Int.J.Curr.Microbiol.App.Sci (2018) *7*(5): 3142-3146

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 7 Number 05 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.705.367

A Study of Prevalence of Hepatitis-B and Hepatitis-C Infection in Thalassemic Patients in a Tertiary Care Hospital, Jamnagar, Gujarat, India

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Keywords

Thalassemia, Hepatitis B, Hepatitis C, ELISA, Blood transfusion

Article Info

Accepted:
22 April 2018
Available Online:
10 May 2018

A B S T R A C T

Thalassemia is an autosomal recessive disease causing haemolytic anaemia. The ideal treatment of these patients involves regular, 2-4 weekly blood transfusions. The major complications by this treatment are the transmission of transfusion acquired infections such as Hepatitis B virus infection, Hepatitis C virus infection, Human immunodeficiency virus infection, Syphilis, Malaria and transfusion acquired iron overload. Aim of the study is to evaluate the prevalence of Hepatitis B & C among Thalassemic patients transmitted by blood transfusion. Retrospective study was conducted in Microbiology department, Shri M.P. Shah medical college and GGG hospital, Jamnagar from January 2016 to June 2017. Patients with thalassaemia having regular blood transfusions at this hospital were enrolled. 200 serum samples were tested by using ELISA Kits for HBsAg and Anti HCV. Out of 200 patients 119(59.5%) were male and 81(40.5%) were females. Out of them 02(1%) HBsAg positive and 10(5%) Anti–HCV reactive. More sensitive screening tests, stringent donor selection and vaccinating all children at the time of induction into the thalassemia transfusion programme are required for the better control of this transfusion – transmitted infections among Thalassemia patients.

Introduction

The Thalassemia is one of the most common genetic diseases in the world. They form a heterogonous group of conditions resulting from a wide variety of mutations of genes which code for hemoglobin synthesis. Beta thalassemia major is the homozygous form, inherited recessively and resulting in reduced or absent beta chain production (Ahmed Kamel Mansour *et al.*, 2012). The ideal treatment of these patients involves regular, 2-4 weekly blood transfusions. The major complications by this treatment are the transmission of transfusion acquired infections such as Hepatitis B virus (HBV) infection, Hepatitis C virus (HCV) infection, Human immunodeficiency virus (HIV) infection, Syphilis, Malaria and transfusion acquired iron overload (Hamid Hussain *et al.*, 2008).

According to the World Health Organization (WHO), approximately 240 million people are chronically infected with HBV worldwide, while 150 million people are infected with HCV (HardikBhavsar *et al.*, 2011). 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% (HardikBhavsar *et al.*, 2011).

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.

Materials and Methods

This study is undertaken to determine prevalence of Hepatitis B virus surface antigen (HBsAg), and antibody to Hepatitis C (anti-HCV) virus, among thalassemic patient attending, Tertiary Care Hospital, Jamnagar, Gujarat, India. Serum from 200 cases was collected from January 2016 to June 2017.

Inclusion criteria

All known thalassemic patients.

Exclusion criteria

Unknown thalassemic patients.
Patients which have other viral hepatitis.
Other sample like fluids.

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. The optical density (OD value) value was taken in ELISA reader and cut off value was calculated as per manufacturers guidelines.

Hepatitis B virus surface antigen (ERBALISA® ELISA HBsAg)

Cut-off Value=Average NC + 0.15

(Negative control mean (NCX) = Absorbance value of Negative controls / Number of Negative Control)

All samples with absorbance value less than the Cut-off Value should consider Negative and absorbance value more than the Cut-off Value should consider Positive for HBsAg.

Antibody Hepatitis C virus (QUALISA® ELISA HCV)

Cut-off Value= Average NC + 0.3

(Negative control mean (NCX) =Absorbance value of Negative controls / Number of Negative Control)

All samples with absorbance value less than the Cut-off Value should consider Non-reactive and absorbance value more than the Cut-off Value should consider Reactive for HCV antibody.

