

Original article:

Prevalence of HCV Infection in Hemodialysis Patients of South Khorasan in Comparison With HBV, HDV, HTLV I/II, And HIV Infection

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Abstract:

Background and objective: This study was performed to evaluate the prevalence of Hepatitis C virus (HCV) infection as well as HBV, HDV, HTLV I/II, and HIV infection in hemodialysis patients in our district.

Methods: The subjects of this study involved 41 hemodialysis patients admitted to hemodialysis ward, Vali- Asr hospital. HBV, HDV, HIV, and HTLV1/2 infections were evaluated by enzyme-linked immunosorbent assay (ELISA) technique. Serum anti- HCV anti-body was measured using the 3rd generation of ELISA kit. HCV Viremia was evaluated in all patients using RT-PCR technique.

Results: HCV infection was not observed in none of patients by ELISA technique; however RT-PCR technique demonstrated HCV viremia in one (2.43%) patient. HBsAg was detected in 4(9.75%) patients, and one (2.43%) was Anti HTLV 1/2 positive; none of patients were HDV or HIV positive.

Conclusion: HCV infection is less common than HBV infection in our patients. ELISA technique can not demonstrate all hemodialysis patients with HCV infection, For this reason it is requirement to evaluate this group of patients for HCV infection using RT-PC technique.

Keywords: Hemodialysis, Hepatitis C, Hepatitis B, HIV Infections, HTLV I/II Infections

DOI: <http://dx.doi.org/10.3329/bjms.v13i1.13903>

Bangladesh Journal of Medical Science Vol. 13 No. 01 January '14 Page 36-39

Introduction

Hepatitis C virus (HCV) infection is the most common chronic blood borne infection in the world¹. Estimated global prevalence of HCV infection is 3%². It is estimated that 5-20% of HCV- infected patients will develop cirrhosis, 1-4% of whom will annually develop hepatocellular carcinoma^{2,3}. Hepatitis C is the major cause of liver disease among patients with chronic renal failure⁴. Patients with chronic renal failure are at higher risk of acquiring blood borne infections including viral hepatitis and HIV infection⁵. Thus the routine evaluation of hemodialysis patients for blood borne infections including HCV infection is recommended⁵⁻⁶.

Nowadays, ELISA is the most used technique for

HCV infection. Although the ELISA technique has been improved in last decades and different generations of ELISA kits have developed; however it could not diagnose all patients with Hepatitis C⁷. PCR technique has been developed in last decades for detecting patients with Hepatitis C as well as viremia suspicious persons⁸. This study was performed to evaluate the prevalence of HCV infection in comparison with other viral blood borne infections in hemodialysis patients in our district.

Methods

This cross-sectional study was performed on hemodialysis patient that referred to hemodialysis ward of Vali-Asr hospital, Birjand, Iran. Birjand is the capital of South Khorasan province, eastern state, of Iran with a total population of nearly 400,

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000. Hemodialysis ward of Vali-Asr hospital is the main center where hemodialysis patients were admitted. The subjects of this study were included all hemodialysis patients who were admitted during fall of 2010.

Subjects were interviewed about their demographic characteristics and their medical history as well. A blood sample was collected at enrollment. All serum samples were analyzed by ELISA technique in terms of HCV antibody (Dia-pro diagnostic ® HCV ELISA, Italy), HBs Ag (Dia lab ® HBs Ag, Italy), and anti HIV antibodies (Dia lab ® HIV Ab, Italy) and anti-HTLV 1/2 antibodies (Dia labs ® Diagnostic HTLV 1/2, Italy) as well.

Serum HCV-RNA was qualitatively analyzed for all serum specimens by nested reverse transcriptase polymerase chain reaction assay (RT-PCR) (Cinnagen ® HCV-RNA, Iran). Ethical approval was obtained from the ethics committee of Birjand University of Medical Sciences. Written informed consent was signed from the patients at enrolment.

Results

In this study we evaluated forty-one hemodialysis patients, who twenty-eight (68.3%) was male. Mean age of the patients were 54.93 ± 16.46 years. The mean of duration of hemodialysis was 16.02 ± 16.98 months; the details are listed in Table 1.

HCV infection was not diagnosed in none of patients by ELISA technique, but RT-PCR technique showed the viremia in one (2.43%) patient. This patient was HBs Ag positive and had history of inguinal hernia surgical repair (10 Years ago) and blood transfusion due to anemia due to CRF as well. Four (9.75%) out of 41 patients were HBs Ag positive, and one (2.43%) was Anti HTLV 1/2 positive. Furthermore, none of the patients were HDV or HIV positive.

