

# Transfusion Related Hepatitis C Virus (HCV) Infection in Sickle Cell Disease Patients

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**ABSTRACT:** This study aimed to determine retrospectively, the prevalence of hepatitis C virus infection in relation to a background history of blood transfusion; through anti HCV antibody screening test, amongst adult sickle cell disease patients. Anti HCV antibody was tested for in the serum of 92 consecutively selected adult SCD patients using anti HCV detection test in serum rapid kit by Clinotech diagnostics which has a sensitivity of 99.4%. 13(14.1%) out of the 92 SCD patients were positive by anti HCV screening. All the 13 were HbSS patients and 12(92.3 %) had record of blood transfusion. 8 were males and 5 were females. The mean transfusion requirement amongst SCD patients was  $2.1 \pm 2.2$  units. Out of the total number of 92 SCD patients studied, 65 (70.7% %) had record of blood transfusion of various units of which 60 % of those transfused had at least up to 4 units of blood; while 27 (29.3% ) were never transfused. Conspicuously, HCV positive SCD patients had a background history of blood transfusion. Frequency of transfusion and HCV positivity is higher in HbS than HbSC. Since screening for anti-HCV antibody actually started in the year 1997, the cohorts of patients studied possibly had been transfused blood not screened for anti-HCV antibody. Anti- HCV positive SCD patients require thorough follow up to avert the complications attributable to HCV infection.

**Keywords:** *Hepatitis C virus, blood, Sickle cell, haematology.*

## INTRODUCTION

Hepatitis C virus infection is primarily transmitted by blood and blood products. It was initially identified in 1989 when it was found to be primary causative agent of non-A, non B hepatitis; a condition associated with high rate of progressive and end stage liver disease, cirrhosis and hepatocellular carcinoma (Ballester JM *et al* 2005). It is regarded as a serious disease because 85% of acutely infected individual (which are clinically undetectable in most instances) will progress to chronic state (i.e. infection of >6 months duration), at which the virus will almost never clear without treatment. The chronically infected patients with apparent chronic hepatitis progress to cirrhosis of which 20% progress to chronic liver disease.

Hepatitis virus infection is a major cause of morbidity and mortality in sub-saharan Africa. Hepatitis C viral infection is, in particular quite prevalent in Africa but

the epidemiology of this infection has yet to be clearly defined<sup>(1)</sup> Mutimer DJ *et al* 2000 170 million people are said to be infected world wide and in United States alone about 40 million people are already infected<sup>(3)</sup>.

Sickle cell disease patients quite often require frequent blood transfusion because of an on-going chronic haemolytic process which may be exacerbated by sequestration crisis or even infections especially malaria which is highly endemic in Nigeria.

Previous study carried out in Nigeria affirmed that all HCV positive sickle cell disease patients had a background history of blood transfusion ( Mutimer DJ *et al* 1994). The University College Hospital blood bank started screening, by enzyme linked immunosorbent assay (ELISA), for Transfusion Transmissible infections (TTI) like HIV 1 and 11 and Hepatitis B surface antigens since 1986 but screening for anti- HCV did not commence until 14 years later (year 2000).

This study was therefore designed to find out the frequency of hepatitis C infection among adult SCD patients in this centre which hitherto had not earlier been determined.

## PATIENTS AND METHOD

The study was carried out at the University College Hospital (UCH) between March 2006 and December 2006. Ninety two (92) sickle cell disease (SCD) patients who consented were consecutively recruited into the study. The age, sex, haemoglobin electrophoresis pattern and total number of blood transfusion requirement for each SCD patient recorded since diagnosis were recorded. Three (3mls) of blood was collected in universal bottle. The blood was allowed to clot and the serum separated from the clot. Anti HCV antibody was tested for immediately in the laboratory using anti HCV detection test in serum using rapid kit by Clinotech diagnostics which has a sensitivity of 99.4% (Clinotech Diagnostics and Pharmaceuticals). Samples that were not screened immediately were kept in -80°C freezer until analysed usually within 24 hours.

Storage information, precautions, limitations and use of test device that accompanied the test kit were strictly followed. Strip positive for anti HCV had colour band appearing in both test and control bands whereas colour band occurred only in control region of the strip in the case of negative strip. When no colour band was visible, the test is invalid and the procedure was repeated with new test device.

## RESULTS

The ages of the 92 SCD patients studied ranged from 15 to 60 years with a mean of  $25.4 \pm 7.5$  years; 44 were males and 48 were females, 87(94.6%) were HbS while 5 were HbSC.

