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Prevalence of Hepatitis B and Hepatitis C Virus Infection in Patients with Advanced Renal Failure: A Tertiary Care Centre Study from North Indian Population

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ABSTRACT

Background: *Viral hepatitis (Hepatitis B Virus (HBV) & Hepatitis C Virus (HCV)) related liver disease is a leading cause of morbidity and mortality especially in the patients with advanced renal failure who are treated with dialysis, and this is due to high number of blood transfusion sessions and/or cross contamination from the dialysis circuits.*

Aims & Objectives*: This study aimed to determine the prevalence of HB and HCV infections in patients with advanced renal failure (ARF).*

Materials & Methods: A cross-sectional study was done in collaboration with the department of Nephrology and department of Gastro-enterology, KGMU, Lucknow, from June 2018 to June 2020 among, CRF patients. Clinical data such as age, gender, duration of dialysis; number of transfusions, Serum sample was collected from each patient. Serological markers for HBV and HCV were determined with ELISA by using commercial diagnostic kits. HCV-RNA and HBV-DNA were determined quantitatively by polymerase chain reaction (PCR) assay.

Results*: A total 934 patients with advanced renal failure attended the nephrology OPD. Out of 934 patients, 65 (6.96%) patients screened positive for HBV/HCV infection. The results of this study also showed that the prevalence of viral hepatitis infection in the haemodialysis (HD) and without HD patients is 8.25% and 6.3% respectively.*

Conclusion: *It has been found that viral infections, particularly HBV and HCV infections are common in advanced renal failure patients who are on HD.*

Keywords: *Hepatitis B, Hepatitis C, Non-Fatty liver disease*

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INTRODUCTION

Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) are transmitted primarily through the parenteral route and in adults, which occurs later in life, includes parenteral and sexual modes and the most typical chronic blood borne infection within the world. Haemodialysis (HD) patients are at high risk for hepatitis like HBV and HCV infection because of the high number of blood transfusion sessions. These patients are often anaemic, require prolonged vascular access, have a high possibility of exposure to infected patients and contaminated equipment, and cross contamination from the dialysis circuits.[1-3]

HBV and HCV infections are the most common causes of liver disease in HD patients[4,5] and hinder the management of the patients in the renal dialysis units. Chronic renal failure (CRF) patients do not clear these viral infections expeditiously, and several other outbreaks of hepatitis have occurred in these settings. CRF is defined as a persistent impairment of kidney function, in other words, abnormally elevated serum creatinine for more than 3 months or calculated glomerular filtration rate (GFR) less than 60 ml per minute/1.73m^2. CRF is characterized by a slow, progressive, and irreversible decrease of renal function, resulting in the kidney's inability to perform their basic duties. From the earliest stages of the disease, the condition is linked to a high rate of morbidity and mortality. Not only does it cause major morbidity, but it also has high mortality and the prevention of CRF is becoming an important concern worldwide, establishing the prevalence of CRF, in any area, is vital for planning the management of individuals afflicted

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by it.[6] A glomerular filtration rate of less than 15ml/min/1.73m^2 indicates kidney failure,[7] which can be treated with RRT (dialysis or transplantation) or supportive treatment.

Viral hepatitis (HBV/HCV) infection itself is linked with different kidney lesions such as mixed cryoglobulinaemia (cryoglobulinaemic nephropathy), membranoproliferative glomerulonephritis and membranous nephropathy.[9,10] In some dialysis centres, HBV and HCV seroprevalence is high, which can have severe repercussions. Varying prevalence and incidence have been observed in Indian studies. Anti-HCV positivity rates in HD patients were shown to be quite high in early studies, accounting for roughly 24% to 28% positivity.[11,12] The frequency of HBV and HCV in HD units from different parts of India varies greatly, ranging from 1.4% to 46%.[13,14] In developed countries, the prevalence of anti-HCV seropositivity among patients on maintenance HD ranges between 5% and 60%.[15] The present study was conducted on 212 CRF patients to determine the prevalence of HBV and HCV infections as the primary objective.

Aims & Objectives.

1. To evaluate the prevalence of hepatitis B (HBV) and hepatitis C (HCV) infection in patients with advanced renal failure.
2. To study the stage of Chronic HBV & HCV infection.
3. To study the clinical profile of the patient with chronic HBV and HCV infection in advanced renal failure patients.

