

The prevalence of hepatitis B surface antigen in the Gezira (Sudan)

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Summary

The prevalence of hepatitis B surface antigen (HBsAg) was studied in blood donors and laboratory technical staff from the Gezira area in Sudan. Of a total of 110 donors, 19 (17.3%) were found to be carriers of the antigen and 4 of 33 (12.1%) technical staff were also found to be carriers. Routine testing of blood donors is recommended as a way of reducing the incidence of post-transfusion hepatitis in the Gezira area of Sudan.

Resume

La fréquence de l'antigène de surface de l'hépatite B (HBsAg) a été étudiée chez les donneurs de sang et chez le personnel technique de laboratoire de la région de Gezira au Soudan. Sur un total de 110 donneurs de sang, 19 (17.3%) étaient porteurs de l'antigène et que dans le personnel technique 4 sur 33 (12.1%) étaient également porteurs. Les examens de routine sont recommandés pour les donneurs de sang en tant que l'un des moyens de réduire l'incidence de l'hépatite post-transfusionnelle dans la région de Gezira au Soudan.

Introduction

Hepatitis B virus (HBV) infection is widely distributed particularly in tropical regions. Survival of the virus is ensured by the reservoir of human carriers, estimated to number about 200 million in the whole world.

The carrier state has been defined as persistence of HBsAg in the circulation for more than six months. The prevalence of carriers differs widely in various countries. In Northern Europe, North America and Australia, the prevalence of the antigen is 0.1% and in Eastern Europe it is 5%. In some parts of Asia, the Pacific region and Africa, as many as 20% or more of the apparently healthy population may be carriers[1,2].

A number of risk factors had been identified in relation to the development of the carrier state. It

is common in males, more likely to follow infection acquired in childhood than adult life[3], and more likely to occur in patients with natural or acquired immunodeficiency. Also laboratory staff are said to be at a higher risk of infection particularly when handling sera from infected patients[4,5]. The mechanisms of virus transmission are probably multiple. There is considerable circumstantial evidence of transmission of the virus by intimate personal contact and by the sexual route[6,7,8]. At very high risk are those sexually promiscuous, particularly male homosexuals[9]. HBsAg had been found repeatedly in blood and various body fluids such as saliva, menstrual and vaginal discharges, seminal fluid, colostrum and breast milk. All of these fluids had been implicated in the spread of infection[10,11,12]. Transmission may also result from accidental inoculation of minute amounts of blood or fluids such as may occur during medical, surgical and technical procedures.

There are few data on the prevalence of HBsAg in the Sudan and the mechanisms of transmission of the virus. In this study the objective is to find out the prevalence of HBsAg in blood donors and laboratory technical staff from the Gezira area of Sudan.

Materials and methods

110 blood donors from the Gezira area, and 33 laboratory technical staff from the University of Gezira Pathology Laboratory consented to give blood samples. The blood donors were all young adult males and the technical staff included 11 females and 22 males. All were healthy at the time of sampling.

A questionnaire was conducted to elucidate past history of jaundice, blood transfusion, tattooing or scarification, or any family history of jaundice.

Blood was collected and transported to the laboratory within one hour. Subsequently all the sera were tested for HBsAg using the reverse passive haemagglutination technique (both the screening and the confirmatory tests kits lots No.

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VK01/02 and VK09) from the Wellcome Company, Dartford, England.

Results

All the results of the study are presented in Tables 1-4. As shown, 4 of 33 technical staff (12%) and 19 of 110 blood donors (17%) were carriers of the antigen.

Discussion

HBsAg is not tested for routinely in blood donors in the Sudan. Consequently there are increasing reports of post-transfusion hepatitis, some of which were fatal.

The results of the present study showed that the incidence of HBsAg is high (17%) which is a strong indication for screening blood donors for the antigen. Most of the risk factors for the development of the carrier state mentioned earlier operate in the Gezira area. Additional factors may also be important. These include, tattooing and scarification [13]. (5.3% of blood donors and 25% of technical staff who were positive for the antigen had evidence of scarification), and repeated biting by blood-sucking arthropod vectors [14]. Mosquitoes are specially prevalent in this area and malaria is endemic. However, results of investigations into the role played by biting insects in the spread of HBV were conflicting. HBsAg had been detected in several species of mosquitoes and in bed bugs, but there was no convincing evidence of replication of the virus in insects. Mechanical transmission of the infection is a possibility [15]. There is also evidence of clustering within family groups. In this study 15.8% of HBsAg positive

blood donors had family history of jaundice compared with 5.5% of HBsAg negative individuals. The mechanism of intrafamilial spread of the infection has not been elucidated [16,17].

Results from the technical staff showed an incidence of carriage of 12% - slightly lower than the incidence in blood donors, although they are at a specially high risk from handling patients sera. This lower rate could be explained by the fact that the sample tested was comparatively small (33 individuals) of whom 11 (33%) were females who tend to have a lower incidence of antigen carriage [18].

The only comparable data available are those from the United States Naval Medical Research Unit (NAMRU3) using radioimmunoassay techniques. They found a carriage rate of 18.8% [19], which is almost in agreement with our result.

Conclusion

This study has established that, in the Gezira area of the Sudan (and probably in other parts of the country), the incidence of HBsAg carriage is high (17.3%). Therefore, detection of the antigen in blood donors should be done routinely in order to reduce the incidence of post-transfusion hepatitis in the area.

The results also showed that the reverse passive haemagglutination method could safely be used for screening carriers because it has reasonable sensitivity and specificity when compared with radioimmunoassay used by NAMRU3 [19], particularly when both the screening and confirmatory tests were used. It is cheap and rapid and has longer shelf life.

Table 1 HBsAg carriage among technical staff of the University of Gezira, Pathology Laboratory.

	No.	%
Number of technical staff tested	33	
Total positive	4	12.1
Total negative	29	87.9

Table 2 Results of the questionnaire among technical staff of the University of Gezira, Pathology Laboratory.

	Positive for HBsAg		Negative for HBsAg	
	No.	%	No.	%
History of jaundice	None	-	4	13.8
History of blood transfusion	1	25	1	3.4
History of tattooing & scarification	1	25	6	20.7
Family history of jaundice	None	-	None	-

Table 3 HBsAg carriage among blood donors in the Gezira area of Sudan.

	No.	%
Number of blood donors tested	110	
Total positive for the antigen	19	17.3
Total negative for the antigen	91	82.7

Table 4 Results of the questionnaire among blood donors in the Gezira area of Sudan.

	Positive for HBsAg		Negative for HBsAg	
	No.	%	No.	%
History of jaundice	10	52.6	10	11
History of blood transfusion	4	21.1	13	14.3
History of tattooing & scarification	1	5.3	1	1.1
Family history of jaundice	2	15.8	5	5.5

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