

Seroprevalence of Anti-HCV, HbsAg and HIV Antibodies in Patients Undergoing Hemodialysis in a Tertiary Care Centre

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Abstract

Background: Hepatitis C virus (HCV), Hepatitis B virus (HBV) and Human Immunodeficiency virus (HIV) infections are important causes of morbidity and mortality in Hemodialysis patients. Patients on Hemodialysis may be infected through blood transfusion, contamination of dialysis machines and equipments as well as interpersonal horizontal transmission in dialysis units. Studies on seroprevalence of HCV, HBV and HIV in Hemodialysis patients are limited in India.

Objective: The present study was carried out to see the seroprevalence of anti-HCV, HBsAg and HIV antibodies in patients on Hemodialysis.

Method: 100 patients undergoing Hemodialysis were included in the study. Patient's history was taken regarding the blood transfusion, high-risk behavior, duration on dialysis and others. With the informed consent of the patients, blood was drawn; serum was separated and subjected to screening for the presence of anti-HCV, HBsAg and HIV antibodies. Healthy individuals included as controls in the study were simultaneously screened for anti-HCV, HBsAg and HIV antibodies.

Results: In our study, a total of 100 patients undergoing Hemodialysis were screened, out of which 11(11%) were anti-HCV positive and none of them were positive for HBsAg and HIV antibodies. Maximum numbers of patients undergoing Hemodialysis were in the age group of 41-50 years 36(36%). All the 100 patients undergoing Hemodialysis were diagnosed to be having Chronic Kidney Disease (CKD). It is been observed that number of blood transfusions and number of Hemodialysis sessions in the given period of time were more in anti-HCV positive patients when compared to anti-HCV negative patients.

Interpretation and conclusion: In the present study, HCV infection is more prevalent among Hemodialysis patients. HCV infection prominently increases the burden of disease in the Hemodialysis population. The longer the patient is on Hemodialysis, the more susceptible he/she is to HCV acquisition. Hemodialysis patients should be routinely screened for HCV infection, preferably using serological methods.

Key Words: HBV, HCV, anti-HCV, HBsAg, HIV, CKD, Seroprevalence, Hemodialysis.

Introduction

Hemodialysis patients are at increased risk of blood borne infection; including Hepatitis C Virus (HCV), Hepatitis B Virus (HBV) & Human Immune Deficiency Virus (HIV) due to the prolonged vascular exposure through contaminated devices, equipments & supplies, environmental surfaces or attending personnel¹. HBV & HCV are the most important cause of morbidity & mortality in the Hemodialysis patients as chronic renal failure patients do not clear these viral infections

efficiently in the patients of Hemodialysis units².

The prevalence of HBV infection is less when compared to HCV in the Hemodialysis units. This is due to introduction of HBV vaccination, detection and isolation of patients with HBV by dedicated dialysis machines. Regular surveillance of HBV infection has dramatically reduced the spread of HBV in these settings².

Most of the patients infected with HCV are asymptomatic. So, HCV transmission occurs easily in the absence of standard infection control measures. However, due to lack of an effective vaccine HCV is the most common cause of chronic viral hepatitis in the dialysis units³.

HBV and HCV infection account for most proportion of liver diseases worldwide. Majority of those infected with HBV &/or HCV will develop complications i.e. cirrhosis (15%-40%), liver failure with or without hepatocellular carcinoma. It has been estimated that over next 20 years the proportion of HBV or HCV infected patients with cirrhosis will increase from 16%- 40%; in addition to this other complications will also increase dramatically like hepatic decomposition (increasing by 106%), HCC (increasing by 81%) & liver related deaths (increasing by 180%)⁴.

Prevalence of HIV is increasing everyday and has become a disaster in certain areas of the world. These three viruses (HCV, HBV & HIV) have similar routes of transmission i.e. through blood and blood products. End stage liver disease is currently a major concern in HIV positive individual as the mortality & morbidity of HIV patients is increased due to the co-infection with hepatotropic viruses. The degree of immunodepression is important factor for liver disease progression⁴.

Dialysis adhering to standard infection control measures has been considered a low risk setting for transmission of HIV. Even in centers with higher prevalence of HIV infections, no evidence of HIV transmission has been seen⁵.

HIV, HBV & HCV are the most common blood borne pathogens implicated in hospital acquired infections.

risk of infection with these pathogens among the health care workers due to occupational exposure ranges from 6%-30% for HBV (depending on the hepatitis B surface antigen status); 1.8% for HCV & 0.1%-0.3% for HIV depending on the type of exposure⁶.

Studies on seroprevalence of HCV, HBV and HIV in Hemodialysis patients are limited in India. Hence, the present study was carried out to see the seroprevalence of anti-HCV, HBsAg and HIV antibodies in patients on Hemodialysis.

OBJECTIVE OF THE STUDY

1. To investigate the seroprevalence of anti-HCV, HBsAg and HIV antibodies in patients undergoing Hemodialysis in a tertiary care Centre.

