

How to Decrease the Prevalence of Hepatitis C in Iraqi Hemodialysis Patients

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ABSTRACT:

BACKGROUND :

Hepatitis C virus infection has been recognized as an emerging problem in dialysis patients, its prevalence varies considerably among different areas of the world. The prevalence of HCV infection in hemodialysis patients and its associated risk factors is not well documented in our country. We performed this study aiming to discuss prevention of further transmission of HCV infection among our patients.

OBJECTIVE:

We performed this study aiming to discuss prevention of further transmission of HCV infection among our patients.

PATIENTS AND METHODS:

A cross sectional study done between September 2003 – December 2008 in the Renal Transplant Center, Medical City Teaching Hospital, Baghdad. Including 244 patients with end stage renal failure and had been on hemodialysis for more than 3 months. focusing on the prevalence of anti-HCV positive patients, and the associated risk factors.

RESULTS:

153(62.7%) were males, and 91(37.3%) were females, with age range 14-67 years. The prevalence of anti-HCV positive patients was 12(4.9%), dialysis in different centers, female sex, ≥ 60 years age, ≤ 6 months on dialysis, blood transfusion, and < 9 hours per week haemodialysis were significant predictors of anti-HCV positivity.

CONCLUSION:

We conclude that adherence to universal infection precautions; HCV screening of transfusions and of patients on hemodialysis; and the use of separate machines in separate rooms for those who are anti-HCV positive, was important factors, To further reduce the prevalence in our patients, erythropoietin should replace blood transfusions, also to test for HCV RNA using polymerase chain reaction before starting hemodialysis.

KEY WORDS: hepatitis c, hemodialysis, infection control, Iraq.

INTRODUCTION:

Hepatitis C virus (HCV) infection is a major health problem among hemodialysis (HD) patients in developing countries^(1,2,3). This could be due to the non adherence to the strict universal infection control measures and the unavailability of vaccines to prevent hepatitis C infection. Viral hepatitis remains a major hazard not only for patients but also for dialysis staff^(2,3,4). Infection with HCV is associated with a poor prognosis for survival among dialysis patients⁽⁵⁾.

We aim in this study to evaluate the strict adherence to universal infection control measures and the prevalence of HCV and its associated risk factors among hemodialysis patients at the Renal Transplant Center, Medical City Teaching Hospital, Baghdad, Iraq. And to discuss prevention of further transmission of HCV infection among our patients.

PATIENTS AND METHODS:

A cross sectional study done between September 2003–December 2008 in the Renal Transplant Center–Medical City Teaching Hospital, Baghdad. Including 244 patients with end stage renal failure and had been on hemodialysis for more than 3 months. 153(62.7%) were males, and 91(37.3%) were females, with age range 14-67 years, the mean age was 36.6 ± 13.33 (Table 1), 92(37.7%) of them had undergone renal transplantation.

None of the patients was known to be an intravenous drug abuser. Routine haemodialysis techniques were used, with 3-4 hours dialysis performed 1-3 times weekly. Using polysulfone dialysers with acetate solution of standard composition.

Patients with hepatitis B surface antigen (HbsAg)-positive, and those with anti-HCV antibody-positive were isolated in separate rooms, and used separate machines. Disposable kits and needles

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were used, and universal precautions such as use of gloves, disinfection of surfaces were considered.

Disinfection of the dialysis machines included hot water rinsing in between patients and chemical disinfection at the end of the day or at the end of the week. Each patient was cared with a separate nurse. All patients and medical staff were vaccinated for hepatitis B. The patients were tested monthly for HbsAg, anti-HCV antibody by the third generation enzyme immunoassay (ELISA) (bioelisa HCV: Core, NS3, NS4, and NS5. Spain), and measuring serum alanine aminotransferase (ALT) which were considered abnormal if they were at least 1.5 times the normal level (0-56 IU). While the medical staff were tested annually for HbsAg, and anti-HCV antibody.

The chi-square test was applied for statistical analysis, and the results were considered significant if P value < 0.05

RESULTS:

The prevalence of anti-HCV positive patients was 12(4.9%), 5(3.3%) were males, and 7(7.7%) were females, The prevalence was statistically significant in females (P<0.05) (Table 1). 153(62.7%) of the patients were ≤ 39 years age, 81(33.2%) were 40-59 years age, and 10(4.1%) were ≥ 60 years age, and their prevalence of anti-HCV positive was 5(3.3%), 5(6.2%), and 2(20%) respectively. There was significantly statistical difference in the development of anti-HCV positive in those who were ≥ 60 years age (P<0.05). The mean duration of hemodialysis was 10.91±5.95 months, 90(36.9%) were ≤ 6 months on dialysis, 7(7.8%) became anti-HCV positive, 89 (36.5%) were 7-12 months on dialysis, 4(4.5%) became anti-HCV positive, and 65(26.6%) were 13-24 months on dialysis, 1(1.5%) of them became anti-HCV positive, with statistical significant difference in those who were ≤ 6 months duration on haemodialysis (P<0.05), and there was significant reduction in anti-HCV positive after 12 months on dialysis (P<0.05). 155(63.5%) didn't receive blood transfusion, 7(4.5%) of them became anti-HCV positive, while 90(36.9%) received blood transfusion, 5(5.6%) of them became anti-HCV positive, so blood transfusion played a significant role in the development of anti-HCV positive antibodies(P<0.05). 70(28.7) of patients received haemodialysis for ≤ 4 hours per week, 5(7.1%) of them became anti-HCV positive, 108(44.3%) received haemodialysis for 5-8 hours per week, 6(5.6%) of them became anti-HCV positive, while 66(27%) of patients received haemodialysis for 9-12 hours per week, 1(1.5%) of them became anti-HCV positive, there was significant difference in

those who received haemodialysis for ≤ 4 hours per week (P<0.05). 2(16.6%) of those with anti-HCV positive, their ALT was > 80 IU, while in 10 (83.3%) of anti-HCV positive patients the ALT was < 80 IU, all of them were asymptomatic, and there was no correlation between positive anti-HCV and abnormal ALT levels, also no correlation between HBs Ag and positive anti-HCV (Table 1). 44(18%) patients had history of hemodialysis in different centers; this was significantly associated with HCV seropositivity (22.7%) (P<0.05). Other risk factors, Namely previous transplantation (N=2), previous jaundice (N=0), Shared needles (N=0), and tattooing (N=30), were not significantly associated with HCV seropositivity.

So dialysis in multiple centers, female sex, ≥ 60 years age, ≤ 6 months on dialysis, blood transfusion, and < 9 hours per week haemodialysis were significant predictors of anti-HCV positivity.

DISCUSSION:

The prevalence and incidence of HCV infection among patients on dialysis is higher than in the general population⁽⁶⁾, with the prevalence in dialysis patients ranging from 5.5 to 10% in the United States⁽⁷⁾ to 94% in some countries in the Middle East⁽⁸⁾. In this study we observed a prevalence of HCV seropositivity of 4.9% in our hemodialysis patients; which is less than our previous report in a study of two years started in 2003 including 169 patients with a prevalence of 7.1%⁽⁹⁾. The prevalence of HCV seropositivity in this study was also less than that reported from a new century data (table 2)^(1,2,7,10).

Many factors could be contributing towards the prevalence of positive anti-HCV patients. Some of these have been confirmed, and others are still awaiting further studies. In our study, HCV seropositivity was significantly associated with dialysis in multiple centers, female sex, ≥ 60 years age, ≤ 6 months on dialysis, blood transfusion, and < 9 hours per week hemodialysis. This concurs with many regional and international reports, Dialysis in multiple centers was found to be significantly associated with higher HCV seropositivity in Saudi Arabia⁽¹¹⁾, in our study all the reported cases of HCV seropositivity was before the year 2005, afterward we didn't admit any patient with history of multiple center dialysis and we didn't report any new case of HCV seropositivity, which indicates a nosocomial transmission of HCV within the hemodialysis units, although the exact modes of transmission are not fully clarified, such nosocomial transmission of HCV infection has recently been documented using molecular techniques⁽¹²⁾.

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Longer duration on HD was shown to be a significant risk factor for HCV seropositivity among hemodialysis patients^(11,13,14,15).

Interestingly we found an increased risk in those who were ≤ 6 months duration on hemodialysis, which may reflect the failure of screening when depending on anti HCV antibody testing only. Because patients on hemodialysis may not be able to mount detectable antibody titers⁽¹⁶⁾. And these patients can be identified by HCV RNA testing using polymerase chain reaction. And we found a decreased risk to a significant level after 12 months on dialysis, this reduction could be due to reduction of titer of anti HCV with time, as was noted by others⁽¹⁷⁾.

Blood transfusion is an important factor in the transmission of HCV infection, We found a positive correlation between blood transfusion and the risk of HCV infection, this risk increased with the increase in the number of units which were transfused. Similar results were reported by others⁽¹⁸⁾. Nevertheless 7(4.5%) of the 155(63.5%) patients how didn't receive blood transfusion developed anti-HCV antibodies. Which indicates that other factors were contributing to this infection in our patients. Some investigators found no correlation between blood transfusion and positive anti-HCV^(1,19,20).