Results and Discussion

A total of 200 patients with thalassemia were evaluated over a period of one and half years. Out of 200 thalassemic patients 119 (59.5%) were males and 81 (40.5%) were females. Amongst 200 patients with thalassemia 5.0% were HCV positive and only 1.0% were HBV positive. Seroprevalence of HCV among males was 7.56% in males and 1.2% in females. Seroprevalence of HBsAg among

males was 0.84% in males and 1.2% in females. Amongst HCV positive patients with thalassemia, highest prevalence (7.5%) was found to be in the age group of 9-12 years. Amongst HBsAg positive patients with thalassemia, highest prevalence (2.8%) was found to be in the age group of 2-4years.

Highest seroprevalence of HCV was seen in patients having more than 100 transfusions (40%) and lowest was seen in patients having less than 50 transfusions. Higher seroprevalence of HCV was associated with more number of transfusions whereas with Hepatitis B no such association was seen.

Highest seroprevalence of Hepatitis B was seen among non-vaccinated patients (4%). No cases of Hepatitis B were seen in patients who were vaccinated.

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 shows 1.0% prevalence of HBsAg among Thalassemic patients, which is lower than other study like Modi *et al.,* (2016) (4.3%), Kataky *et al.,* (2001) (6.6%), Wonke *et al.,* (1992) (7.4%) and comparable to other study like Emothal *et al.,* (2007) (0.8%), Satia *et al.,* (2016) (1.4%) and Shaharam *et al.,* (2006) (1.5%). In our study shows HCV prevalence rate of 5.0% among Thalassemic patients, which is lower than other study like Wonke *et al.,* (1992) (11.1%), Satia *et al.,* (2016) (18.6%) and Modi *et al.,* (2016) (20.4%) and comparable to other study like Chakrabarti *et al.,* (2006) (5.0%) and Kataky *et al.,* 2001(3.3%).

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

Gender	No. of patients	HBsAg Positive	Anti-HCV Reactive
Male	119	1 (0.84%)	9 (7.56%)
Female	81	1 (1.2%)	1 (1.2%)
Total	200	2 (1.0%)	10 (5.0%)

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

Age Group	No. of patients	HBsAg Positive	Anti-HCV Reactive
<2 year	7	-	-
2-4 Year	35	1 (2.8%)	2 (5.7%)
5-8 Year	53	-	2 (3.7%)
9-12 Year	40	-	3 (7.5%)
>12 Year	65	1 (1.5%)	3 (4.6%)

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

No. of Transfusion	No. of patients	HBsAg Positive	Anti-HCV Reactive
0-25	72	1 (1.38%)	-
26-50	70	-	-
51-75	26	1 (3.84%)	2 (7.69%)
76-100	22	-	4 (18.18%)
>100	10	-	4 (40.0%)

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

Vaccination Status	No. of patients	HBsAg Positive	HBsAg Negative
Immunized	150	0 (0)	150(100%)
Non Immunized	50	2 (4%)	48(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 (Table 1–4).

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. Similar findings have been reported by Satia *et al.*, (2016). Therefore, preventive measures, especially HBV vaccination should be given to all especially thalassaemia patients.

Patients with thalassemia major are at higher risk of developing hepatitis due to transfusion of blood from donor infected with hepatitis B virus (HBV). To decrease prevalence of HBV infection emphasizes the need for routine screening of donor's blood for HBV infection and also the need for vaccinating all children at the time of induction into the thalassemia transfusion programme. In our study, a high prevalence of HCV seropositivity (5%) 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.

Acknowledgement

I express my heartfelt thanks and gratitude to my institution, Shri M.P. Shah Govt. medical college and GGG hospital, Jamnagar for allowing me to conduct the study.

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How to cite this article:

Chandani C. Surani, Ruchi V. Shah and Mala Sinha. 2018. A Study of Prevalence of Hepatitis-B and Hepatitis-C Infection in Thalassemic Patients in a Tertiary Care Hospital, Jamnagar, Gujarat, India. *Int.J.Curr.Microbiol.App.Sci.* 7(05): 3142-3146.
doi: https://doi.org/10.20546/ijcmas.2018.705.367