

Hepatitis C virus infections and risk factors among Haemodialysis patients at Tertiary care hospital of India

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Abstracts

Background & objectives: Chronic renal failure (CRF) patients on haemodialysis (HD) have a high risk of acquiring Hepatitis C virus (HCV) infection. The HCV infection in HD patients is highly variable between different countries. The association between hepatitis C virus infection and clinical and laboratory measures in maintenance haemodialysis patients are poorly understood. This study was under taken to find out HCV infections and multifactor association of HCV infection in patients on HD in our region.

Methods: This prospective study was conducted at haemodialysis unit of tertiary care hospital over a period of 6 months. A total of 100 chronic renal failure patients on haemodialysis at common unit were studied. The blood samples were collected before initiation of haemodialysis. Then all the samples were subjected to 3rd generation HCV Elisa for HCV antibody detection. All clinical and laboratory data were collected and analyzed. **Results:** Four percentage patients were turn out to be HCV reactive after haemodialysis. Among HCV reactive 4.5% patients were more than 50 years age, 12.5% were unmarried, 7.9% belong to lower & middle socio-economical class, 7.8% having history of haemodialysis more than 1year, & 5% were on haemodialysis every 7th day. Almost 20% HCV reactive patients had history of blood transfusion more than 10 times. 7.6% HCV reactive cases had history of major invasive procedure. The normal AST, ALT, and bilirubin level in all HCV reactive patients. **Interpretation & Conclusion:** We conclude that predictor of HCV infection in haemodialysis patients included older age, male gender, unmarried status, lower and middle socio-economical class, more number of blood transfusions, increased frequency and duration of dialysis, and any invasive procedure irrespective of aetiology of CRF and units of dialysis. The ALT and AST level cannot predict the extent of liver damage in haemodialysis patients with HCV infection.

Key Words: Chronic renal failure (CRF), Hepatitis C Virus (HCV), Haemodialysis (HD),

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Introduction: Chronic renal failure patients on haemodialysis are at high risk for blood borne infection because of prolonged vascular access and the potential for exposure to infected patients and contaminated equipments. Infection due to hepatitis viruses is one such infection that continues to be a major concern in dialysis setting. Patients on HD have a high risk of acquiring HCV infection. Transfusion of unscreened blood, duration of dialysis and nosocomial transmission within HD unit is implicated as the main transmission routes of HCV infection in HD patients. The Prevalence of antibodies to HCV (anti HCV) in HD patients ranges worldwide from 1% in UK to 62% in Portugal and is highly variable between different countries in the same locality⁴. The prevalence of anti HCV in patients on HD from India is reported to be in the range of 3-45%¹. The virological diagnosis and monitoring of HCV infection are based on two categories of laboratory tests. Namely serological assays detecting specific antibody to HCV (indirect test) and assay that can detect viral particles (direct test)¹⁻⁷.

The association between hepatitis C virus infection and clinical and laboratory measures in maintenance haemodialysis patients are poorly understood. This study was under taken to find out HCV infection and

multifactor association of HCV infection in patients on HD.

Material and Methods: This prospective study was conducted at haemodialysis unit of tertiary care hospital over a period of 6 months. In the haemodialysis department an isolated unit was there for HIV, HBsAg and HCV positive patients. All patients on haemodialysis at isolated unit were excluded. A total of 100 chronic renal failure patients on haemodialysis at common unit were studied after obtaining an informed consent. The following patients were included in study those who have undergone haemodialysis for chronic renal failure & at the time of sample collection they were non reactive for HCV, HBsAg & HIV. The post renal transplant patient were also included who receives haemodialysis intermittently. The details of patient history were recorded. The blood samples were collected from ante cubital fossa from the arterio-venous fistula before initiation of haemodialysis with aseptic precaution. Then all the samples are run by HCV Elisa. HCV antibody was detected with the help of 3rd generation HCV Elisa (Advance). Samples which were positive by one Elisa were confirmed by repeating with second Elisa. The sensitivity of the HCV Elisa was 70 to 91 % and specificity estimated to be 99.49 to 99.73%. The all samples were also tested for Liver function tests like SGPT

(ALT), SGOT (AST) and serum Bilirubin. All data were collected and statistical analysis was performed using Epi Info 2002. Chi-square test & Fisher's exact test were used for comparing categorical variables. A probability of less than 0.05 was considered statistically significant.

Results: In case series of 100 patients's pre-dialysis HCV, HIV, and HbsAg status were negative. We found (4/100) 4% patients were turn out to be HCV reactive after haemodialysis. Among HCV reactive 4.5% (2/44) having age more than 50 years and 3.7% (2/54) patient having age between 20 to 50 years. The HCV infection was not detected in below 20 year age group. In this study 3.7% (1/27) female & 4.1% (3/73) male were HCV reactive. The male/female ratio for HCV infection is 1:1. Among HCV reactive 3.2% (3/92) were married, 12.5% (1/8) unmarried, 2.7% (1/37) belong to low socio-economical class, and 5.2% (3/57) belong to middle class. The HCV infection was not found in higher socio-economical class. We noticed hypertensive nephropathy was most common etiology of CRF. In our series 7.8% (3/38) patient were HCV reactive, having history of haemodialysis more than 1year. Among HCV reactive patient 5% (2/40) were on haemodialysis every 7th day and 4.4% (2/45) HCV reactive patients on haemodialysis every 3rd day. We did not detected HCV infection in

