

Hepatitis B, C virus co-infection and behavioral risks in HIV-positive patients in southern Iran

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Abstract

Objective: To determine the risk factors and frequency of hepatitis B and C virus co-infections in human immunodeficiency virus-positive patients.

Methods: The cross-sectional study was conducted at the Control of Diseases Centre of Kerman Medical University, southern Iran, between May and December 2011. Demographic features and history of high-risk behaviours were evaluated in 165 patients positive for human immunodeficiency virus. Third-generation hepatitis C virus antibody and hepatitis B surface antigen tests were performed by enzyme-linked immunosorbent assay method. SPSS 18 was used for statistical analysis.

Results: Out of the 165 patients, 136 (82.4%) were male and 29 (17.6%) were female. The mean age of the subjects was 40.4±9 years. Positive hepatitis C antibody was found in 122 (73.9%) and positive hepatitis B surface antigen was present in 6 (3.6%). Frequency of all three viruses co-infection was 3 (1.8%). History of imprisonment (OR= 17.5; 95% CI: 7.1-43.1) and drug injection addiction (OR= 15.3; 95% CI: 6.4-36.1) were the most significant risk factors involved in hepatitis C virus co-infection.

Conclusion: Seroprevalence of hepatitis C virus and human immunodeficiency virus co-infection was high and it was strongly related to history of imprisonment and drug injection addiction.

Keywords: Human immunodeficiency virus, Hepatitis virus, Co-infection. (JPMA 64: 134; 2014)

Introduction

As the hepatitis C (HCV) and B (HBV) viruses and human immunodeficiency virus (HIV) have similar transmission routes, including sexual contact, intravenous drugs (IVD) injection and mother-to-child passage, it is anticipated that co-infection of these viruses could be high.¹

Worldwide it is estimated that HBV, HCV and HIV infected people are 400, 170, and 38.6 million respectively. Furthermore, among the HIV-positive patients, 2 to 4 million have HBV and 4 to 5 million have HCV co-infection.² Infection with HBV is still endemic in many parts of the world and is a serious threat to public health.³ HCV infection is also a serious disease, increasing in prevalence due to lack of an effective vaccine. Frequency of co-infection in these viruses mainly depends on the route of transmission. The risk of HIV-HCV co-infection was higher in IVD addicts than those who were infected by sexual contact.¹ The rate of co-infection has been reported from 10% in sexually transmitted cases to 90% in IVD users.^{4,5}

The predominant route of HIV transmission in Iran is the

IVD addiction. There are about 250,000 users in Iran; more than 2/3 of them have been infected with HIV.^{6,7}

The global prevalence of HCV infection has been reported at about 1%. In Iran, its frequency has been estimated at about 0.1% which is likely to be increased in the future.⁸ HBV prevalence in Iran after the introduction of vaccination programme in 1992 has decreased to 2.6%.⁹

HBV and/or HCV co-infection has exposed HIV-positive patients to the risk of liver complications. It is estimated that the most frequent cause of mortality not related to the acquired immunodeficiency syndrome (AIDS) in HIV-infected patients is related to liver diseases.^{1,10} In case of co-infections, higher rates of advanced fibrosis and cirrhosis have been reported.^{1,11} HIV-positive patients are potential threat to themselves and public health, so it is necessary to monitor this high-risk group for other potentially serious viruses periodically.

The current study was conducted to clarify the prevalence of HIV-HCV and/or HBV co-infection and the related risk factors in Kerman province, the largest one, located in southeast Iran.

Patients and Methods

The cross-sectional study was conducted on 165 HIV-infected patients from May to December 2011 and comprised those who had been registered with the

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Control of Diseases Center (CDC) of Kerman Medical University. The center deals with all patients with high-risk behaviours and provides medical care and social support across the province. The institutional ethics committee approved the study.

Subjects who had tested positive for HIV antibody through enzyme-linked immunosorbent assay (ELISA) and confirmed by Western-blot (Innogenetics kit, Belgium) assay were eligible for the study. Those who refused voluntary participation or had consecutive negative Western bolt assay were excluded.

Data collection, including demographic features and history of behaviour risks, was recorded by a trained physician.

Three mL of blood was obtained from each patient for HCV-HBV serological markers. The third-generation HCV Ab test (ELISA; Ultra kit Hepanostika, UK) and HBsAg (Ultra kit, Biomerieux co., France) were detected.

