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SEROPREVALENCE OF HEPATITIS B AND HEPATITIS C AMONG THALASSEMIA PATIENTS AT A TERTIARY CARE HOSPITAL IN NORTH INDIA

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ABSTRACT

Background: Thalassemia is an autosomal recessive disease causing haemolytic anaemia. Repeated blood transfusion in thalassemia patients is necessary for their survival; however, such transfusions increase their exposure not only to HCV but also to other blood-borne viruses like hepatitis B, hepatitis G and human immunodeficiency virus. The aim of the present study was to evaluate seroprevalence of viral hepatitis B and C in Thalassemia patients. **Material and Methods:** This was a cross-sectional study from January 2013 to August 2015 conducted at Lady Hardinge Medical college and Associated Hospitals. Patients with thalassaemia having regular blood transfusions at this hospital were enrolled. Complete history and physical examination was carried out in all the patients and blood samples collected The serum samples were tested by using ELISA Kits for HBs antigen and Anti HCV. **Results:** During the study period 418 thalassemia patients were enrolled .Out of 418 patients 230 were male and 188 were females respectively. Seroprevalence of HCV among thalassemia patients was 18.6%. Seroprevalence of HBV was 1.4%. Higher seroprevalence of HCV was associated with, more number of transfusions and older age. Co-infection of HBV and HCV was seen in 0.96% of the thalassemic patients. Unavailability of vaccine, repeated blood transfusions and screening of blood donors without nucleic acid amplification techniques are the major factors for high prevalence of HCV. **Conclusion:** HCV infection is an important cause of viral infection among thalassemia patients with a prevalence of 18.6% in our study population, hence screening of blood by nucleic acid amplification techniques is essential to reduce the rate of transmission of HCV in thalassaemia patients.

KEYWORDS: *Thalassaemia, Hepatitis B, Hepatitis C.*

INTRODUCTION

Thalassemia is one of the most common genetic diseases in the world. It is an autosomal recessive disease causing haemolytic anaemia. It is a major health problem, causing morbidity and early mortality requiring lifelong transfusions for the affected patients.[1] Repeated blood transfusion in thalassemia patients is necessary for their survival; however, such transfusions increase their exposure not only to HCV but also to other blood-borne viruses like hepatitis B, hepatitis G, human immunodeficiency virus, transfusion transmitted virus.[2] Even though donor screening, testing procedures and suitable donor selection programs have been able to reduce transmission of HCV via transfusion of blood products, there are still many countries where standards of blood product management do not adequately protect chronically-transfused patients especially thalassemia patients from this infection.[3]

According to the World Health Organisation (WHO), approximately 240 million people are chronically infected with HBV worldwide, while 150 million people are infected with HCV[4] The general incidence of thalassemia trait in India varies between 3 and 17%. The prevalence of HCV infection among thalassemic patients in India ranged from 7% to 25% in different reports whereas prevalence of Hepatitis B in thalassemic patients in India has varied between 1% to 6.4%.[4]

As there is paucity of data regarding seroprevalence of Hepatitis B and C among thalassemic patients in North India therefore the present study was undertaken. The aim of present study was to investigate the true prevalence of HBV and HCV in patients with thalassemia and to assess HCV and HBV infection associated risk factors.

MATERIAL AND METHODS

This prospective study was conducted in the Department of Microbiology at Lady Hardinge Medical College, New Delhi which is a tertiary care hospital in Northern India, from January 2013 to August 2015. Serum samples were collected from 418 patients with Thalassemia. Demographic data such as age, duration and number of blood transfusions, history of HBV vaccination were obtained from detailed interviewing of

the patient and/or guardians. The material collected was whole blood using sterile disposable syringes under aseptic precautions. 5ml of blood was withdrawn by venipuncture aseptically and it was collected in a plain vial without adding any anticoagulant. The blood was centrifuged and clear serum was transferred into provials. The serum samples were subjected to ELISA as per kit instructions for the following viral markers.

1. Hepatitis B virus surface antigen (Biorad ELISA HBsAg) 2. Antibody Hepatitis C virus. (Biorad ELISA HCV Ag-Ab).

The optical density (OD value) value was taken in ELISA reader and cut off value was calculated as per manufacturers guidelines. All serum samples having antibody index above 1.1 were considered positive and those below 0.9 were taken as negative.

RESULTS

A total of 418 patients with thalassemia were evaluated over a period of three years. Out of 418 thalassemic patients. 230 (55%) were males and 188 (45%) were females.

Table 1: Sex-wise distribution of HBsAg and Anti HCV in Thalassemia patients.

Gender	No.of patients	HBs	HCV	Coinfection
Male	230	4 (1.7%)	46 (20%)	3 (1.3%)
Female	188	2 (1.06%)	32 (17.02%)	1 (0.53%)
Total	418	6 (1.4%)	78(18.7%)	4 (0.96%)

Amongst 418 patients with thalassemia 18.6% were HCV positive and only 1.4% were HBV positive. Seroprevalence of HCV among males was 20% in males and 17.02% in females. Seroprevalence of HBs antigen among males was 1.7% in males and 1.06% in females. Even though there was slight increase in prevalence of Anti HCV and HBs antigen among male it was not statistically significant (p value=0.437 and p value =0.581 respectively). Coinfection with HBV and HCV was found to be 1.3% among males and 0.53% among females.

Table 2: Age wise distribution of HBsAg and Anti HCV in Thalassemia patients.

