Profile of Hepatitis B Virus, Hepatitis C Virus, Hepatitis D Virus and Human Immunodeficiency Virus Infections in Hemodialysis Patients of a Tertiary Care Hospital in Uttarakhand

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Background and aim: **Viral hepatitis and human immunodeficiency virus (HIV) infection are important causes of morbidity and mortality in hemodialysis (HD) patients. The present study was performed to assess the prevalence of hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV) and HIV infections in hemodialysis patients of a tertiary care hospital in Uttarakhand.** ***Methods:*** **All patients undergoing maintenance HD at our center were screened for hepatitis B surface antigen (HBsAg), antibody to HCV (anti-HCV), antibody to HDV (anti-HDV) and HIV antibody by ELISA. Detailed history regarding age, sex, duration of dialysis, blood transfusions, number of dialysis centers, dialyzer reuse and laboratory data was recorded.** ***Results:*** **A total of 118 patients (79 males and 39 females) were followed for 18 months with screening for the presence of HBV, HCV and HIV infections. At baseline, 12 (10.2%) patients were positive for HBsAg, 19 (16.1%) for anti-HCV and 2 (1.7%) for HIV antibody. Over 18 months, one additional patient became HBsAg positive and an additional 17 became anti-HCV-positive to give a total of 36 HCV-positive patients. Dual HBV and HCV infection was seen in 5 (4.2%) and anti-HDV antibodies were found in 1 (0.9%) patient. History of blood transfusions, duration of HD, dialyzer reuse and dialysis at multiple centers were found to be important risk factors for anti-HCV positivity.** ***Conclusions:*** **Implementation and adherence to universal work precautions by dialysis staff is imperative to prevent transmission of these infections. (J Clin Exp Hepatol 2013;3:24–28)**

Haemodialysis (HD) is an important modality of therapy for the patients of end-stage renal disease (ESRD). Being an extracorporeal mode of therapy the dialysis patients have an increased risk of exposure to parenterally transmitted hepatitis viruses and human immunodeficiency virus (HIV). Both, viral hepatitis (hepatitis B virus [HBV], hepatitis C virus [HCV], hepatitis D virus [HDV]) and human immunodeficiency virus (HIV) infection are important causes of mortality and morbidity in these patients treated with HD.[1,2] The prevalence of these infections is known to vary widely in different regions of the world. Even within India, a very wide range of prevalence rates for HBV (3.4–45%) and HCV (4.3–45.2%) in the dialysis population have been reported.[3] These prevalence rates are higher than the average prevalence rates estimated for the general population in India (4.7% and 1.85% for HBV and HCV respectively).[4,5]

HBV infection is less prevalent than HCV in HD units.[6] Introduction of HBV vaccination, isolation of HBV positive patients, use of dedicated dialysis machines and regular surveillance for HBV infection have dramatically reduced the spread of HBV in this setting.[7] The prevalence of HCV infection among HD is high and varies between countries and between dialysis units within a single country.[8] Dual infection with HBV and HCV leads to more aggressive liver disease in patients with ESRD on HD.[9]

The present study was undertaken to estimate the prevalence of HBV, HCV, HDV and HIV infection among haemodialysis patients.

METHODS

Patients

A total of 118 patients undergoing HD at HIMS were initially screened and subsequently every 3–4 months for HBsAg, anti-HCV, anti-HIV upto a period of 18 months. Patients were enrolled after written informed consent. Detailed history regarding age, sex, cause of ESRD, duration of HD, history of blood transfusion, history of dialysis

Keywords: hepatitis C, hepatitis B, hepatitis D, HIV, hemodialysis
Received: 13.1.2013; *Accepted:* 2.2.2013; *Available online:* 10.2.2013
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Abbreviations: HD: haemodialysis; ESRD: end-stage renal disease; HBsAg: hepatitis B surface antigen; HIV: human immunodeficiency virus; HBV: hepatitis B virus; HCV: hepatitis C virus; HDV: hepatitis D virus
http://dx.doi.org/10.1016/j.jceh.2013.02.003

outside our institution, reuse/non-reuse of dialyzer and tubing, and erythropoietin therapy was recorded. At our center, we do not use dedicated machines for HCV-positive patients however dialyzers are reused in these patients. We do not reuse dialyzers in HIV and HBsAg positive patients and apply universal work precautions for infection control.

