

Prevalence, Seroconversion And Risk Factors Of Hepatitis B And C Infection In Haemodialysis Patients At District Hospital Of Mehsana

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Abstracts: Background & Objective: Hepatitis B and Hepatitis C are significant problems in the management of haemodialysis patients. We aimed to investigate the incidence and prevalence of HBV and HCV infection in the hemodialysis patients as well as risk factors for infection. **Methodology:** All adult patients receiving maintenance hemodialysis (n=150) in District hospital, Mehsana were studied between June 2014 to October 2015. Testing for Hepatitis B surface antigen (HBsAg) and anti-HCV antibodies was performed at initiation of dialysis and every 3 months thereafter. Patients who were sero-negative for HBV and HCV were followed up for 1 year to detect sero-conversions. **Results:** The prevalence and seroconversion rates were 11.33% and 4.66% in HBV patients and 14% and 6% in HCV patients respectively. There was a significant correlation of the prevalence and seroconversion of HCV and HBV with number of blood transfusion and duration of haemodialysis. **Conclusion:** Patients on maintenance hemodialysis have a high incidence and prevalence of HCV infection and lower rates of HBV infection in this study. The factors associated with HBV and HCV infection are highly suggestive of nosocomial transmission within hemodialysis units. Strict infection control measures are required. [Patel K NJIRM 2015; 6(6):19-23]

Key Words: Haemodialysis, Hepatitis B, Hepatitis C, Incidence, Nosocomial infection

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Introduction: Infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) are well-known and important causes of liver disease in end-stage renal failure patients on hemodialysis^{1,2,3,4}. Patients receiving maintenance haemodialysis (HD) therapy are at increased risk for acquiring these infections and have a higher prevalence of HBV and HCV than the general population^{5,6}. The introduction of blood donor screening and a reduction in blood transfusions due to the availability of recombinant erythropoietin has significantly reduced the incidence of new HCV infections among HD patients in many countries^{7,8,9}. HBV infection is usually due to patient to patient transmission within HD units¹⁰. Prior to effective screening of blood donations, HCV infection was associated with blood transfusions needed to correct the anaemia associated with kidney disease^{11,12} but patient to patient transmission in HD units is also reported^{13,14}. Recognition of the risk of nosocomial infection has resulted in recommendations that strict infection control procedures should be followed on HD units; patients with blood-borne virus infections should be isolated from sero-negative patients during dialysis and patients as well as staff should be vaccinated against hepatitis B. This study aimed to investigate for the first time the incidence and prevalence of HBV and HCV infection in the entire HD population at district hospital of Mehsana.

Material and Methods: The study was performed in haemodialysis unit of general hospital, Mehsana after

permission of respective authorities. A total 170 patients were enrolled in this study from June 2014 to October 2015. 150 patients gave informed consent and thus 92.5% of the whole patient population were investigated. The patients who were on hemodialysis for a minimum period of 1 month and were likely to be available for follow-up for at least 6 months were included in the study. The patients who had acute renal failure were not included in the study. The patients were monitored for seroconversion every 3 months during their follow-up visit using HbsAg ELISA and Anti-HCV ELISA tests.

All tests were carried out and interpreted strictly in accordance with the manufacturer's instructions. All sero-conversions were recorded and included even if patients were transplanted or died afterwards. All patients were frequently monitored during the study period to assure the inclusion of every new sero-conversion. All new sero-conversions were retested to confirm positive result. All samples were also tested for SGPT and SGOT.

Results: Total 150 patients were observed at least for a period of 6 months for seroconversion. Among them 85 were males (56.66%) and 65 were females (43.33%). Out of total 150 patients, 17 (11.33%) were reactive to HbsAg ELISA test and 24 (14%) were reactive to anti-HCV ELISA test.

Patient Status	Prevalence	Seroconversion
HbsAg reactive	17(11.33%)	7(4.66%)
HbsAg non-reactive	133(88.6%)	-
HCV reactive	24(14%)	9(6%)
HCV NON-reactive	126(84%)	-

Maximum number of patients underwent seroconversion between 6 month to 1 year after the start of haemodialysis. 7 patients (4.66%) who were initially non-reactive became HbsAg reactive during follow-up. Of these one had previously been vaccinated against hepatitis B, four had not been vaccinated and in two vaccination status was not documented. 9 patients (6.00%) who were initially non-reactive became HCV reactive during follow-up.

Out of 17 HbsAg reactive 11(64.70%) received blood transfusion and out of 133 HbsAg nonreactive 34(25.56%) received blood transfusion. Out of 24 HCV reactive 17(70.83%) received blood transfusion and out of 126 HCV nonreactive 35(27.77%) received blood transfusion. In our study 20 (60.60%) HCV reactive patients had history of blood transfusion more than 10 times and 12 (36.36%) HCV reactive patients had history of blood transfusion more than 5 times. only 1 (3.03%) HCV reactive patient had no history of blood transfusion. In our study 10(41.66) HbsAg reactive patients had history of blood transfusion more than 10 times and 8 (33.33%) HbsAg reactive patients had history of blood transfusion more than 5 times. 6 (25%) HbsAg reactive patient had no history of blood transfusion.