Age group	Total Thalassemia	HCV	HBs	Coinfection
1-10years	183	16 (8.7%)	1 (0.54%)	0(0%)
11-20 years	179	42 (23.4%)	2(1.1%)	1 (0.55%)
21-30years	46	16 (34.8%)	2(4.3%)	2(4.3%)
31-40years	10	4 (40%)	1 (10%)	1 (10%)

Amongst HCV positive patients with thalassemia, highest prevalence (40%) was found to be in the age group of 31-40 followed by 34.8% in 21-30 years and 23.4% in 11-20 years. HBs antigen positivity was lowest in the age group of 1-10 years and highest in the age group of 31-40 years. Higher seroprevalence of HCV and HBV among 31-40years (p value=0.0006 and p value<0.0001) and 21-30 years (p value<0.0001 and p value=0.0049) was statistically significant.

Table 3: Seroprevalence of Hepatitis B and Hepatitis C in association with number of blood transfusions.

Number of Transfusions	Number of patients	HBs positive	Anti HCV positive	Coinfection (HBVand HCV)
0-25	80	1 (1.25%)	9 (11.25%)	0(0%)
26-50	103	1 (0.97%)	18(17.4%)	0(0%)
51-75	89	1 (1.1%)	18(20.2%)	0(0%)
76-100	95	1 (1.05%)	20 (21.05%)	2 (2.1%)
>100	51	2 (3.92%)	13(25.5%)	2 (3.9%)

Highest seroprevalence of HCV was seen in patients having more than 100 transfusions (25.5%) and lowest was seen in patients having less than 25 transfusions (11.25%). Higher seroprevalence of HCV was associated with more number of transfusions whereas with Hepatitis B no such association was seen.

Table 4: Seroprevalence of Hepatitis B in thalassemia patients in association with their vaccination status.

Vaccination status	Total number. of patients	HBs positive	HBs negative
Not vaccinated	50	3(6%)	47(94%)
With one dose	87	4(4.5%)	83(95.4%)
Two doses	116	0(0%)	116(100%)
Three doses	165	0 (0%)	165(100%)

Highest seroprevalence of Hepatitis B was seen among non-vaccinated patients (6%) followed by incompletely vaccinated patients (4.5%). No cases of Hepatitis B were seen in patients who were completely vaccinated.

DISCUSSION

The HCV infection is a widespread disease that affects a large number of thalassemia patients worldwide and is considered as a major public health problem in these high risk groups Transfusion-transmitted infections such as Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and HIV are dreaded consequences of transfusions, as these can result in long-term morbidity and mortality. In India, it is mandatory to screen donated blood for HIV (since 1996), anti-HCV (since 2001), HBs antigen (since 1996), syphilis and malaria.

In our study, the prevalence of HBV, HCV and Confection among thalassemic patients was found to be 1.4%, 18.6% and 0.96%. There was no statistical significant difference among male and female patients. HCV infection was found to be highly prevalent amongst transfusion associated infection. The major reason for this could be non availability of vaccine against HCV. Thalassemia patients may acquire hepatitis C through the administration of HCV-infected blood collected during the donor window period. In different parts of the world the prevalence of HCV infection in thalassemia patients differs: Malaysia 22.4%, 42% in Pakistan, 40.5% in Egypt, 26.4% in Iraq.[1,5,6,7] In India seroprevalence of HCV has varied from 8.25% to 25%[4,9] This extreme degree of variability depends on two major factors, i.e., the prevalence of HCV in the relevant population (and therefore also in the blood donors), and the practice of HCV antibody screening before the transfusion.

In our study highest prevalence (40%) was found to be in the age group of 31-40 years followed by 34.8% in 21-30years, 23.4% in 11-20 years and 8.7% in 1-10 years suggesting that HCV prevalence increased with advancing age. Similar findings have been reported by Bhavsar and Mansaour et al.[4] This might be because of the fact that the total numbers of blood transfusions received by older thalassemics are more than younger patients. Moreover, frequency of transfusions received by older thalassemics is more compared with younger patients and more risk of HCV during window period.

Prevalence of HBV was 1.4% in multi-transfused β-thalassemia major patients in our study. The prevalence of hepatitis B Among thalassemics from other parts of India was 1.2% to 6.4%.[10] In other countries the prevalence of hepatitis B among thalassemic patients 6.4% in Iraq[6], 0.75% in Turkey. Our study reported lower prevalence of HBV, which might be due to the free availability of hepatitis B vaccine and better understanding of parents about HBV vaccination and inclusion of Hepatitis B vaccine in National immunisation program where first dose of hepatitis B vaccine is given at birth. In our study seroprevalence of HBs antigen was seen only in non-vaccinated and incompletely vaccinated individuals. Similar findings have been reported by Raham et al in Iran.[13] Therefore, preventive measures, especially HBV vaccination should be given to all especially thalassaemia patients.

In our study, 4 (0.96%) of the thalassaemic patients had HBV and HCV coinfection. Similar findings have been reported by Karim et al in Bangladesh (1%).[14] Co-infection of both HBV and HCV has serious implications in the pathogenesis of chronic viral hepatitis, leading to rapid progression towards cirrhosis of the liver.

CONCLUSION

In our study, a high prevalence of HCV seropositivity (18.6%) was observed. As there is no vaccine available for Hepatitis C the only way of reducing the prevalence of HCV in multiple transfused thalassemic patients by effective screening of blood .Screening of blood by ELISA technique is ineffective as ELISA techniques are unable to detect these viruses in window period. Therefore nucleic acid amplification techniques should be made mandatory for screening of blood for hepatitis B and C in developing countries like India to reduce the prevalence of hepatitis C infection.

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