MATERIALS AND METHODS

This study was carried out in the Department of Microbiology of a tertiary care Centre, from January 2015 to January 2017.

This is a prospective, cross sectional study where 100 patients undergoing Hemodialysis in the Hemodialysis unit of Department of Nephrology of a tertiary care Centre, were screened for anti-HCV, HBsAg and HIV antibodies.

The study also included 30 asymptomatic healthy individuals who constituted the control group.

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Photo 1: J MITRA & Co. HCV MICROLISA kit along with the serum samples tested



PHOTO 2: Anti-HCV ELISA plate in ELISA washer

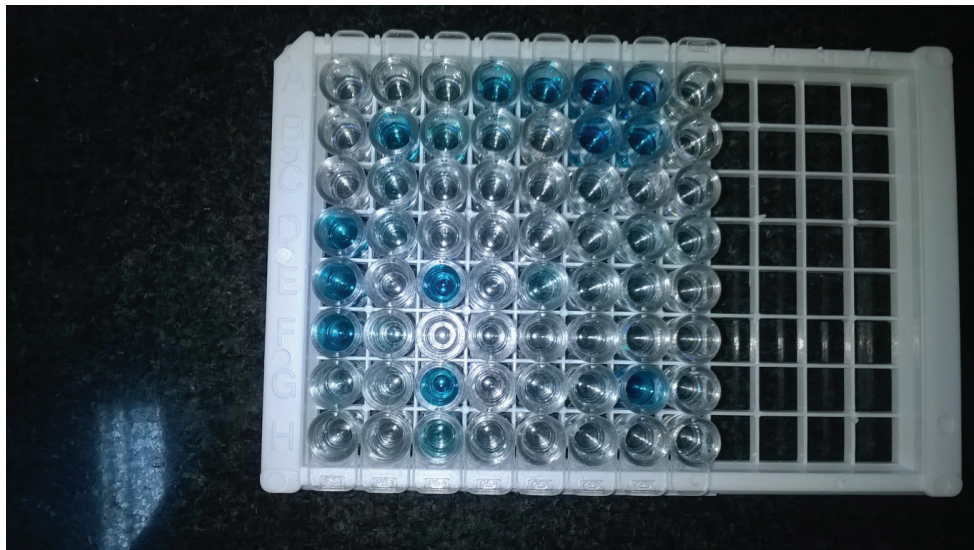


PHOTO 3: Anti- HCV ELISA plate after addition of substrate before adding stop solution. A₁-Blank Control (sample diluents only), B₁ and C₁ – Negative controls, D₁, E₁ and F₁ - Positive controls

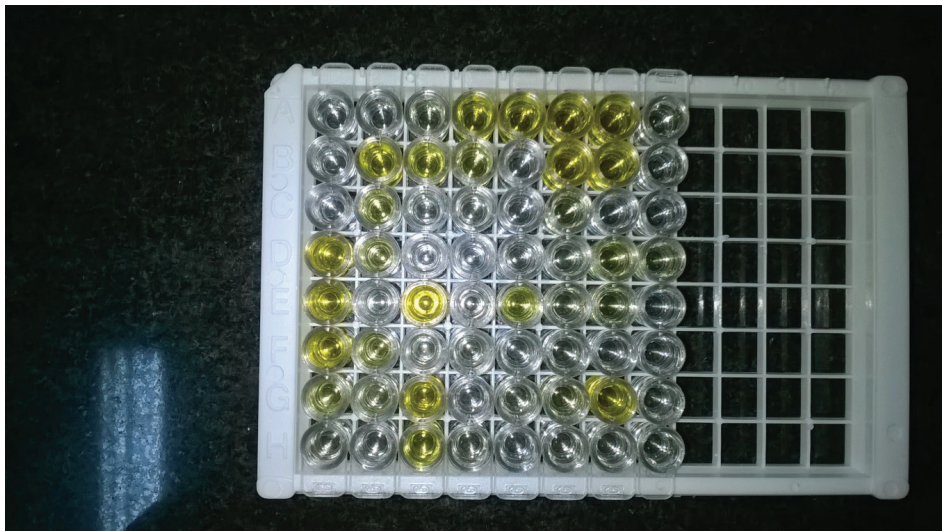


PHOTO 4: Anti-HCV ELISA plate after addition of substrate followed by stop solution.

A₁-Blank Control (sample diluents only), B₁ and C₁ – Negative controls, D₁, E₁ and F₁- Positive controls

Inclusion criteria:

1. Patients of all age groups on maintenance Hemodialysis who are negative for anti-HCV, HBsAg and HIV antibodies.

2. Patients undergoing Hemodialysis for the first time in VIMS & RC.

Exclusion criteria:

1. Patients who are seropositive for anti-HCV, HBsAg, or HIV antibodies.

Patients' informed consent and detailed history was taken before the blood sample was drawn.

