

HEPATITIS B SURFACE ANTIGEN (HBsAg): (A survey of hospital staff in Zambia)

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Summary

The frequency of HBs Ag in health workers at University Teaching Hospital appears high (3.1%) as compared to Western health workers. The laboratory staff and the nursing staff are at higher risk than others; 8.3% of laboratory staff and 4.7% of nursing staff were positive for HBsAg. Awareness and greater care as to cleanliness and handling of samples is necessary to determine the immune status and infection with HBV by testing HBsAg, and HBsAb markers in these workers.

Introduction

Viral hepatitis is recognised as a hospital hazard in medical personnel (WHO, 1977). Various laboratory techniques to characterize hepatitis B surface antigen (HBsAg), antibodies against hepatitis B core antigen (HBcAb) have been helpful in carrying out surveys in hospital staff which show high frequencies of viral hepatitis or carrier state (Lewis et al., 1973; Grist, 1975, 1976; Burrell and Marmion, 1976 and Dienstag and Ryan, 1982). However, certain health workers are at higher risk of developing over HBsAg-positive hepatitis such as workers in dialysis units (Hennekens, 1973; Garibaldi et al., 1973), oncology units et al., (1974) and the dental profession (Glazer et al., 1973). Williams et al (1974) reported an epidemic of viral hepatitis in hospital workers.

The frequency of positive HBsAg or other markers in health workers in Zambia is unknown. About 5 to 7% of blood donors are assumed to be positive for HBsAg. We report the results of a study carried out in health workers in Zambia to determine the frequency of HBsAg in this group.

Material and Methods

In October, 1981, we collected sera of 187 individuals at University Teaching Hospital, Lusaka. Of these 157 (84%) were health care workers, 30 (16%) were healthy individuals working as administrative staff at University Teaching Hospital and did not have exposure

to blood or to patients. The latter groups served as controls. We wished to include more cases in our study, both health workers and controls but since this survey was a voluntary one, workers were reluctant to come forward. Hospital workers included resident doctors, ward nurses, workers in the haemodialysis unit, laboratory staff, final year medical students and ward attendants. Medical students at University Teaching Hospital start attending the wards from 5th year and by the 7th year they work almost like junior doctors which gives them abundant exposure to infected material, needle pricks and patients.

In the study there were 82 (44%) males and 105 (56%) females between the ages 21 and 58 years. All the sera tested by passive haemagglutination technique Hepatest — 3 Wellcome kit donated by Cooper Zambia Ltd. Screening and confirmatory test procedures were carried out as described in manufacturer's instructions. Present and past history with regard to any illness, jaundice, fever, weakness, previous transfusions and needle-stick in the past 6 to 8 months, was taken for each individual.

Results

The HBsAg positive rate among health care workers was 3.1%. The overall frequency of HBsAg among 187 individuals was 2.7%. Three (8.3%) of the laboratory staff and two (4.7%) among nursing staff showed positive HBsAg (Table I). Amongst haemodialysis workers, residents, medical students and ward attendants none showed positivity. All the controls were negative for the test. Three out of five HBsAg positive were males and 2 females. There was no correlation with age. Table II shows positive history in health workers. None of the 5 with history of jaundice were positive, but 2 out of 12 with long history of weakness and fatigue were positive for HBsAg.

Discussion

It is now generally accepted that HBsAg is one

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of the markers of viral hepatitis B (HBV) infection and should be tested in all persons who are at risk, including blood donors. Although radioimmunoassay (RIA) is the most sensitive method for detecting HBsAg, lack of ready availability and expense on each test is beyond the budget of many hospital laboratories, particularly in underdeveloped countries as a screening method. The second best alternative which we have used in this study has been the passive haemagglutination test. It is less expensive, readily available, and in optimal conditions its sensitivity approaches though does not quite reach that of RIA (WHO, 1977).

Our results of 3.1% HBsAg positive are high compared to Western studies. Lewis et al. (1973) reported 8 (0.8%) health care workers positive for HBsAg out of 1052 in a matched controlled study at National Institute of Health. Similar results were obtained by Dienstag and Ryan (1982) in 624 hospital workers in the U.S.A. It is possible that the apparent high rate in the present study may have reflected a trend in general population or in blood donors of Africa rather than abnormality related to occupation compared to western population (Szumners, 1975); Bowry et al, 1981). However, firstly, our control though unmatched for number did not show any positive results. Secondly, there is not a single, large controlled trial from Zambia to suggest such a high frequency in the general population. Moreover, the source of exposure could be different in these two populations. High frequency of 8.3% in laboratory staff and 4.7% in nursing staff indicated that HBsAg is positive in those with frequent and longer blood contact and not in those who are exposed only to patients.

