

PREVALENCE OF Q- FEVER IN SMALL RUMINANTS IN AL-QASSIM CITY

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ABSTRACT

The present study was carried out on 500 of small ruminants (sheep and goats) to determine the prevalence of *Coxiellosis* in small ruminants in AL-Qassim city by using ELISA test .

The results showed 16% of small ruminants in AL-Qassim city were seropositive to coxiellosis . Infection in sheep (19.4%) was higher than in goat (8%) .The present study was concluded that coxiellosis did not affect by sex and age of examined animals.

INTRODUCTION

Q fever is a zoonotic disease first identified in Queensland, Australia, in 1935. The disease was named “Query (Q)” fever, because its etiopathogenesis was not known (1). Since its discovery, Q fever has been reported worldwide with the exception of New Zealand. (2).

The aetiological agent, *Coxiella burnetii*, is a Gram-negative obligate intracellular bacterium, which belongs to the *Rickettsiaceae* family (3). Sheep, cattle, and goats are considered the most common livestock reservoirs for the disease . Infection has been noted in a wide variety of other animals, including other species of livestock and in domesticated pets. (4), and small ruminants are considered as the source of human Q-fever in Netherlands (5).

The main clinical manifestations of Q fever in goats and sheep are abortion and stillbirth, also most of animals have subclinical disease . Organisms are excreted in milk, urine, and feces of infected animals. Most importantly, the organisms are shed in high numbers within amniotic fluids and the placenta (6, 7).

Serological surveys have been carried out in many countries to evaluate the distribution of Q fever in domesticated ruminants (8,9,10,11,12).

Among serologic tests for detection of antibodies against *C. burnetii* , ELISA and immunofluorescence assay (IFA) are commercially available. ELISA is better than IFA for serologic study because it has higher sensitivity. (12).

The importance of this disease is related much more with human health and must be considered by veterinary services as both economic and public health importance.

MATERIALS AND METHODS

Samples :

Blood samples were collected by jugular venipuncture randomly from 350 sheep and 150 goats of different sexes and classified in two groups of age as yearling (1-2 years old) and adult (>2 years old) from different rural locations in AL-Qassim city during June and July \ 2011

Sera were separated by centrifugation 11000 r.p.m for 5 minutes at 4 C(by cooled centrifuge) , and serum samples were preserved at freezing until used .

ELISA. Serum samples were tested for Q fever antibodies using the indirect ELISA kit (Idexx Switzerland, Switzerland), according to the protocol recommended by the manufacturer . Sera were prepared at 1:400 dilution, and specific antibodies were detected using a peroxidase-labeled anti-ruminant immunoglobulin G (IgG) conjugate. Results were expressed as a percentage of the optical density reading of the test sample (value), calculated as $\text{value} = 100 \times (S - N) / (P - N)$, where S, N, and P are the OD of the test sample, the negative control, and the positive control, respectively. Sera were considered to be ELISA positive if they had a value of 40% or more, suspect if the value was between 30% and 40%, and negative if the value was < 30%.

Statistical analysis

The prevalence rate was estimated and t-student test for detection the Differences were significant or not .

RESULTS

Out of 500 serum samples, only 80 samples of small ruminants were positive for ELISA anti- *Coxiella burnetii* as 16% , sheep and goat had seropositive of Coxiellosis as 19.4% , 8% respectively , table (1)

Table (1): prevalence rate of Q-fever in small ruminants

Animals	Examined animals	Positive ELISA	Infection %
Sheep	350	68	19.4
Goat	150	12	8
Total	500	80	16

The results were showed the significant effect of age on coxiellosis in small ruminants as 19.3% , 19.5% as Q- fever prevalence in (1-2 years) , (> 2 years)aged of sheep respectively ,and 8.3% , 7.7% as Q- fever prevalence in (1-2 years) , (> 2 years) aged of goat respectively ,table (2)

Table (2) : Effect of age of examined small ruminants on Q- fever prevalence

	Aged groups					
	1-2 years old			> 2 years old		
	Examined animals	Positive ELISA	Infect. %	Examined animals	Positive ELISA	Infect. %
Sheep	150	29	19.3	200	39	19.5
Goat	60	5	8.3	90	7	7.7
Total	210	34	16.1	290	46	15.8

Table (3) was showed non-significant effect of sex of examined animals on Q- fever prevalence as 15% (male) ,16.3% (female) in small ruminants ,which summarized as (18.7% ,19.6% of male and female sheep respectively) and (7.5% , 8.1% of male and female goat respectively) .

