



SEROSURVEY OF BRUCELLO, COXIELLOSIS AND CHLAMYDIOSIS IN SHEEP FROM BAGHDAD CITY

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Abstract

This study was conducted to detect the infection rates of ovine brucellosis, chlamydiosis and coxiellosis in Baghdad city. (186) serum samples were collected randomly from sheep (122 aborted and 64 non-aborted) aged from 1 to 4 years in herds with a history of abortion and located in different areas of Baghdad between October 2018 to March 2019. Serum samples were submitted to indirect enzyme linked immunosorbent assay (i-ELISA). The study showed the infection rates of ovine brucellosis, chlamydiosis and coxiellosis were 36.02%, 19.35% and 6.9% respectively. The age group (1-2 years) were recorded the highest infection rate for brucellosis, chlamydiosis and coxiellosis with a percentage of 52.45%, 22.95% and 13.11% respectively in sheep. The highest infection rate was recorded in December (44.44%) for brucellosis and October (44.44%) for chlamydiosis and in November (22.22%) for coxiellosis. While the lowest was recorded in November (27.77%) and (0%) for brucellosis and chlamydiosis respectively and in October (0%) for coxiellosis. Aborted ewes showed a higher infection rate for brucellosis, chlamydiosis and coxiellosis 50%, 26.22% and 6.55% respectively than non-aborted ewes that showed infection rates 9.37%, 6.25% and 7.81% respectively. Only 4 (2.15%) animals gave positive results for mixed infection between brucellosis and chlamydiosis. We concluded that brucellosis, chlamydiosis and coxiellosis are prevalent diseases that cause abortion in sheep of Baghdad city.

Key words : brucellosis; chlamydiosis; abortion; ELISA.

Introduction

Abortion causes considerable economic losses in farm animals. In addition, abortion has a great importance to public health, if it is prompted by microorganisms that may cause diseases to humans. *Brucella*, *Listeria*, *Coxiella*, *Chlamydia*, *Leptospira*, and *Toxoplasma* are some of the microorganisms of public health importance causing abortion in small ruminants (Jonker, 2004). Brucellosis is an infectious bacterial disease of domestic and wild animals with a zoonotic importance in human and remains an uncontrolled problem in high endemic areas especially in the Mediterranean, middle-east, Africa and Asia (Rajashelcara *et al.*, 2006). Many detailed studies have documented the problem of ovine brucellosis in different provinces of Iraq such as (Selaisel 1998; Mosa 2015; Al-Hamada *et al.*, 2017; Salman *et al.*, 2018; Mosa *et al.*, 2019) which identified brucellosis as an endemic problem in Iraq with a variable prevalence at different times and locations. Chlamydiosis has a serious effect on animals

health because it infects vital organs such as liver, kidney, muscles and heart leading to their damage. *Chlamydiosis* is one of the most important causes of infectious abortion as well as fetal death in mammals such as cattle, sheep, pigs, goats, dogs, cats, birds, reptiles, koalas and amphibians and also humans (Radostits *et al.*, 2017). (Dhahir, 1990) in Iraq was the first to isolate and discover the organism in the specimens taken from aborted and non-aborted sheep and goat in different parts of Iraq and many studies have been conducted to study the epidemiology of chlamydiosis such as (Fahad and Salman, 2017; Al-Hushemi, 2018; Salman *et al.*, 2018). Coxiellosis is considered a cause of abortion and reproductive disorders in domestic animals such as endometritis, metritis, still birth, reduced birth weight and infertility and *Coxiella burnetii* can induce epidemics of reproductive failure in sheep and goats, but not in cattle (Agerholm, 2013). Many studies have been conducted to detect the distribution of coxiellosis in Iraq such as (Kshash, 2012; Al-Hamdawee, 2016; Hussein *et al.*, 2018). This study was

aimed towards determination of infection rates of Brucellosis, Coxiellosis and Chlamydiosis in sheep and also detecting the percentage of mixed infections with the three infectious agents.

