Iranian Journal of Virology 2010;4(2): 45-48

Short Communication

Hepatitis B Infection in End-Stage Renal Disease Patients in Khuzestan Province, Iran

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The hepatitis B virus (HBV) is one of the most common causes of acute or chronic hepatitis, cirrhosis, or hepatocellular carcinoma and it has been reported that up to 80% of liver cancers are from this viral infection. Despite the availability of effective vaccines since 1982, more than 350 million of the world's population are chronic carriers and annually up to 1 million die due to the consequences of this infection (1- 3). In the end-stage renal disease (ESRD), is a distinct clinical problem in view of the natural history of HBV infection among such patients, the immunosuppressive effect of renal failure, the susceptibility for de novo infection and nosocomial transmission. The significant disease is also because of the long-term effects on morbidity and mortality, and the change in clinical course of kidney transplant patients. In addition, HBV is also known as one of the most important parenteral route transmitted infections in hemodialysis patients (4-7).

There are many studies about the incidence and the prevalence of HBV infections among ESRD patients in both industrialized and developing countries and the results varies markedly from country to country. According to these reports, it seems that in the past few decades, the incidence and the prevalence of HBV infection in dialysis patients has significantly decreased. The aim of the study was to investigate this issue and to determine the seroprevalence of HBV infection and its relationship in ESRD patients living in the province of Khuzestan, Iran.

From October 2010 to January 2011, this cross sectional study was conducted on all ESRD patients living in the province of Khuzestan, Iran. The ESRD was defined as irreversible and permanent loss of kidney function due to primary or secondary renal diseases requiring renal replacement therapy. A standardized questionnaire was used to collect demographic characteristics of study participants and medical records, cause of ESRD, kind and date of onset of renal replacement therapy, length of time receiving peritoneal or Hemodialysis services.

Hemodialysis was performed for 6-12 h, one, two or three times a week, using two different types of dialyzers, semi-synthetic (cellulose diacetate), or synthetic (polysulfone) dialyzer membranes, and bicarbonate-based dialysis solution at a delivered bicarbonate concentration of 35-40 mEq/L. The PD was also performed as Continuous Ambulatory Peritoneal Dialysis (CAPD) three, four or five times in a 24-hour period. The patients were screened for Hepatitis B surface antigen (HBs Ag) by enzyme-linked immunosorbent assays (ELISA, Abbott Laboratories, and North Chicago, IL, USA). The Ethics committee of the Research Center, affiliated to Ahvaz

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Joundishapur University of Medical Sciences approved the study.

For statistical analysis, the statistical package for social sciences (SPSS) version 15 software was used and prevalence rates and 95% confidence intervals were calculated. Chi-square tests or Fisher's exact and T test were performed to test the association of various risk factors and compare the mean values of quantitative variables in the HBs Ag positive and negative patients. Statistical significance was considered at p value of <0.05.

In overall, 1037 ESRD patients, 617 male (59.49%) and 420 female (40.50%), referred to peritoneal or hemodialysis centers of Khuzestan province were enrolled for the study. At the beginning of study, the mean age of all ESRD patients was 58.28 years. Figure 1 shows the age distribution of patients.

The most common cause of ESRD was high blood pressure in 25.4%, followed by, DM in 24.2%, Glomerulonephritis in 10.3%, and Obstructive uropathy in 8.9% and Cystic Kidney Disease in 3.9%. The cause of ESRD was unknown in 27.3%. The most of patients, 997 patients (96.14%) were on HD and only, 40 patients (3.86%) were on CAPD. Our HD centers were not used reprocessing of hemodialyzers for reuse in both HBs Ag positive and negative patients. In addition, the program of our HD center was segregation of dialysis rooms and machines for HBs Ag positive patients.

Standard precautionary measures and using personal protective equipment like, washing hands and wearing gloves when contacting potentially infectious surface or material, using gown and wearing it when exposure to blood or body fluids was expected, were mandatory for nurses and staff.

In overall, the prevalence of HBs Ag positivity in ESRD patients was 1.15% (12 patients, 8 males and 4 females, with mean age of 50.45±8.1years). Although the prevalence of HBs Ag positivity was higher in males, but there was no a statistically significant differences between males and females (p=0.06) and there also was no a statistically significant difference between mean age of HBs Ag positive and HBs Ag negative patients (P=0.59).