Table (3): Relation ship between Sex and Q- fever prevalence of examined small ruminants

	Sex of animals					
	Male			Female		
	Examined animals	Positive ELISA	Infect. %	Examined animals	Positive ELISA	Infect. %
Sheep	80	15	18.7	270	53	19.6
Goat	40	3	7.5	110	9	8.1
Total	120	18	15	380	62	16.3

DISCUSSION

The results of present study was recorded seropositive of Q-fever in small ruminants (sheep and goat) in AL-Qassim city / Babil province as first time and that confirm the world wide of Q-fever distribution (13).

The occurrence of disease due to many factors were assistant in disease prevalence as a ticks (14), animal reservoirs of Q-fever as domesticated pets (15) or rodents (16) , un controlled movements of small ruminants in grazing or in trades ,disease occurrence in neighboring countries like Turkey and Iran (17,18) .

High prevalence rate of Q-fever in sheep (19.4%) than in goat (8%)is in according to (19) ,while (20) showed the disease prevalence in goat is higher than in sheep .

The pevalence rate of coxiellosis in sheep and goat in the present study is agreement with many reports in sheep as 20%inSpain(8), 18.9%in Cyprus (9) ,whereas ,in goat as 9.8% in Albania (10) but there are many studies revealed seropositivity to *C.burnetii* in both animals either lower of higher than our results as 3.5 % in the Netherlands (12) , 2 to 30 % in Italy (21) and 10 % in Mexico [11], and 62 % in Sudan (22) , 3%in Northern of

Spain (23) , 13.3% in Albania (24) ,38% in Italy (6) (in sheep) and 6.3 % in Italy (25) , 48.2% in Cyprus (9) , 17.7% in Albania (24) ,15.6% in Newfoundland (26) , 38% in Italy (6) ,10.5% in Iran (18) ,48.2% in Cyprus (9) in goat , these differences in the prevalence rates of *C. burnetii* infection in animals between present study and others studies in various areas of world are attributed to various types of testing , season, geographic location, assay type, as well as possible differences among laboratories and testing procedures and criteria used to define positive results (27) .

There was non significant effect of age and sex on seroprevalence of disease in present study which is similar to results of (28) which revealed that coxiellosis was not affected by sex or age of small ruminant , but our result does not in accord to (29) who showed high occurrence of disease in females than males due to the organism has a high affinity for the placenta, fetal membranes and mammary glands, and is found in large numbers in these tissues .

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انتشار حمى كيو في المجرىات الصغيرة في مدينة القاسم
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الخلاصة

أجريت هذه الدراسة على 500 من المجرىات الصغيرة (150 من الماعز و 350 من الأغنام) في مدينة القاسم - بابل للتحري مصليا عن الأجسام المضادة لجراثومة *Coxiella burnetii* المسببة لحمى كيو باستخدام فحص الاليزا .

وسجلت نسبة إصابة بلغت في المجرىات الصغيرة 16%، حيث كانت في الأغنام 19.4% وهي أعلى مما في الماعز 8% ولم يظهر أي تأثير للعمر و الجنس على نسبة الإصابة

REFERENCES

- 1- Jennifer, H.; McQuiston, D. ; James , M.S.; Childs, E. ; Herbert , S.D .and Thompson, A.(2002). Q fever . JAVMA ., 221 (6):15 .
- 2- Greenslade ,A.D.; Beasley , E. E.; Jennings , A., ; Woodward,A. and, Weinstein, P.(2003) Has *Coxiella burnetii* (Q Fever) been Introduced into New Zealand? . *Emerg. Infect. Dis.*, 9(1): 138-

140.