Discussion

This study indicated that average prevalence of HCV infection among hemodialysis patients, with at least one year or more history of hemodialysis, in Birjand is 2.43%. The reported prevalence of HCV infection among hemodialysis patients varies from 1.9% in the Slovenian to 89.6% in Saudi Arabia⁴⁻⁹. Reported prevalence of the infection from different parts of Iran varies from 5.5% in Shiraz to 55.9% in Rasht¹⁰⁻²⁰. From the data, it was observed that the infection is less prevalent among hemodialysis patients in our region comparing with other regions

of Iran. This finding could be attributed to lesser prevalence of HCV infection in normal population of South Khorasan.

Ghafouri et al. reported that only 0.054% of first-time blood donors in South Khorasan had HCV infection²¹. This is nearly one third of prevalence of this infection in the country prevalence of infection in this region is nearly one-third². The prevalence of HCV infection among hemophilia patients of South Khorasan is less than other parts of Iran as well²².

Furthermore, our study observed that HCV RNA was found in one patient (2.4%), while Anti HCV antibody was not found in none of patients by ELISA technique. Thus, there are some other studies showing the deficiency of ELISA in detecting all patients with HCV infection^{8,23-24}. In hemodialysis patients, the reported Prevalence of HCV RNA positive/ HCV-Ab negative was varied from 0-12%⁴. This phenomenon could be due to deficiency of antibody production in hemodialysis patients, as well as long window period of HCV infection in hemodialysis patients²⁴.

From this data it can be argued that 9.75% of our patients were HBs-Ag positive. This is higher than other reports from Iran which the prevalence of HBV infection in hemodialysis patients varies from 2.4 to 6.72 percents^{14,16,18,25-30}. This could be due to that none of patients had completed their HBV vaccination program till this study.

Based on the data of this study, all patients except one (2.43%) had not HTLV I/II infection. This result is similar to reported studies about rate of the infection among hemodialysis patients from other regions^{23,31-33}. As respects, this patient had history of hemodialysis for three years and none of other hemodialysis patients, which were hemodialysed simultaneously in same center had not HTLV I/II infection, It seems that hemodialysis machines could not transmit the HTLV I/II infection. There are other studies in which this conclusion can be seen^{34,35}. All of our patients were without any HIV infection. This is not surprise finding as the HIV infection in normal population of our province is very rare²¹.

Conclusion

We concluded that, HCV infection is less common than HBV infection in our patients. Since all

hemodialysis patients with HCV infection could not be found by ELISA technique, hence it is needed to evaluate this group of patients for HCV infection by RT-PCR. Another outstanding finding of the study is that it seems that HTLV 1/2 infection are not transmissible via hemodialysis machines.

Acknowledgments

The financial support of the Research Council, Birjand University of Medical Sciences is gratefully

acknowledged. Researchers wishing to offer a big thanks to patients, physicians and nursing staff of the dialysis unit at Vali- Asr hospital. The authors would like to thank Dr. M. Ghafouri for performing RT-PCR on serum specimens too and the vice chancellor for research affairs at the Birjand University of Medical Sciences for financial support. The authors grate the Zamen Salamati co. for English proofreading.

Reference:

- Alavian SM, Fallahian F. Epidemiology of Hepatitis C in Iran and the World. *Shiraz E Medical Journal*. 2009;**10**(4):162-73.
- Alavian SM, Ahmadzad-Asl M, Lankarani KB, Shahbabaie MA, Bahrami Ahmadi A, Kabir A. Hepatitis C infection in the general population of Iran: A systematic review. *Hepat Mon*. 2009;**9**(3):211-23.
- Alavian SM. Hepatitis C infection in Iran; A review article. *Iran J Clin Infect Dis*. 2009;**4**(1):47-59.
- Rahnavardi M, Hosseini Moghaddam S, Alavian SM. Hepatitis C in Hemodialysis Patients: Current Global Magnitude, Natural History, Diagnostic Difficulties and Preventive Measures. *Am J Nephrol*. 2008;**28**:628-40. <http://dx.doi.org/10.1159/000117573> PMID:18285684
- Wreghitt TG. Blood-borne virus infections in dialysis units--A review. *Reviews in Medical Virology*. 1999;**9**(2):101. [http://dx.doi.org/10.1002/\(SICI\)1099-1654\(199904/06\)9:2<101::AID-RMV234>3.0.CO;2-U](http://dx.doi.org/10.1002/(SICI)1099-1654(199904/06)9:2<101::AID-RMV234>3.0.CO;2-U)
- Zuckerman M. Surveillance and control of blood-borne virus infections in haemodialysis units. *J Hosp Infect*. 2002 ;**50**(1):1-5. <http://dx.doi.org/10.1053/jhin.2001.1068> PMID:11825044
- Medhi S, Potukuchi SK, Polipalli SK, Swargiary SS, Deka P, Chaudhary A, et al. Diagnostic utility of hepatitis C virus core antigen in hemodialysis patients. *Clin Biochem*. 2008 ;**41**(7-8):447-52. <http://dx.doi.org/10.1016/j.clinbiochem.2007.12.024> PMID:18267117
- Tashkandy M, Khodari Y, Ibrahim A, Dhafar K, Gazzaz Z, Azab B. Evaluation of the available anti-HCV antibody Detection Tests and RT-PCR assay in the Diagnosis of Hepatitis C Virus Infection. *Saudi Journal of Kidney Diseases and Transplantation*. 2007;**18**(4):523. PMID:17951937
- Jasuja S, Gupta AK, Choudhry R, Kher V, Aggarwal DK, Mishra A, et al. Prevalence and associations of hepatitis C viremia in hemodialysis patients at a tertiary care hospital. *Indian J Nephrol*. 2009;**19**(2):62-7. <http://dx.doi.org/10.4103/0971-4065.53324> PMID:20368926 PMID:PMC2847810
- Alavian SM, Einollahi B, Hajarizadeh B, Bakhtiari S, Nafar M, Ahrabi S. Prevalence of hepatitis C virus infection and related risk factors among Iranian haemodialysis patients. *Nephrology*. 2003;**8**(5):256-60. <http://dx.doi.org/10.1046/j.1440-1797.2003.00166.x> PMID:15012714
- Alavian SM, Tabatabaei SV, Mahboobi N. Epidemiology and risk factors of HCV infection among hemodialysis patients in countries of the Eastern Mediterranean Regional Office of WHO (EMRO): a quantitative review of literature. *Journal of Public Health*. 2011;**19**:191-203. <http://dx.doi.org/10.1007/s10389-010-0366-2>
- Amiri Z, Shakib A, Toorchi M. Seroprevalence of hepatitis C and risk factors in haemodialysis patients in Guilan, Islamic Republic of Iran. *East Mediterr Health J*. 2005;**11**(3):372-6. PMID:16602456
- Ansar M, Kooloobandi A. Prevalence of hepatitis C virus infection in thalassemia and haemodialysis patients in north Iran Rasht. *Journal of viral hepatitis*. 2002;**9**(5):390-2. <http://dx.doi.org/10.1046/j.1365-2893.2002.00368.x>
- Assarehzadegan M, Shakerinejad G, Noroozkohnejad R, Amini A, Rahim Rezaee S. Prevalence of hepatitis C and B infection and HC V genotypes among hemodialysis patients in Khuzestan province, Southwest Iran. *Saudi Journal of Kidney Diseases and Transplantation*. 2009;**20**(4):681. PMID:19587521
- Hajiani E, Hashemi J, Masjedizadeh R, Shayesteh AA, Idani E, Rajabi T. Seroepidemiology of hepatitis C and its risk factors in Khuzestan Province, southwest of Iran: a case-control study. *World J Gastroenterol*. 2006;**12**(30):4884-7. PMID:16937474
- Hamissi J, Hamissi H. Occurrence of hepatitis B and C infection among hemodialyzed patients with chronic renal failure in Qazvin, Iran: A preliminary study. *Journal of Collaborative Research on Internal Medicine & Public Health*. 2011;**3**:89-96.

