

## Prevalence of Hepatitis B virus, Hepatitis C virus and human immunodeficiency virus infections among patients candidate for orthopedic trauma surgeries

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### Abstract

**Background:** Infectious diseases are major public health problems, among which blood-borne ones are the most important infections. Patients who undergo orthopedic surgery are at higher risk of transmitting infectious diseases from and to others, due to repeated blood examinations and injection, drains secretion and receiving blood products. Accordingly, in this study we determined prevalence of Hepatitis B Virus (HBV) Hepatitis C Virus (HCV) and human immunodeficiency Virus (HIV) infections in patients who underwent surgery in a general training hospital.

**Methods:** In this cross-sectional study the prevalence of HBV, HCV, and HIV infections was determined among 320 patients under orthopedic trauma surgeries in a general training hospital in Tehran, Iran from 2009 to 2011. Associations of these rates with age, gender, marital status, residence location, substance abuse history, hospital admission history, previous surgery, blood transfusion, dentistry procedures, and previous medical history were also assessed.

**Results:** A total of 320 patients (290 male, 30 female) were studied. Ten patients (3.2%) had at least one of these three infections. Totally 10 patients (3.2%), 2 subjects (0.6%), and 8 patients (2.5%) had HCV, HIV, and HBV infections, respectively. None of the evaluated variables had significant relationship with HCV, HBV, and HIV infections ( $p > 0.05$ ).

**Conclusion:** According to the obtained results, routine use of diagnostic tests for infectious disease such as HIV and viral hepatitis is recommended and should be considered before orthopedic operations.

**Keywords:** Hepatitis B virus, Hepatitis C virus, Human immunodeficiency virus, Orthopedic Surgery.

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### Introduction

Infectious diseases, especially blood-borne diseases, are major public health problems. The patients undergoing orthopedic surgery, specially orthopedic trauma procedures, as well as patients under other

extensive surgeries, might have the chance of transmission of infections such as hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency viruses (HIV) to others and also reverse transmission of infections from others to them due to repeat-

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ed injections, drain secretions, and blood transfusion (1).

Different studies have been performed to determine the prevalence of such diseases among thalassemia patients (1), pregnant women (2), blood donors (3), prisoners (4), hemodialysis patients (5), and subjects under surgery and invasive heart procedures (6). The transmission chance is reciprocal; the virus-contaminated tools may transmit the disease to other patients and also health staff through needle stick injuries. Use of harder instruments such as pins by orthopedic surgeons would increase the chance of transmission. However, the amount of imposed risk is different in various settings; necessitating different studies in various regions. This would be relevant for decision-making about routine use of preoperative viral assessments in each hospital and each geographic region. Regarding different transmission routes for HIV, HBV, and HCV, different studies have performed to determine the prevalence of these infections in different settings to predict the transmission risk. Hence, this study was performed to determine the prevalence of these infections among patients who underwent orthopedic surgeries in a general training hospital in our country.

### Methods

In this descriptive cross-sectional study the prevalence of HBV, HCV, and HIV infections was determined among patients who underwent orthopedic trauma surgeries and the association of these rates with age, gender, marital status, residence location, substance abuse history, hospital admission history, previous surgery, blood transmission, dentistry procedures, and previous medical history was assessed. Inclusion criterion was history orthopedics surgery and exclusion criteria were immunodeficiency and lack of possibility for monitoring the infections.

Totally, 320 patients undergone orthopedic surgeries in a general training hospital in Tehran, Iran since 2009 to 2011 were

selected in a simple random manner. Data collection was performed using a questionnaire completed by semi-interview. Helsinki Declaration was respected all over the study and it was approved by local Ethical Board Committee.

Data analysis was performed using SPSS version 13. Chi-square and Independent-Sample-T tests were used. Significance level was considered as 0.05.

### Results

Demographic data are demonstrated in Table 1. Mainly the patients were in age range from twenty-five to fifty years. Totally 10 patients (3.2%), 2 subjects (0.6%), and 8 patients (2.5%) who underwent orthopedic trauma surgeries, had HCV, HIV, and HBV infections, respectively. There was no significant association between HBV, HCV, and HIV infection with other variables including age, gender, marital status, residence location, substance abuse history, hospital admission history, previous surgery, blood transmission, dentistry procedures, and previous medical history (Tables 2, 3, and 4). However HIV-positive patients had no history of substance abuse, those with HBV and HCV infection had more positive history of addiction. But there was no significant difference in this study.

Addiction and substance abuse are also common transmission route for HIV, but the HIV-positive patients in this study had no addiction history.

Table 1. Demographic characteristics among 320 patients

Variable	n	%
Age Group		
<25	84	26.25
25-50	184	57.5
>50	52	16.25
Gender		
Male	290	90
Female	30	10
Marital Status		
Single	120	38
Married	200	62
Residence Location		
Tehran	240	70
Other cities	80	30

Table 2. Association of HCV infection with other variables

	Without Infection		With Infection		p
	n	%	n	%	
Age Group					NS*
<25	84	26.25	---	---	
25-50	164	51.25	10	3.1	
>50	62	19.4	---	---	
Gender					NS
Male	254	80	10	3	
Female	56	18	---	---	
Marital Status					NS
Single	120	38	2	1	
Married	190	59	8	2	
Residence Location					NS
Tehran	208	65	8	2	
Other cities	102	32	2	1	
Substance Abuse					NS
Yes	176	55	2	1	
No	134	42	8	2	
Hospital Admission History					NS
No	180	56	2	1	
Yes	130	41	8	2	
Previous Surgical History					NS
No	170	53	4	1	
Yes	140	44	6	2	
Blood Transmission History					NS
No	198	62	4	1	
Yes	112	35	6	2	
Dentistry History					NS
No	198	62	2	1	
Yes	112	35	8	2	
Previous Medical History					NS
No	224	70	2	1	
Yes	86	27	8	2	

