Prevalence of Hepatitis C virus infection among haemodialysis patients in North-Eastern Nigeria

Ibrahim Ummate*, Ibrahim Musa Kida*, Bukar Bakki*, Baba Waru Goni*, Mohammed Abdullah Talle*

*Department of Medicine, University of Maiduguri Teaching Hospital, P.M.B 1414, Maiduguri, Borno State, Nigeria.

Correspondence to: Dr Ibrahim Musa Kida, Department of Medicine University of Maiduguri Teaching Hospital, P.M.B 1414, Maiduguri, Borno State, Nigeria. Email: imkidah@yahoo.com

Abstract

There is paucity of information on the prevalence of HCV infection among patients with chronic kidney disease in Nigeria in general and North East Nigeria in particular, it is therefore necessary that the extent of the problem be ascertained in our centre.

We studied 100 patients with stage 5 chronic kidney disease requiring haemodialysis and attending the nephrology clinic or admitted into the medical wards of the University of Maiduguri Teaching Hospital. Patient's demographic data including age and sex, were recorded. Anti HCV testing was made by the 2nd generation ELISA.

Out of the 100 patients, 68 were males and 32 were females. Their ages ranged between 15 and 74 years with a mean (± SD) of 39.9 ± 13.58 years. The mean (± SD) age of the male patients was 41.71 ± 13.27 years and that of female patients was 36.06 ± 13.64 years.

Fifteen (15%) patients and eight (4%) of the controls were positive for HCV antibody, (p value = 0.001). We did not find age or sex predilection of HCV infection.

Conclusions

Hepatitis C virus infection is highly prevalent in haemodialysis patients with chronic kidney disease.

Introduction

Hepatitis C virus (HCV), a member of the family *Flaviviridae,* is an RNA virus which was first identified in 1989 and recognized as the primary cause of non-A/non-B hepatitis[1]. There are about 170 million chronic HCV carriers throughout the world with an estimated global prevalence of 3%[2,3]. In Africa epidemiological data are deficient but a prevalence of 6% has been documented[4,5].

The development of haemodialysis, peritoneal dialysis and renal transplantation has considerably improved the life expectancy of patients with chronic kidney failure, a situation that has however, led to the emergence of various concurrent diseases, including viral hepatitis B and C. HCV infection can detrimentally affect patients throughout the spectrum of chronic kidney disease (CKD): it can lead to cryoglobulinemic glomerulonephritis and have a negative effect on the survival of chronic dialysis patients[6,7]. This seems to be a consequence of blood transfusion and, in the case of patient undergoing haemodialysis, there is an additional risk due to blood handling in the haemodialysis unit.

The prevalence of hepatitis C viral infection in haemodialysis units varies from 8-51%[8-10]. Agbaji in Jos Nigeria found a prevalence of 22% among their haemodialysis patients[11]. This variation results from the region in which the haemodialysis unit is located, the amount of transfusion and the duration of haemodialysis. A higher prevalence of HCV infection has been reported in patients on both haemodialysis and peritoneal dialysis than in the general population[12].

Following exposure to hepatitis C virus, approximately 85% of individuals develop chronic infection[13]. Transmission of HCV takes place most readily through serum[14]. Sexual transmission is rare because of the usually low level of viraemia. Vertical transmission is possible with marked viraemia. The spread of HCV in renal patients on haemodialysis has been reported not to occur via the haemodialysis machine but is presumably carried over by medical personnel in spite of preventive measures.[14,15] It has also been reported that the rate of anti HCV positivity is related to the length of time on dialysis treatment and number of transfusions.[16]

Factors associated with poor prognosis for chronic HCV infection include male sex, age at HCV acquisition of more than 40 years, alcohol consumption, iron overload, high titres of viral ribonucleic acid (RNA), immuno-suppression and high gamma glutamyl transferase and bilirubin levels[17,18]. Hepatitis C viral infection is a significant cause of membranoproliferative glomerulonephritis (MPGN), especially in countries where HCV is highly prevalent. The virus is present in about 60% of patients with MPGN in Japan and in 10 - 20% of patients with MPGN in the United States[19]. The greater prevalence of MPGN in some developing countries may be due to greater prevalence of chronic HCV infection[19]. Also, HCV infection has been reported to be present in about 7 - 9% of patients with kidney failure who have not undergone dialysis and who have no history of blood transfusions[20]. Nosocomial transmission of HCV during dialysis may occur, independent of blood transfusions[20].