17. Jabbari A, Besharat S, Khodabakhshi B, Gorgan I. Hepatitis C in hemodialysis centers of Golestan province, northeast of Iran (2005). *Hepat Mon.* 2008;**8**(1):61-5.
18. Mansour-Ghanaei F, Sadeghi A, Mashhour MY, Joukar F, Besharati S, Roshan ZA, et al. Prevalence of Hepatitis B and C Infection in Hemodialysis Patients of Rasht (Center of Guilan Province, Northern Part of Iran). *Hepat Mon.* 2009;**9**(1):45-9.
19. Nemati E, Alavian S, Taheri S, Moradi M, Pourfarziani V, Einollahi B. Hepatitis C virus infection among patients on hemodialysis: A report from a single center in Iran. *Saudi Journal of Kidney Diseases and Transplantation.* 2009;**20**(1):147. PMID:19112238
20. Toosi MN, Larti F, Seifei S, Abdollahi A. Prevalence of viral hepatitis in hemodialysis patients in Tehran, Iran. *J Gastrointestin Liver Dis.* 2008 Jun;**17**(2):233-4. PMID:18568149
21. Ghafouri M, Ameli MR. Comparing prevalence of transfusion transmitted viral infections in various population groups of South Khorasan. *Sci J Blood Transfus Organ.* 2011;**7**(4):242-8.
22. Ziaee M, Zarban A, Malekinejad P, Akhbary H. Evaluation of HGV viremia prevalence and its coinfection with HBV, HCV, HIV and HTLV-1 in hemophilic patients of Southern Khorassan, Iran. *HEPATIS MONTHLY.* 2007;**7**(1):11-4.
23. Rigopoulou EI, Stefanidis I, Liaskos C, Zervou EK, Rizos C, Mina P, et al. HCV-RNA qualitative assay based on transcription mediated amplification improves the detection of hepatitis C virus infection in patients on hemodialysis: Results from five hemodialysis units in central Greece. *Journal of Clinical Virology.* 2005;**34**(1):81-5. <http://dx.doi.org/10.1016/j.jcv.2005.05.007> PMID:16009596
24. Hussein M, Mooij J, Hegazy M, Bamaga M. The impact of polymerase chain reaction assays for the detection of hepatitis C virus infection in a hemodialysis unit. *Saudi Journal of Kidney Diseases and Transplantation.* 2007;**18**(1):107. PMID:17237902
25. Aghakhani A, Banifazl M, Kalantar E, Eslamifar A, Ahmadi F, Razeghi E, et al. Occult Hepatitis B Virus Infection in Hemodialysis Patients With Isolated Hepatitis B Core Antibody: A Multicenter Study. *Therapeutic Apheresis and Dialysis.* 2010;**14**(3):349-53. <http://dx.doi.org/10.1111/j.1744-9987.2009.00798.x> PMID:20609190
26. Alavian SM. Occult hepatitis B and hemodialysis patients need increased precautions with the interpretation of results. *Ther Apher Dial.* 2010 Dec;**14**(6):609-10; author reply 10-1. <http://dx.doi.org/10.1111/j.1744-9987.2010.00878.x> PMID:21118374
27. Khameneh ZR, Sepehrvand N. Survey of hepatitis B status in hemodialysis patients in a training hospital in Urmia, Iran. *Saudi J Kidney Dis Transpl.* 2008 May;**19**(3):466-9. PMID:18445915
28. Mahdavamazdeh M, Hosseini-Moghaddam SM, Alavian SM, Yahyazadeh H. Hepatitis B Infection in hemodialysis patients in Tehran province, Iran. *Hepat Mon.* 2009;**9**(3):206.
29. Mostaghni AA, Soltanian A, Mokhtari E, Japoni S, Mehrabani D. Seroprevalence of hepatitis B virus among hemodialysis patients in Bushehr province, southern Iran: HBV seroprevalence in hemodialysis patients. *Hepat Mon.* 2011 Mar;**11**(3):200-2. PMID:22087144 PMID:PMC3206679
30. Toosi MN, Larti F, Rasteh M, Foroutan H, Salarieh N, Lessan-Pezeshki M, et al. Risk factors and seroprevalence of hepatitis B and C infections among hemodialysis patients in Tehran. *Iranian Journal of Pathology.* 2007;**2**(4):181-6.
31. De Rossi A, Vertolli U, Romagnoli G, Bertoli M, Gassa OD, Chieco-Bianchi L. LAV/HTLV-III and HTLV-I Antibodies in Hemodialysis Patients. *Nephron.* 1986;**44**(4):377-8. <http://dx.doi.org/10.1159/000184025> PMID:2879251
32. Karimi A, Nafici M, Imani R. Comparison of Human T-cell Leukemia Virus Type-1 (HTLV-1) Seroprevalence in High Risk Patients (Thalassemia and Hemodialysis) and Healthy Individuals from Charmahal-Bakhtiari Province, Iran. *Kuwait medical journal.* 2007;**39**(3):259.
33. Khameneh ZR, Baradaran M, Sepehrvand N. Survey of the seroprevalence of HTLV I/II in hemodialysis patients and blood donors in Urmia. *Saudi J Kidney Dis Transpl.* 2008 Sep;**19**(5):838-41. PMID:18711311
34. Mojaat N, Kaabi H, Hmida S, Maamar M, Slama S, Boukef K. Seroprevalence of HTLV-I/II Antibodies in Blood Donors and Different Groups at Risk in Tunisia. *JAIDS Journal of Acquired Immune Deficiency Syndromes.* 1999;**22**(3):314. PMID:10770357
35. DeVito C, Pampuro S, Del Pino N, Peralta LM, Libonatti O. HTLV-I/II Survey On Hemodialysis Patients In Buenos Aires. *JAIDS Journal of Acquired Immune Deficiency Syndromes.* 1996;**12**(5):525,6.