METHODS

Study Type: The study is a cross-sectional study done in collaboration with Department of Nephrology and Department of Gastroenterology, King George's Medical University, Lucknow, from June 2018 to June 2020.

Study Population: Patients with advanced renal failure (ARF) (stage 3 or more according to KDIGO classification) having age more than 18 years were enrolled in this study. Inclusion Criteria: Patients with HCV and HBV diagnoses who had CKD with or without dialysis for at least one month were included. Exclusion Criteria: Patients with multi-organ failure, HBV/HCV, HBV/HIV, HCV/HIV, co-infected patients, having disorders other than kidney disease, and those who refused to give informed consent were excluded from the study. Ethical Approval: Ethical clearance was obtained from the institutional ethics committee, and the Ethical approval ref. no. is 95th ECM II A/P27. Sample Size: The study included all outdoor patients as well as those admitted during the study period who met the eligibility criteria. Strategy for collection: Clinical & biochemical data such as age, gender, duration of dialysis, number of transfusions, CBC, LFT, KFT, PT/INR, and serum protein/albumin were recorded, using a preformed questionnaire at the time of enrolment. Approximately 3 ml of blood was collected from each subject and sera were tested for anti-HCV anti-bodies (ErbaTransasia 3rd generation) and Hepatitis B sur-face antigen (HBsAg) (ErbaTransasia) by an enzyme-linked immunosorbent assay (ELISA). Patients who tested positive for antibodies against HCV and/or HBsAg were examined with a real-time polymerase chain reaction for identifying HCV and HBV nucleic acid as per the protocol described by Prakash et al.[16] All the study subjects were examined for the status of liver cirrhosis by FIBROSCAN (FIBROSCAN 630) and the patient's liver stiffness with >12.5 kPa was considered as cirrhotic.[17]

Statistical Analysis:

SPSS version 22 was used for statistical analysis. Continuous variable such as age and liver stiff-ness measurement were expressed as Mean and standard deviation whereas categorical variables were summarized as frequency and proportions. The study participants will be divided into two subgroups i.e., patients with hemodialysis (HD) and patients without HD for sub-group analysis.

RESULTS

A total of 934 patients with advanced renal failure attended the nephrology OPD during the study period. Out of 934 patients, 65 (6.96%) patients were screened positive for HBV/HCV infection. Of 65 patients, 37 were males and 28 were females. The age group varied from 18 to 78 years with mean age for HBV infected patients was 46.13 ± 12.21 years and for HCV infected patients was 47.18 ±11.79 years. In the present study, total patients screened with advanced renal failure was 934 and the HBV/HCV+ve patients were 65 i.e. 6.96%. Further, the study population was divided into two groups i.e. patients with haemodialysis (HD) 315(33.73%) and patients without HD 619(66.27%). 26(8.25%) patients with a mean age of 46.5±12.36 years were found to be infected with HBV/HCV out of 315 HD patients and 39(6.3%) patients with a mean age of 46.76± 11.77 years were found to be infected with HBV/HCV out of 619 without HD patients. The demographic profile of the HBV/HCV positive with HD and without HD is given. Out of 26 HD patients, 9(2.86%) patients were found to be infected with HBV, 17(5.4%) patients were found to be infected with HCV. 4(1.27%) patients were found to be cirrhotic and 22(6.98%) patients found to be non-cirrhotic. Out of 39 without HD patients, 23(3.72%) patients were found to be infected with HBV, 16(2.58%) patients were found to be infected with HCV. 8(1.29%) patients were found to be cirrhotic, and 31(5.01%) patients were found to be non-cirrhotic. A Pie Chart of Cir-rhotic and non-cirrhotic patients of the study population is given.

