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Risk Factors And Prevalence of Hepatitis B And Hepatitis C Viral Infection in Patients on Hemodialysis in A Tertiary Care Hospital

KEYWORDS: Chronic renal failure ,haemodialysis ,hepatitis B and hepatitis C

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ABSTRACT *Background and Aims –Chronic renal failure patients on haemodialysis are more susceptible to viral infections (HBV and HCV) .Infection by these viruses is promoted by immune dysfunction .Prevalence of these viruses among haemodialysis patients in SMS Hospital was not studied until now , so we aimed to determine risk factors and prevalence of HBV and HCV infection in patients on haemodialysis in SMS Hospital ,Jaipur .*
Material and Method –ELISA for HBsAg and anti HCV antibody was performed on blood samples of 140 patients on haemodialysis and PCR was performed on blood samples of 37 cases (34 patients with increased SGOT /SGPT and 3 positive for HBV and / or HCV infection by ELISA)
Results –Prevalence of HBV ,HCV and co-infection in SMS hospital ,Jaipur is 7.85% , 5.0 % and 2.85 % respectively . Increased duration of haemodialysis , increased number of haemodialysis , increased number of blood transfusion ,increased levels of SGOT /SGPT and serum alkaline phosphatase were significant risk factors of acquiring HBV and HCV infection in patients on haemodialysis .
Conclusion –There is low prevalence of HBV and HCV infection in haemodialysis patients in SMS Hospital Jaipur .

INTRODUCTION

Viral hepatitis remains a major hazard for both patients and medical staff of haemodialysis units. [1-3]. Haemodialysis patients are at an increased risk of hepatitis B and C viral infections due to prolonged vascular exposure, multiple blood transfusions, contaminated devices, equipments, supplies, environmental surfaces and attending personal may also play a crucial role in the nosocomial transmission of these infections. . [4, 5, 6]

Practices to minimize virus transmission have been used in haemodialysis units for many years. Even so many studies have shown that incidences of viral transmission continue to occur in haemodialysis centres and the prevalence and seroconversion greatly vary among haemodialysis facilities depending upon centre to centre, region to region and country to country.

Comparative analysis from Indian studies showed prevalence of HBV infection as low as 0.90% [7] and as high as 25.0% [8] and HCV infection ranging from 1.02 % to 46.0% [9].

Hence the present study aimed at studying prevalence and risk factors affecting occurrence of HBV, HCV and their co -infection in haemodialysis patients.

MATERIAL AND METHODS

The present observational discreptive study was conducted in the Department of Microbiology, SMS Medical College, Jaipur. 140 haemodialysis patients admitted at Nephrology Deptt during May 2014 to April 2015 were included in the study . Patient with history of haemodialysis ≥ 10 times were included in the study whereas patients with history of haemodialysis <10 times and patients already positive for HBsAg and/or anti- HCV antibody were excluded .

A structured proforma was used to collect data on age, gender, number of haemodialysis , duration of haemodialysis, number of blood transfusions, hepatitis B vaccination, previous status of HBsAg ,previous status of anti- HCV antibody, h/o tattooing, h/o body piercing, h/o i/v drug abuse after written informed consent from the patient.

3 ml of blood in plain vial and 4 ml of blood in EDTA vial was collected by venepuncture aseptically from 140 patients.Serum samples were processed for HBsAg ELISA by ELISA kit procured from J. Mitra & Co. Pvt. Ltd .Serum samples were also tested for anti HCV antibody by HCV ELISA kit procured from J. Mitra & Co. Pvt. Ltd . Due to high cost of PCR we did the PCR of blood samples with elevated liver function test and which were positive for HBsAg and or anti HCVantibody . 24IU/L for AST (SGOT) and 17 IU/L ALT (SGPT) were considered as the upper limits of normal. Plasma samples stored at -80°C (34 samples with increased SGOT/SGPT and 3 samples positive for HBsAg and anti-HCV antibodies by ELISA method, total 37 samples) were brought at room temperature, gently vortexed and then centrifused for few seconds and were tested for HBV and HCV by Qualitative multiplex Real Time PCR on ABI 7500 Fast (Life Technologies, USA) using AgPath-IDTM One-Step RT-PCR kit (Ambion) .