To present the descriptive statistics, mean and standard deviation (SD) for continuous variables and absolute and relative frequencies for categorical variables were used. Chi square test, Fisher's exact test and univariate logistic regression were used to determine the association between behavioural risk factors and being HCV-positive among the HIV patients. All statistical analysis was done on SPSS 18 and p-value less than 0.05 was considered significant.

Results

A total of 180 patients were in attendance. Of them 15 (8.33%) were excluded; 13 (7.2%) were not willing to participate and 2 (1.11%) had consecutive negative Western bolt assay. The study population, as such, was 165 (91.66%).

Out of these 165 HIV-infected patients, 136(82.4%) subjects were male and 29(17.6%) subjects were female. The mean age of subjects was 40.4±9 years (range of 7 to 65 years).

Patients' demographic characteristics, including gender, level of education, employment status, marital status and place of residency are presented in Table-1. Among high risk behaviors imprisonment history, drug injections and tattooing with the frequencies of 131(79.3%), 126 (76.2%) and 98(59.4%) were more prevalent. Other behavioural risk factors are shown in Figure-1.

Regarding the viral markers, 122(73.9%) cases had positive HCV Ab and 6(3.6%) patients had positive HBs Ag. Prevalence of co-infection with all the three HIV, HBV and

Table-1: Demographic features of HIV-infected subjects (N=165).

Variable	Frequency (%)	HCV Positive	HCV Negative	P-value
Gender				
Male	136 (82.4)	117 (95.9)	19 (44.2)	<0.001*
Female	29 (17.6)	5 (4.1)	24 (55.8)	
Employment Status				
Unemployed	93 (56.4)	64 (52.5)	29 (67.4)	0.039**
Employed	3 (1.8)	1 (0.8)	2 (4.7)	
Self-employment	69 (41.8)	57 (46.7)	12 (27.9)	
Education				
Illiterate	21 (12.7)	14 (11.5)	7 (16.3)	0.093**
Elementary school	46 (27.9)	31 (25.4)	15 (34.9)	
High school	95 (57.6)	76 (62.3)	19 (44.2)	
Academic	3 (1.8)	1 (0.8)	2 (4.7)	
Residency				
Rural	4 (2.40)	2 (1.6)	2 (4.7)	0.27**
Urban	161 (97.60)	120 (98.4)	41 (95.3)	
Marital status				
Single	66 (40)	59 (48.4)	7 (16.3)	<0.001**
Married	38 (23.0)	17 (13.9)	21 (48.8)	
Divorced	49 (29.7)	41 (33.6)	8 (18.6)	
Widowed	12 (7.3)	5 (4.1)	7 (16.3)	

*Chi square test. **Fisher's Exact test. HIV: Human Immunodeficiency Syndrome. HCV: Hepatitis C Virus.

Table-2: The odds ratios of being HCV positive for each behavioral risk factor.

Behavioral risk factors	OR (95% CI)	P value
Imprisonment history	17.5 (7.1-43.1)	<0.001
Injection Drug use	15.3 (6.4-36.1)	<0.001
Tattooing	5.3 (2.4- 11.3)	<0.001
Unprotected sexual intercourse contact	3.7 (1.74-7.8)	<0.001

HCV: Hepatitis C Virus.

HCV viruses was 3(1.8%).

Out of 122 HCV infected cases, 117(95.9%) were male. Some of the demographic variables such as age, gender, marital and employment status had significant association with positive anti HCV Ab ($p < 0.001$). Infection with HCV was more prevalent in men. Majority of them were single, unemployed, aged 15 -39 years old. There was a significant association between HCV infection and some high risk behaviours: imprisonment (OR= 17.5, 95% CI: 7.1-43.1, $p < 0.001$), injecting drug addiction (OR= 15.3, 95% CI: 6.4-36.1, $p < 0.001$), tattooing (OR= 5.3, 95% CI: 2.4-11.3, $p < 0.001$) and unprotected sexual intercourse (OR= 3.7, 95% CI: 1.74-7.8, $p < 0.001$) (Table-2).

