

SEROPREVALENCE OF HEPATITIS C VIRUS IN THALASSEMIC PATIENTS

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Abstract:

Hepatitis C virus is one of the leading causes of liver disease and represents a major public health problem. It is a common cause of cirrhosis and hepatocellular carcinoma (HCC) as well as the most common reason for liver transplantation. This cross sectional study was carried out during the period of April 2007 to April 2008 among thalassemic patients with history of multiple blood transfusion (>20 units). Total 200 thalassemic patients from Thalassemia Samity Hospital, Green Road, Bangladesh Thalassemia Foundation, Dhanmondi, and from Department of Transfusion Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka were included in the study. After taking detailed history and clinical examination, 0.3 ml of venous blood was collected from each patient and tested for anti HCV by commercial kit. Positive cases were confirmed by ELISA method. Among 200 patients majority (68.5%) were below age of 20 years with a male to female ratio of 1.7:1, 16.5% were found to have anti HCV positive. Anti HCV positivity increased with duration of exposure and number of blood transfusion., 22.9% of patients who had duration of exposure for more than 10 years and 36.4% having blood transfusion more than 40 units were positive for anti HCV.

Key words: Seroprevalence, hepatitis C virus, thalassemia.

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Introduction:

Hepatitis C virus (HCV) is an important human pathogen. It has high prevalence and worldwide burden and produces several grave consequences if persistent, infection like cirrhosis of liver, hepatocellular carcinoma, and end-stage liver disease necessitating liver transplantation. The incidence of all of these "complications are expected to rise in the near future.^{1,2} HCV accounts for about 15% of acute viral hepatitis, 60-70% of chronic hepatitis, and up to 50% of cirrhosis, end-stage liver disease and liver cancer.³ A distinct and major characteristic of hepatitis C virus is its tendency to cause chronic liver disease.⁴ At least 75% of patients with acute hepatitis C ultimately develop chronic infection. At least 20% of patients with chronic hepatitis C develop cirrhosis usually after 10 to 20 years. After 20

to 40 years, a small percentage of patient with chronic liver disease develop liver cancer.⁵ HCV infection is often silent, and clinical symptoms are absent or minimal unless the disease is severe or cirrhosis is diagnosed.⁶ There are different risk factors for acquiring HCV Infection. The transmission of HCV primarily occurs through exposure to infected blood and blood products. Blood transfusion, injectable drug abuse, occupational exposure in health care workers, hemodialysis, solid organ transplantation from an infected donor, high-risk sexual activity, and birth to an infected mother are the modes of transmission.⁷ According to the Centers for Disease Controls and Prevention (CDC), the most common risk factors for acute HCV infection in the U.S. from 1991-1995 were high-risk drug abuse in parenteral route (60%) and risky sexual

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behaviors (20%). Other modes of transmission (occupational, hemodialysis, household and perinatal) accounted for approximately 10% of infection.⁸

A potential risk factor can be identified in approximately 90% of persons infected with HCV. In the remaining 10%, no recognized source of infection can be identified, although most persons in this category associated with low socio-economic level.⁹ Risk for sexual transmission is rare and occurs in <5% of those couples where one of the individual is infected with HCV. Mother to infant transmission of HCV is possible but uncommon, and occurred in 3-5% of babies born to HCV positive mothers.¹⁰ HCV is endemic in most parts of the world, with an estimated overall prevalence of 3%, representing approximately 170 million HCV-infected persons world-wide.¹¹ The estimated figures are 0.3% in New Zealand and 4% in Cambodia.¹² However, there is considerable geographic variation in the incidence and prevalence of HCV infection. Much of the variability between regions can be explained by the frequency and extent to which different risk factors like injection drug use accounting for 60 to 80%¹³, transfusions and transplants 5 to 13%¹³, unsafe injections and other healthcare related procedures 2 to 18%, occupational exposures 0 to 7%¹⁴, perinatal transmission 0 to 40%¹⁵ have been contributed to the transmission of HCV. α -thalassemia major patients are among the high risk groups for HCV infection due to repeated blood transfusion. In contrast to the low rate of HCV infection in healthy population, thalassemic patients reveal high prevalence of HCV infection because of repeated exposure to blood. Infections among these patients ranged from 11.1% to 63% in various studies¹⁶⁻¹⁸ and rate of infection in these patients correlate with the amount of blood transfused. Studies from Italy, Iran and Thailand showed a high prevalence of anti HCV antibody of 60%, 27.1% and 20.2% respectively.^{19, 20-22} Seroprevalence of anti-HCV among thalassemic patients was 56.8% in Pakistan.²³ A study from Bangladesh revealed that anti-HCV seropositivity was 12.5% in thalassemic children compared to 0.9% among age and sex matched control group.²⁴ This study was conducted with the aim to find out anti-HCV sero-prevalence among thalassemic patients.

