

Serosurvey of HBV surface antigen and anti-HBV surface antibody among HIV-infected patients in Fars province, southern Iran

Mohammad Rastegarian¹, Ali Zeighami¹, Reza Shahriarirad¹, Amirhossein Erfani¹, Nasir Arefkhah², Fariba Ghorbani³, Bahador Sarkari^{2,3}, Jamal Sarvari^{4,5}

¹Research Committee, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran;

²Department of Parasitology and Mycology, School of Medicine, Yasuj University of Medical Sciences, Yasuj, Iran;

³Basic Sciences in Infectious Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran;

⁴Department of Bacteriology and Virology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran;

⁵Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

SUMMARY

HBV infection is a major public health issue that can lead to liver cirrhosis and hepatocellular carcinoma. The current study evaluated the prevalence of HBsAg and anti-HBsAb among HIV/AIDS patients in Shiraz, southern Iran. The subjects in this study comprised 251 participants previously confirmed for HIV infection registered at the Shiraz HIV/AIDS center in southern Iran. Peripheral whole blood (5 ml) was obtained from each participant and evaluated for HBsAg and anti-HBs antibodies, utilizing commercial ELISA kits. The 251 participants consisted of 158 (63.5%) males and 91 (36.5%) females. HBsAg and anti-HBsAb were

detected in 16 (6.4%) and 117 (46.6%) cases, respectively, while five cases (2%) were positive for both viral markers. No statistically significant association was observed between patients age, sex, or CD4+ cell count and seropositivity to HBsAg or anti-HBsAb. The findings of the study revealed a relatively high seroprevalence of HBsAg and anti-HBsAb among HIV patients, highlighting the importance of preventive and therapeutic programs in such patients.

Keywords: Hepatitis B, HIV, seroprevalence, Fars province, Iran.

INTRODUCTION

Hepatitis B virus (HBV) infection is a major health problem in many countries around the world. Approximately 250 million people have chronic HBV infection that may progress toward hepatic cirrhosis and hepatocellular carcinoma (HCC). Detection of HBV surface antigen (HBsAg) plays a key role in the detection of chronic HBV infection and is still widely used as the screening test in epidemiological studies [1].

Moreover, anti-HBs antibody (HBsAb) is an HBV marker that shows immunity against HBV infection [2].

There are at least 10 genotypes and several subtypes identified for HBV. Although HBV vaccine induces protection against all genotypes of the virus, these genotypes differ from each other in epidemiology, patterns of transmission, and clinical characteristics of infected patients [3].

The global prevalence of HBV infection is estimated at 3.5% of the general population. The Eastern Mediterranean region, including Iran, is categorized in regions with a moderate prevalence of chronic HBV with 3.3% estimated prevalence [4]. Systematic review and meta-analysis of studies on HBV prevalence have revealed a prevalence

Corresponding author

Jamal Sarvari

E-mail: sarvarij@sums.ac.ir

rate of 3% in the Iranian general population [5]. Motamedifar et al. reported that 1.2% and 50% of pregnant women in Shiraz, Iran were positive for HBsAg and HBsAb, respectively [6]. Khosravani et al. reported a prevalence of 1.2% for HBsAg among high-risk groups in Kohgiluyeh and Boyer-Ahmad province, in Southwest of Iran [7]. Arefkhan et al. reported anti-HBsAb in 85.1% of vaccinated children in Fars Province, southern Iran [8].

More than 36 million people are infected with the Human Immunodeficiency Virus (HIV) worldwide. HIV/AIDS is the underlying cause of about 1 million mortalities every year [9]. Along with infections, cardiovascular and pulmonary disorders, liver diseases, especially co-infection with hepatitis viruses, is an important non-AIDS cause of mortality in HIV/AIDS patients [10].

It has been reported that HBV infection prevalence rate is higher among HIV/AIDS patients compared to the general population [11]. HBV/HIV co-infection increases the complications of viral hepatitis, including liver cirrhosis and hepatocellular carcinoma [9]. The current study aimed to assess the prevalence of HBsAg and anti-HBsAb among HIV/AIDS patients in Fars province, Southern Iran.

■ PATIENTS AND METHODS

Cases and blood sampling

Subjects of this study were 251 HIV-confirmed patients, confirmed by ELISA and Western blotting tests, admitted to Shiraz HIV/AIDS Research Center in 2017. All participants were asymptomatic for HBV infection and underwent highly active antiretroviral therapy (HAART). After obtaining proper informed consent from the patients, 5 mL of blood was collected from each patient, centrifuged and then, the obtained serum was kept at -20°C until use. The study was approved by and performed under the guidelines of the Ethical Committee of Shiraz University of Medical Sciences.

Evaluation of HBs antigen and anti HBs-antibody

Detection of HBs antigen and HBs-antibody was performed by commercial ELISA kits (Pishtaz Teb Zaman, Tehran, Iran and Arya Mabna Tashkhis, Tehran, Iran for anti-HBs antibody and HBs antigen respectively). Index values for seropositivity in each test were calculated based on the kits instructions.

Statistical analysis

Statistical analysis was done using SPSS (version 18; SPSS Inc., Chicago, IL, USA). The association between the seropositivity (either for HBsAg or HBsAb) and the socio-demographic features of the patients was assessed by the Chi-square test.