Materials and Methods

One hundred and eighty six mixed breed sheep of ages ranged from 1 to 4 years and both sexes were selected randomly from different herds with history of abortion from Baghdad during the period from October, 2018 to March, 2019. Ten ml of blood were taken from the jugular vein by disposable syringe after sterilizing the puncture area with 70% alcohol, transferred into Eppendorf tubes for sera stored at -20C as described by (Aktas *et al.*, 2005). For Brucellosis, serum was tested by I-ELISA for *Br. melitensis* IgG test (IDEXX Switzerland). For chlamydiosis we used I-ELISA test for *Ch. abortus* IgG (Abbexa - USA) and for Coxiellosis we used i-ELISA test for *C. burnetti* IgG (Abbexa - USA). All tests were done according to the manufacturer's instructions

Results and Discussion

Out of a total 186 sera samples from sheep tested by indirect ELISA assay, A total of 67(36.02%) gave positive results to brucellosis, while 36(19.35%) were positive to chlamydiosis and 13(6.9%) were positive to coxiellosis as showed in table 1.

Table 1: Infection rate of Brucellosis, Chlamydiosis and Coxiellosis in sheep of Baghdad city.

Total No. of tested animals	Disease	Positive	Percentage (%)
186	Brucellosis	67	36.02
	Chlamydiosis	36	19.35
	Coxiellosis	13	6.9

ELISA is a confirmatory test that has a higher sensitivity and specificity than other tests and capable of detecting class A, G and M immunoglobulin which allows better interpretation of clinical results and detect chronic cases more efficiently than other serological tests (Molavi *et al.*, 2014). The infection rate of Brucellosis in this study agreed with (Salman *et al.*, 2014; AL-kannee 2016; AL-hamada, 2017; Shuaib *et al.*, 2018) in a percentage 26.66%; 33.8%, 28.75% and 55.3% respectively, But our results disagreed with (Arslan *et al.*, 2011; Al-Lamy 2013; Ahmed & Musa 2015; AL-Shwany and Robertson., 2018; Abdalla *et al.*, 2019) which recorded a percentages of 3.5%; 14.05%; 5.3%, 6.2% and 4.5% respectively. While infection of chlamydiosis agreed with (Mora Díaz *et al.*, 2015; Roukbi, *et al.*, 2016; Bhardwaj *et al.*, 2017; Fahad and Salman, 2017; AL-Hashemi., 2018) with a

percentage of 9.6%, 13.5%, 16.3%, 8.44% and 15.38% respectively and disagreed with (Merdja *et al.*, 2015; Villagra-Blanco *et al.*, 2015; Krcalija *et al.*, 2015) with a percentage of 35%, 5.29% and 91.7% respectively. Infection rate of Coxiellosis was in agreement with (Kshash, 2012; Mohammed *et al.*, 2014 and Kayedi *et al.*, 2017) with a percentage of 5.8%; 12.38% and 10.5% and disagree with (Esmaili *et al.*, 2015; AL-Hamdawee *et al.*, 2016; AL-Hushami, 2018) with a percentage of 26.4%, 41.84% and 37.68% respectively.

This may be due to the variations between factors such as the geographical location of the study; type of the serological test used and its efficacy; breed of animal; size and type of sample taken; grazing strategies and population density and this agreed with; (Radostits *et al.*, 2017; Abushahba *et al.*, 2017) that mentioned that several factors affect the prevalence of causes of abortion such as nutritional deficiency, bad management; 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 these diseases and its economic losses and the type of the study performed on healthy or aborted animals. (Roukbi *et al.*, 2016; Selim *et al.*, 2018) noted that the differences between epidemiological studies may be due to applied techniques (CFT, ELISA), herd size, climatic conditions, development of a clinic for herd breeding of commercial breeds, and breeding practices.

Out of 61 animal aged from 1-2 years old only 32(52.45%) were positive to brucellosis and 14 (22.95%) positive to chlamydiosis while 8 (13.11%) were positive to coxiellosis. Also, out of 125 sheep aged 2 < - 4 there were 35(28%) gave positive results to brucellosis and 22(17.6%) were positive chlamydiosis and 5 (4%) were positive to coxiellosis as showed in table 2.

Our study showed a higher Brucellosis, chlamydiosis and coxiellosis prevalence in age group 1-2 years old with significant differences ($p < 0.05$) than the low prevalence in 2-4 year old group, which are in agreement with (Zhao *et al.*, 2012; Wang *et al.*, 2012; Negash *et al.*, 2012; Esmaili *et al.*, 2015; Shokat *et al.*, 2015; Bhardwaj *et al.*, 2017) that pointed that there is significant increase in infectious abortion prevalence in young animals than in adult animals and considered season and age as a major risk factors associated with abortion. Results of this study are disagreement with (Al-Lamy 2013; Teshay *et al.*, 2014; Lafta and Muhsen, 2016; Abdalla *et al.*, 2019) who mentioned that there is no difference between sex, age, breed or state of origin and also the antibodies titer against these infectious causes is associated with age where the young has lower

Table 2: Infection rate of ovine brucellosis, chlamydiosis and coxiellosis according to age group.