**Table 1**

Showing the Proportion of SCD patients transfused with varying number of blood units over the study period.

No of Blood units Transfused	No of SCD patients	Percentage (of total SCD patients)
00	27	29.3
1	12	13.0
2	23	25.0
3	12	13.0
4	8	8.7
5	2	2.2
6	1	1.1
7	4	4.3
8	2	2.2
10	1	1.1
<b>Total</b>	<b>92</b>	<b>100</b>

00 = No record of blood transfusion

Transfusion requirement in this group of SCD patients ranged from zero to 10 units (Table 1) over the period of their registration in the hospital with a mean transfusion requirement of  $2.1 \pm 2.2$  units. Out of the total number of 92 SCD patients, 65 (70.7%) had blood transfusion of various units of which 60% of those transfused had up to 4 units of blood; while 27 (29.3%) were never transfused (Table 2). Out of the total number of 87 HbS, 63 (72.4%) had received variable units of blood transfusion.

Out of the 92 SCD patients; 13 (14.1%), [8 males and 5 females] (Table 3), were positive by anti HCV screening. All the 13 were HbSS patients and 12(92.3%) had record of blood transfusion while 1 patient did not have any demonstrable evidence of previous blood transfusion.

**Table 2:-**

Frequency of anti-HCV positivity according to Sex in SCD patients

Sex	Negative	Positive	Total
Male	36	8	44
Female	43	5	48
<b>Total</b>	<b>79(85.9%)</b>	<b>13(14.1%)</b>	<b>92(100%)</b>

Asy. Sig. (2 sided) 0.285 (NS)

**Table 3:-**

Blood transfusion requirements in the two categories of SCD patients studied.

Transfusion	HbSS	HbSC	Total
Not Transfused	24(27.6%)	3	27(29.3%)
Transfused	63 (72.4%)	2	65(70.7%)
<b>Total</b>	<b>87 (94.6%)</b>	<b>5</b>	<b>92 (100%)</b>

## DISCUSSION

Transfusion-transmitted infections (TTI) continue to be a problem in many parts of the world; especially in multiply transfused patients, in a setting where routine screening of blood or blood products is inadequately and unacceptably carried out, and where non-medical injecting medications and or drug use are prevalent (de Paula *et al* 2005 and Laguna-Torres *et al* 2005)

Sickle cell disease patients form substantial part of transfusion dependent patients that are more prone to acquiring various transfusion-transmissible infections such as hepatitis B (HBV), hepatitis C (HCV) and Human Immunodeficiency virus (HIV) (Ocak *et al* 2005). This study was carried out mainly to estimate the prevalence of anti-HCV amongst SCD patients in

this tertiary Teaching hospital that commenced screening for anti- HCV in 2000

In our study, 13(14.1%) out of 92 SCD patients were anti- HCV positive and all were Sick cell anaemia (HbSS) patients. This brings to light again that HbSS patients often require blood transfusion because they have more clinically severe disease than HbSC patients and hence at a higher risk of HCV infection.

Blood transfusion requirements range from zero to 10 units per patient. Out of the total number of 92 SCD patients, 65(71%) required blood of varying number of units at one point or the other and 13(20% of those actually transfused) turned out to be anti HCV positive. This positive rate is very high amongst transfused SCD patients. This could have happened before the onset of anti- HCV screening in the hospital. Out of 27 [29% of total number of SCD patients] that did not have any evidence of blood transfusion, one (4%) turned out to be anti- HCV positive. It is possible that this patient could have previously received blood transfusion from an outside facility or from unsafe injecting practices for administration of parenteral analgesics.

Safe blood transfusion appears to be the major answer to curtailing HCV infection amongst SCD patients since it has been established that all HCV positive SCD patients had history of blood transfusion (Ocak *et al* 2005). Blood management must be proper, efficient and effective. Therefore, the on-going National blood transfusion Service (NBTS) in Nigeria must be well funded, properly equipped with up-to-

date equipment and consumables for safe donor recruitment, screening of blood units for TTI, proper separation of products and storage of blood products and distribution must be smooth, even and effective. This will go a long way in eradicating unsafe blood being collected from paid donors and dangerous commercial blood banks that characterize our system. In addition, apart from ensuring a good care of SCD patients to minimize transfusion requirements, unnecessary blood transfusion must be avoided.

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