ORIGINAL ARTICLE

SEROPREVALENCE OF HEPATITIS C VIRUS ANTIBODY IN SICKLE CELL ANAEMIA PATIENTS IN BENIN-CITY, NIGERIA

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ABSTRACT

Background: The rate of blood transfusion is high in Nigeria due to high prevalence of sickle cell anaemia. Hepatitis C virus infection is a blood borne infectious disease primarily transmitted parenterally. This study was conducted to see the prevalence of Hepatitis C virus among patients with sickle cell anemia. **Methods:** This study was conducted at University of Benin Teaching Hospital, Edo state, Nigeria, from January 2009 to April 2009. Candidates for this study were adults ≥15 years, from Haematology Out-Patient Department. Haemoglobin phenotype of patients was confirmed by haemoglobin electrophoresis. Blood transfusion history and demographic information were collected. Blood sample was taken from each participant for HCV antibody by enzyme-linked immune-sorbent assay. Data was analyzed using SPSS version 15. **Results:** A total of 252 sickle cell anaemia patients were recruited; 200 with history of regular blood transfusions and 52 who never had blood transfusion. They comprised of 56(22.2%) males and 196(77.8%) females, with male to female ratio of 1: 3.5. Age range was 15-48 years, mean 26.6±6.0 years. The prevalence of anti-HCV antibodies in sickle cell anaemia with regular blood transfusions was 4.5% (9 out of 200), and it was 1.9% (1 out of 52) in those who never had blood transfusion (p=0.0001). **Conclusion:** The seroprevalence of Hepatitis C virus antibodies among regularly transfused sickle cell anemia patients is significantly higher than those not requiring transfusions.

KEY WORDS: Blood transfusion, Sickle cell anaemia, Hepatitis C virus.

INTRODUCTION

The rate of blood transfusion is high in Nigeria.[1] Blood for transfusion is normally tested for Hepatitis C virus (HCV) antibodies. HCV infection is a blood borne infectious disease primarily transmitted parenterally.[2,3] It is a positive-sense ribonucleic acid (RNA) virus, a member of the flaviviridae family and a major cause of chronic liver disease worldwide.[3] A subgroup of infected individuals develop progressive liver damage with chronic hepatitis, liver cirrhosis and hepatocellular carcinoma,[4,5] leading to significant morbidity and mortality. HCV infection is also associated with cryoglobulinaemia,[6] non-Hodgkin's lymphoma[7,8] and glomerulonephritis.[9] About 60—85% of patients infected with HCV will develop chronic hepatitis.[10] The incidence of post-transfusion hepatitis was reported to be 7-12% before 1980 in the United States of America.[11-13] Approximately 170 million people in the world are infected with HCV.[14] By the late 1980s' three distinct hepatitis viruses had been well characterized.[15] Most people with HCV have few, if any symptom after the initial infection, yet the virus persists in the liver in about 85% of those infected.

Sickle cell anaemia is an important health problem in Nigeria, with a prevalence rate of 1-3%, has one of the highest concentrations of patients with this disorder in the world.[16,17] Twenty-four percent of the Nigeria population are carriers of the mutant gene and the prevalence of sickle cell anaemia is about 20 per 1,000 births. This means that in Nigeria alone, about 150,000 children are born annually with sickle-cell anaemia.[18]

This study was conducted to see the prevalence of Hepatitis C virus among patients with sickle cell anemia.

MATERIAL AND METHODS

This study was conducted at University of Benin Teaching Hospital, Edo state, Nigeria. Candidates for this study were adults aged ≥15 years, from Haematology Out-Patient Department of the hospital from January 2009 to April 2009. The candidate's haemoglobin pheno-

type was confirmed by haemoglobin electrophoresis.

Sickle cell anaemia patients with history of intravenous drug abuse, multiple unprotected sexual partners, commercial sex workers, and those with tattoo or scarification marks on their bodies were excluded from this study. Also excluded were persons with haemolytic anaemia other than SCA.

Informed consent in writing was obtained from each participating candidate. Blood transfusion history and demographic information including the age, gender, marital status, area of residence, ethnicity, educational and occupational status were collected from the candidates using a self-administered questionnaire.

Blood sample was taken from each participant for HCV antibody screening. Hepatitis C screening was done with a rapid test based on the second generation enzyme-linked immunosorbent assay (ELISA) developed by Clinotech Diagnostics Canada. The sensitivity of the rapid test was 95.5%. All samples with positive results were repeated and double positive results regarded as truly positive. The data obtained was analyzed using the statistical package for the social sciences (SPSS) version 15.

RESULTS

A total of 252 patients satisfied the inclusion criteria and were recruited for this study. They comprised 200 sickle cell anaemia patients with history of regular blood transfusion and 52 sickle cell anaemia patients who never had blood transfusion. They were made up of 56 (22.2%) males and 196 (77.8%) females, with male to female ratio of 1: 3.5. The study patients were aged between 15 and 48 years with a mean age of 26.6±6.0 years. The other socio-demographic characteristics of the candidates are shown in Table 1.