Statistical analysis:

The categorical data were presented as proportions and were compared among groups using Chi square test. Continous data were presented as mean and standard deviation and were compared using by students t-test. P value <0.05 was considered statistically significant.

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Results: Table No 1
Magnitude of hepatitis infection in haemodialysis patients

N=140	Positive	Percentage (%)
Hepatitis B	11	7.85
Hepatitis C	7	5.00
Co-infection	4	2.86
Both Negative(HBV –HCV)	122	87.14

Positive samples by RT-PCR are considered positive and samples positive for HBsAg and or anti HCV antibody by ELISA but negative by RT-PCR are considered negative .

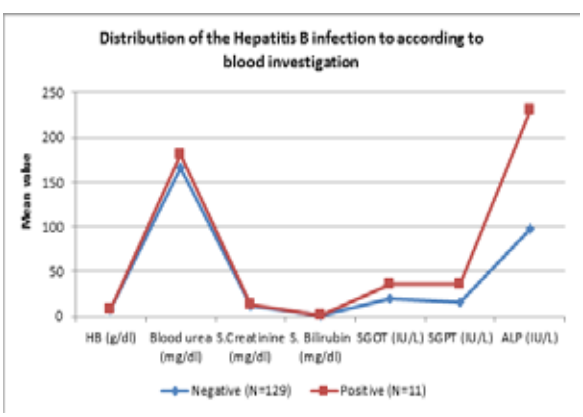
Table No. 2
Difference in haemodialysis pattern of HBV positive and HBV negative cases

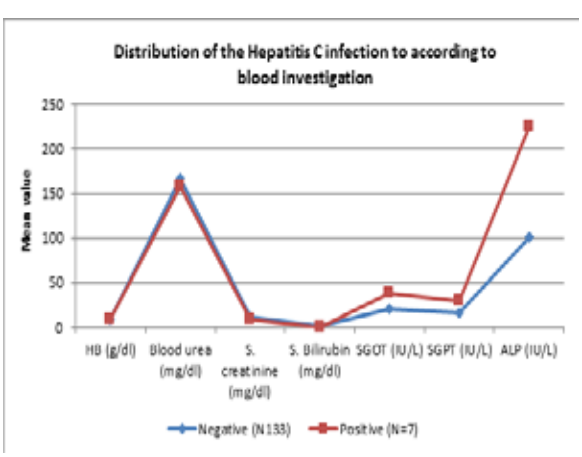
HBV		Duration of haemodialysis (month)	No. of haemodialysis	No. of Blood Transfusion
Negative (N=129)	Mean±SD	6.82±6.267	37.08±20.180	4.40±4.205
Positive (N=11)	Mean±SD	15.73±18.805	91.45±86.08	7.27±4.58
P value LS		0.026	<0.001	0.03

Table No. 3
Difference in haemodialysis pattern of HCV positive and HCV negative cases

HCV		Duration of haemodialysis (in month)	No. of haemodialysis	No. of Blood Transfusion
Negative (N=133)	Mean±SD	7.05±6.57	37.51±20.99	4.34±3.89
Positive (N=7)	Mean±SD	16.57±22.59	114.29±101.79	9.29±7.99
P Value LS		0.002	<0.001	0.003

Proportion of the HBV positive cases were significantly less with vaccinated individuals as compared to unvaccinated ones. (Chi-square = 8.232 with 1 degree of freedom; P = 0.004).





Discussion:
Haemodialysis patients are at high risk for hepatitis viral infections due to the high number of blood transfusions, prolonged vascular access and the potential for exposure to infected patients and contaminated equipment. [10]

The prevalence of HBV infection reported from various parts of world ranges from as low as 0.9% to as high as 29.8 %. In our study 7.85% of patients undergoing haemodialysis were found to be positive for HBV infection. The prevalence of HCV infection reported from various parts of world ranges from as low as 3.8% to as high as 71.0 %. In our study 5.0% of patients undergoing haemodialysis were found to be positive for HCV infection.

In our study PCR detected 29.73% of HBV infected cases as compared to ELISA which detected only 2.14% of HBV infected cases.PCR detected 18.91% of HCV infected cases as compared to ELISA which detected only 2.14% of HCV cases.