The number of chronic kidney failure patients sustained by haemodialysis has been on the increase in Maiduguri perhaps due to the availability and increased awareness of renal replacement therapy by the people.

Our dialysis unit, which was established 14years ago (2000), only commenced HCV screening 10 years ago (2004). The implication of this is that there might have been cross infection and HCV infected blood might have been transfused to our patients, hence our decision to embark on the study.

Justification for the study

There is paucity of information on the prevalence of HCV infection among patients with chronic kidney disease in Nigeria in general and North East in particular, it is therefore necessary that the extent of the problem be ascertained in our centre.

Hitherto, screening for antibodies (abs) to HCV was not a routine practice in our centre and so we may have dialyzed many patients with this infection with any of our machines. Now that it is mandatory to screen for Abs to HCV before dialysis in our centre, it is justifiable to screen all our patients and see how many patients are actually hepatitis C viral Abs positive.

Materials and Methods

This was a cross-sectional study involving 100 consecutive patients with stage 5 chronic kidney disease requiring haemodialysis and attending the nephrology clinic or admitted into the medical wards of the University of Maiduguri Teaching Hospital. Patient's demographic data including age and sex, were recorded. Blood samples were drawn at entry for creatinine clearance, serum electrolytes, urea, and creatinine, including serum calcium and phosphate, liver function tests, HIV screening, HCV abs, HBsAg and full blood count (FBC). Estimated glomerular filtration rate (eGFR) was calculated using the Cockroft-Gault equation[63]. Abdominal ultrasound scan was also done on all the patients. The controls were 198 patients attending medical outpatient clinics or admitted to medical wards that do not have CKD. Patients were matched for age, sex and GFR and their clinical characteristics and laboratory findings were compared. The aim of

this study was to evaluate the prevalence of hepatitis C virus infection among haemodialysis-requiring CKD patients in Maiduguri. Ethical approval for the study was obtained from the Research and Ethics Committee of the University of Maiduguri Teaching Hospital.

Results

One hundred consecutive kidney failure patients made up of 68 males (68%) and 32 females (32%) were enrolled into the study. Table 1 shows the age and sex distribution of the patients. Most of the patients (53%) were in the 3rd and 4th decades of life. Their ages ranged between 15 and 74 years with a mean (± SD) of 39.9 ± 13.58 years. The mean (± SD) age of the male patients was 41.7 ± 13.3 years and that of female patients was 36.1 ± 13.6 years. Seventy nine (79%) patients comprising of 52 males and 27 females were married while 21 (21%) of the patients comprising of 16 males and 5 females were single.

Table 1 also shows most of the patients (32%) had secondary education followed by tertiary education in (31%). Thirty patients (30%) had non-formal education whereas 7 (7%) had primary education.

Table 1: socio-demographic characteristics and Anti-HCV Status

Parameters	Frequency n (%)		Total
Age groups (years)	**male n(%)**	**females n(%)**	
=19	3(3)	3(3)	6(6)
20-29	9(9)	8(8)	17(17)
30-39	17(17)	7(7)	24(24)
40-49	20(20)	9(9)	29(29)
50-59	11(11)	3(3)	14(14)
60-69	6(6)	2(2)	8(8)
=70	2(2)	0(0)	2(2)
Total	68(68)	32(32)	100(100)

	Anti-HCV status		
Age groups (years)	**negative n (%)**	**positive n (%)**	
=19	5(1)	1(1)	6(6)
20-29	14(14)	3(3)	17(17)
30-39	22(22)	2(2)	24(24)
40-49	23(23)	6(6)	29(29)
50-59	12(12)	2(2)	14(14)
60-69	7(6)	1(1)	8(8)
=70	2(2)	0(0)	2(20
Total	85(85)	15(15)	100(100)

Gender	**anti-HCV negative (%)**	**anti-HCV negative n(%)**
Male	59 (59%)	9 (9)
Female	26 (26)	6(6)
Total	85(85)	15(15)

Occupation	**frequency n (%)**
Professionals	23 (23)
Semi-skilled	27 (27)

Artisans	14 (14)
Unemployed	36 (36)
Total	100(100)
Educational status	**frequency n (%)**
Primary	7(7)
Secondary	32(32)
Tertiary	31(31)
Non-formal	30(30)
Total	100(100)

Majority of the study subjects (36%) were unemployed. Semiskilled workers followed with 27%. Twenty-three percent of the study patients were professionals while 14% were artisans.