NS: Not Significant (p&gt; 0.05)

Table 3. Association of HIV infection with other variables

	Without Infection		With Infection		p
	Count	Percent	Count	Percent	
Age Group					NS*
<25	84	26.25	---	---	
25-50	174	54	2	1	
>50	60	18.75	---	---	
Gender					NS
Male	262	82	2	1	
Female	56	17	---	---	
Marital Status					NS
Single	140	44	---	---	
Married	178	55	2	1	
Residence Location					NS
Tehran	200	62	2	1	
Other cities	118	37	---	---	
Substance Abuse					NS
Yes	178	56	---	---	
No	140	43	2	1	
Hospital Admission History					NS
No	180	56	---	---	
Yes	138	43	2	1	
Previous Surgical History					NS
No	178	56	2	1	
Yes	140	43	---	---	
Blood Transmission History					NS
No	206	64	2	1	
Yes	112	35	---	---	
Dentistry History					NS
No	114	36	---	---	
Yes	204	63	2	1	
Previous Medical History					NS
No	238	74	2	1	
Yes	80	25	---	---	

NS: Not Significant (p&gt; 0.05)

Table 4. Association of HBV infection with other variables

	Without Infection		With Infection		p
	Count	Percent	Count	Percent	
Age Group					NS*
	<25	84	26	---	---
	25-50	166	52	6	2
	>50	62	19	2	1
Gender					NS
	Male	252	79	8	3
	Female	60	19	---	---
Marital Status					NS
	Single	132	41	2	1
	Married	180	56	6	2
Residence Location					NS
	Tehran	200	62	8	3
	Other cities	112	37	---	---
Substance Abuse					NS
	Yes	176	55	2	1
	No	136	42	6	2
Hospital Admission History					NS
	No	178	55	6	2
	Yes	134	42	2	1
Previous Surgical History					NS
	No	176	55	2	1
	Yes	136	42	6	2
Blood Transmission History					NS
	No	206	64	4	2
	Yes	106	32	4	2
Dentistry History					NS
	No	114	35	2	1
	Yes	198	62	6	2
Previous Medical History					NS
	No	246	77	4	1
	Yes	66	21	4	1

NS: Not Significant (p&gt; 0.05)

Moreover, there was no significant association between hospital admission history, dentistry procedures, and blood transmission in current study,

### Discussion

In this cross-sectional study, higher rates of HIV, HBV, and HCV infections among patients demonstrate the necessity of routine viral studies before surgical procedures. Mainly the patients were in age range from 25 to 50 years that is in congruence with the age range of subjects with HIV in Iran ranging from 15 to 44 years. Previous positive surgical history has also been mentioned as a risk factor for HIV and HCV infections in similar studies (7, 8) that was also approved in current study. Also positive history of previous medical diseases in most patients with hepatitis was previously seen in other studies.

In a study conducted in Pakistan (7), it

was seen that more than ten percent had HCV infection and nearly two percent had HBV infection and the authors concluded that preoperative evaluations should be performed as a routine manner. However current study would demonstrate this matter; the prevalence rate of HCV infection was lower than that study. The report by American College of Surgeons has shown multiple transmissions of hepatitis to patients and health care providers (8). Previous studies in Iran have higher infection rate among thalassemia patients (1) and similar rates among general population (9,10). Also in cardiac surgery cases in Iran it was reported that less than two percent were positive for HBV and HCV infections and no case of HIV was seen (6) that shows the higher importance of preoperative assessments in orthopedics procedures (11,12).

A study by Weiss et al demonstrated that HIV (26%), hepatitis B (4%), hepatitis C

(35%), and co-infection with HIV and hepatitis C (17%) are common among hospital-admitted subjects in training setting (13). Gańczak et al evaluated 100 orthopedics patients and reported that prevalence of anti-HCV and anti-HIV was 0% (95% CI 0-3.7%); as for HBV, one was HBsAg positive (14). We had HCV and HIV positive cases as well. Another study by Gańczak et al showed that 4% (95% CI: 1.6-9.8%) were positive either with HBV or HCV: Two were HBsAg positive, Two were anti-HCV positive (2%; 95% CI: 0.6-7%); there were no HIV positive cases among their patients (15). Our data revealed differed results.

Although current data indicate that the risk of transmitting a blood borne pathogen in a health care setting is low, some risk is unavoidable. The danger can be greatly reduced by following the accepted recommendations of the CDC, PHS, and other agencies. Orthopedic surgeons should be familiar with these established guidelines (17).

Among the limitations in this study, we may mention the low available sample population that would result in less probability of generalization of acquired results. Accordingly, further similar studies should be carried out with larger sample size. Finally according to obtained results in this study it may be concluded that routine performance of diagnostic tests for infectious disease such as HIV and viral hepatitis is necessary and should be considered before operation (16). Since standard testing strategies rely on enzyme immune-assays (EIA), which require a critical and costly amount of infrastructure and human resources, its routine use would be impractical and costly. Therefore, the implementation of a viable screening strategy to identify co-infected patients is crucial as an effective intervention. Rapid diagnostic testing (RDT) has also successfully facilitated widespread screening for HIV. Several point of care products for the detection of HBsAg are currently available although their take-up has been limited so far. The

practical evaluation of these RDT devices in HIV-positive patients can be a key in order to study the utility of including them in diagnostic routines (18).

### Conclusion

Finally, according to the obtained results in this study, routine use of diagnostic tests for infectious disease such as HIV and viral hepatitis is recommended and should be considered before orthopedic trauma operations.

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