Anti HCV appeared to be more prevalent in females than males, Which could be due to females are more exposed because of labor. The higher prevalence among females was also reported by others⁽²¹⁾, while in other studies the prevalence was more in males⁽¹⁸⁾.

We observed that the prevalence was decreased to a significant level after three sessions of

haemodialysis per week, which may be due to the use of polysulfone membrane which has relatively larger pore size in comparison with other dialysis membranes, this may create a greater opportunity for escape of HCV to spent dialysate⁽³⁾. Hayashi et al suggested that viral particles are adsorbed onto the inner surface of the filter membrane during haemodialysis⁽²²⁾.

No correlation was found between ALT and anti-HCV positivity, which was also found by other investigators⁽¹⁸⁾. This could be because of non virulent HCV strain, tolerance to HCV, immunosuppression. It is reported that patients can have positive anti-HCV and circulating HCV RNA with normal liver enzymes and liver biopsy⁽²³⁾. Evaluation of HCV is further complicated by the observation that aminotransferase values are lower in dialysis patients than the non-uremic population⁽²⁴⁾. The presence of HBs Ag was not a risk factor for the development of HCV antibodies, while some said it plays a role⁽²¹⁾.

HCV seropositivity was noted to be significantly higher among HD patients older than 30 years; this agrees with reports from USA⁽²⁵⁾, and Saudi Arabia⁽²⁶⁾.

With regards to previous renal transplantation, There was small number of patients in our study who underwent previous transplantation 2(0.8%), and so it was difficult to derive conclusions from the results. Previous renal transplantation was shown to be a risk factor for HCV seropositivity in reports from the USA⁽¹⁵⁾. Other risk factors for HCV infection were not found to be associated with HCV seropositivity in our study, namely previous surgery, previous jaundice, shared needles and tattooing.

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Table1: Comparison of haemodialysis patients regarding their anti- HCV status

Variables		Total no. of patients (%)	No.of anti-HCV positive patients (%)	P value
Gender	Male	153 (62.7)	5 (3.3)	< 0.05
	Female	91 (37.3)	7 (7.7)	
Age	≤ 39 years	153 (62.7)	5 (3.3)	< 0.05
	40-59 years	81 (33.2)	5 (6.2)	
	≥ 60 years	10 (4.1)	2 (20)	
No. of months on dialysis	≤ 6 m	90 (36.9)	7 (7.8)	< 0.05
	7-12 m	89 (36.5)	4 (4.5)	
	13-24 m	65 (26.6)	1 (1.5)	
No. of transfusions	0	155 (63.5)	7 (4.5)	< 0.05
	1-2	49 (20.1)	1 (2)	
	3-5	24 (9.8)	2 (8.3)	
	6-10	13 (5.3)	2 (15.4)	
	> 10	4 (1.6)	0 (0)	
Haemodialysis time (h/week)	≤ 4	70 (28.7)	5 (7.1)	< 0.05
	5-8	108 (44.3)	6 (5.6)	
	9-12	66 (27)	1 (1.5)	
ALT (IU)	< 80		10 (83.3)	NS
	> 80		2 (16.6)	
HBs Ag No Yes				NS
		243 (99.6)	12 (4.9)	
		1 (0.4)	0 (0)	
Multi center dialysis No Yes				< 0.05
		200 (82)	2 (1)	
		44 (18)	10 (22.7)	
Previous transplant	2 (0.8)		0 (0)	NS

Table 2: Prevalence of HCV infection among dialysis patients: new century data

Country	Prevalence of HCV infection	
Middle/Far East	Iran	19.6 %
	Syria	49 %
	Saudi Arabia	68 %
	India	4-36 %
	China	30 %
	Taiwan	34 %
	Japan	27 %
Africa	Tunisia	42 %
	Sudan	23 %
Europe	Netherlands	2.9-3.4 %
	Switzerland	5 %
	Germany	7 %
	France	42 %
	Spain	19-30 %
	Italy	31 %
	New Zealand	10 %
America	USA	5.5-10 %
	Brazil	11-26 %
Australia	10 %	

CONCLUSION:

In this study, it appeared that the prevalence of anti-HCV was low in comparison with the prevalence in other developing countries. This was due to strict adherence to universal infection precautions; HCV screening of transfusions and of patients on haemodialysis; use of separate

machines in separate rooms for those who are anti-HCV positive. To further reduce the prevalence of dialysis associated HCV in our patients, erythropoietin should replace blood transfusions, also to test for HCV RNA using polymerase chain reaction before starting haemodialysis, especially

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in patients with history of multiple center dialysis.

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