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Occurrence of hepatitis B and C infection among hemodialyzed patients with chronic renal failure in Qazvin, Iran: A preliminary study

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ABSTRACT

Background: A critical problem for hemodialysis patients are hepatitis infections. Some of the risk factors associated with HBV infection include blood transfusion, frequency, and duration of hemodialysis, and equipment contamination of infected patients. In fact, HCV infection through dialysis units has increased worldwide.

Aims & Objectives: The aim of this study was to determine the prevalence of the hepatitis B virus (HBV) and hepatitis C virus (HCV) in hemodialysis patients in Qazvin province, Iran.

Methods & Materials: The data were obtained from a total of 195 patients who have been receiving hemodialysis for years, and who were screened for the presence of the hepatitis B surface antigen (HBsAg) and HCV antibodies.

Results: Results showed that six patients (3.1%) had the hepatitis B antigen and 13 patients (6.7%) had hepatitis C. Of the total sample, 195 patients participated in this study. Five patients (3.2%) were found to have seropositive hepatitis markers. Two patients (1.3%) were HBsAg seropositive and three patients (1.9%) were anti-HCV seropositive.

Conclusion: Considering the outcome of this study, education for dangerous behaviors along with screening, vaccination, and appropriate treatment for hepatitis is strongly recommended to control this persistent infectious source of hepatitis B and C in the community. Taking the medical history without a screening blood test for HBV and HCV might lead to treating infected patients as non-infected ones.

Keywords: Prevalence, hepatitis B, hepatitis C, Qazvin, Iran

Introduction

One of the major functions of the kidneys is the removal of metabolic waste products, electrolytes, and water. The increased occurrence of non-communicable diseases such as diabetes mellitus, hypertension, and

their complications has drawn the attention of physicians and healthcare authorities to kidney failure. Moreover, chronic kidney disease (CKD) and end stage renal disease (ESRD) have been designated as a worldwide public health problem. (1, 2) Chronic renal failure is defined as the progressive and typically

irreversible decline of GFR. (3) Dialysis is an artificial means of removing nitrogenous and other toxic products of metabolism from the blood. (4) Hepatitis B viruses (HBV) are very serious public health problems with an estimated 2 billion individuals infected worldwide and 350 million with chronic HBV infection. The World Health Organization estimates that 500,000 to 1.2 million deaths each year are due to HBV-related chronic liver disease and this infection is the tenth leading cause of death. (5, 6)

The epidemiology of HBV transmission is complex and it could occur in all age groups. The greatest concentrations of HBV occur in blood and serous fluids, and infection most frequently occurs through direct inoculation of the virus through unsafe injections or contaminated medical equipment. Other common transmissions include sexual contact with infected persons and births from HBV-infected mothers. (7, 8) Additionally, frequent occupational exposure to blood poses a serious threat for transmitting the Hepatitis C virus (HCV) (9) since it spreads primarily by direct contact with human blood. (10)

Fortunately, it has been reported that the prevalence of HCV infection among hemodialysis patients has decreased from 14.4% in 1999 to 4.5% in 2005. (11-13) Moreover, the range of HCV in hemodialysis patients varies from 4% to 70% in different countries (14). The nature and common contact with blood and saliva explains the increased risk for blood-borne infections, mainly HBV and HCV (15).

The purpose of this study was to assess the prevalence of hepatitis B & C among hemodialysis patients in Qazvin province, Iran, considering that the risk of transmission of viral hepatitis is mainly determined by their prevalence in the patient population (16).

Material & Methods

In this study, we evaluated 195 blood-screening forms for HBsAg and anti-HCV, which were distributed among patients attending the following three regional renal dialysis centers affiliated with the Qazvin University of Medical Sciences Hospital, Bo Ali Sina, Zakaria Razei, and Takestan Dialysis Center. The participants were 75 females (38.5%) and 120 males (61.5%). The mean ages were 63.85±16.8 for males, 53.25±15.61 for females, and 53.62±16.31 for all patients and they attended one of the centers during July 2009-Oct 2009.

Blood samples were drawn in a routine manner at medical laboratories in the hospitals. The samples were then tested for the presence of HBsAg and HCV antibodies at the university hospital's virology department using the Abbott AxSYM system. Each sample was tested for the presence of both HBsAg and anti-HCV antibody.

Ethical Aspects

The study was permitted by the Ethics in Research Committee of the Qazvin University of Medical Sciences. Additionally, the procedures, possible discomforts, and risks were fully explained to the patients.

Statistical Analysis

Data was entered using the Epi Info computer program after which the data was transferred to the SPSS version 15 software program for analysis. Univariate analyses were performed by use of chi-square statistics and the Fisher Exact test.