■ RESULTS

Our study population consisted of 251 HIV positive cases, including 158 (63.5%) male and 91 (36.5%) female patients. Patients were aged between 14 and 83 years with a mean age of 40.8 (SD: 9.7). The patients CD4+ T-cell counts varied from 14 to 1709, with a mean of 403.9 (SD: 266.7). The majority of patients (45.4%) had CD4+ count between 200 to 500. HBsAg was detected in 16 (6.4%) and anti-HBsAb in 117 (46.6%) patients, whereas 5 (2%) of the cases were positive for both markers. Considering the patients gender, 10 (66.7%) of HBsAg positive cases and 6 (59.5%) of anti-HBsAb positive cases were male, while 5 (2%) of HBsAg positive and 47 (40.5%) of anti-HBsAb positive cases were female. Statistical analysis of the data revealed that the seropositivity to HBsAg and anti-HBsAb was not associated with patients sex ($P=0.790$ and 0.224 , respectively).

Regarding the patients age groups, the highest rate of HBsAg seropositivity (2.4%) was observed in the 40-49 years old group. Also, patients aged between 30-39 years old and between 50-59 years old had the highest (17.9%) and the least (2.8%) seropositivity of anti-HBsAb, respectively. No significant statistical association was found between the seropositivity to HBsAg or HBsAb and patients age ($P=0.347$ and 0.854 , respectively).

Considering the patients CD4+ T-cell count, HBsAg positivity was more common in the patients with 201-500 CD4+ T-cell counts. Besides, the majority (41.9%) of seropositive patients for anti-HBsAb, belonged to the group 201-500 cell counts. No statistically significant association was found between the seropositivity to HBsAg or anti-HBsAb and patients CD4+ count ($P=0.169$ and 0.426 , respectively). Table 1 demonstrates the demographic and immunological features of HIV patients and relative seropositivity to HBsAg and anti-HBsAb.

Table 1 - Demographic and Immunological features of HIV patients and relative seropositivity to HBsAg or anti-HBsAb in Fars province, southern Iran.

Characteristics	Frequency		Positive for HBsAg		Positive for anti-HBs antibodies	
	No.	%	No.	%	No.	%
Gender						
Male	158	62.9	10	4	69	27.7
Female	91	36.3	5	2	47	18.9
<i>Age group</i>						
<30	29	11.6	2	0.8	12	4.8
30-39	97	38.6	4	1.6	45	17.9
40-49	93	37.1	6	2.4	43	17.1
50-59	15	6	1	0.4	7	2.8
>60	17	6.8	3	1.2	10	4
<i>CD4+ count</i>						
0-100	19	7.6	0	0	7	2.8
101-200	45	17.9	5	2	22	8.8
201-500	114	45.4	9	3.6	49	19.5
>500	73	29.1	2	0.8	39	15.5

DISCUSSION

According to the World Health Organization (WHO) reports, Iran, located in the Eastern Mediterranean region, has a moderate prevalence of HBV infection [4]. A recent study revealed that HBV prevalence is 1.79% among the Iranian general population [12].

The higher prevalence of HBV and HCV infection among high-risk groups is an important health issue that needs proper attention [7, 8, 13, 14]. A recent systematic review revealed that the pooled prevalence of HBV infection among Iranian high-risk groups, including female sex workers, injecting drug users and prisoners was 4.8% [13]. Previous studies have revealed that the incidence of HBV infection tends to be more frequent among HIV/AIDS patients that may be due to common transmission routes [12]. Hence, further studies in this area are justified.

In the current study, out of 251 confirmed cases of HIV, seropositivity of 6.4% and 46.6% was found for HBsAg and anti-HBsAb respectively. Our findings are consistent with the findings of a recent systematic review which reported a global prevalence rate of 6.1% for HBV infection [15].

In our study, the seropositivity of anti-HBsAb

was considerably high. This finding is consistent with previous studies on the serological profile of HBV infected patients [16-19]. Seropositivity of anti-HBsAb may be due to the proper immune response to vaccination or previous exposure to HBV or seroconversion of HBsAg in chronic HBV infection [20]. In our study, 2% of participants were positive for both HBsAg and anti-HBsAb, which could be linked to the mutations in the S and P genes of reverse transcriptase region of the virus [21].

In our study, although the seropositivity of HBsAg and anti-HBsAb was more prevalent among male patients, no significant association was observed between seropositivity and patients gender. However, such association has been reported in Zahedi et al. study which reported a higher prevalence of HBV infection among male HIV patients [22].

In the current study, no statistically significant association was found between patients age and HBV seropositivity. A systematic review by Tengan et al. revealed that patients above 40 years old had higher HBV prevalence than other age groups [23]. Considering the CD4+ cell count of the patients, our data analysis revealed that the group with 201-500 cell count had the highest seropositivity rate for both HBsAg and anti-HBsAb. Seyed Alinaghi et al. reported a higher prevalence of HBV infection among HIV patients with a CD4+ count of 200-500, although no significant association was observed [24]. However, a study by King et al. reported that the group with CD4+ count 0-50 had the highest prevalence of HBsAg positivity [25].

In conclusion, our study revealed a relatively high seroprevalence of HBsAg among HIV infected patients, in comparison with the general population. This high prevalence rate of HBsAg should be noted not only in the treatment program for these subjects but also in the follow up of these patients for long time sequela of HBV infection including cirrhosis and HCC. Moreover, the results of this study showed that only 46% of HIV infected individuals have a protective level of anti-HBsAb, which necessitates the HBV booster vaccination program among this high-risk group.

Competing interests

Authors declare that they have no competing interests.

Ethics approval and informed consent

The study was approved by and performed under the guidelines of the Ethical Committee of Shiraz

University of Medical Sciences. Proper informed consent was obtained from all study subjects for the collection of samples and subsequent analysis.

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