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DETECTION OF Q FEVER ANTIBODIES IN DAIRY CATTLE AND HUMAN CONTACTS IN KALUBIA GOVERNORATE

By

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SUMMARY

This study was carried out in Kalubia Governorate from April 1997 to March 1998 to investigate the occurrence of IgG antibodies against Coxiella burnetii phase II in dairy cows and human contacts using indirect immuofluorescent technique. A total of 200 blood sera and 100 milk sera were collected from dairy cows. As well as 200 blood sera from veterinarians, animal attendants and farmers. The occurrence of IgG antibodies against Q fever was 26 % and 62 % in blood sera and milk sera of dairy cows respectively. 85 (42.5 %) in humans react positively against Coxiella burnetii phase II antigen. 44 %, 46.6 % and 39 % were positive in veterinarians, animal attendants and farmers; respectively.

INTRODUCTION

Q fever is one of zoonotic rickettsioses caused by Coxiella burnetii that differs from other rickettsiae in its filterability and its high resistance to physical and chemical agents. Moreover, it does not produce agglutinins for the Weil-Felix test, does not cause cutaneous rashes in man, and can be transmitted without involvement of vectors. There are two antigenic phase of C. burnetii I and II (Acha & Szyfres, 1992). Infected dairy cattle are the main reservoirs of Q fever infection in man (Muarry et al., 1994). Q fever occurs worldwide and has been reported in at least 51 countries in 5 continents (Leedom, 1980). In Upper Egypt Q fever antibodies were detected among dairy cattle and humans (Asmaa Hussein, 1993).

Because dairy cows constitute a real menace to man, therefore it was of great importance to study the occurrence of Q fever in dairy cows and human contacts. This study was carried out on dairy cows and human contacts in Kalubia Governorate.

MATERIALS AND METHODS

This investigation was carried out during the period from April 1997 to March 1998.

Sampling:
Blood samples were collected from apparently healthy 200 dairy cows (100 frizian and 100 cross breeds) were selected from governmental and private farms in Kalubia Governorate. As well as blood samples were collected from 200 person in groups considered to be at risk of contracting an infection due to proximate association with animals. The groups are veterinarians (25), animal attendants (75) and farmers (100). Blood sampling was carried out according to Gruickshank et al. (1975). The collected sera were coded and preserved at ñ20 oC up to the time of their testing.

Milk samples were collected from randomly selected 100 dairy cows including frizian (50), cross breeds (50) in governmental and private dairy farms in Kalubia Governorate. The milk sample was collected aseptically into sterile Maccartney bottle of 25 ml capacity. Milk serum was obtained according to (Davis and Macdonald, 1952). The collected milk sera were coded and preserved by freezing.

Serodiagnosis of Q fever by the Indirect Fluorescent Antibody technique (IFA):

Principle: The serum sample is placed on a Coxiella burnetii (phase II antigen)- Spot IF substrate slide. Antibodies fixed to this antigen are revealed by a fluorescein labeled antihuman globulin IgG liquid globulin conjugate (fluoline-G). A positive reaction is indicated by fluorescence of C. burnetii on the slide, visible under a UV microscope.

Reagents used: Reagents for serodiagnosis of C.burnetii by the indirect fluorescent antibody technique (IFA) were provided by bioMerieux, France.

Procedure: was carried out according to Hunt et al. (1983). Results were registered in tables (1 to 4) and Figs. (1, 2).

RESULTS & DISCUSSION

Table (1) shows the occurrence of IgG antibodies against Coxiella burnetii phase II in blood sera of examined dairy cattle at a titer of 1/40 was 26 % by using indirect immunofluorescent technique. The results achieved were lower than that reported in Zimbabwe (Rohde et al., 1993). While were higher than those recorded in dairy cows in Hokkoido, Japan (Yanase et al., 1997) and in Voralberg region of Austria (Khashabi et al., 1996).

The results obtained revealed that 24 % and 28 % were positive in frizian and crossbreed of examined cows respectively. A finding observed nearly similar with that demonstrated among two breeds of examined dairy cows in Upper Egypt (Asmaa Hussein, 1993).

