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Sero-Prevalence of Hepatitis B and C Co-infection in Multi-transfused Children in South India.

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ABSTRACT

The two hepatotropic viruses HBV & HCV share common routes of transmission and therefore co-infection occurs. However the rate of co-infection is unknown. This study was done to estimate the Sero-prevalence of HBV and HCV co-infection in Multi-transfused children with blood disorders who require repeated blood and blood product transfusions as major part of treatment and are at high risk of acquiring transfusion transmitted infections. Study was conducted in a tertiary care hospital in Chennai, south India. Study Group (Group-I)- 75 children of age 2-13 years with blood disorders and >5 transfusions. Matched control group (Group-II)- 30 children with blood disorders and no transfusion. Control group (Group III)- 30 normal healthy children. Serum samples from all 3 groups were tested for HBV and HCV viral seromarkers individually using commercial ELISA kits. To detect co-infection, HBsAg positive and Anti HBc positive sera were tested for Anti-HCV antibodies. In Group I; HBsAg and Anti-HBc were positive in 20% and 49% of cases, of which 17% showed combined positivity. Group II; 13% and 27% with 7% positive cases for both seromarkers. Group III; none were positive. Anti-HCV in Group I showed 32% positivity, while Groups II & III had no positive cases. 8% of Group I was positive for both HBsAg and Anti-HCV and 1.33% for both Anti-HBc and Anti-HCV. Study showed a co-infection rate of 9.33% in multi-transfused children. This observation is of great concern as children with co-infection are at a higher risk of liver damage with rapid progression to cirrhosis and Hepatocellular Carcinoma. Treatment of dual hepatitis infection still remains a challenge. Therefore a strict emphasis should be made on highly sensitive blood screening methods and HBV vaccination.

Keywords: Hepatitis B virus, Hepatitis C virus, Blood disorders, Multi transfused children, Dual infection, Co-infection.

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INTRODUCTION

HBV and HCV co-infection is not uncommon in areas where high endemic level of both viral infections is reported such as South East Asia and Mediterranean. High risk patients for dual infection are the injection drug users, hemodialysis, organ transplantation, HIV positive and β -thalassemic patients. Intravenous drug use and blood transfusion account for nearly 90% of dual infection [4]. Children suffering from severe blood disorders require regular blood transfusions for survival and are at a high risk of contracting transfusion transmitted viral infections, especially Hepatitis B and C. Co-infection with both these viruses are common as they share similar modes of transmission. Rapid progression of fibrosis with development of severe liver disease, Cirrhosis and high incidence of Hepatocellular Carcinoma occurs in dual infection, as compared with HBV or HCV mono infection [1,3,5]. HBV and HCV interact with each other and affect the host immune response. Several Studies have shown that both the viruses inhibit the replication of the other. [6] This is mainly because one of the viruses replicate at a much faster rate, inhibiting the replication of the other. Treatment of co-infected patients still remains a challenge [7].

Objectives

To study the sero-Prevalence of HBV and HCV Co-infection in children with hematological disorders receiving multiple transfusions with blood and blood products as part of their blood disorder therapy, in comparison with non transfused children and healthy controls in south India. Children with thalassemia, leukemias, lymphomas, aplastic anemias, bone marrow hypoplasias and variceal bleed with portal hypertension, receive blood and blood products regularly as part of their supportive care. They are therefore at a high risk of acquiring hepatitis B and C viral infections, if the blood and blood products are not properly screened and HBV vaccination not given prior to start of transfusion therapy.

MATERIAL AND METHODS

Blood samples were collected from children attending a referral tertiary care hospital in Chennai for a period of one year.

The study group was divided into three.

Group-1: 75 children of age group 2-13 years with hematological disorders receiving multiple transfusions (5 and more) formed the test group.

Group-2: 30 children with hematological disorders with no history of any blood transfusion formed the matched control group

Group-3: 30 normal school children of same age group formed the healthy control group.

After obtaining consent from the parent in written consent form, 5ml of blood was drawn with sterile precautions and serum separated. Samples from all 3 groups were tested individually for HBV seromarkers- HBsAg, anti Hbc (IgG) and HCV seromarkers-Anti HCV, using commercial ELISA kits. HBV sero-positive samples were selectively tested for Anti-HCV to detect co-infection.

RESULTS AND DISCUSSION

Table-1 compares the HBsAg and Anti- Hbc positivity in the study groups. In group I comprising of 75 cases, it was found that HBsAg and Anti-Hbc were positive in 20% and 49% of cases respectively. 17% were found to have combined positivity. In group II comprising of 30 cases, it was found that HBsAg and Anti -Hbc were positive in 13% and 27% respectively. 7% were found positive for both the markers. In group III out of 30 cases, none were positive for these two markers.

Table-2 highlights, the percentage of anti-HCV positive cases in the 3 study groups. Group I showed 32% positivity while in group II and III no positive cases were detected.

Table-3 shows, the incidence of co-infection of HBV and HCV in the multi-transferred children.8% of cases were found to be both HBsAg and anti-HCV positive and 1.33% of cases were found to be both anti-HBc and anti HCV positive. This study showed a co-infection rate of 9.33%.

Table 1: HBsAg and Anti-HBc positivity in % in the Study groups

| Group | % of HBsAg+ve cases | % of Anti-HBc+ve cases | % of HBsAg &Anti-HBc +ve cases |
|-----------------|---------------------|------------------------|--------------------------------|
| I-75 children | 20% | 49% | 17% |
| II-30 Children | 13% | 27% | 7% |
| III-30 children | 0% | 0% | 0% |

Table 2: Percentage of Anti-HCV positive cases in the Study groups

| Group | Sample Size | Anti-HCV+ve |
|-------|-------------|-------------|
| I | 75 | 24(32%) |
| II | 30 | 0% |
| III | 30 | 0% |

Table 3: HBV and HCV co-infection in Multi-transfused Children

| | | |
|----------------------------------|------|-------|
| HBsAg with Anti-HCV | 6/75 | 8% |
| Anti-HBc alone +ve with Anti-HCV | 1/75 | 1.33% |
| HBV/HCV co-infection rate | 7/75 | 9.33% |

Results of the study showed a co-infection rate of 9.33% in multi-transfused children in south India, which correlated well with previous studies done in South East Asia showing a co-infection rate varying from 9% to 30% in various population groups [3,4].

This observation is of great concern as children with HBV and HCV co-infection are at a high risk of developing cirrhosis and HCC at an early age if not treated aggressively. Treatment of such co-infection is complicated due to lack of recommended standard approved therapy and depends totally on which of the two viral infections is predominant in each case. Some studies showed that patients with dual HBV and HCV infection had responded poorly to interferon (IFN) mono-therapy. Detailed serological and virological evaluations are required for co-infected patients before starting antiviral therapy [2,3]. The levels of serum HBV DNA and serum HCV RNA should be determined. In co-infected patients with HCV dominant disease and low level of HBV, Interferon (IFN) and pegylated IFN plus ribavirin and in dually active HBV/HCV, adding oral nucleos(t)ide analogs is a reasonable option [3].

Therefore preventive measures such as early immunization for Hepatitis B, sophisticated and sensitive pre-transfusion screening of blood and blood products for transfusion transmitted viruses and stringent donor selection procedure should be adopted before transfusion [8,9].

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