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SEROPREVELANCE OF BRUCELLA AGGLUTININS IN BLOOD DONORS IN KHARTOUM TEACHING HOSPITAL BLOOD BANK

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ABSTRACT

Brucellosis is a zoonosis of both public health and economic significance in most developing countries. In Sudan, the blood donors aren't screened for brucellosis in spite of the fact that the disease is transmitted through the blood transfusion. Analysis of blood samples represents an important investigation to diagnose brucellosis and prevent transmission of infection. This cross sectional study was conducted to screen fifty males blood donors for the anti *Brucella abortus* and *Brucella melitensis* antibodies seroprevelance in Khartoum teaching hospital blood bank by the standard tube agglutination test. Investigation of all serum specimens revealed a titer less than 20 for *B. abortus* and *B. melitensis*; this is considered as a titer of no significance. Thus, the percentage for infection by *Brucella* agglutinins among blood donors investigated was 0%.

KEYWORDS: *Brucella abortus, Brucella melitensis,* blood donors, sero- agglutinins.

1. INTRODUCTION

Brucellosis is a zoonosis of both public health and economic significance in most developing countries ***(Eltayeb SM, 2003).***First officially diagnosed as an infection in British soldiers. Descriptions of the disease date back to the days of Hippocrates, although the organism was not isolated until 1887, when British Army physician David Bruce isolated the organism that bears his name from the spleens of five patients with fatal cases on Malta. The disease gets its names from both its course (undulant fever) and location (Malta fever, Crimean fever) **(*Gorald Maloney, 2004*)**.It is caused by bacteria belong to genus Brucella. *Brucella abortus* primarily infects cattle but is transmitted to buffaloes, camels, deer, dogs, horses, sheep and man. *Brucella melitensis* causes a highly contagious disease in sheep and goats although cattle can be infected. It is the most important species in human infection***. Stack J.A and MacMillan A.P, 2005).*** *Brucella melitensis* is the most virulent and causes the most sever and acute cases of brucellosis, *Brucella abortus* associated with mild to moderate sporadic disease that rarely associated with complications **(*Gorald Maloney, 2004*)**. The global incidence is estimated to be around 500,000cases/ year, but brucellosis is underreported at ratio of about 1:26 (one reported to 26 unreported) (***Araj, 1999).*** In Sudanese camels, the overall incidence of brucella antibodies was 4.9, 7.5% from eastern region ,3.1% from Darfour region and 2% from central region ***(Damir HA,1984)*** The magnitude of human brucellosis in Sudan was not fully reflected in the official records of ministry of health (MOH) .The total inpatient cases admitted to hospitals of Sudan were (44) cases .Twenty five male and 19 female in a period of five years (1996-2000) where five cases occurred in 1996 and 18 cases in 2000***(Sudan ministry of health, annual reports 1996,1997,1998,1999 and2000).*** In Gezira area, central Sudan, the annual report of ministry of health showed fluctuation in number of inpatient cases those who were proved to have brucellosis and admitted to the hospitals. ***(Eltayeb, 2003).*** 76% of the patients presenting with symptom and signs suggesting brucellosis were found to have a combined infection of both *B.abortus* and *B.melitensis* infections with titre 160 and above ***(Mohd MG, 1989).*** Although the risk of infection by blood transfusion is relatively low , break through infection still occur ,transfusion related fatalities caused by infection continue to be reported , and blood is not tested for many potentially dangerous pathogens ***(Allain JP et al,2005),*** such as Cytomegalovirus but in patients with week immuno defenses ,lyme disease , Creutzfeldt-Jakob disease ,mad cow disease ,some Herpes viruses ,Epstein-Bar virus ,brucellosis ,leishmaniasis , malaria ,toxoplasmosis ,babesiosis and Chagas disease ***(AABB , ,2004)***. The rate of septic episodes after transmission of contaminated blood donations is approximately 0.3 %(0.003-5%) of all blood transfusions ***(Hoher, 1996)***. Analysis of blood samples represents an important

investigation to diagnose brucellosis and prevent transmission of infection. This study was conducted to screen the anti *Brucella abortus* and *Brucella melitensis* antibodies Seroprevelance in Sudanese blood donors in Khartoum teaching hospital blood bank.

2. MATERIALS AND METHODS

5-1 Study design

An observational, descriptive, cross sectional, hospital based study was carried out in April 2005, to determine the prevalence of *Brucella abortus* and *Brucella melitensis* antibodies in Khartoum teaching hospital blood bank

2.2 Study population

Fifty unselected blood donors at blood bank of Khartoum teaching hospital .They were males of varying ages, occupations and residences.

The samples of the present study were drawn from Khartoum teaching hospital blood bank .Which was established in 1962 by the efforts of Sudanese doctors: Edris Elfadil ,Hussian Abdurazig ,Elrashid Warrag and Mohammed Abdurrahman ziada . The blood bank works for 24 hours, employee in this bank are about 32, sections presented are recipient room, doctor office, blood obtaining room, laboratory and donor unites.

2.4 Sample size

Fifty blood samples from blood donors, the number of samples was determined according to the time of the study and facilities.