Since PCR is more sensitive technique , we recommend use of PCR for the diagnosis of HBV and HCV infections in haemodialysis patients .

Variation in prevalence of HBV and HCV infections among various studies could be due to various reasons one of which is the differences in sensitivity of the methods used for detecting antibodies and the virus genome. The prevalence in our setting is lower as compared to other parts of India probably because 91.42% (128/140) of patients were vaccinated.

Studies on prevalence of HCV and HBV co- infection in

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haemodialysis are rare. Kara et al reported dual infection in three patients (4.47%) out of 67 haemodialysis patients. [11] Kuan et al reported dual infection of 30.4% and it was higher than non hemodialysis patients which were only 3.8% in their studies.[12] In our study, we found 4 cases (2.86%) of dual infection in haemodialysis patients .

When we compared no of blood transfusions in HBV positive(7.27±4.58) and HBV negative (4.40±4.20) patients we found that they were significantly higher in HBV positive ones($p<0.03$) . Similarly number of blood transfusion in HCV positive (9.29±7.99) and HCV negative (4.34±3.89) patients ,we found that they were significantly higher in HCV positive ones (p=<0.001S) .Although the blood for transfusion is screened for HBV and HCV, absence of HBsAg or anti -HCV antibody does not exclude the presence of HBV and HCV in blood donors always. [13]

A similar correlation of hepatitis B and C positivity with number of blood transfusion has been reported by Oguchi et al [14] and Pijesa et al [15]. A statistically significant difference was observed in the mean duration of dialysis15.73 ±18.80 months among HBV infected patients in comparison to 6.82±6.26 months in HBV uninfected patients (p=0.026). Similarly statistically significant difference was observed in the mean duration of dialysis16.57±22.59 months among HCV infected patients in comparison 7.05±6.57 months in HCV uninfected patients(p=.002) . This was consistent with the observations made by almost all the authors in different studies worldwide. [16-19] Our study highlights the duration of dialysis as an important risk factor for infection of HBV and HCV among haemodialysis patients. This observation was in agreement with previous reports in Palestine, Moldavia and other studies from different regions of the world i.e M J Zaheji et al [20] from Iran, A Covic [21] from Moldavia and D N Irish [22] . Duration of dialysis is an important risk factor for acquiring infections as it is related to nosocomial transmission and dissemination of the infections in the dialysis units. [4]

We have found that in hepatitis B infected patients mean number of haemodialysis is 91.45 ±86.08 and in HBV uninfected patients is 37.08±20.18. In HCV positive patients mean number of haemodialysis is 114±101.79 and 37.51± 20.99 in HCV uninfected patients. Number of haemodialysis is a significant risk factor for acquiring infection as it is also related to nosocomial transmission and dissemination of the infections in the dialysis units. Similar correlation has been reported by Hardy N M et al [23].

Vaccination for HBV has been included in the national schedule of immunization.As also demonstrated by our study that in of 128 vaccinated patients, only seven patients (5.46%) acquired hepatitis B infection as against 4 out of 12 (33.33%) in non-vaccinated patients.

In present study the mean SGOT, SGPT and ALP values observed were higher in HBV positive patients as compared to HBV negative patients. Whereas no such significant differences were found in according to Hb , blood urea , serum creatinine , serum bilirubin ,h/o i/v drug abuse ,h/o haemodialysis from other hospital and h/o tattooing .

Similarly, In HCV infected patients SGOT ,SGPT and ALP values were statistically significant higher in infected patients as compared to uninfected ones .

Conclusion:

This study shows that increased duration of haemodialysis , increased number of haemodialysis , increased number of blood transfusion , increased levels of SGOT/SGPT and serum alkaline phosphatise were found to be significant risk factors for acquiring HBVand HCV infections in haemodialysis patients . So dialysis units must have strict policy of segregating HBV and HCV infected patients from uninfected patients. Universial precaution should be followed strictly and nursing staff dealing with infected patient should not be allowed to come in contact with uninfected patients or other staff members. It is highly recommended to vaccinate both patients and staff at the haemodialysis centre for preventing transmission of infection.

It is also advisable to diagnose HBV and HCV infections in these patients by PCR at the earliest so as to minimize the risk of transmission of virus.

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