The prevalence of anti-HCV antibodies among sickle cell anaemia with regular blood transfusions was 4.5% (9 out of 200), and it was 1.9% (1 out of 52) in those that never had blood transfusion. The observed difference between the two groups was statistically significant (p=0.0001). (Table 2)

The demographic characteristics of seropositive patients revealed that 80% were females, the modal age was 15-20 years, 60% were married and 60% were unemployed. (Table 3)

Table 1: Socio-demographic characteristics of the study group.

Variable	Number	Percentage
Sex		
Male	56	22.2
Female	196	77.8
Age (in years)		
15-20	47	18.7
21-30	151	59.9
31-40	41	16.3
41-50	13	5.2
Education		
None	13	5.2
Primary	8	3.2
Secondary	104	41.3
Tertiary	127	50.4
Marital status		
Single	52	20.6
Married	200	20.6
Occupation		
Student	85	33.7
Unemployed	75	29.7
Employed	92	36.4

Table 2: Prevalence of HCV antibodies in sickle cell anaemia patients.

	Total n (%)	Positive n (%)	Negative n (%)
SCA patients with regular blood transfusions	200 (100.0)	9 (4.5)	191 (95.5)
SCA patients withoutblood transfusion	52 (100.0)	1 (1.9)	51 (98.1)

x^2=101.9, df=1, p=0.0001

DISCUSSION

Blood transfusion is a well known risk factor for the transmission of hepatitis C virus.[19-21] The age range of SCA patients in this study was 15-48 years. The upper age limit of 48 years in this study can be attributed to the low life expectancy of the SCA patients in our environment. In the United States of America[22] median survival was estimated in 1994 to be 42 years for men and 48 years for women, whereas comparable figures for Jamaica published in 2001 suggested 53 years for men and 58.5 years for women. The higher survival of sickle cell anaemia patients in Jamaica may be attributed to the haplotype predominant in that area or a possible high fetal haemoglobin in the sickle

Table 3: Demographic chracteristics of seropositive patients.

Variable	Number	Percentage
Sex		
Male	2	20.0
Female	8	80.0
Age (in years)		
15-20	4	40.0
21-30	2	20.0
31-40	3	30.0
41-50	1	10.0
Education		
None	2	20.0
Primary	3	30.0
Secondary	4	40.0
Tertiary	1	10.0
Marital status		
Single	6	60.0
Married	4	40.0
Occupation		
Student	1	10.0
Unemployed	6	60.0
Employed	3	30.0

cell anaemia patients. There are, however, no firm data on the survival of patients with sickle-cell anaemia on the African continent. In sub-Saharan Africa mortality will be much higher, and in some areas estimates derived from the age structure of populations attending clinics suggest that half of those with sickle-cell anaemia had died by the age of five years usually from infections including malaria and pneumococcal sepsis, and from the anaemia itself.[22]

The peak age prevalence of HCV antibodies in this study was in the "15-20" year age range. This was in contrast to what was noted in Makurdi, Nigeria where the peak age of 50 year and above was recorded.[23] In Kano, Nigeria researchers reported an increased infection acquisition with increasing age.[24] The peak age range in Kano study was recorded as 45 years and above. These two studies were however carried out among healthy blood donors. The exclusion of SCA patients with risky behaviors from the index study and the lower life expectancy among SCA patients may have contributed to the higher prevalence of HCV antibodies in younger age range as against what has been reported in other studies in Nigeria.

The prevalence of HCV antibodies among sickle cell anaemia patients with regular blood transfusion in this study was similar to what Adewuyi[25] reported at Ilorin, North central Nigeria when he carried out a similar study. These findings suggest strongly that blood transfusion is still a major route of transmission of hepatitis C virus. The finding is also in keeping with what has been reported from other parts of Nigeria, where a higher prevalence of 6.0% among blood donors in Jos, Northern Nigeria was noted.[26] The prevalence from this study contrasts with the 0.26% recorded by Contreras et a [27] in the United Kingdom. The low prevalence rate in the United Kingdom may be attributed to early introduction of pre-donation screening of HCV antibodies, a better and more sophisticated method of screening of blood donors and availability of non remunerated blood donors. Al-Shegyab et al[28] in Jordan, reported a 40.5% prevalence rate of HCV antibodies in patients with chronic haemolytic anaemia. They concluded that blood transfusion is a serious risk factor for hepatitis C infection in Jordan. This is rather very high when compared with the 4.5% from our study. It may be attributed to the study population (patients with chronic haemolytic anaemia) which is different from this index study.

In a related study in Brazil, Towes et al[29] reported a prevalence rate of anti-HCV of 14.1% in sickle cell anaemia patients who started transfusion before 1992 when the screening for hepatitis C was commenced and those who had up to ten units of blood. This high prevalence rate among patients that had blood from unscreened donors also supports the fact that blood transfusion is a major risk factor for the transmission of hepatitis C.

CONCLUSION

The seroprevalence of Hepatitis C virus antibodies among regularly transfused sickle cell anemia patients is significantly higher than those not requiring transfusions.

All agencies and hospitals involved in blood procurement should enforce routine screening of all blood for HCV prior to transfusion. All sickle cell anemia patients with history of blood transfusions should be screened for anti-HCV antibodies with identification of cases requiring follow-up.

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