In our study, we did not follow clinically or biochemically health workers who were HBsAg positive or having related history of hepatitis. 12% gave such a history. Studies by Hoofnagle et al. (1975) and Kojima et al. (1977) suggested that antibody to hepatitis B core antigen (HBcAb) in high titres may indicate infection or chronic carrier state with sub-detectable levels or absence of detectable HBsAg even in the presence of antibody to HBsAg (HBsAb). Such high titres of HBcAb or HBsAb have been reported in blood donors from Africa and Europe and in hospital workers from West (D. Bowry et al., 1981 and Dienstag and Ryan., 1982). If those workers with related history of hepatitis in our study correlated with high titres of HBcAb and HBsAb then the possibility of overt hepatitis B infection would be much higher.

Hence, from the study we suggest that there is a need for more awareness amongst hospital workers. Laboratory staff, nursing staff and others who are in close contact with blood need to take more precautions as regard to improvement in cleanliness and handling of blood samples, and possibly protection through vaccination. Lastly, a large controlled follow up study is necessary to detect the exact incidence of hepatitis infection and carrier state by using techniques to determine HBsAg, HBcAb and HBsAb.

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TABLE I
FREQUENCY OF HBsAg IN VARIOUS HOSPITAL WORKERS

Hospital Workers	No.	%	HBsA + ve	%
Laboratory Staff	36	23.0	3	8.3
Haemodialysis Unit	9	5.7	—	—
Resident Doctors	33	21.0	—	—
Nursing Staff	42	26.7	2	4.7
Medical Students	22	14.0	—	—
Ward Attendants	15	9.5	—	—
Total	157		5	3.1

TABLE II

CLINICAL HISTORY IN 157 HEALTH WORKERS DURING PAST 6 TO 8 MONTHS

History	Present in No. (157)
Fever longer than one week	2
Jaundice	5
Weakness/Fatigue	12
Previous Transfusion	—
Others	—

References

1. Bowry, T.R., Ahmad, Z and Chemtai, A.K. (1981): Hepatitis B Core antibody in volunteer blood donors in Kenya. *East Af. Med. J.* 58, 570.
2. Burrell, C.J. Marmion B.P. (1976): Infection acquired in Pathology Laboratory, *Lancet* II 1406.
3. Dienstag, J.L. and Ryan, D.M. (1982): Occupational exposure to hepatitis B virus in hospital personnel, infection or immunization? *AM. J. of Epidimiology* 15, 26.
4. Garibaldi, R.A., Forrest, J.N., and Bryan J.A. (1973) Haemodialysis associated hepatitis. *JAMA* 225, 384.
5. Grist N.R. (1975): Hepatitis in clinical laboratories, A three-year survey. *J. Clin. Path.* 28, 255.
6. Grist N.R. (1976): Hepatitis in clinical laboratories — 1973-74. *J. Clin. Path.* 29, 480.
7. Glazer R.I., Spatz S.S. and Catone G.A. (1973): Viral hepatitis: A hazard to oral surgeons. *J. Oral Surg.* 31: 504.
8. Hennekens C.H. (1973): Haemodialysis associated hepatitis, an outbreak among hospital personnel *JAMA* 225, 407.
9. Hoofnagle, J.H., Gerety, R.J. and Dewelleys F.B. (1975) Antibody to hepatitis B. Core antigen. *Am. J. Med. Sci.* 270.
10. Kojima, M., Kazumichi, V., Takahashi, Y., Toshizawa, H., Tsuda, F., Itoh, Y., Miyakawa, Y and Mayumi, M (1977): Correlation between titre of antibody to hepatitis B core antigen and presence of viral antigens in liver *Gastroenterology*, 73, 664.
11. Lewis, T.L., Alter, H.J., Chalmers, T.C., Holland, P.V., Purcell, R.H., Alling, D.W., Young, D., Frenkel, L.D., Lee, S.L. and Lamson, M.E. (1973): A comparison in hospital and non-hospital personnel. *New Eng. J. Med.* 289, 647.
12. Szmuners, W (1975): *Am: J. of Path.* 81, 629.
13. Wands, J.R., Walker, J.A. Davis, T.T., Waterburg, L.A., Owens, A.H. and Carpenter C.C.J. (1974): Hepatitis B in an Oncology Unit. *New Eng. J. Med.* 291, 1371.
14. Williams, S.V., Huff, J.C. Feinglass, E.J. Gregg, M.B., Hatch, M.M. and Matsen, J.M. (1974): Epidemic viral hepatitis, type B in hospital personnel, *Am. J. of Med.*, 57, 904.
15. W.H.O. (1977): Advances in viral hepatitis. *Tech. Rep. Sr. No.* 602.