Research Article

Seroprevalence of hepatitis C in renal failure patients on maintenance hemodialysis – Study in a tertiary care hospital – Western India

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Abstract

Background: Hepatitis C is endemic in most parts of the world. It is a blood borne infection, which has a significant impact in treatment and outcome of renal failure patients undergoing dialysis.

Objective: To determine the seroprevalence of hepatitis C in renal failure patients on maintenance hemodialysis in a tertiary care hospital.

Materials and Methods: This study was carried out retrospectively on patients undergoing hemodialysis whose samples were received for Hepatitis C screening in the Department of Microbiology, BJ Medical College, Ahmedabad, Gujarat, India. A total of 910 patients were included in the study conducted over a period of 12 months. Screening for anti-hepatitis C virus (HCV) antibodies was done by a third-generation enzyme-linked immunosorbent assay and their epidemiological data were analyzed.

Result: Of the 910 patients screened for anti-HCV antibodies, 25 patients were found to be positive for Hepatitis C. The overall seroprevalence of hepatitis C among dialysis patients was 2.7%. The HCV positive rates were more among the males and highest in the age group of 30–60 years. Only 44% seropositive patient had raised alanine transaminase level.

Conclusion: Regular screening of hepatitis C patients is mandatory as it has a detrimental effect contributing to morbidity and mortality. Strict adherence to infection control practices should be prioritized in the health-care settings to reduce the burden of disease among the high-risk groups.

KEY WORDS: Hepatitis C, hemodialysis, prevalence

Introduction

Hepatitis C is an emerging infectious disease, which has a slow and progressive course leading to cirrhosis and hepatocellular carcinoma. According to WHO, about 175 million people are affected worldwide contributing to a global prevalence of 3%.[1]

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The major risk factors for hepatitis C virus (HCV) transmission include repeated transfusion, intravenous drug abuse, organ transplantation, chronic hemodialysis, and occupational exposure among health-care workers.[2,3] Patients with end stage kidney disease on maintenance dialysis are among high risk in acquiring hepatitis C infection resulting in lower survival rates and treatment response. The mode of transmission of HCV in these patients is still unclear. A strong causal association between hepatitis C and renal disease has been observed, which further adds to the disease burden. The difficulty arising from limited diagnostic options in many health-care settings puts HCV on high priority in the research arena.

The prevalence of HCV infection varies widely across different countries and also between different units within the same country. Dialysis Outcomes and Practice Patterns Study reported a prevalence of anti-HCV antibodies among patients with dialysis between 2.6% and 22.9%.[4] The wide variation in prevalence rates may be due to many factors such as good infection control measures, socioeconomic factors, and lower prevalence of the HCV infection among the general population.[5] Although various studies have been done worldwide, many vital details still remain unexplored. With this background, this study was undertaken to determine the seroprevalence of HCV among patients undergoing hemodialysis in the hospital.

Materials and Methods

This study was conducted in the Department of Microbiology, BJ Medical College, Ahmedabad, Gujarat, India, over a period of 12 months. A total of 910 patients with chronic renal failure on maintenance dialysis were studied. Patients who were positive for anti-HCV antibodies before starting hemodialysis were excluded from the study.

A 5-mL venous blood sample was collected from all the patients for anti-HCV antibody testing. The blood was kept at room temperature for 45 min and the serum was separated after low-speed centrifugation.

All the sera were tested for the presence of antibodies against HCV by third-generation enzyme immunoassay kit (QUALISA HCV ELISA; Qualpro Diagnostics, Goa, India). The test was performed in accordance with manufacturer's instructions with controls and the absorbance was read at 450 nm in an enzyme-linked immunosorbent assay (ELISA) reader within 30 min of adding stopping solution. The samples that were initially reactive were retested in duplicate. All the samples which were reactive in either or both of the duplicate testing were considered repeatedly reactive. Initially reactive samples that were nonreactive in both the duplicates were considered negative.

Result

This study included 910 patients with chronic renal failure on maintenance dialysis. Table 1 shows the age- and gender-wise distribution of patients included in the study group.

Of the total 910 patients screened for the anti-HCV antibodies, 25 (2.7%) patients were found to be seropositive. Among the seropositive patients, 64% were men and 36% were women. Seropositive rate was more common in patients between 31 and 60 years (88%) when compared to more than 61 years (8%) and less than 30 years (4%).

Of the 25 seropositive patients, 11 (44%) had raised alanine transaminase (ALT) levels. Rest of the 14 patients had normal ALT levels.

Discussion

Patients with end-stage renal disease on chronic hemodialysis are at high risk for HCV infection for which screening for anti-HCV antibodies is highly recommended. Our study showed HCV prevalence of 2.7% among the patients on maintenance dialysis. It is concordant with similar studies in India carried out by Pooja et al. (4%)[6], Poddar et al. (5%),[7] and Reddy (5.9%).[8] Jasuja et al.[9] and Kumar et al.[10] reported a prevalence of 27.7% and 12.4%, respectively.

Sero epidemiological studies on HCV prevalence in patients undergoing hemodialysis remain inadequate. According to KDIGO guideline, the prevalence of HCV infection among dialysis patients in different parts of the world varies from 1% to 90%. The lowest was reported in the European nation with less than 5% prevalence.[11] A large number of factors have an impact on the prevalence. The lower prevalence rate in this study and similar studies conducted in the same region may be due to lower rate in the general population itself.

Another factor that is of main concern in HCV transmission is its potential for nosocomial spread. Potential sources for transmission include environmental aerosols, droplets contaminated with the virus, and contaminated hands and articles. Stringent universal precautions in the dialysis units and availability of isolated area and separate dialysis machines for infected patients will contribute to reduced cross contamination and nosocomial infection among patients.[12]

In our study, only 44% HCV seropositive patients had raised ALT levels. In a similar Indian study, Hegde et al.[13] reported raised ALT levels in only 33.3% of patients and Chigurupati et al.[14] in 41.6% patients. Dialysis patients have intermittent rise and fall of ALT levels frequently that contributes further to decreased sensitivity of estimation of ALT in this group of patients.[15] Low or normal ALT levels in patients undergoing dialysis may be associated with factors related to the procedure itself. This implies that positive ALT levels cannot be considered as a predictor of hepatitis C infection.

The screening of the test samples was carried out using a third-generation ELISA that has a sensitivity and specificity of 100%. It has resulted in marked decrease in false positive rate and low falsely high prevalence.

The limitation of this study was that HCV RNA detection was not done. Anti-HCV antibody testing may not be reliable to detect all infected cases because of the depressed immune system and blunted antibody response in these patients.

The test preferred for initial screening is HCV RNA detection by PCR. The final decision regarding the choice of test is up to every dialysis unit and depends on financial constraint and the prevalence of HCV infection in that region. It is necessary to develop a cost-effective, reliable, and simple HCV screening test in this group of patients for early case detection and improving treatment outcome.

Conclusion

The burden of hepatitis C infections in patients undergoing chronic hemodialysis is more in developing nations than in developed countries. The lower seroprevalence in this study definitely point toward an efficient infection control team and strict adherence to universal precautions in the hospital setting.

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