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Original Article

Epidemiology of Hepatitis B virus (HBV) Infection and its Prevalence in Rafsanjan

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Abstract

Background and Aims: Chronic hepatitis B virus (HBV) infection is one of the most important health problems worldwide. Currently, Iran is located in the intermediate HBV zone,This study was conducted to find out the prevalence of HBV infection among patients referring the hospital care in Rafsanjan, Iran.

Materials and Methods: A total of 2030 blood samples (471 from males and 1559 from females) were received and screened for hepatitis B infection during December 2015 to December 2016. After separation of serum from blood samples in local laboratory, All samples were tested for HBSAg by ELISA tests and Liver enzymes [Alkalin Phosphatase (ALK), Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST)] were determined using biochemical proceduies.

Results: Among 2030 collected samples, 26 persons (1.28%) were positive for HBS Ag. Among the positive ones HBSAg hepatitis was more prevalent, in female patients, than the males. 16 females and 10 males were positive for HBV hepatitis. The prevalence rate of HBS in males was 2.12% and 1.02% for female. There was no significant difference between males and females in terms of prevalence of hepatitis (P=0.856). Results related to age showed that higher rate of infection in 20-29 years old (%53.24) and the lowest was in 0-9 years old groups (1.08%). Of the three enzymes ALP, AST and ALT, only ALT was significantly higher than the control group (P=0.018).

Conclusions: In conclusion, the prevalence of HBS in Rafsanjan was at an increasing rate. Findings from the current study will be helpful for the better management and control of viral hepatitis B infection.

Keywords: Prevalence, Epidemiology, Hepatitis B.

Introduction

Hepatitis B virus (HBV) infection is a worldwide problem which results in 500,000 to 1.2 million deaths per year caused mainly by chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC) [1, 2,3]. Hepatitis B has over 385 million carriers around the world [4]. In the United States, a low endemic area, the incidence of acute hepatitis B has declined 82%, from 8.5 per 100000 in 1990 to 1.5 per 100000 in 2007[5]. In Malaysia, HBsAg prevalence in children decreased from 1.6% in 1997 to 0.3% in 2003[3]. In Italy, the morbidity of acute hepatitis B in patients aged 15 to 24 years old decreased from 17 per 100000 in 1990 to less than 0.5 per 100000 in 2005[2, 6]. In the Middle East, Bahrain, Iran, and Kuwait are areas of low endemicity. Iraq and the United Arab Emirates have intermediate endemicity,

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and Jordan, Oman, Palestine, Yemen and Saudi Arabia have high endemicity [7].

In Iran 2-3% of the population are carriers of the hepatitis B virus [8] and from which 67.8% have chronic hepatitis and 82% of the patients infected with hepatitis B have at least one positive sign of serologic Hepatitis virus [9, 10]. The epidemiology of HBV infection in Iran has been changed during the last two decades[11]. The prevalence of hepatitis B surface antigen (HBsAg) in the country was reported to be between 2.5% and 7.2% in 1979. It was estimated that there were one million HBsAg positive carriers among 35 million Iranians at that time [12]. In the 1980s, almost 3% of the Iranian population was affected, differing from 1.7% to 5% in different provinces [11, 13]. Infantile vaccination with high coverage is the main cause for this change[14, 15].

Knowledge of region- and age-specific prevalence of hepatitis B infection is important for evaluating vaccination programs and national disease prevention and control efforts. Furthermore, any modeling and assessment of the disease burden associated with the hepatitis B virus (HBV) requires prevalence estimates. So far, global studies on HBV seroprevalence are limited and comprehensive data are not available for many countries. In addition, demographic changes and expanded vaccination can create new epidemiological patterns of the virus which impact on region-specific endemicity levels [5]. On the other hand Iran is located in the Middle-East in a position like a bridge between Indian subcontinent, Arab peninsula, Middle Asia, and Europe. This geographical situation, mass immigration from Afghanistan and Iraq, frequent travelers in western borders to Turkey, and illegal drug traffic from eastern borders with Pakistan and Afghanistan have all affected epidemiology of HBV in this country[16].

We conducted a cross-sectional study to put all evidence on HBV infection in rafsanjan and to make an accurate estimate of HBV infection prevalence in our city for further planning to control the infection.

Methods

This was a hospital based cross-sectional study that included 2030 inpatient and outpatient who referred to the laboratory of Ali ebne Abitaleb hospital of Rafsanjan University of Medical Sciences, during December 2015 to December 2016. Informed consent was obtained and a questionnaire was filled for each participant. Demographic information including age, sex, were collected.Blood samples were taken, in the fasting state from the brachial vein. . After separation of serum from blood samples in local laboratory, sera were frozen in - 20°C for enzyme-linked immunosorbent assay (ELISA) and ELISA tests also were conducted on a weekly basis.

All samples were tested for HBS Ag. The Antigen of HBS was determined by ELISA method using commercial kit (Pishtaz,Iran).Liver enzymes [Alkalin Phosphatase (ALP), Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST)] were determined in all patients using the standard methods. All assay protocols, cut offs and result interpretations were performed according to the manufacturers' instructions.

