Original Article

Hepatitis B virus and hepatitis C virus co-infection in hemodialysis patients: A retrospective study from a tertiary care hospital of North India

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections represent significant public health issues globally. They are important causes of morbidity and mortality in hemodialysis patients. Patients with HBV/HCV co-infection have a higher risk of progression to cirrhosis and decompensated liver disease and have an increased risk of hepatocellular cancer (HCC). Because the two hepatotropic viruses share same modes of transmission, co-infection with the two viruses is not uncommon, especially in areas with a high prevalence of HCV infection and among people at high-risk for parenteral infection. **Aims:** To estimate the prevalence of HBV and HCV co-infection among hemodialysis patients. **Materials and Methods:** This retrospective, single centered hospital record-based study was carried out in a tertiary care hospital in Faridkot (Punjab), India. All the patients who underwent hemodialysis from January 2013 to December 2014 were included in the study. Patients of all age groups were tested for anti-HCV antibodies by fourth Generation HCV Tridot ELISA (J. Mitra & Co. Pvt. Ltd., New Delhi, India) and for hepatitis B surface antigen (HBsAg) by Hepalisa (J. Mitra & Co. Pvt. Ltd). **Results:** Of the total 262 patients on hemodialysis, 88 (33.5%) were found to be having HCV infection, 4 (1.5%) were found to be positive for HBsAg. Co-infection with HBV/HCV was observed in 2 (0.8%) patients. Out of the total 92 patients having HBV and HCV infection, 62 (67.4%) were males and 30 (32.6%) were females. The majority of the patients were found to be of 41-60 years of age (41.3%) followed by 21-40 years (31.5%) and thereafter in 61-80 years (23.9%) and lowest prevalence was observed in the age group of <20 years (2.2%) and >80 years (1.1%). **Conclusion:** The risk of co-infection is greater among the chronic renal failure (CRF) patients due to the high frequency of transfusions of blood/blood products and extracorporeal circulation during hemodialysis. Patients with HBV/HCV co-infection have a higher risk of progression to cirrhosis and decompensated liver disease and further have an increased risk of HCC. In our study, out of the total 262 patients, 88 (33.5%) were found to be having HCV infection, 4 (1.5%) were found to be positive for HBsAg and dual infection was observed in 2 (0.8%) patients which is higher than the rates reported from different studies all over the world and India.

Key words: Dialysis, hepatitis B virus, hepatitis C virus

INTRODUCTION

Hepatitis B (HBV) and hepatitis C (HCV) viral infections are important causes of morbidity and mortality in hemodialysis patients and pose problems in the management of these patients in the renal dialysis units.[1] An estimated 400 million persons are carriers of HBV

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worldwide; 75% of whom reside in Asia and the Western Pacific, and HCV infection is estimated at approximately 170 million people globally.[2] The reported prevalence and incidence of HCV infection in hemodialysis patients varies from country to country and ranges between 1 and 84.6%.[3]

Because of the shared modes of transmission, HBV/HCV co-infection is not uncommon in highly endemic areas and among subjects with a high-risk of parenteral transmission. Patients with dual HBV/HCV infection have a higher risk of progression to cirrhosis and decompensated liver disease[4] and further have an increased risk of hepatocellular cancer (HCC).[5] Prolonged vascular exposure and multiple blood transfusions increase the risk of acquiring these blood-borne infections in hemodialysis patients. Contaminated devices, equipment and supplies, environmental surfaces, and attending personnel may also play a crucial role in the nosocomial transmission of these infections. Infections with hepatitis viruses in hemodialysis patients are further promoted by the significant immune status dysfunction developing due to irreversible renal compromise.[6]

HBV infection is less prevalent than HCV in hemodialysis units. The introduction of HBV vaccination, isolation of HBV positive patients, use of dedicated dialysis machines and regular surveillance for HBV infection has dramatically reduced the spread of HBV in this setting.[7] There are very few studies on the prevalence of such dual infections in hemodialysis patients from this region. Therefore, the present study was undertaken to estimate the prevalence of HBV and HCV co-infection among hemodialysis patients.

MATERIALS AND METHODS

This retrospective hospital record-based study was carried out in a tertiary care hospital in Faridkot (Punjab), India. Clinical, demographic and geographical data of the renal disease patients admitted to our hospital for hemodialysis was collected for a period of 2 years (January 2013-December 2014). The dialysis unit has 10 hemodialysis machines. Among these, one is dedicated for HBV positive and two machines are dedicated for HCV-positive patients. These three machines are placed away from the rest of the machines in an isolated room, so as to avoid cross contamination. The dialyzers of the patients are reused. Reprocessing of the dialyzers of the HBV/HCV positive patients are done in a separate room, away from the rest of the patients. Dedicated nursing staff looks after each patient during the dialysis session.

Patients of all age groups were tested for anti-HCV antibodies by fourth Generation HCV Tridot ELISA (J. Mitra & Co. Pvt. Ltd., New Delhi, India) and for hepatitis B surface antigen (HBsAg) by Hepalisa (J. Mitra & Co. Pvt. Ltd., New Delhi, India).