Materials and Methods:

This cross sectional study was carried out during the period of April 2007 to April 2008 among thalassemic patients with history of multiple blood transfusion (>20 units). Total 200 thalassemic patients were enrolled from Thalassemia Samity Hospital, Green Road, Bangladesh Thalassemia Foundation, Dhanmondi, and from Department of Transfusion Medicine, BSMMU, Dhaka. After taking informed written consent of the subjects all necessary information were recorded in a pre-designed structured questionnaire. After that 3.0ml of venous blood was collected in a sterile test tube aseptically by venipuncture with sterile disposable syringe. Blood was tested for anti HCV by commercial kit according to standard operating procedure of manufacturer's instruction (Anti HCV test done by Excel HCV rapid device, made in USA).²⁵ Sensitivity of this method was found to be 99% with Specificity of 98.6%.^{25,26} All positive cases were confirmed by ELISA method. Statistical analysis was performed using SPSS program. Odds ratio and chi-square test were done to test the significance of the factors of study in relation with the seroprevalence of anti-HCV antibodies. Logistic regression analysis was applied to identify the risk factors. $p < 0.05$ was considered significant.

Results:

Out of 200 patients 33 (16.5%) were anti HCV positive and 167 (83.5%) were anti HCV negative (Fig-1)

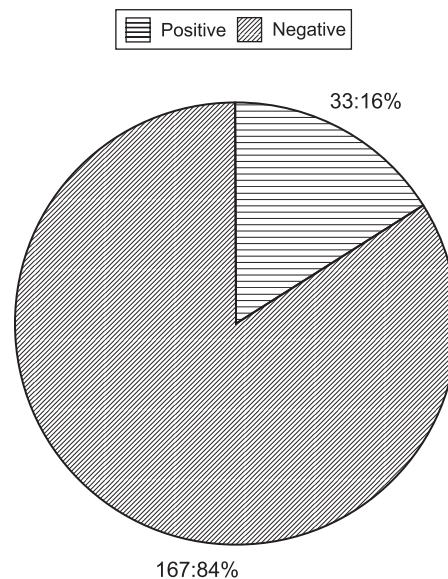


Fig-1: Distribution of patients according to anti HCV status.

Among HCV positive individuals 21 (63.6%) were male and 12 (36.4%) were female and among HCV negative individuals 100 (66%) were male and 57 (34%) were female (Table-1). There is male predominance with a male to female ratio 1.7:1.

Table-I*Distribution of patients according sex.*

Anti HCV status	Anti HCV status	
	Male No of Patient (%)	Female No of Patient (%)
Positive	21 (63.6)	12 (36.4)
Negative	110 (66)	57 (34)

Majority (68.5%) of patients are within 20 years of age. Among HCV positive individuals, 25 (76%) patients were in the age group of <20 years followed by 7 (21%) in 21-30 years and 1(3%) was > 30 years of age. Among HCV negative individuals, 112 (67%) patients were in < 20 years of age, 40 (24%) were in 21-30 years and 15 (9%) were in > 30 years of age (Table-II)

Table-II*Distribution of patients according to age*

Age distribution	Anti HCV status	
	Positive	Negative
<20 years (n=137)	25 (76%)	112 (67%)
21-30 years(n=47)	7 (21%)	40 (24%)
>30 years (n=16)	1 (3%)	15 (9%)

Among 200 patients, 84(42%) individuals were in middle socioeconomic class followed by 64 (32%) in lower and 52 (26%) were in upper class. Of them 12(14.36%), 15(23%) and 6 (11.5%) were HCV positive respectively Table-III

Table-III*Distribution of patients according to socioeconomic status*

Social class	Anti HCV status	
	Positive	Negative
Upper class (n=52)	6 (11.5%)	46 (88.5%)
Middle class (n=84)	12 (14.3%)	72 (85.7%)
Lower class (n=64)	15 (23%)	49 (77%)

Duration of exposure to risk factors was also calculated and was correlated with seropositivity of HCV. Out of 200 patient 88 (44%) had 5-10 years of exposure of them 14 (16%) were anti HCV positive, 70 (35%) patient had >10 years exposure of them 16 (22.8%) were anti HCV positive and 42 (21%) had < 5 years of exposure of them only 3 (7.1%) were anti HCV positive (Table-IV).