Under aseptic precautions a minimum of 5ml of blood sample was collected from patients undergoing Hemodialysis. By process of centrifugation, the

serum was separated from blood and stored at -20 deg centigrade. These samples were processed within one week duration. All the serum samples were tested for anti-HCV, HBsAg and HIV antibodies using 3rd generation ELISA. The samples which came positive for HBsAg and HCV were retested by rapid tests of different antigen.

HIV detection was done according to NACO Guidelines 2016⁷.

Results

The present study was performed to investigate the seroprevalence of anti-HCV, HBsAg and HIV antibodies in patients undergoing Hemodialysis in a tertiary care centre, and also to assess the possible route of transmission of HCV, HBV and HIV in patients undergoing Hemodialysis by eliciting the history of the patients.

Table No.1: Seroprevalance Of Anti-Hcv, Hbsag And Hiv Antibodies In Patients Undergoing Hemodialysis

Total No. of Patients Undergoing Hemodialysis Screened	No. of Anti-Hcv Positive (%)	No. Of Hbsag Positive (%)	No. of Hiv Positive (%)
100	11 (11%)	0	0

A total of 100 patients undergoing Hemodialysis were screened, out of which 11(11%) were anti-HCV positive, and none of them were positive for HBsAg and HIV antibodies.

Discussion

Hepatitis C is an emerging infection in India. Hepatitis C infection is defined as the inflammation of liver caused by Hepatitis C Virus (HCV), enveloped, single stranded, positive sense RNA virus. The estimated global prevalence of HCV infection is around 3% of the world population, resulting in about 170 million HCV infected persons. The WHO has estimated that 3 to 4 million people worldwide are newly infected with HCV infection every year⁸.

The main transmission route of HCV is parenteral, that is blood (0.5% to 13%)and blood products transfusion(66%), Hemodialysis (20%), organ transplant (50 to 100%), nosocomial (2 to 20%), intravenous drug users (70 to 90 %), tattooing(12.6%), mother to child (4 to7%) , sexual (0.23%) and household contacts(4%)¹.

However, approximately 10% of the cases are sporadic, without well-defined transmission routes. Hepatitis C Virus has a causative role in chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma⁸.

Patients on Hemodialysis are at high risk of infection by HCV because these patients are often anemic and require multiple blood transfusions. Despite screening of blood for HCV and the wide use of erythropoietin, some patients still become infected by HCV during Hemodialysis. The reason for this may be the donor was in the window period masking the infection or improper screening in blood banks. Moreover, they have prolonged vascular access and frequent parenteral interventions. In addition, a state of partial immunosuppression prevailing in this population aggravates the risk of HCV infection. The other contributing factors supporting transmission

of HCV infection are nosocomial factors, longer duration of Hemodialysis, and visiting more than one centre for Hemodialysis⁸.

HBV infection is less prevalent than HCV in Hemodialysis units. Introduction of HBV vaccination, isolation of HBV positive patients, use of dedicated dialysis machines and regular surveillance for HBV infection dramatically reduced the spread of HBV in this setting².

Dialysis adhering to standard infection control measures has been considered a low risk setting for transmission of HIV. Even in centers with higher prevalence of HIV infections, no evidence of HIV transmission has been seen. The most likely source of entry of HIV into dialysis centers maybe blood products⁵.

In our study, out of 100 patients undergoing Hemodialysis, 11(11%) were anti-HCV positive and none were positive for HBsAg and HIV antibodies. This prevalence of HCV antibodies was lower when compared to the prevalence seen in the studies conducted by Reddy AK et al. and Kumar SP et al showing 13.23% and 12.4% respectively^{9,10}, but our prevalence was higher when compared to Hinrichsen H et al. and Kanigapriya M et al. showing 7.0% HCV prevalence among Hemodialysis patients^{11,8}.

The prevalence is consistently higher in Hemodialysis patients (12-15%) than in the general population (1.8-2.5%). The prevalence of HCV infection in Hemodialysis patients varies worldwide from country to country, region to region and also from one unit to another (1%-62). There are only a few studies done on prevalence of HCV in Hemodialysis patients in India. The prevalence of HCV on Hemodialysis patients in India was in the range of 3 to 45%⁸.

The prevalence of HCV infection among the patients on Hemodialysis at our dialysis centre was lower than that in other parts of the country, it still remains high. There were no hepatitis B or HIV infections amongst the patients undergoing Hemodialysis in our study. We believe that preventive measures and the adherence to 'universal precautions for HCV control' remain a priority. Hence, we recommend the use of dedicated dialysis equipment, space, nursing staff, separate washing areas and regular screening of the patients, for preventing cross infection. This study recommends that Hemodialysis patients should be monitored in order to determine the full risk factors for HCV infection.

CONCLUSION

In the present study, HCV infection is more prevalent among Hemodialysis patients. HCV infection prominently increases the burden of disease in the Hemodialysis population. The longer the patient is on Hemodialysis, the more susceptible he/she is to HCV acquisition. Hemodialysis patients should be routinely screened for HCV infection, preferably using serological methods.

Conflict of Interest: None

Ethical Clearance: Done

Source of Funding: Nil

Referances

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