3. Brouqui , P.; Raoult, D. and Marrie, T.J. (2003). *Coxiella*. In: Manual of clinical microbiology. Murray, P.; Baron, E.;Jorgensen ,J.H.; Pfaller, M.; Tenover, R.(editors). Washington: ASM Press; p. 1030–1038.
4. Maurin, M.and Raoult, D. (1999).Q fever. Clin .Microbiol. Rev.,12:518–53.
- 5- Guatteo, R.; Seegers, H.; Taurel, A.F.; Joly ,A.and Beaudeau, F. (2011).Review Prevalence of *Coxiella burnetii* infection in domestic ruminants: a critical review. . *Vet. Microbiol.*, 149(1-2):1-16.
- 6-. Masala G, Porcu R, Sanna G, Chessa G, Cillara G, Chisu V, Tola S, 2004. Occurrence, distribution, and role in abortion of *Coxiella burnetii* in sheep and goats in Sardinia, Italy. *Vet Microbiol* 99: 301–305.
7. Woldehiwet, Z.(2004). Q fever (coxiellosis): epidemiology and pathogenesis. *Res.Vet.Sci.*, 77:93-100.
- 8- Rodríguez, N.F.; Carranza, C.; Bolaños, M.; Pérez-Arellano, J.L. and Gutierrez, C. T. (2010). Seroprevalence of *Coxiella burnetii* in domestic ruminants in Gran Canaria Island, Spain. *Emerg. Dis.*, 57(1-2):66-7.
- 9- Psaroulaki, A.; Hadjichristodoulou, C.; Loukaidis, F.; Soteriades, E .; Konstantinidis, A.; Papastergiou ,P.; Ioannidou, M.C. and Tselentis, Y.(2006). Epidemiological study of Q fever in humans, ruminant animals, and ticks in Cyprus using a geographical information system. *Eur .J .Clin .Microbiol . Infect. Dis.*, 25:576-586.
- 10-Mirela, Ç.; Anna, P.; Majlinda, K.; Enkeleida, V. and Kristaq, B.(2008). Report of a serological study of *Coxiella burnetii* in domestic animals in Albania.*Vet .J.*,175 (Issue 2): 276-278.
- 11- Salinas –Malendez, J.A. ; Avalos-Ramirez, R.; Riojasvaldez,V. and Kawas –Garza, J. and Fimbres –Durazo, H. (2002) .Serologic survey in animals of ‘Q’ fever in Nuevo Leon. *Microbiologia*, 44: 75-78.
- 12-Houwens , D.J. and Richardus , J.H. (1987) . Infections with *Coxiella burnetii* in man and animals in the Netherlands. *Zentralbl. Bakterirol. Mikrobiol. Hyg. [A]* 267 : 30-36
- 12- Rousset, E.; Durand , B.; Berri , M .; Dufour, P.; Prigent, M.; Russo, P.; Delcroix, T.; Touratier, A .; Rodolakis, A . and Aubert, M.(2007). Comparative diagnostic potential of three serological tests for abortive Q -fever in goat herds. *Vet Microbiol*, 124: 286–297.