Results

According to our results, from 195 patients with an age range of 15-90 years old, six patients tested positive for HBsAg (3.1%) and 13 patients (6.7%) tested positive for the anti-HCV antibody. All 195 patients had a minimum of two to a maximum of three dialysis sessions per week. Mean age in HBsAg positive cases was 58+7.4 years and all of them were males. Duration of dialysis was 8-12 years in all five HBsAg positive patients. Mean age in HCV positive patients was 46+15.3 years. Patients that tested positive for HCV were 53.8% males and 46.2% females. Duration of dialysis was 0-4 years in 7.7% of HCV positive patients, 4-8 years in 59.2% of patients, 8-12 years in 33.1% of patients and 12-17 years in 7.7% of patients.

In our study, it was reported that HBV was more prevalent in male hemodialysis, dental patients (7.2%), with HCV having the same prevalence in males (8.8%) and females (10.5%).

Discussion

Hemodialysis patients can be at high probability for hepatitis viral infections. (17)

The purpose of this study was to evaluate the prevalence of hepatitis B and C among hemodialyzed patients. In describing the characteristics of the diseases, it has been reported that viral hepatitis infection rates are in proportion to blood transfusion sessions, protracted vascular access, and the probability of exposure to infected patients, and contamination of equipment. (18-19) Moreover, important risk factors of cirrhosis development and decomposition of liver function could be observed in HBV and HCV infected hemodialysis patients (20). Boulaajaj

et al. has reported a 2% HBsAg positively in 168 hemodialysis patients (21). Yakaryilmaz et al. in their study found the HBV infection in 13.3% of hemodialysis patients similar to other researchers around the world (Table 1). (22)

The prevalence of HCV infection varies considerably among various populations of patients from different geographical regions. The reports presented a range for HCV seroprevalence among hemodialysis patients from 1.9% in Slovenia to 80% in Senegal (23). Boulaajaj et al. in their study reported HCV positivity to be at 76%. (21) Yakaryilmaz et al. have reported that HCV infection (20.2%) is more prevalent than the HBV infection (13.3%) in hemodialysis patients. (22) Carneiro et al. showed an anti-HCV prevalence of 39% (24). Otedo et al. also have reported a low prevalence of HCV (5%) in these patients (25). Hamankaya et al. have indicated that the prevalence of HCV positivity in their hemodialysis units was 4.7%. (26) In 2003 Thanachartwet et al. reported that the seroprevalence of HCV was 4.8% (27, 23) and Alavian et al. reported that the seroprevalence of HCV was 13.2% (24). (Table 2)

In our study, we found the prevalence of HCV infection in hemodialysis patients to be 9.3%, which is higher among the non-hemodialysis patients (2-3%), similar to other researchers around the world (Table 2). (28)

Ehisaf et al. reported that the presence of anti-HCV was associated with the dialysis duration. (29) Carneiro et al. also in their study showed the relationship between anti-HCV and the duration of dialysis (30). The most important quantitative index in the evaluation of dialysis sufficiency is the number of weekly sessions. Standard dialysis treatments are thrice weekly, but with 1 or 2 sessions per week are measured to be under dialyzed. (31)

This preliminary study evaluated the prevalence of HBV and HCV among

hemodialysis patients in Qazvin and the study revealed that 3.2% of hemodialysis, dental patients were seropositive to blood-borne hepatitis viruses (HBV and HCV), indicating that these patients are potentially infectious to dental healthcare workers. (32, 33) Additionally, this is the first time such a study has been conducted at regional renal dialysis centers and reports show that HCV was more prevalent in female hemodialysis dental patients (3.19%) compared to male hemodialysis dental patients (1.59%). (34) In addition, it was found that HCV (3.19%) was more common than HBV (2.65%) in female hemodialysis dental patients (34). Additionally, in our study has been discovered that HBV was more prevalent in male hemodialysis dental patients (7.2%), and HCV had the same prevalence in males (8.8%) and females (10.5%).

Takata et al. also screened dental patients for the presence of the HCV anti-body and 5.8% were seropositive for HCV compared to only 2.1 % of HBsAg infected patients. (35) In another study by Takata et al., it was reported that 3.8% of patients with impacted teeth or jaw deformities were HCV seropositive and that the prevalence of HBsAg in the same group of patients was 0.7%. (36) Considering the results of this study, education for hazardous behavior along with screening, vaccination, and appropriate treatment against hepatitis have been demonstrated to be cost effective (32,33,37); therefore, these are strongly recommended to control this persistent infectious source of hepatitis B and C in the population.