To evaluate the association between prevalence of HBV infection ethyologies of ESRD, we determined the prevalence of different causes of ESRD in HBs Ag positive and HBs Ag negative patients. From 12 patients with HBs Ag, 6 patients had HTN, 3 patients had DM and 3 patients had unknown etiology and there was a significant association between HTN with HBs Ag positivity (0.033).

All of HBs Ag positive patients were on HD and therefore the prevalence of HBs Ag positivity in HD patients was 1.20% and in PD patients was zero. To determine the relationship between the kind of dialysis (PD or HD) and HBsAg positivity, we used Fisher's exact test and there was no association between them (p=0.39).

In the past, seroprevalence of HBV infection in patients with end-stage renal disease was high and it was the most common and major cause of viral hepatitis among these patients (8,9). As an example, 30 years ago, a study from Iran reported that 68% of hemodialysis (HD) patients had hepatitis B surface antibody (anti-HBs Ab). In comparison, the prevalence of anti-HBs Ab in voluntary blood donors and, hemodialysis staff were 30% and 39% respectively, that were significantly less than HD patients (8).

The prevalence of HBV infection among patients receiving maintenance dialysis in the developed countries was also high in the past few decades (9). For example, in the United State, it was the major cause of viral hepatitis in patients with end-stage renal disease (9). However, it appears that the incidence and prevalence of HBV infection in dialysis patients has decreased in recent years. (10,11).

Mahdavimazdeh et al investigated the seroprevalence of HBV infection in 2630 HD patients living in the province of Tehran, Iran (11). They screened HD patients for HBs Ag and anti-HBsAb by enzyme-linked immunosorbent assays. In this study, 46 patients were HBs Ag positive and therefore the prevalence of HBV infection was only 2.6% lower than the other reports during the last few decades. The results of our study are

similar and the prevalence of HBs Ag positivity among ESRD patients was only 1.15% which was much lower than the other last reports.

According to the result of our study and the study of Mahdavimazdeh *et al*, the prevalence of HBs Ag in ESRD patients is not higher than general population. For example Merat *et al*, in a cross-sectional study during 2006 evaluated the Prevalence of HBs Ag and Anti-Hepatitis B Core Antibody in three provinces of Iran namely Tehran, Golestan, and Hormozgan (12). In this study the Prevalence of HBs Ag and Anti-HBC Antibody were 2.3% and 14.2% for Tehran, 5.1% and 36.9% for Golestan and 2.7% and 13.3% for hormozgan. In overall they were 2.6% and 16.4% which were similar to the report of Mahdavimazdeh *et al*.

Ghanaei *et al* evaluated the prevalence of hepatitis B and C virus infections among 221,508 Guilan's volunteer blood donors referring to the Blood Transfusion Organization from 1998 till 2003 (13). They used ELISA method for HBs Ag detection. In this study the prevalence of HBs Ag was 0.45% which was much lower than the results of our study. However, it appears that determination of HBs Ag in blood donors can underestimate its prevalence in general population due to exclusion of high risk group from pool of donation (14).

In a study by Amini *et al* and by Harbour *et al*, in volunteer blood donors, it was found that the prevalence of HBS Ag was 2.49% and 1.7% respectively (15.16). In other study on volunteer blood donors in Tehran, Iran, 250000 people evaluated and in this study 3.6% of men and 1.6% of women were positive for HBs Ag (17). It appears that some factors have an important role for the decline of the incidence and prevalence of HBV infection in dialysis patients and the spread of HBV infection in dialysis units in developed and developing countries. Some of them include: Introduction of rigorous infection control measures (such as standard barrier precautions to prevent exposure to blood borne agents and universal precautions), reduced need for transfusion after the advent of erythropoietin, routine screening of patients and staff for HBs Ag and anti–HBs antibody and hepatitis B vaccination in susceptible patients and staff, don't use of reprocessing of hemodialysis for reuse in both HBs Ag positive and negative patients in some of countries and prohibition of dialyzer reuse in HBs Ag positive patients in other countries and segregation of dialysis rooms and machines for HBs Ag positive patients (18,19,20,21).

Acknowledgments

We thank the subjects for compliance in participating in this study and Imam Research center for statistical analysis.