Out of 100 milk sera of dairy cows 62 % were contained Q fever antibodies (Table 2). 29 (58 %) in frizian and 33 (66 %) in cross breed. A finding was lower than those exhibit in milk sera of two breeds of examined cows in Upper Egypt (Asmaa Hussein, 1993).

From the available literature the infected cows are the main reservoirs of Q fever infection in man, the microorganism multiply in the placenta and mammary glands of infected animals, shed at birth and grossly contaminating the environment

and appear in milk (Muarry et al., 1994). Coxiella burnetii isolated from cow milk and uterus swab sample from dairy cattle with reproductive disorders (Hoto et al., 1995). While antibodies against Q fever were detected in aborted cows (Kashabi et al., 1996).

Regarding serodiagnosis among humans, table (3) displayed the occurrence of Q fever IgG antibodies among some occupational groups. Out of 200 blood sera 85 (42.5 %) were positive in indirect immunofluorescence test. 11 (44 %) veterinarians, 35 (46.66 %) animal attendants and 39 (39 %) farmers. The results achieved were higher than those recorded in farmers in Sweden (Akesson et al., 1991) and in employees in veterinary service in France (Edlinger, 1987). While were lower than that reported in Netherlands (Richardus et al., 1984).

Consumption of contaminating unpasteurized milk and the characteristics of resistance and epidemiology of Coxiella burnetii, as well as the principal mode of transmission is by aerosols, this explain the high results obtained in some high risk groups.

Occurrence of IgG antibodies against Coxiella burnetii phase II was higher in male 54 (45 %) than female 31 (38.75), table (4); a finding support what had been previously noticed by (Nashowa, 1996).

Q fever includes self-limited febrile illness in acute course, in addition chronic infection lead to pneumonitis, hepatitis and rarely endocarditis (Sawyer et al., 1988). Fetal abnormalities such as bicusped aortic valve and congenital cardiac defect (Wilson et al., 1976).

Table (1): Occurrence of IgG antibodies against C.burnetii phase II in blood sera of examined cows.

Breed	Examined number	Positive sera	
		Number	%
Friesian	100	24	24
Cross breed	100	28	28
Total	200	52	26

Table (2): Occurrence of Q fever antibodies in milk sera of examined cows.

Breed	Examined number	Positive sera	
		Number	%
Friesian	50	29	58
Cross breed	50	33	66
Total	100	62	62

Table (3): Occurrence of IgG antibodies against C.burnetii phase II among examined humans

Occupation	Examined number	Positive sera	
		Number	%
Veterinarians	25	11	44
Animal attendants	75	35	46.66
Farmers	100	39	39
Total	200	85	42.5

Table (4): Occurrence of Q fever antibodies among examined humans in relation to sex

Sex	Examined number	Positive sera	
		Number	%
Female	80	31	38.75
Male	120	54	45
Total	200	85	42.5

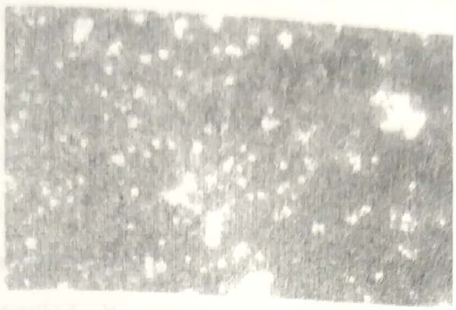

Fig. (1): Identified Coxiella burnetii antibodies by indirect immunofluorescence technique x 1600.

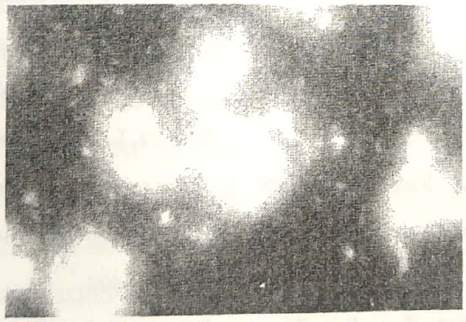

Fig. (2): Negative result in indirect immunofluorescence technique x 1600.