RESULTS

In the present study, a total number of 262 patients were enrolled for hemodialysis in the 2 consecutive years (January 2013-December 2014). In our study, majority 225 (85.8%) of patients undergoing hemodialysis were of chronic renal failure (CRF) whereas 37 (14.2%) were of acute renal failure [Table 1]. The underlying cause of CRF were diabetic nephropathy 70 (31.2%) followed by hypertensive nephropathy 56 (24.8%) and chronic glomerulonephritis 54 (24%) [Table 2]. Of the total 262 patients, 88 (33.5%) were found to be having HCV infection, 4 (1.5%) were found to be positive for HBsAg and dual infection was observed in 2 (0.8%) patients [Table 3]. Both the patients with dual infection were having history of transfusion of blood or blood products and hemodialysis from other centers. Out of the total 92 patients, 62 (67.4%) were males and 30 (32.6%) were females. Most of the patients were in the 41-60 years of age group (41.3%) followed by 21-40 years (31.5%), thereafter in 61-80 years (23.9%) and lowest prevalence was observed in the age group of <20 years (2.2%) and >80 years (1.1%). Among the districts of Punjab, the highest frequency distribution of positivity was found in Faridkot (32.6%) followed by Ferozepur (23.9%), thereafter Moga (19.6%) and lowest was observed in Zira district (1.13%).

Table 1: Type of renal failure in 262 patients undergoing hemodialysis

Type of renal failure	No. of patients	%
Acute renal failure	37	14.1
CRF	225	85.9
Total	262	100

CRF: Chronic renal failure

Table 2: Underlying diseases in 225 patients of CRF undergoing hemodialysis

Disease of CRF	No. of patients	%
Diabetic nephropathy	70	31.2
Hypertensive nephropathy	56	24.8
Chronic glomerulonephritis	54	24
Others*	45	20
Total	225	100

*Others include interstitial nephritis, polycystic kidney disease and drug abuse.
CRF: Chronic renal failure

Table 3: Percentage of patients having HBV/HCV/co-infection

Positivity	No. of patients	%
HBV	4	33.5
HCV	88	1.5
Co-infection (HBV+HCV)	2	0.8

HBV: Hepatitis B virus, HCV: Hepatitis C virus

DISCUSSION

Patients diagnosed with CRF on maintenance hemodialysis pose a higher risk of acquiring HBV or HCV infections due to frequent use of blood and blood products and multiple invasive procedures performed in these patients.[8] The literature review points to the fact that viral hepatitis is a serious threat for hemodialysis patients as 1.9% of all deaths among this population are related to the consequence of viral hepatitis.[7]

The results from our study demonstrate that the prevalence of HBV and HCV infections in hemodialysis patients is 1.5% and 33.5%, respectively, which is higher than the rates reported from different studies all over the world and India.[8-11] Since both these viruses share a common mode of transmission, we looked for the co-infection with HBV and HCV among the patients, was seen in two patients, one male and one female (2/262 = 0.8%). Studies on the prevalence of HCV and HBV co-infection in hemodialysis are rare. Kara *et al.* reported dual infection in three patients out of 67 hemodialysis patients.[12] Hung *et al.* reported co-infection of 30.4% and it was higher than nonhemodialysis patients which was only 3.8%.[10] Reddy *et al.* found 3.7% prevalence of dual infection in hemodialysis patients.[11] In another study by Saravanan *et al.*, out of 251 patients, 67 (26.7%) were positive for anti-HCV, 112 (44.6%) were positive for HBV, 15 (5.9%) had dual infection, and 57 (22.7%) were nonHBV/nonHCV.[13] Other studies reported the prevalence of HBV, HCV, and HBV/HCV co-infection as 7, 46, and 37%;[6] 11, 30 and 3%;[14] 2.6, 31.1, and 1.2%,[15] respectively. The high prevalence of HCV infection in our study may be due to the study population being restricted to hemodialysis patients and also due to the lesser sample size in the current study. Moreover, the population being rural and illiterate in our region lack risk perception due to unsafe therapeutic injections by quacks. Many dental procedures are being performed by untrained individuals using the unsterilized equipment.

CONCLUSION

The prevalence of HBV and HCV infections and HBV/HCV co-infection in hemodialysis patients of our setting was found to be 1.5%, 33.5%, and 0.8%, respectively. Other studies reported the prevalence of HBV, HCV, and HBV/HCV co-infection as 7, 46, and 37%; 2.6, 31.1, and 1.2% the risk of co-infection is greater among the CRF patients due to the frequent exposure to blood from transfusions and extracorporeal circulation during hemodialysis. Strict adherence to universal precautions, proper maintenance of hemodialysis machines and proper disposal of used material (tubing, catheters, and fluid) should be implemented in the dialysis units to decrease the risk of transmission of HBV and HCV. Immunization with HBV vaccine before beginning the dialysis, isolation of HBV positive patients, use of dedicated machines, and regular surveillance for HBV infection helps dramatically in decreasing the spread of HBV in hemodialysis units. Moreover, the blood used for transfusion should be screened for HBV and HCV by adopting methods like PCR or by using nucleic acid techniques.

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Conflicts of interest
There are no conflicts of interest.

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