

**Prevalence of Hepatitis B, Hepatitis C and Human Immunodeficiency Virus
Among trauma patients:
A study on 27000 trauma patients**

Abstract

Background: The aim of this study was to investigate the prevalence of Hepatitis B(HBV),Hepatitis C(HCV),and Human immunodeficiency virus(HIV)in a large trauma center in northeast of Iran.

Methods: In a descriptive cross sectional study, 27252 consecutive patients admitted in a trauma hospital in Mashhad, Iran during March 2012 to March 2017 who required surgery for their traumatic injuries were screened for the presence of Hepatitis B surface antigen (HBsAg), anti HCV Ab and anti HIV Ab.

Results: In 926 patients at least one of the serologic tests was positive, showing an incidence of 3.3% seropositivity among study population. HBsAg was positive in 523 patients (1.9%), HCV Ab in 388 (1.4%) and HIV Ab in 15 patients (0.05%) respectively. 19 patients (0.06%) were simultaneously infected by more than one virus.

Conclusion: The results of this study demonstrate that seroprevalence of blood born-pathogens among trauma patients, especially HCV and HIV, are higher than general population and it emphasized that health care workers in trauma centers must adhere to standard precautions to prevent viral transmission.

Level of Clinical Evidence:4

Keywords: Hepatitis B Virus, Hepatitis C Virus, Human Immunodeficiency Virus, Trauma

Received: 4 months before printing; Accepted: 20 days before printing

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Introduction

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Blood borne pathogens such as Hepatitis B (HBV), Hepatitis C (HCV) and human immunodeficiency virus (HIV) are among most important infectious diseases in developing countries and imposing high financial burden on health care systems. Health care workers are at high risk for being infected by the seropositive patients. Risk of transmission for each needle stick is 6-30% for HBV, 1-3% for HCV and 0.1-0.3% for HIV.(1-3)

Previous studies have indicated higher prevalence of these viruses among trauma patients compared to general population(4-6), so health care workers in trauma centers must adhere accurately to standard precautions to prevent viral transmission. However imposing risk levels are different in various situations and communities and it is directly related to the prevalence of these infections in those populations(7) .Therefore determination of prevalence of blood borne pathogens in different patient populations may lead us to make better policies in hospitals to reduce the rate of transmission. The aim of this study was to determine the prevalence of HIV, HBV and HCV infection in a largest trauma center in east of Iran.

Method

Study participants

This study is a retrospective cross-sectional survey on 27252 patients admitted in shahidkamyab hospital, Mashhad, Iran from March 2012 to March 2017 who needed surgery for a traumatic event. Informed consents for blood sampling were provided for all the study population. Institutional review board also confirmed the study (N.951654).

Measurement

Blood specimens were sent to the hospital laboratory and checked for the viruses using Eliza testing. HBs Ag and HCV Ab were detected by Pishtaz Teb kit, Iran and HIV byDia-pro kit, Italy. All of the positive specimens were reconfirmed by HIVase1,2 for HIV and SURASE B96for HBs Ag and NANBASE C96 for HCV. Seropositive patients admitted during 2017 were assessed for risk factors of viral infection including drug addiction, high risk sexual contacts and history of blood product transfusion. Evaluation of risk factors was performed using medical records of the patients and also phone contact to the patients. Selection of the subgroup of the patients admitted in 2017 was due to the lack of needed information in medical records of the patients of previous years and difficulty in contacting all of the patients.

Data were entered into a database using SPSS software (version 16, Inc, Chicago). The prevalence of the pathogens was calculated as the number of seropositive individuals divided by the total number of the test results.

Results

27252 patients were evaluated during the study period. Demographic data of the patients were summarized in Table 1. In 926 patients at least one of the serologic tests were positive showing an incidence of 3.3% seropositivity among study population. HBsAg was positive in 523 patients (1.9%), HCVAb in 388 patients(1.4%) and HIV Ab in 15

patients(0.05%) respectively. 19 patients (0.06%) were simultaneously infected by more than one virus. Simultaneous infection of HIV and HCV were detected in 9 patients and also 9 patients were positive for both HBsAg and HCV Ab. One patient was infected by HIV, HCV and HBV. Table 2

Table 1. Demographic characteristics of the patients

Variable	n	%
Gender		
Male	18640	68.4%
Female	8612	31.6%
Age Group		
<20	6159	19.9%
20-50	15670	57.5%
>50	159	22.6%
Marital Status		
Single	8448	31%
Married	18804	69%
Residence Location		
urban	20548	75.4%
rural	6704	24.6%

1. Hepatitis B Surface Antigen, 2. Hepatitis C virus antibody, 3. Human Immunodeficiency Virus antibody

Table 2: prevalence of blood borne pathogens

	frequency	Prevalence
HBs Ag ¹	523	1.9%
HCV Ab ²	388	1.4%
HIV Ab ³	15	0.05%
HBs Ag & HCV Ab	9	0.0003
HCV & HIV Ab	9	0.0003
HCV & HIV & HBsAg	1	0.00003

Risk factors for being infected by these viruses were evaluated in seropositive patients admitted in 2017. 17% of seropositive patients had a history of drug addiction, among them 30% were IV drug abusers. History of high-risk sexual contacts and blood product transfusions were recorded in 15% and 30% of these

patients respectively. History of tattooing and phlebotomy were positive in 12% of the patients.

Discussion

Prevalence of HBV infection differs from 1-15% in different countries around the world. Iran is in the region with intermediate prevalence (2-8%) of HBV infection^(8,9)

In this study the prevalence of HBs Ag positive patients was 1.9% which was lower than national reported prevalence of HBV (Alavian, 2008:2.14%, Salehi Vaziri, 2016:2.2%)(10, 11) National HBV vaccination program may lead to decrease in prevalence of HBV infection in recent years. Salehi et al reported 1.3% as the prevalence of HBV infection after 2010. Based on this updated systematic review and meta-analysis the prevalence in our study is higher than general population⁽¹¹⁾.

Prevalence of HCV Ab positive patients was 1.4% in the study population which is much more prevalent than national reported prevalence in general population and blood donors' population that was reported to be less than 1% (0.2-1%)(12, 13). Other authors reported higher prevalence of HCV in trauma centers^(4,5).

HIV prevalence was 0.05% in our study which demonstrates low prevalence of this virus in Iran but it is higher than national reported prevalence. There were 61 000 (37 000 - 120 000) people living with HIV in 2018 in IRAN.⁽¹⁴⁾ Mousavi et al reported 0.01% prevalence of HIV in blood donors' population in 2007 which was lower than the prevalence in this study⁽¹⁵⁾ Patients with high risk behaviors are more susceptible to traumatic events^(16,17) and may therefore justify, to some extent the higher prevalence of this infection in the study.

One of the limitations of our study was related to the retrospective design of the study. Lack of needed information about risk factors for being infected by these viruses in medical records of the patients and also difficulty in

contacting all of the patients to assess of the risk factors were other limitations for this study.

Conclusion

The results of this study demonstrate that seroprevalence of blood borne pathogens among trauma patients, especially HCV and HIV, are higher than general population and it emphasized that health care workers in trauma centers must adhere diligently to the standard precautions to prevent viral transmission.

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