From zoonotic point of view Q fever is of public health importance, it is advisable to protect occupational groups exposed to high risk by vaccination. Vaccination, separation of cows from the remainder of the herd prior to calving and destruction or burying.

Joints between public health authorities and veterinary service should be under taken to establish survey for prevalence of Q fever and plans for control.

REFERENCES

Acha, P. and Szyfres, B. (1992): Zoonoses and Communicable Diseases Common to Man and Animals. 2nd ed. Pan American Health Organization, Washington, USA.

Akesson, A.; Macellaro, A. and Tull, P. (1991): Epidemiology of Q fever in Sweden. Scandinavian Journal of Infectious Diseases, 23, 5: 153-157.

Asmaa Hussein, A.A. (1993): Incidence of Q fever among infected and inapparently infected animals and man in Upper Egypt. Ph.D. Thesis, Fac. Vet. Med. Assiut Univ.

Cruickshank, R.; Duguid, J.; Marmion, B. and Swain, R. (1975) :Medical Microbiology. 2nd vol. 12th ed. Livingstone, Edinburgh, London and New York.

Davis, J.G. and Macdonald, F.G. (1952): Richmondís dairy chemistry. 5th ed. Charles Griffinx Company Limited London.

Edlinger, E.A. (1987) Q fever in France. Zent. Fur. Bact. Mikro. Hyg. Series A. 27, 26 - 29.

Hoto, K.; Yamasaki, N. and Zhang, G. (1995): Isolation of Coxiella

burnetii from dairy cattle and ticks and some characteristics of the isolates in Japan. Microb. & Immuno. 39 (9) 663 - 671.

Hunt, J.G.; Field, P.R. and Murphy, A.M. (1983: Immunoglobin response to Coxiella burnetii (Q fever); single s serum diagnosis of acute infection, using an immunoflu orescene technique. Infect. Immuno., 29: 977- 981.

Khashabi, D.; Schope, K. and Schmid, E. (1996) Serological prevalence of Q fever in Western Austria. Wiener Tieraztliche Monatsshchrift, 83 (1) 2 - 5.

Leedom, J.M. (1980) Q fever: an update. In: Remington, J.S. & Swartz,

M.N. eds. Current Clinical Topics in Infectious Disease. New York, McGraw Hill, 304 ñ 331.

Muarry, P.; Kobayashi, G.; Pfaller, M. and Rosenthal, K. (1994): Medical Microbiology. 2nd ed. International Student edition.

Nashwa Khalifa, O. (1996): Epidemiological Studies on Zoonotic Rickettsioses in Rodents and Human Contacts. Ph.D.V.Sc., Thesis, Fac. Vet. Med. Zagazig Univ.

Richardus, J.H.; Donkers, A.; Schaap, G. and Akkermans, J. (1984):Antibodies to Coxiella burnetii and Brucella abortus in serum from practising veterinarians in the Netherlands. Tijdschrift Voor Diergeneeskunde, 109. 612- 615.

Rohde, C.; Kelly, P. and Raoult, D. (1993): Dairy cows as reservoirs of Coxiella burnetii in Zimbabowe. Central African Journal of Medicine, 39 (10) 208 - 210.

Sawyer, L.A.; Fishbein, D.B.; McDade, J.E. (1988): Q fever in patients with hepatitis and pneumonia: Results of laboratory-based surveillance in USA. J. Inf. Dis., 158: 2. 497- 498.

Wilson, H.G.; Neilson, G.H.; Galea, E.G.; Stafford, G. and OíBarian,

M.F. (1976) Q fever endocarditis in Queensland. Circulation, 53: 680- 684.

Yanase, T.; Muramatsu, Y. and Ueno, H. (1997): Seasonal variations in the presence of antibodies against Coxiella burnetii in dairy cattle in Hokkoido, Japan. Microb. & Immuno. 41 (2) 73 -75.