A SEROLOGICAL INVESTIGATION OF Q FEVER IN PAKISTAN

Pages with reference to book, From 126 To 129

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Abstract

A Serological study of Q fever in human beings and animals of Pakistan was performed using complement fixation test. Sera from 56 patients having different type of infection showed that 26.8 percent had been exposed to Q fever agent and had circulating antibodies against Coxie/la burnetii. In animals ser from 55 buffaloes, 35 cows, 60 sheep, 65 goats and 300 rodents were tested and showed a prevalence of 34.5, 10.4, 18.3, 4.6 and 1 8.0 percent respectively.
This investigation focuses on the natural infection of Q fever among rodents of semklesert areas of Sind and Baluchistan and indicates widespread Q fever infection in man, domestic animals and commensal rodents of Pakistan (JPMA 37: 126 , 1987).

INTRODUCTION

Q fever is an acute and specific rickettsial infection characterized by sudden onset, severe headache, malaise and patchy infiltration of the lungs, without any cutaneous rash. Its etiologic agent Coxiella burn etii has world wide distribution and often presents a variety of clinical syndromes such as fever, Pneumonitis, endocarditis and pericarditis[1-4]. There are several modes of transmission of Q fever in nature. Persons working with cattle, goats and sheep, especially during birth of young animals, as well as in stock yards, abattoirs and dairies and in contact with infected animal material seem to be especially likely to contract[15-20]. Cattle carry the infection and the organisms occur in milk which, drinking raw, transmits the disease. Inhalation of dust containing the organism is also a common means of infection. Person to person infection is rare.
This investigation was undertaken to assess the prevalence of Q fever among human beings and animals and to discover the enzoonotic infection of Q fever in rodents of Pakistan.

MATERIAL AND METHOD

Blood samples were obtained from patients mostly suffering from enteric fever, typhoid fevor and pneumonia. Blood samples of buffaloes, cows, sheep and goats were taken at their slaughtering at the local abattoir. Rodents from different rent areas were trapped alive and blood samples were collected in the laboratory. All these sera were stored at-20°C. A serological study was carried out on 571 sera by complement fixation test. The procedure adopted was the micro -CFT, using the Microtitre kit, over night incubation at 4°C using two units each of antigen, complement hemolysin and 2% sheep RBCs. The complement fixation test was first performed in 1:4 initial dilution of inactivated sera with all necessary controls being included. All the 1:4 positive sera were serially diluted and retested to determine the antibody titre. The results of the sera were read after incubation at 37°C for 15-30 minutes depending on the time required for the complement control to be clear.

RESULTS

Sera from 55 human beings, 55 buffaloes, 35 cows, 60 sheep, 65 goats and 300 rodents were tested for

the presence of antibodies against Coxiella burnetii. The prevalence rate of 26.8, 34.5, 10.4, 183, 4.6 and 18.0 percent, respectively, were found (Table I).

TABLE – 1

Serologic Prevalence of Q Fever in Man and Animals.

Species	Number tested	Number Positive	Percent Positive
Human beings	56	15	26.8
Goats	65	3	4.6
Sheep	60	11	18.3
Cows	35	4	10.4
Buffaloes	55	19	34.5
Rodents	300	54	18.0

Most of the seropositive for Coxiella burnetii had low titre 1:4. The highest titre was 1:128 in man, 1:32 in buffalo and sheep, 1:8 in cow and goat and 1:256 in rodent (Table-II).

TABLE - II

Reciprocal Antibody Titre of Positive Sera for Q Fever.

Species	1:4	1:8	1:16	1:32	1:64	1:128	1:256	Total
Human beings	6	4	2	1	1	1		15
Goats	2	1						3
Sheep	8	2		1				11
Cows	3	1						4
Buffaloes	9	6	4					19
Rodents	14	10	9	7	5	5	4	54

Prevalence of Q fever antibodies in different species of rodents, trapped from residential areas, city markets, rice and wheat godowns of Karachi, agricultural areas, and semidesert areas of Sind and Baluchistan were studied: Prevalence rate was highest in Rattus norvagicus (53.3%) followed by Rattus rattus (3 1.1%). These cornmensal rodents were trapped from old residential areas and city markets of Karachi. The prevalence rate in Meriones hurrianae was 22.8%, in Gerbillus nanus was 13.3% and in Tatera indica was 5.3%. These rodents were trapped from semi-desert areas of Sind and Baluchistan (Table-III).

