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Role of immune serum globulin in post transfusion virus B infection

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Fifty four blood recipients were administered prophylactic immune serum globulin (31) or hepatitis B immune globulin (23) and followed up for six months. None of the patients developed either acute hepatitis B or HBsAg carrier state. However, 7 (14%) had anicteric self limiting non-B post-transfusion hepatitis. Twenty (40%) of the blood recipients developed anti-HBs during the follow up period suggesting either HBV exposure by subdetectable levels of HBsAg present either in blood or immunoglobulin preparation or due to passive transfer by administration of immunoglobulins.

Post-transfusion hepatitis B virus (HBV) infection is one of the major modes of HBV infection in India[1,2], because of nonavailability of third generation screening tests for HBsAg in most blood banks and frequent use of commercial blood for transfusion[3]. Hence, utilisation of voluntary blood source and use of sensitive methods for HBsAg screening in donors will be ideal to prevent post-transfusion HBV infection. Till these facilities are widely available, alternative approaches like post-transfusion administration of immune serum globulin (ISG) and hepatitis B immune globulin (HBIG) containing varying titers of neutralising antibody against HBV, may be tried to prevent post-transfusion HBV infection. The present study was undertaken to find out the efficacy of ISG in comparison to HBIG in preventing post-transfusion HBV hepatitis and reducing the carrier rate.

Material & Methods

Fifty four blood recipients, suffering from portal hypertension with recurrent variceal haemorrhage due to either extrahepatic portal venous obstruction (EHO) or noncirrhotic portal fibrosis (NCPF) and admitted to the Rajgarhia liver unit of the All India Institute of Medical Sciences, New Delhi, between September 1985 and December 1986 were included in this study. Subjects with history of taking gammaglobulin within the last 6 months, drug addiction, clinical and biochemical evidence of chronic liver disease and HBsAg positivity, were excluded from the study. Only blood recipients coming from Delhi or a nearby place were included in the study so as to minimise the drop out rate.

These blood recipients were randomly

assigned to receive 5 ml of ISG (31) or HBIG (23). The first injection was scheduled to be given within 24 h of the last transfusion and second within one month of the first infection. ISG used in the study was a 10 per cent solution with anti-HBs titer of 1 :200 (Cure wells India). HBIG was imported (Behringworke West Germany) with anti-HBs titer of 1:12,800.

Prior to the transfusion, each recipient was subjected to clinical evaluation and screened for HBsAg and anti-HBs. The patients were followed up at 1, 3 and 6 months after the immunoprophylaxis, during which they had a clinical evaluation and their blood was tested for serum bilirubin SGOT, SGPT, HBsAg, anti-HBs and IgM anti-HBc.

Blood recipients with transaminases values of 60 karmen unit/dl or more and without overt features of hepatitis, were diagnosed to have anicteric post-transfusion hepatitis (PTH). Presence of IgM anti-HBc in their sera indicated HBV as the etiology of hepatitis and its absence indicated non B-PTH. Blood recipients without features of hepatitis but positive for either HBsAg or anti-HBs were considered to have HBV exposure. Those of the recipients having anti-HBs prior to the transfusion, and who showed at least four-fold rise, were diagnosed to have HBV re-exposure.

HBsAg and anti-HBs were tested by established micro Elisa techniques[4,5]. IgM anti-HBc was tested by Corzyme-M EIA kit (Abbott Laboratories, USA). Liver function tests were carried out by standard methods.

Results & Discussion

The number of patients finaly analysed in the ISG and HBIG groups were 28 and 22 respectively (Table). The mean age, mean duration of follow up, number of

Table Comparison of various characteristics in blood recipients receiving ISG and HBIG

Characteristic	ISG (n=31)	HBIG (n=23)
Number of patients analysed	28*	22
Mean age (yr)	28.6±16.4	31.2±13.3
Mean follow up (months)	6.20±0.8	6.41±1.0
Number of patients receiving blood transfusion before inclusion into the study	11 (7)	11 (5)
Number of patients receiving blood transfusion after immunoprophylaxis	5	4
Source of blood given to patients following immunoprophylaxis		
Commercial	2	1
Voluntary and screened for HBsAg	23	17
Mixed	3	4
Mean units of blood transfused following immunoprophylaxis	4.1±3.4	4.3±2.1
No. of patients developing anicteric post transfusion NANB hepatitis	3	4

All variables were comparable in the 2 groups
*3 patients in ISG group and 1 in HBIG group were lost to follow up
Figures in parentheses include number of patients receiving blood from commercial source.
ISG, immune serum globulin; HBIG, hepatitis B immunoglobulin

patients receiving transfusion before inclusion into the study and their source of transfusion, number of patients receiving transfusion following immunoprophylaxis, their source of blood and mean number of unit transfused per patient, were comparable in patients belonging to ISG and HBIG group (Table).

Anicteric PTH occurred in 7 of the 50 (14%) blood recipients. None of the recipients including the anicteric hepatitis patients developed HBsAg and IgM anti HBc in their sera during six months follow up, indicating that all the anicteric hepatitis patients had non-B PTH and none of the blood recipients developed HBV carrier state or PTH type B. In contrast, the HBsAg carrier rate has been reported to be 12.3 per cent in recipients of blood[2] who had similar disease as in the present study. In another study reported[7] from our Institute, 16.6 per cent blood recipient had PTH out of which 66 per cent were due to HBV. Prevention of post-transfusion HBV infection in the present study is possibly due to three factors: (*i*) Number of recipients of voluntary blood are more in the present study than in the earlier studies[2,6]; (*ii*) Twenty (14 in ISG group and 6 in HBIG groups) blood recipients (40%) of the present study had anti-HBs before immunoprophylaxis was instituted. However, 30 patients (16 of the ISG group and 14 of HBIG group) not having anti-HBs in their sera were also protected from HBV infection following immunoprophylaxis, thus emphasising the role of immunoglobulin in prevention of HBV infection; (*iii*) The immunoglobulins *i.e.*, ISG and HBIG might have been solely responsible for prevention of HBV infection.

Further all the 7 non B-PTH patients had a self limiting course and had normal transaminases at the end of six months. It is possible that immunoprophylaxis might have prevented a chronic sequele in them which is frequent in non B-PTH[7–11].

Another serological event in relation to HBV exposure in the present study was appearance of anti-HBs in 20 (40%) patients (8 in ISG group and 12 in HBIG group) and rising titer of anti HBs in six recipients through out the follow up period who had anti-HBs in their sera prior to the immunoprophylaxis. In the former group, anti-HBs could have been passively transferred from blood or immunoglobulins which may also be responsible for the rising anti-HBs titer in the latter group. Similar anti-HBs response has been reported[7–11].

The present study revealed the possibility of preventing post-transfusion HBV infection by prophylactic passive immunisation using ISG or HBIG. ISG being cheaper, widely available and as effective as HBIG in preventing PTH-B, should be the choice for immunoprophylaxis. Further, it may make the course of non A non B PTH more benign and self limiting.

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