Table-IV*Distribution of patients according to duration of exposure to risk factors*

Duration of exposure	Anti HCV status	
	Positive	Negative
<5 years (n=42)	3 (7.1%)	39 (92.9%)
5-10 years (n=88)	14 (16%)	74 (84%)
>10 years (n=70)	16 (22.9%)	54 (77.1%)

In this study, populations were also distributed according to number of blood transfusion. Total 55 (27.5%) patients received 20-30 units blood transfusion of them only 4(7.3%) were anti HCV positive, 112 (56%) received 31-40 units blood transfusion of them 17(15.2%) were anti HCV positive and 33 (16.5%) received >40 units blood transfusion of them 12(36.4%) were anti HCV positive (Table-V)

Table-V*Distribution of patients according to number of blood transfusion*

Number of blood transfusion	Anti HCV status	
	Positive	Negative
20-30 units (n=55)	4 (7.3%)	51 (92.7%)
31-40 units (n=112)	17 (15.2%)	95 (84.8%)
>40 units (n=33)	12 (36.4%)	21 (63.6%)

P value=0.069

On clinical examination, out of 200 patients all (100%) had jaundice and hepatomegaly, 198 (99%) patients had splenomegaly, 15 (7.5%) had oedema, 7 (3.5%) had clubbing. Spider nevi, palmar erythema, gynaecomastia, testicular atrophy, engorged abdominal vein, and ascities were not found in any individual.

Discussion:

Hepatitis C virus infection is a major cause of liver related morbidity and mortality and

represents a major public health problem world wide. HCV infection is more notorious than hepatitis B virus infection (HBV) because of greater risk of chronicity and other sequelae of liver disease like chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma. Its prevalence is lower than hepatitis B virus. The overall prevalence of HCV infection is 1% to 2% in most countries but the distribution of HCV varies considerably among different populations.⁸ HCV is most frequently transmitted by percutaneous exposure to infected blood or blood derived body fluids and very high rates of HCV infection are found among persons exposed to HCV through these routes. HCV prevalence rate in USA is about 1.8%¹³, in Africa it is 5.3%. Mediterranean region 4.6%, Western Pacific region 3.9%, South East Asia 2.13% and in Europe 1.03%.¹¹ In Pakistan, among voluntary blood donors anti HCV antibody positivity ranges from 0.44% to 1.18% and among health care workers is 6%.²⁷ In our neighboring country India, anti HCV positivity among voluntary blood donors ranges from 1.5 to 1.78% and among healthcare workers 4%²⁸. There are few studies on seroprevalence of hepatitis C virus infection in Bangladesh. Studies done by Laura Gibney et al.²⁹ in a population of Bangladeshi trucking industry by Shirin T et al³⁰ among injectable and non injectable drug abuse, and by Khan M et al.,³¹ in professional and non professional blood donors were < 1%, 24.8%, 5.8%, 1.2% and 0.0% respectively. In this study, prevalence of hepatitis C virus was found to be 16.5% out of 200 thalassemic patients. Previous study from Bangladesh on thalassemic patients reported the anti HCV seropositivity to be 12.5%²⁴. The prevalence of anti HCV positivity among thalassemics from India varied from 19% - 68%.³² Studies from Pakistan by Shah et al. (2005)²³ reported a much higher prevalence of 56.8%. Prevalence of 20.0% and 60% were reported from Thailand and Italy respectively.^{20, 22} This wide variability among the prevalence reported in different studies is because of different sensitivity and specificity of the test used, different anti HCV prevalence in donor populations and differing donor selection criteria.³³

Conclusion:

From this study it was evident that, majority (68.5%) of patients were below 20 years of age and there is male preponderance with a male to female ratio 1.7:1. Out of 200 thalassemic patients 16.5% were found anti HCV positive. Anti HCV positivity increased with duration of exposure and number of blood transfusion. It was found that 22.9% of patients who had duration of exposure for more than 10 years and 36.4% who had history of blood transfusion for more than 40 units were positive for anti HCV. It is difficult to comment on risk factors in this small population. To get dependable conclusion regarding prevalence of HCV, further extensive studies with larger sample size should be carried out.

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