroprevalence of ovine brucellosis according to gender using RBPT

Gender	No. Of sera tested	Positive sera	Percentage (%)
Rams	61	19	31.14
Ewes	239	108	45.18
Total	300	127	42.33

Seroprevalence of brucellosis in this study was higher in ewes than rams and this was in agreement with (24) who noticed that rams gave positive results 1.4% less than ewes 1.68%; (25) that found higher prevalence in ewes 6.44% than rams 2.54%; (26) recorded that infection rate in rams 0.0% was less than ewes 2.61%; (22) who found that prevalence in ewes and rams was 27.5% and 12.1% respectively. On the other hand,

this results disagreed with (27) that recorded infection rate higher in rams than ewes 7.4% and 6.5% respectively; (17) indicated that prevalence in rams was 13.82%,while in ewes was 9.69% and (8) who recorded a higher prevalence in rams 16% than in ewes 13.8%. The higher prevalence of brucellosis in ewes comparing to rams may be due to the breeding system conducted which prefer raising higher number of ewes than rams, also the level of erythritol which is essential for the growth of *brucella* is very high in the reproductive system of females (specially pregnant uterus) comparing to the reproductive system of male which makes the incidence of abortion and spread of brucellosis is much higher and the presence of infected rams without any clinical signs is very important source of spreading infection to ewes and other fields during mating (26). Our study showed a higher brucellosis prevalence in age group 3 years 41.79% and 1-3 years 44% with significant differences ($p<0.05$) than the low prevalence in1 year old group 31.25% as showed in table (4). There was a significant difference in the prevalence of brucellosis recorded in this study between adult and young animals and this agreed with (28) who reported that incidence of brucellosis increases with age and its high In sexually mature animals; (29) mentioned that the antibodies titer against *brucella i*s associated with age where young animals has lower prevalence than adults. Our results also agreed with (30) who indicated that the variation could be due to low number of samples in the age group 1 year. It also in agreement with (8-17-26)who recorded a high prevalence in age group >3 years due to the fact that brucellosis occurs in sexually mature animals and the bacteria localizes in large numbers in the reproductive system of pregnant animals. Results of this study disagreed with (31) who showed that there are no significant differences in seroprevalence of brucella antibodies and species, age and sex of animal. Also disagreed with (32, 33, and 34) who mentioned that there is significant increase in brucellosis prevalence in young animals than in adult animals.

Table (4) Seroprevalence of ovine brucellosis according to age group using RBPT

Age group (year)	No. sera tested	No. of positive sera			Percentage (%)
		Rams	Ewes	Total	
<1	16	1	4	5	31.25
1-3	150	10	56	66	44
>3	134	8	48	56	41.79
Total	300	19	108	127	42.33

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