DISCUSSION

Chronic renal failure is linked with kidney damage and de-crease for almost three months. Chronic renal failure critically affects the quality of life; enhance the health care expenditures, rate of morbidity and mortality, which leads to premature death. In2017, the number of persons with all stages of CKD exceeded 700 million, outnumbering those with diabetes, osteoarthritis, chronic obstructive pulmonary disease (COPD), asthma, or depressive disorders.[18] Out of 133 conditions, CKD is the 12th greatest cause of death according to GBD.[19] The most common types of viral hepatitis, hepatitis B & C related glomerulonephritis include membranous nephropathy, membranoproliferative glomerulonephritis, mesangial proliferative glomerulonephritis, Polyarteritis nodosa (PAN), IgA nephropathy.[9,10,20] In patients on long-term dialysis, HBV/HCV-related liver damage is typically asymptomatic. Some symptoms that are frequent in non-dialysis HBV/HCV patients (e.g., asthenia, cognitive impairment) are also common in dialysis patients, regardless of their HCV

serologic status. Because blood aminotransferase concentrations are often lower in dialysis patients than in nonuremic individuals, biochemical evaluation of HCV infection in people on long-term dialysis is erroneous. HCV viraemic dialysis patients have higher aminotransferase levels than non-viraemic dialysis patients, though the levels are still within the "normal" range. According to Wright TL, et al. the prevalence of HCV antibodies in patients admitted to nephrology units is significant, ranging from 5 to 54% and the HBV infection is less prevalent than HCV in HD units.[21] The present study shows that the prevalence of viral hepatitis infection in patients with advanced renal failure is 6.96% and the results of this study also showed that the prevalence of viral hepatitis infection in the HD and with-out HD patients is 8.25% and 6.3% respectively. Present study also showed that, the prevalence of HBV infection in the patents with HD is 2.86% and without HD is 3.72%; on the other hand, the prevalence of HCV infection in the patents with HD is 5.4% and without HD is 2.58%. According to Chandra M, et al. & Prakash, et al.,[13,16] the prevalence of HBV and HCV in HD units from various parts of India varies substantially, ranging from 1.4 to 46 %. Anti-HCV seropositivity is common among patients on maintenance HD in developed nations, with rates ranging from 5% to 60%.[15, 22-24] In India, there hasn't been a community-based epidemiological investigation to evaluate the prevalence of CRF. There are a few Indian studies[25-28] that remark on various elements of the CRF problem, however they are all hospital-based. HCV prevalence among HD patients varies widely in different parts of the world. Studies have shown a prevalence in HCV of 8-36% in North America, 25-39% in South America, 1-36% in Eu-rope, 17-51% in Asia, 1.2-10% in New Zealand and Australia and 7-85% in South Africa.[29-33] Because viral hepatitis infections are the greatest cause of health loss and death in advanced renal failure due to HBV & HCV related membranous nephropathy and membranoproliferative glomerulonephritis, and this risk may more increased in patients receiving HD therapy. This is the serious public health concerns in both developed and devel-oping countries. After viral hepatitis, HD patients are at a very high risk of developing cirrhosis or hepatocellular carcinoma. This is high time for healthcare professionals and policymakers to take urgent actions against this endemic condition. HD centers must acquire internationally accepted immunization criteria and infection control policies, in order to reduce the burden of HBV and HCV in patients already burdened by their advanced kidney disease.

CONCLUSION

It has been found that viral infections, particularly HBV & HCV infections are common in advanced renal failure patients who are on HD. Hepatitis C is the most common cause of liver disease. in the dialysis patient, in comparison to HBV infection. Prevention of HBV infection in non-infected advanced renal failure patients by vaccination is important. Dialysis patients are less able to mount an immune response than are other individuals. Its prevalence differs from country to country and between HD centres. Because of the frequent exposure to blood from transfusions and extracorporeal circulation during HD, the risk is higher in advanced renal failure patients. These patients should be recognized early and treated effectively to lessen the risk of long-term consequences like cirrhosis. In this study, the high prevalence of HBV and HCV is observed among ARF patients.

Recommendation

Implementation of this program in hemodialysis centers will reduce opportunities for patient-to-patient transmission of HBV and HCV, directly or indirectly via contaminated devices, equipment and supplies, environmental surfaces, or hands of personnel.

Limitation of the study

We view our research as having some limitations viz. lack of information on HBsAg status and history of vaccination before the diagnosis of chronic hepatitis B lack of follow-up of seropositive treated individuals for additional monitoring.

Relevance of the study

Analysis of the baseline characters of patients having viral infection who are either on dialysis or not and their treat-ment efficacy during the period of study is recorded.

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