References

1. Margolis HS, Alter MJ, Hadler SC. Hepatitis B: Evolving epidemiology and implications for control. Seminars in liver disease. 1991;11:84-92.
2. Yeoh EK. Hepatitis B virus infection in children. Vaccine. 1990;8:6-9.
3. Maynard JE. Hepatitis B: global importance and need for control. Vaccine. 1990;8:18-20.
4. Lewis-Ximenez LL, Oliveira JM, Mercadante LA, De Castro L, Santa Catharina W, Stuver S, et al. Serological and vaccination profile of hemodialysis patients during an outbreak of hepatitis B virus infection. Nephron. 2001;87(1):19-26.
5. Vladutiu DS, Cosa A, Neamtu A, State D, Braila M, Gherman M, et al. Infections with hepatitis B and C viruses in patients on maintenance dialysis in Romania and in former communist countries: yellow spots on a blank map? J Viral Hepat. 2000;7(4):313-9.
6. De Castro L, Araujo NM, Sabino RR, Alvarenga F, Yoshida CF, Gomes SA. Nosocomial spread of hepatitis B virus in two hemodialysis units, investigated by restriction fragment length polymorphism analysis. Eur J ClinMicrobiol Infect Dis. 2000;19(7):531-7.
7. Fabrizi F, Bunnapradist S, Lunghi G, Aucella F, Martin P. Epidemiology and clinical significance of hepatotropic infections in dialysis patients. Minerva UrolNephrol. 2004;56:249–57.
8. Farzadegan H, Harbour C, Ala F. The prevalence of hepatitis B surface antigen and its antibody in blood donors and high risk groups in Iran.Vox Sang. 1979;37(3):182-6.

9. Tokars, JI, Alter, MJ, Favero, MS, et al. National surveillance of hemodialysis associated diseases in the United States, 1990. ASAIO J. 1993;39:71-2.
10. Alavian SM, Bagheri-Lankarani K, Mahdavi-Mazdeh M, Nourozi S. Hepatitis B and C in dialysis units in Iran: changing the epidemiology. Hemodial Int. 2008;12(3):378-82.
11. Mahdavi-Mazdeh M, Zamyadi M, Nafar M. Assessment of management and treatment response in hemodialysis patients in Tehran province, Iran. Nephrol Dial Transplant. 2008;23:288–93.
12 .Merat S, Rezvan H, Nouraie M, Jamali A, Assari S, Abolghasemi H, et al. The prevalence of hepatitis B surface antigen and anti-hepatitis B core antibody in Iran: a population-based study. Arch Iran Med. 2009;12(3):225-31.
13. Mansour-Ghanaei F, Fallah MS, Jafarshad R, Joukar F, Salari A, TavafzadehRShafaghi A, Yousefi-Mashhoor M, Ramezani N, Farzaneh F, et al. Prevalence of Hepatitis B Surface Antigen and Hepatitis C Virus Antibody and Their Risk Factors among Guilan's Volunteer Blood Donors (1998-2003). Hepatitis Monthly. 2007;7(4):239-41.
14. Khedmat H, Alavian SM, Miri SM, Amini M, Abolghasemi H, Hajibeigi B, et al. Trends in seroprevalence of hepatitis B, hepatitis C, HIV, and syphilis infections in Iranian blood donors from 2003 to 2005. Hepatitis Monthly. 2009;9(1):24-8.
15. Amini S, Mahmoodi MF, Andalibi S, Solati AA. Seroepidemiology of hepatitis B, delta and human immunodeficiency virus infections in Hamadan province, Iran: A population based study. J Trop Med Hyg. 1993;96(5): 277-87.
16. Harbour C, Foroozanfar N, Sharma MK, Ala F. Professional and voluntary blood, A preliminary study in Iran. Vox sang. 1978;34:87-91.
17. Rezvan H. Epidemiology of viral hepatitis in Iran, International Symposium on Hepatitis. 1993 Nov, Tehran, Iranian Blood Transfusion Organization.
18. Centers for Disease Control: Control measures for hepatitis B in dialysis centers. Viral hepatitis Investigations and Control Series, Atlanta. Centers for Disease Control and Prevention. 1977.
19. Kellerman S, Alter MJ. Preventing hepatitis B and hepatitis C virus infections in end-stage renal disease patients: back to basics. Hepatology. 1999;29:291-2.
20. Miller ER, Alter MJ, Tokars JI. Protective effect of hepatitis B vaccine in chronic hemodialysis patients.Am J Kidney Dis 1999;33:356.
21. DaRoza G, Loewen A, Djurdjev O, et al. Stage of chronic kidney disease predicts seroconversion after hepatitis B immunization: earlier is better. Am J Kidney Dis. 2003;42:1184.