TABLE – III

Prevalence of Q Fever Antibodies in Rodents of Pakistan.

Rodent Species	Number tested	Number Positive	Percent Positive
Rattus rattus	45	14	31.1
Rattus norveqicus	30	16	53.3
Tatera indica	75	4	5.3
Meriones hurrianae	70	16	22.8
Gerbillus nanus	30	4	13.3
Nesokia indica	20	–	–
Bandicota bengalensis	10	–	–
Milardia meltada	20	–	–
	300	54	18%

DISCUSSION

Q fever is a zoonotic disease. It is a natural infection found in certain wild animals especially rodents, rabbits, hedgehogs and tortoises. Rodents may be the principal animal reservoir for Q fever, where ticks help to maintain the natural cycle of the disease. Many species of ticks, some of which feed on cattle and sheep, others on rodents, are known to harbour the rickettsia, Coxiella burnetii. In natural cycle, Q fever is transmitted by vector ticks Haemaphysalis sp., Ixodes sp. and Hyalomma sp. Coxiella burnetii has been isolated from Hyalomma sp. and Haemaphysalis punctata.[22]

The present investigation records the serologic prevalence of Q fever in men and animals of Pakistan. In this study 26.8% of human sera were seropositive. Most of the positive sera were from patients with clinical diagnosis of typhoid fever.The antibody titre varies from 1:4 to 1 :128 indicating past infection in some patients and acute in others.

In domestic animals the highest prevalence rate was found in buffaloes (34.5%), which are a major source of milk supply in Pakistan, and appear as main source of human infection of Q fever. It is observed that Q fever is a potential hazard to persons who handle raw meat, process wool and hides and to workers in slaughter houses.[17-20] As Q fever antibodies are found in a majority of live stock, so continuous daily exposures of man to infected live stock could result in sporadic un-diagnosed illness or seroconversion from sub-clinical infection.

Serological study of rodents from old residential areas, city markets, godowns and semi-deserted area indicated the prevalence of Q fever infection in rodents. Q fever organisms seem to be relatively more prevalent in commensal rodents trapped from old residential areas and city markets. R. norvagicus (53 3%) and R. rattus ‘(31.1%) are considered to be the most frequent carrier of Q fever in Karachi. Since these rodents did not have the infestation of vector tick species, it is concluded that the Q fever infection was acquired from infected material or infected dust of the environment and not the transmission cycle of Q fever in which vector tick is involved.

Three species of rodents Nesokia indica, Bandicota bengalensis and Millardia meltada from rice and wheat fields of Gharo (Thatta) and Mahrobula Khan (Sajawal) were tested for the presence of Q fever antibodies. These rodents were found sero-negative for Q fever and also did not have any infestation of vector tick species. The results indicate that agriculture field rodents are not the carrier of Q fever infection.

Rodents from semi-desert areas of Ranikot (Dadu), Umer kot and Chhor (Tharparker) and Uthal (Lasbela) district were tested for the presence of Q fever antibodies. These areas seem to be medically significant and indicate enzootic Q fever, involving mainly Meriones hurrianae, Gerbillus nanus and Tatera indica species of rodent. These species were found positive having Q fever antibodies in their sera and also having either Hyaloinma sp. or Haemaphysalis sp. of ticks on their body. Both of these species of ticks are responsible in the natural cycle of transmission of Q fever with in rodents[21-22]. The result indicates that Meriones hurrianae, Gerbillus nanus and Tatera indica are natural reservoir of Q fever in which transmission occurs by vector ticks.

It is concluded that only the infected domestic animals and commensal rodents are mainly responsible for the environmental contamination and airborne transmission of disease in human beings. The disease is more communicable from livestock to man by the inhalation of dust. contaminated with infected secreta or excreta of diseased animals.

ACKNOWLEDGEMENT

The author is grateful to M.M. Shafi, Project Director, Vertebrate Pest Control Laboratory, Karachi, for facilities provided during this investigation. Field and technical, assistance rendered by Zafar Ali, Mohd. Aslam and Mohd. Ghaffar, Assistants V.P.C.L. are also acknowledged.

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