Conclusions

As our survey showed, we could conclude that the hepatitis C infection presents a high prevalence in patients undergoing dialysis and

an anti-HCV test should be performed before being scheduled for hemodialysis.

Although some research do not suggest the isolation of a dialysis setting, some strategies for instant closed control of services given to these patients such as blood transfusion and staff training to prevent the spread of this infection seems to be important.

For that reason, it is strongly recommended that all staff adhere to strict infection control procedures in addition to the HBV vaccine.

Recommendations

A larger series of patients is needed to confirm our findings and to verify the hypothesis.

Competing interests

The authors declare that they have no competing interests.

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Figure 1: Prevalence of HBsAg and anti-HCV among female and male patients

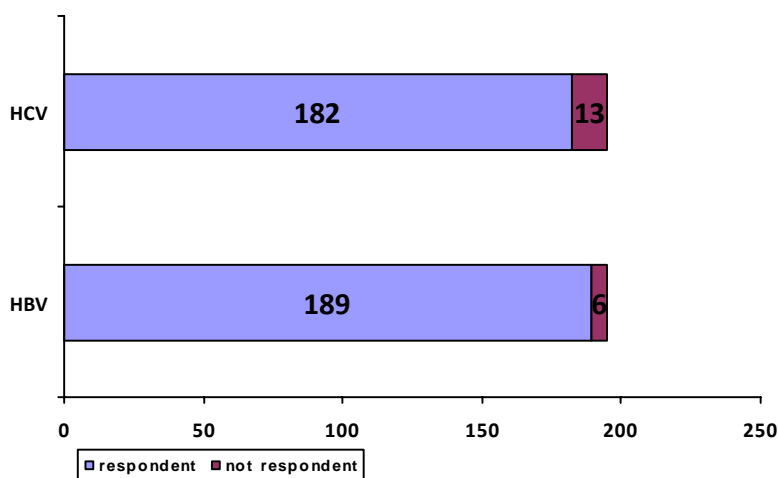


Table 1: Prevalence of HBV infection in hemodialysis patients

No	Study	Prevalence of HBV
1	Boulaajaj, K. et al. (Maroc) (21)	2%
2	Yakaryilmaz, F. et al. (Turkey) (22)	13.3%
3	Otedo, A. E. et al. (Kenya) (25)	8.3%
4	Thanachartwet, V. et al. (Thailand) (27)	6.3%
5	Reddy, G. A. et al. (India) (30)	1.4%
6	Kheradpezhoh, M. et al. (Iran) (31)	4.6%
7	Our result	3.1%

Table 2: Prevalence of HCV infection in hemodialysis patients

No	Study	Prevalence of HCV
1	Boulaajaj, K. et al. (Maroc) (21)	76%
2	Yakaryilmaz, F. et al (Turkey) (22)	20.2%
3	Carneiro, M. A. et al. (Brazil) (24)	39%
4	Otedo, A. E. et al. (Kenya) (25)	5%
5	Harmankaya, O. et al. (Turkey) (26)	4.7%
6	Thanachartwet, V. et al. (Thailand) (27)	6.5%
7	Reddy, G. A. et al. (India) (30)	5.9%
8	Kheradpezhoh, M. et al. (Iran) (31)	20.4%
9	Our result	6.7%

Figure 2: Age distribution among hemodialysis patients

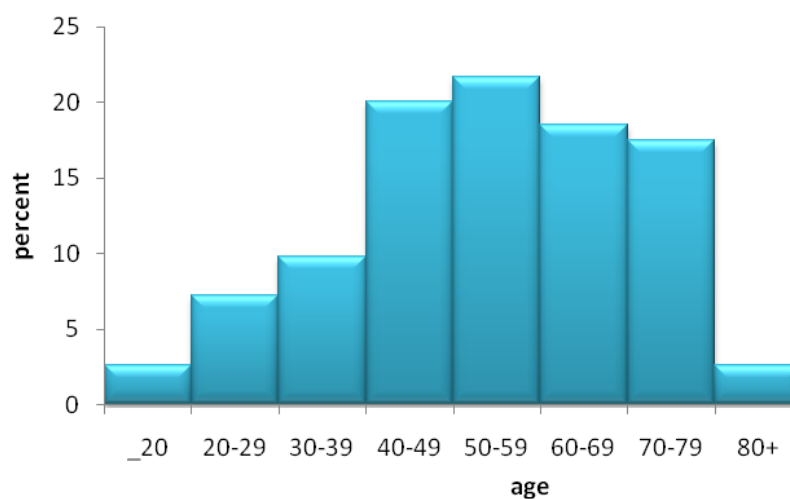


Figure 3: Prevalence of HBsAg and anti-HCV among hemodialysis patients