All of the HBs Ag-positive patients were men. History of HBV vaccination was present in 59(35.8%) of cases. No

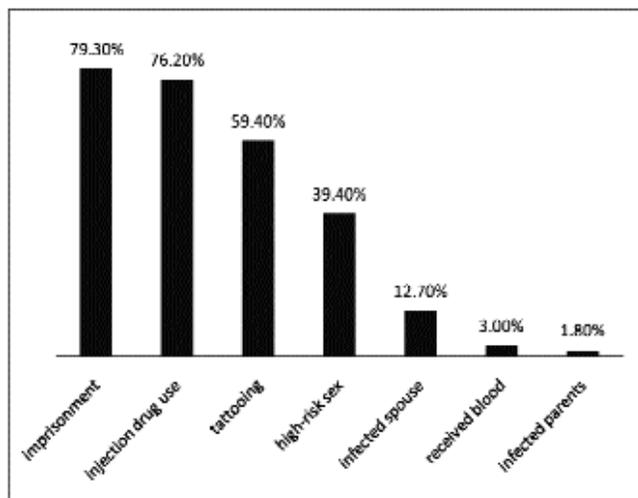


Figure: Frequency of each behavioural factor in Human Immunodeficiency Syndrome patients.

significant association was observed between positive HBs Ag, demographic variables and the high-risk behaviours at all.

Discussion

The prevalence of co-infection with hepatitis C and B in HIV-infected individuals was 73.9% and 3.6% respectively. Besides, the frequency of co-infection involving all the three viruses was 1.8% in the current study.

In a study in France on 1849 HIV-infected patients, the prevalence of co-infection with HCV was 24.3%; it ranged from 3.1% in homosexual men to 92.8% IVD users. Positive HBsAg and concurrent HIV-HCV-HBV co-infection were 7% and 1.6%.¹² In another study from Greece, the prevalence of HCV in HIV-infected individuals differed from 8.8% in heterosexuals to 58.3% in IVD addicts.¹³ In a Brazilian study, the prevalence of HCV and HBV co-infections in HIV cases was reported to be 17.7% and 5.7% respectively.¹⁴ In the Lorestan province, southwest of Iran, HIV and HCV co-infection was found to be 72%.¹⁵

Generally, in American and European countries where the HIV transmission proves to be mainly through the sexual contact, the prevalence of HCV co-infection has been reported at 33%.¹⁶ HIV- HCV co-infection is higher in areas where the major route of transmission is IVD injection.^{5,17} In the present study, the high prevalence of HCV co-infection and concurrent HIV-HCV-HBV infection were related to IVD injection as the major cause of HIV infection.

Evidence of previous HBV infection is observed in 90% of HIV-positive patients, but positive HBsAg is found in 5-

15% of the patients.¹⁸ In a study from Nigeria on 260 HIV-positive patients, the prevalence of HBsAg was reported 11.5%.¹⁹ In another study from Italy, HBV and HIV co-infection was reported in 6.7% of the cases.²⁰ In a study in Iran, the co-infection of these two viruses was reported to be 9.4%.²¹

The results of a meta-analysis comprising 17664 patients showed that the risk of HIV-HCV co-infection was more prevalent than those of HBV-HIV co-infection.²² It was explained by using vaccination against HBV and the higher degree of spontaneous HBV resolution compared to HCV infection.

In the present study, history of high-risk behaviours, particularly IVD, imprisonment, tattooing and unprotected sexual intercourse were found to be related to HCV co-infection. Previous studies have also generally reported these findings, especially among prisoners. Based on another study from Iran, multi-injection, repeated imprisonment, longer period of injection and needle- sharing facilitate the transmission of these infections among IVD users.²³

The more prevalence of HIV-HCV co-infection among male gender could be explained by more IVD use and unsafe sexual contacts especially in single men.

The frequency of HIV-HBV co-infection in this study was 3.6%, slightly more than those of average 2.6% for general population.⁹ In addition, no relation was found between HBV infection with demographic features and high-risk behaviours. This might be due to the low sample size of HBV cases.

Conclusion

Prevalence of HIV and HCV co-infection was high in southern part of Iran. IVD use and imprisonment history appeared to be the two major risk factors. Attention to prophylactic measures, including public education about viral transmission routes, prisoners' medical issues and avoidance of IVD injection, should be further emphasised.

Acknowledgement

We are grateful to Deputy for Health of Kerman Medical University for facilitating the research.

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