Table 2 shows that 15 (15%) of the study patients were positive for HCV antibody, while the remaining 85 (85%) were negative. This number reflects the prevalence among patients with stage 5 chronic kidney disease. Eight (4%) patients among them were positive for HCV antibody while the remaining 190 (96%) were negative. There is statistically significant difference in the prevalence of infection with HCV among cases and controls (χ^2 value = 11.205, p = 0.001).

Tables 1 also show the age and sex distributions of HCV antibody among the study patients. The age group that has the highest prevalence of HCV infection is 40 – 49 years. This age group equally has the highest number of patients recruited into the study. When subjected to statistical analysis, we found no statistically significant difference in the age distribution of infection with HCV (χ^2 value = 2.077, p = 0.91).

Nine (14%) out of the 68 male patients in this study were HCV positive, while 6 (18%) out of 32 female patients were HCV positive (χ^2 value = 0.519, p = 0.47).

Table 2: Comparison of anti-HCV status between cases and controls

Anti-HCV status	Case n(%)	Controls n(%)
Positive	15 (15)	8(4)
Negative	85 (85)	190(96)
Total	100(100)	100(100)

Discussion

This study revealed that the prevalence of HCV infection in haemodialysis requiring CKD patients was 15%. This was far higher than the prevalence of HCV infection in the control group (4%), the general population worldwide (which was 3%), and African epidemiological data, which was reported as 6%[2-5]. The prevalence of HCV infection in haemodialysis units worldwide varies from 8-51%[8-10]. Agbaji in Jos Nigeria found a prevalence of 22% among their haemodialysis patients[11]. This wide range is influenced by factors such as location of haemodialysis unit, blood transfusion and the duration of haemodialysis[21]. Our dialysis unit, which was established 7years ago (2000), only commenced HCV screening 3 years ago (2004). The implication of this is that there might have

been cross infection and HCV infected blood might have been transfused to our patients, hence our relatively high HCV positive prevalence rate. As a way of stemming the trend, we now screen our patients routinely for HCV abs and HBsAg before haemodialysis. In addition we have dedicated separate dialysis machines for HCV and HBV positive patients, and we now screen all blood donors routinely before bleeding them. Dialyser reuse, which could favour transmission of infection, could not have been contributory because since inception in our centre we discard all dialysers, femoral catheters, bloodlines, and syringes and needles after single use. A major contributory factor to the high prevalence may be transfusion of blood to the patients in many peripheral hospitals around Maiduguri prior to presentation in our haemodialysis unit. This is particularly common among patients that have been on haemodialysis for long and those coming from far places for haemodialysis. The fact that most centres in north eastern Nigeria have no facilities to screen for HCV abs may also confound the picture.

From our study we did not find any age or sex predilection of HCV infection. It is clear that the age group that has the highest number of patients who are positive for HCV abs also has the highest number of cases recruited into the study ($p = 0.91$). This agrees with the study by Sahin *et al* who found no significant difference in the mean ages of HCV positive cases and that of HCV negative controls[22].

Even though we found that males have the highest number of patients with HCV abs, it is just a reflection of the population of patients recruited into the study. We did not find any statistical difference between gender and HCV seropositivity. This is similar to the findings of Sahin *et al* who also established that there was no sex predilection for HCV infection[22].

Conclusions

Hepatitis C virus infection is prevalent in haemodialysis patients with chronic kidney disease. Routine screening for HCV should be done before blood transfusion. All safety measures should be taken in our haemodialysis units to prevent cross infection among patients and staffs. These safety measures include; discarding syringes, needles, gloves, bloodlines and dialysers after single use, and the use of sterile dressings on each patient visit

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