13. Raoult ,D.; Marrie, T.J.and Mege, ,J.L.(2005). Natural history and pathophysiology of Q fever. *Lancet Infect. Dis.*,5:219–26.
14. Mantovani, A . and Benazzi, P. (1953).The isolation of *Coxiella burnetii* from *Rhipicephalus sanguineus* on naturally infected dogs., *J. Am Vet. Med. Assoc.*, 122:117–120.
15. Roest, H.I.; Tilburg, J.J.; Van der Hoek, W.; Vellema, P.;Van Zijderveld, F.G. and Klaassen, C.H.(2011) . The Q fever epidemic in the Netherlands: history, onset, response and reflection. *Epidemiol. Infect.*,139:1–12.
- 16- Webster, J. P.; Lloyd, G.; and Macdonald, D .W. (1995). Q fever (*Coxiella burnetii*) reservoir in wild brown rat (*Rattus norvegicus*) populations in the UK. *Parasitology.* ,110:31–35.
- 17-Cetinkaya, B., Kaldener, H.; Ertas, B.H. ; Muz, A. ; Arslan, N. ; Ongor, H. and Gurcay, M. (2000) Seroprevalence of coxiellosis in cattle, sheep and people in the east of Turkey., *Vet. Rec.* 146 :131-136.
- 18-Khalili, M .and Sakhaee, E. (2009). An update on a serologic survey of Q Fever in domestic animals in Iran. . *Am. J. Trop. Med. Hyg.*, 80(6):1031-1032.
- 19- Hatchette, T.; Campbell, N.; Whitney, H.; Hudson, R .and Marrie, T.J. (2002). Seroprevalence of *Coxiella burnetii* in selected populations of domestic ruminants in Newfoundland., *Can. Vet. J.*, 43(5):363-364.
20. Psaroulaki, A .; Hadjichristodoulou, C.; Loukaides, F.; Soteriades ,E.; Konstantinidis , A .; Papastergiou, P.; Ioannidou, M.C. and Tselentis ,Y. (2006).Epidemiological study of Q fever in humans, ruminant animals, and ticks in Cyprus using a geographical information system. *Eur. J .Clin. Microbiol. Infect .Dis.*, 25:576-586.
- 21- Tringali , G. and Mansueto, S . (1987). : Epidemiology of Q fever in Italy and in other Mediterranean countries. *Zentralbl. Bakteriол. Mikrobiol. Hyg, [A]* 1987, 267, 20-25.
- 22-Reinthalер , F.F. ; Mascher , F.; Sixl , W. and , Arbesser , C.H. (1988).Incidence of Q fever among cattle, sheep and goats in upper Nile province in southern Sudan. *Vet. Rec.*, , 122 : 137.

- 32-OPORTO, B. ; BARANDIKA, J..F. ; HURTADO, A. ; ADURIZ, G.; MORENO, B. and GARCIA-PEREZ, A.L.(2006) . Incidence of ovine abortion by *Coxiella burnetii* in Northern Spain . Can. Vet .J. , 35(6): 376-378 .
- 24- Dhimitër, R.; Rezart, P.; Bejo, B.; Pëllumb, Z.; Xhelil ,K. and Rami , S.(2011) . Preliminary data on serological investigation to Q- fever, lyme disease and echinococcus in Albania. *Macedonian Journal of Animal Science*, 1(1) : 21–25 (2011)
- 25-Capuano, F.; Parisi, A.; Cafiero, M.A.; Pitaro, L.and Fenizia, D. (2004). 2004. Review :*Coxiella burnetii*: what is the reality?. *Parassitologia.*, 46(1-2):131-4.
- 26-Hatchette, T.; Campbell, N. ;Hudson, R.; Raoult, D. and Marrie, T. J.(2003).Natural history of Q-fever in goats . *Vector-Borne and Zoonotic Diseases*. 3(1): 11-15.
- 27-Aitken , I.D. (1989) . Clinical aspects and prevention of Q fever in animals. *Eur. J. Epidemiol.*, 5,:420-424.
- (28-Ruiz-Fons, F.; Astobiza, I.; Barandika, J.F.; Hurtado, A.; Atxaerandio, R.; Juste, R.A. and , García-Pérez, A.L.(2010). Seroepidemiological study of Q fever in domestic ruminants in semi-extensive grazing systems. . *Vet. Res.*, 20(6):3.
- 29- PALMER, N. C.; KIERSTEAD, M.; KEY, D. W.;WILLIAMS, J. C.; PEACOCK, M. and VELLEND, H. (1983). Placentitis and abortion in goats and sheep in Ontario caused by *Coxiella burnetii*. *Canad.Vet. J.*, 24: 60-61.