Age group	Total No. of tested animals	Disease	Positive	Percentage (%)
1 – 2	61	Brucellosis	32	52.45*
		Chlamydiosis	14	22.95*
		Coxiellosis	8	13.11*
2< - 4	125	Brucellosis	35	28
		Chlamydiosis	22	17.6
		Coxiellosis	5	4

*Significant difference at (p<0.05).

Table 3: Infection rates of ovine brucellosis, chlamydiosis and coxiellosis according to state of abortion.

Status	Total No. of tested animals	Disease	Positive	Percentage (%)
Aborted	122	Brucellosis	61	50*
		Chlamydiosis	32	26.22*
		Coxiellosis	8	6.55
Non-aborted	64	Brucellosis	6	9.37
		Chlamydiosis	4	6.25
		Coxiellosis	5	7.81

*Significant difference at (p<0.05).

Table 4: Mixed infection.

Total No. of tested animals	Mixed infection	Positive	Percentage (%)
186	Brucellosis +Chlamydiosis	4	2.15
	Brucellosis + Coxiellosis	0	0
	Chlamydiosis+ Coxiellosis	0	0

prevalence than adult due to the fact that brucellosis occur in sexually mature animal and bacteria localizes as large number in the reproductive system. The variation of abortion could be due to that young aged animals are low sexually mature with the difference between breed and sex showed different in sero prevalence of abortion.

Out of 122 aborted ewes tested there were 61(50%) positive to brucellosis and 32 (26.22%) positive to chlamydiosis while 8(6.55%) were positive to coxiellosis. Also, out of 64 non aborted ewes there were 6(9.37%) gave positive results to brucellosis and 4(6.25%) were positive to chlamydiosis and 5 (7.81%) were positive to coxiellosis as showed in (Table 3).The higher seroprevalence for Brucellosis and chlamydiosis detected in aborted ewes than in non-aborted agreed with (Mohammed *et al.*, 2014; Longbottom *et al.*, 2013; AL-Hashemi, 2018). On the other hand, these results are in disagreement with (Saleem *et al.* 2004; Al-Hangawe 2006; Al-Lamy 2013). A lower seroprevalence for *Coxiella burnetii* was detected in aborted ewes than in non-aborted which agreed with (Selim, 2016: *Lafta and*

Muhsen. 2016; Pradeep *et al.*, 2017) and disagreed with (Abushabba *et al.*, 2017; AL-Hashemi *et al.*, 2018). The higher sero prevalence in random which might have experienced previous and not a recent abortion. Regarding this study aborted animals appear in the titers, and advanced levels of abortion may be detected in sheep even in the post-abortion period. In non-pregnant animals the level of antibodies usually decreases rapidly. Also, the lack of vaccination animals and the treatment of aborted animals increases abortions show high antibodies by serological tests (Rahman, 2011). (krkalic, *et al.*, 2013) mentioned the aborting ruminant do not always showed a rise of titers and serology employed from the infection and aborting as a herd test and use in paired samples to confirm diagnosis and the systemic antibody response even the several years has elapsed from the infection and aborting.

Out of 186 sheep tested only 4 (2.15%) gave positive results to mixed infection between brucellosis and chlamydiosis while there were no mixed infection between brucellosis and Coxiellosis or chlamydiosis and coxiellosis as showed in (Table 7).

Mixed infection with Brucellosis and Chlamydiosis was reported in this study. This finding agreed with (Benkirane *et al.*, 2015; Softic *et al.*, 2018) who

reported concomitant infections with brucellosis and chlamydiosis in ruminants by ELISA with results ranging between 5%-8% and other results of mixed infection between Chlamydiosis and coxiellosis. This finding correlates with that mentioned by (Kreizinger *et al.*, 2015; Firestonea, 2016; Al-Hushami, 2018).

All these infections have been present for a long time and remained endemic due to lack of control measures which are uncommon practice, enabling the exchange of infectious agents among farms and Regions and this agreed with (Softic *et al.*, 2018).

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