In our study 25 patients were Hcv reactive having history of haemodialysis more than 6 months. Among HCV reactive patients 8 were on haemodialysis every 7th day and 12 HCV reactive patients on haemodialysis every 3rd day. We did not detect HCV infection in patients who were on haemodialysis every 20th day.

Most common cause for end stage renal disease was diabetes mellitus (45%). 2nd most common cause was hypertension (22%). We found that 7% patients were HCV reactive, having history of major invasive procedure and 3% had history of minor invasive procedure.

2(8.33%) HbsAg reactive patients, had history of i.v. drug abuse while 8 (6.01%) HbsAg non-reactive patients, had history of i.v. drug abuse. Similarly 4(12.12%) anti-HCV reactive patients, had history of i.v. drug abuse while 5 (3.96%) anti-HCV non-reactive patients, had history of i.v. drug abuse. Hepatitis B vaccine had been administered in 133 of 150 patients but antibody levels were not checked post vaccination. Vaccination status was not documented in remaining 17(11.33%) patients.

Mean values for Alanine Aminotransferase and Aspartate Aminotransferase were higher in seropositive patients despite being within the normal range.

Discussion: Hepatitis B and C infections are serious problem in chronic haemodialysis patients. This study was conducted to determine the prevalence and seroconversion characteristics of HbsAg and anti-HCV in patients with CRF, with the tests done at baseline and repeated after every 3 months. The prevalence and seroconversion rates were 16% and 6% respectively for HCV. The prevalence of anti-HCV in patients on haemodialysis from India is reported to be in the range of 3% to 45%¹⁵. The prevalence of HCV infection is known to vary widely in different regions of the world. The reason for variation in prevalence of HCV in haemodialysis patients is largely unknown¹⁶. Implementation of universal precaution in HD unit, method of HCV testing, blood transfusion and variable policy of isolation could be the potential reason. Prevalence of HCV in our study is relatively higher than other study from India. Possible reason for that are lack of knowledge of nursing staff and high prevalence of hepatitis C in general population.

The prevalence and seroconversion rates were 11.33% and 4.66% respectively for HBV. In India, prevalence in HD patients ranged from 3.4% to 45% which is clearly in excess to the prevalence of 4.7% in the general population¹⁷. The study conducted by Bhowmik et al in HD patients, shows 5.5% seroconversion for hepatitis B infection¹⁸. Our study shows relatively higher prevalence of hepatitis B than other study. Possible reason is we receive patients at a relatively later stage of CKD and effectiveness of hepatitis B vaccination decreases as renal function declines, making patients prone to hepatitis B infection in spite of vaccination. Use of HBV vaccine, use of dedicated dialysis machines and regular surveillance are the

possible reason for less prevalence of HBV than HCV in HD unit¹⁹.

As per our study seroconversion rate for hepatitis B and hepatitis C were 4.66% and 6% respectively. In study conducted by VikasMakkar et al seroconversion rate for hepatitis B and Hepatitis C were 4.8% and 6.8% respectively²⁰. In study conducted by Kumar et al seroconversion rate for hepatitis C was 7.44%¹⁶.

A positive history of blood transfusions as well as the number of blood transfusions was strongly associated with HBV or HCV infection in our study. Several study have shown that the risk of acquiring the HCV infection increase with an increase in the number of units of blood which were transfused^{21,22,23}.

On the other hand, the prevalence and incidence of HBV or HCV sero-positivity was significantly related to the length of time on HD. This is consistent with nosocomial transmission related to dialysis since longer duration of dialysis represents a longer period at risk of acquiring an infection. Similar observations have been reported by other authors^{24,25,26}. Prevention of nosocomial transmission is of vital importance as HCV antiviral treatment is expensive and its availability is limited to only a few centres.

There was no significant differences in HCV infection among patients undergone for major and minor invasive procedure. So irrespective of type of invasive procedure breach in body tissue will increase the risk of HCV infection. Few case series also observed high prevalence of HCV infection in IV drug abuse^{27,28}.

Mean values for Alanine Aminotransferase and Aspartate Aminotransferase were higher in seropositive patients despite being within the normal range in this study. Various investigators confirm the lack of sensitivity or specificity of ALT and AST as a surrogate marker for chronic liver disease, mainly in haemodialysis patients^{29,30,31}. There is no clear explanation for this. But possible reason 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 hemodialysis patients, since these two parameters correlate relatively well in the majority of patients. HCV infected haemodialysis patients may develop liver damage despite normal ALT levels.

Our study had several limitations. First, we did not use HCV RNA due to financial limitation which is recommended test for HCV in haemodialysis patients in areas of higher prevalence. Secondly, we did not evaluate efficacy of HBV vaccine in our patients and whether a relatively higher rate of seroconversion was due to inadequate antibody titre. Thirdly, we did not analyse data regarding patients receiving dialysis at other centres and its contribution to seroconversion.

Conclusion: In conclusion, patients on maintenance HD in District hospital Mehsana have a higher incidence and prevalence of HCV infection than HBV infection. The factors associated with HBV and HCV infection are highly suggestive of nosocomial transmission. Urgent action is required to improve infection control measures in HD centre and to reduce dependence on blood transfusions for the treatment of anaemia.

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