2.5 Collection of specimens

Collection of blood from donors under study was arranged. Five milliliter of venous blood were withdrawn by sterile disposable syringe ,transferred into centrifuge tube ,left to clot ,then centrifuged for five minutes and the serum separated for standard tube agglutination test .

2.6 The standard tube agglutination test

Test tubes were placed in a suitable rack .Using automatic pipette; 1.9 ml of 0.9% sodium chloride solution was dispensed into the first tube and 1.0 ml of sodium chloride solution into the remaining seven. 0.1 ml of serum to be tested was added to the first tube, mixed well and 1.0 ml of the diluted serum was transferred from the second tube to the third tube and this procedure was repeated until all eight tubes containing serial two fold serum dilution. From tube eight, 1.0ml of the diluted serum was discarded to give uniform volume .tube no 1 is considered a 1:20 dilution, this procedure was repeated with negative control serum.

One tube containing 1 ml of normal saline was placed at the end of the series, to which 1ml of antigen was added, this tube represents a saline control.

The antigen suspension was mixed by gentle shaking then one drop of appropriate antigen suspension was added into each tube .The rack was shaken well to mix of antigen and serum and was placed in a water bath. The recommended time and temperature of incubation is 37C° incubation, time 24 hours. After incubation, agglutination was observed .The titre of reactive serum is the highest dilution showing positive agglutination.

3. RESULTS AND DISCUSSION

The present study was carried out to assess the seroprevelance of anti brucella antibodies among fifty Sudanese blood donors in Khartoum teaching hospital blood bank. Blood samples were analyzed to determine the percentage of *Brucella abortus* and *Brucella melitensis* antibodies by standard tube agglutination test.
100% of blood donors were male, similar to the study a study carried out in1989 during part of which time there was an outbreak of human brucellosis *(B.abortus*) in Benghazi,Libya ***(Giasuddin et al 1991).*** Unlike the present study the prevalence of *B.abortus* was 2.64% positive. However, slide micro agglutination test is not specific and gives cross reactions.

In the present study, investigation of all serum specimens revealed a titer less than 20 for *B. abortus* and *B. melitensis*, this is considered as a titer of no significance. Thus, incidence for infection by *Brucella* infections among blood donors investigated was 0%. This might be due to negative history of animal contact of the blood donors. Their survival in areas away from endemic zones of brucellosis may provide another explanation. Similar insignificant results were obtained in a study carried out by ***Hewitt* and *Payne.*** Radioimmuno assay technique was used for the examination of anti-brucella IgG and IgM in105 blood donors, the upper limit of the 99% confidence interval on the mean of both immunoglobulin classes in blood donor sera was below 7 units/ml ***(Hewitt WG* and *Payne DJ 1984)***. Another study was conducted in Argentina to screen blood donors for diseases transmitted by transfusion. Out of a total of 1,075,051 blood donors registered, was 0.94% Seropositivity incidence for brucellosis. (***Perez Bianco R and Santarelli, 1993*).** Similar Findings to the present study were obtained when an enzymatic immunoassay for antibrucella antibodies was carried out to screen 1966 blood donors from the Oporto regional blood centre. These were randomly selected amongst the donor population of the Tras-os-montes and Oporto region. There was no positive result in the Oporto region when the enzyme immunoassay results were submitted to further confirmation using indirect immunoflurecence ***(Carla Moreira etal, 2003).***

Closely similar results were obtained in a study carried out in 2001 by ***(Fuentes Rivera et al).***Rose Bengal test was done on 194 blood donors from Lima and Callao. Five blood donors presented positive serology to Brucella. These were 1 was from Callao,3 from Barranca, 1 from Supe, and no positive serological results was found from Paramonga. Of 100 volunteer blood donors, none has antibodies against brucella

positive which is in agreement with the present study. In 2004, a study was carried out to determine brucella antibodies using Rose Bengal agglutination test in sera of donors attending a blood bank in Sulaimani city in Iraqi Kurdistan region. The overall positive agglutination results were obtained in 29 out of 548 cases. Twenty seven of these gave negative reaction when titrating the serum at 1:80 dilution .This meant that only two agglutination results were positive. This is in agreement with the present study as the result was insignificant. They recommended that if only Rose Bengal test is used to confirm diagnosis of brucellosis, titration of patient's serum is useful for better evaluation ***(Omer SA, 2004).***

Table 1: Sex of the donors.

Variable	Frequency	%
Male	50	100
Female	0	0
total	50	100

Table 2: Titre of *Brucella abortus* in blood donors

Variable	Frequency	%
Significant	0	0
Suggestive	0	0
Of no significance	50	100
Total	50	100

Table 3: Titre of *Brucella melitensis* in blood donors.

Variable	Frequency	%
Significant	0	0
Suggestive	0	0
Of no significance	50	100
Total	50	100

CONCLUSION

Investigation of 50 Sudanese male blood donors by standard tube agglutination test reflected a titre of no significance which is less than 20 for *Brucella abortus* and *Brucella melitensis*. The results obtained from this research are not the final findings, because time of the study was short, resources were limited, hence the small sample size .For this reasons, we advised the researchers to investigate the blood from more blood donors for brucellosis in order to reach final conclusions.

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