Serology

Blood samples were screened for hepatitis B surface antigen (HBsAg), antibody to HCV (anti-HCV) and anti-HIV antibodies at the time of undergoing HD for the first time during inclusion in the study. The above serological tests were repeated every 3–4 month to look for any seroconversion. Patients found to be positive for HBsAg were also tested for antibody to HDV (anti-HDV antibody).

Hepatitis B Surface Antigen

HBsAg was assessed in our study using a direct immunoenzymatic assay of the "sandwich" type (Hepanostika HBsAg Ultra, Biomerieux, Netherlands).

Antibody to Hepatitis C Virus

A third generation ELISA was used to detect antibodies against HCV using cut-off OD value = 0.27 × PCx (PCx = mean value of positive controls) as described by the manufacturer (Hepanostika HCV Ultra, Biomerieux, Netherlands). The test detected antibodies against highly antigenic segments of core, NS3, NS4 and NS5 regions of hepatitis C virus.

Antibody to Human Immunodeficiency Virus

A fourth generation ELISA based on one-step "sandwich principle" was used to detect HIV-1 p24 antigen and antibodies against HIV-1 gp160, HIV-1 ant70 peptide, HIV-2 env peptide (Vironostika HIV uniform II, Biomerieux, Netherlands).

Antibody to Hepatitis D Virus

Anti-HDV was assessed using commercially available ELISA kit based on "competitive" ELISA method (Wantai Hep D, Wantai Biologicals, Beijing).

Institutional ethical committee approved the study protocol.

Statistical Analysis

The data are presented as number (%) and relative risk (RR) with 95% confidence interval (CI). A χ^2 test was used to compare differences in categorical variables; Yates correlation was applied when required. A two-tailed *P* value of less than 0.05 was considered statistically significant. Statistical analysis was performed with EPI info (version 3.5.1; Aug 2008) from CDC Atlanta, Georgia.

RESULTS

A total of 118 patients undergoing HD at HIMS (79 males and 39 females) were initially screened and subsequently every 3–4 months for HBsAg, anti-HCV, anti-HIV upto a period of 18 months. The underlying cause of chronic renal failure in these patients was mainly chronic glomerulonephritis 36 (30.5%) and diabetic nephropathy 31 (26.3%) followed by hypertensive nephropathy 23 (19.5%). The demographic profile of patients is shown in Table 1.

Majority of our patients remained asymptomatic for liver disease during the short term period of follow-up in the present study.

Prevalence of Viral Hepatitis and HIV Infection

Baseline

Initial screening at the beginning of HD, demonstrated that 12 (10.2%) patients were positive for HBsAg, 19 (16.1%) for anti-HCV and 2 (1.7%) for HIV antibody. Among 12 patients with HBsAg, 1 (8.3%) was also positive for anti-HDV (Table 2).

Follow-up

All patients were followed up for a total of 18 months. After 18 months of follow-up, screening of 118 patients for various viral markers revealed that, 13 (11%) patients were HBsAg positive, and 36 (30.5%) were positive for anti-HCV (Table 2). Whereas dual infection i.e. HBV and HCV was seen in 5 (4.2%) patients, HBV and HDV was seen in 1 (0.9%) patient and HCV and HIV was seen in 2 (1.7%) patients. 74 patients (62.7%) were negative for all viral markers.

Table 1 Demographic profile of patients.

Parameter	Number (%)
Age[a]	50.02 years (17–83)
Male:female	79 (66.9):39 (33.1)
History of blood transfusion	68 (57.6)
Dialyzer reuse	36 (30.5)
History of intravenous drug abuse	1 (0.85)
Duration of HD	
<1 year	71 (60.2)
>1 year	47 (39.8)
Baseline hemoglobin (g/dL)[a]	8.65 (5.2–13.5)
Baseline serum urea (mg/dL)[a]	149.8 (50–350)
Baseline serum creatinine (mg/dL)[a]	9.6 (4.6–24.4)
Baseline serum alanine aminotransferase (IU/mL)[a]	51.10 (15–227)
Baseline serum aspartate aminotransferase (IU/mL)[a]	39.21 (12–221)

[a]Mean (range).