patient who were on haemodialysis every 15th day. In our series 20% (1/5) HCV reactive patients have history of blood transfusion more than 10 times and 3.3% (2/60) HCV reactive patients having history of blood transfusion more than 5 times. Only 1/26 HCV reactive patient had no history of blood transfusion. We found that 7.6% (2/26) patients were HCV reactive; having history of major invasive procedure and 2.7% (2/74) patients had history of minor invasive procedure. In our series unprotected sexual relation was not present among HCV reactive patient. We noticed 7.4% (2/23) tobacco addicted patients were HCV reactive and 2.4% (2/73) teetotalers were HCV reactive. In this study we noticed normal SGPT, SGOT, and bilirubin level in all HCV reactive patients. In our series 4.5% (2/44) HCV reactive patients were on regular haemodialysis in our unit as well as in other health institution and 3.5% (2/56) HCV reactive patient were on regular haemodialysis only at our unit.

Discussion: CRF patients on haemodialysis have a high risk of acquiring HCV infection. There were very few studies from developing countries regarding association between hepatitis C virus infections in haemodialysis patients. The prevalence of anti HCV in patients on haemodialysis from India is reported to be in the range of 3-45 %². In our

series of 100 patients predialysis HCV, HIV, and HbsAg status were negative and we found (4/100) 4% patients were turn out to be HCV reactive after haemodialysis. A dilemma exists on the value of serology since some investigators reported a high rate of false negative serologic testing⁵. However, the current literature reflects conflicting results in the topic since the frequency of HCV-RNA positive, anti-HCV negative haemodialysis patients ranged from 0-12% of all studied haemodialysis subjects from several recent reports^{5,6}. A study in India presented a high proportion of HCV-RNA positive and anti-HCV negative subjects among the studied CRF population treated with HD or renal transplantation⁷. According to Kalantar-Zadeh K et al predictors of HCV included younger age, male gender, unmarried status, HIV positivity and smoking history. However, in our series HCV reactive patients belongs to older age group. The probably they were in high risk because they are undergone haemodialysis due to disease affecting older age group like hypertensive and diabetic nephropathy. In this study HCV infection was not detected in below 20 year age group. Like various investigators we also found slight high association of HCV infection in male gender and unmarried status of patients^{8, 10, &11}. In contrast to Kalantar-Zadeh K et al none of our

HCV reactive patients were HIV positive & high risk sexual behaviour. However few case series also observed high prevalence of HCV infection in intravenous drug abuser, high risk sexual behavior, and homeless persons^{8,9}. In this study HCV reactive patients were belong to low & middle socio economical class. The HCV infection was not found in high socio economical class. This is probably due to education, awareness, and information about HCV infection in higher class. In our series there were no significant differences in HCV infection among patients on regular haemodialysis in our unit as well as in other health institution. It suggests that standard practice of haemodialysis at different institution was not risk factor for HCV infection. Since the risk of HCV infection increases with the duration of dialysis treatment, there is an indication that the environment itself functions as a vehicle in the dissemination of the virus among the patients in dialysis centers¹²⁻¹⁷. The importance of duration on haemodialysis as an independent risk factor for hepatitis C has been shown by many investigators¹⁸⁻²⁰. The present study also showed long duration and more frequent haemodialysis had been associated with HCV infection. The number of blood transfusion was major risk factor for HCV infection in haemodialysis patients as noticed by us & various investigators^{11,21}. In addition

introduction of screening of blood for Anti-HCV has led to a decline the incidence of post-transfusion hepatitis. Never the less, our study showed that 1 of the 26 patients on haemodialysis who had not received previous blood transfusions had positive anti-HCV, a finding which indicates that factors other than blood transfusion contributing to the transmission of HCV infection. Few other investigators also found no correlation between blood transfusion and positive anti-HCV^{22,23}. There were no significant differences in HCV infection among patients under gone for major or minor invasive procedure. So irrespective of type of invasive procedure breach in body tissues will increase the risk of HCV infection. In this series we noticed normal alanine aminotransferase (ALT), aspartate aminotransferase (AST), and bilirubin level in all HCV reactive patients. The various studies were also showed similar association of serum transferase and HCV infection among haemodialysis patients. Various investigators confirm the lack of sensitivity or specificity of ALT and AST as a surrogate marker for chronic liver disease, particularly in haemodialysis patients²⁴⁻²⁶. There is no clear explanation for this phenomenon; however, it is thought that uremia suppresses serum transferases. Therefore, HCV RNA and liver histology rather than serum transferases should

probably be the means to determine the presence or absence of liver disease in haemodialysis patients, since these two parameters correlate relatively well in the vast majority of patients²⁴. HCV-infected haemodialysis patients may develop liver damage despite normal ALT levels^{27,28}.

Conclusion: We conclude that predictor of HCV infection in haemodialysis patients included older age, male gender, unmarried status, lower and middle socio-economical class, more number of blood transfusions, increased frequency and duration of dialysis, and any invasive procedure irrespective of etiology of CRF and units of dialysis. The ALT and AST level cannot predict the extent of liver damage in haemodialysis patients with HCV infection.

Limitation of study:

We used 3rd generation test for anti HCV. Even with the use of 3rd generation tests, false negative and false positive results are still observed. The immunoenzymatic tests may fail to detect individuals with active HCV infection³⁸.

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