Statistical analysis. Prevalence of 95% confidence intervals (95% CI) and odds ratio were calculated by SPSS software version 18.0 (SPSS Inc., Chicago, IL). Data com¬parisons were performed using the Chi square test and Fisher's exact test. The differences were considered significant if $P< 0.05$.

Results

Among 2030 collected samples, 26 person (1.28%) were positive for HBS Ag. Among the positive ones HBV infection was more prevalent (16 peson) ,in female patients,than the male (10 person).

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Table1: The rate of HBV infection among the studied population, Demographic characteristics of studied records

Sex	Total number of participant (N=)	HBS Ag (+)	prevalence rates (%)	average age of HBS Ag (+)	P- value
Male	471	10	2.12	44.6 ±5.69	0.856
Female	1559	16	1.02	37.37 ±4.4	

Table 2: Table 2. enzyme levels of ALP, AST, ALT in people referred to the laboratory (U/L)

	Healthy (Mean±SD)	Patient (Mean±SD)	P- value
ALP	32.96±3.08	104.00±48.37	0.054
AST	31.37±2.74	86.25±45.28	0.109
ALT	151.72±21.84	256.12±48.24	0.018

Table 3: The range of participants age in research

	Age(year)								
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	<80
number of participant (n)	22	119	1083	258	209	152	100	53	34
Percent of participant	%1.08	%5.86	%53.34	%12.70	%10.29	%7.48	%4.92	%2.61	%1.67

The prevalence rates of HBV in male was 2.12% and 1.02% for female. There was no significant difference between males and females in terms of prevalence of hepatitis (P=0.856). Table 1

The level of three enzymes ALP,AST and ALT of the participants was determined in this research. The Average of ALP enzymes in healthy sampels was 32.96±3.08 and in patients 104.00±48.37. Similarly, the Average level of AST enzyme in healthy sampels was 31.37±2.74 and in patients was 86.25±45.28. Finally the Average of ALT enzymes in healthy sampels was 151.72±21.84 and in patients 256.12±48.24. Of the three enzymes ALP,AST and ALT ,only ALt was significantly different (P=0.018) in the two groups healthy and the patients . Table 2

In this study, sampels were divided into 9 groups according to the age. Results related to age showed that higher marginal viral loads found in the age groups of upper 20-29 years old (%53.24). And the lowest is in 0-9 years groups (1.08%).

Discussion

The HBV infection is a widely spread disease that affect large number of populations worldwide and is considered as a major public health problem in many countries [17]. In Iran, a decline in HBV was seen after 2006, which may be related to the implementation of the

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1993 HBV vaccination program. Similarly, in Turkey and Saudi Arabia, who also initiated national immunization programs for HBV in 1998 and 1989, respectively, there was a decline in HBV prevalence after 2006 [18].
distribution across the world shows variations depending on geographical location.[19] Based on the data extracted from this study, the rates of HBV prevalence. For example, in Goles-tan, which has a particularly high rate of HBV, the prevalence reported in 2004 was 8.86% while it decreased to 5.1% in 2007[20, 21].
highest rate of HBV was seen in Golestan province. As described by Merat and colleagues Golestan is inhabited by the Turkaman ethnicity, which has limited contact with the rest of the country and rarely marries outside that ethnicity.This higher rate may partly be due to the location of Golestan, which is one of Iran's provinces with international borders and increased international communication and exposure. Recent data on HBV prevalence in Turkmenistan, Golestan's neighboring country, was not found to support this notion.
In all studies presented in this meta-analysis, HBV was more prevalent in men than women. This may be because of the fact that high risk behaviors are generally more common in men, and also because in some areas of the country, men may practice polygamy, which increases their exposure[20].
In this study the highest incidence was observed in people aged 31-40 More commonly seen in people aged 31-40 years old.
Alterations in liver enzyme levels are one of the most common problems encountered in everyday clinical practice. Finding the way through the multiple diagnostic pathways can challenge even the experienced clinician. Knowledge of the pathophysiology of liver enzymes is an essential guide to understanding their alteration. The patternof enzyme abnormality, interpreted in the context of the patient's characteristics, can aid in directing the subsequent diagnostic work-up. Awareness of the prevalence of determined liver disease in specific populations and of possible hepatic involvement during systemic illnesses or drug therapies may help the clinician identify the cause of alterations efficiently[22].
Previous studies in different parts of Iran had demonstrated a variety of seroprevalence rates ranging from 6% in Golestan Province [23]to 10.6% in Guilan Province [24], 11% in Nahavand [25], 22.2% in Babol [26]and 37.1% in Hamadan cities [27]. The overall prevalence of positive hepatitis B antigen in Our study was 1.28% using ELISA method. Alavian et al., estimated that the prevalence of HBV infection varies from 2.1 to 2.6% among Iranian males and females, respectively. Some studies show recently the prevalence of HBV is increasing in Iran [28-31]. which our results is consistent with the results of other studies .
The association between the HBS antigen positivity and gender was not statistically significant but the prevalence among men was much higher than women, which is similar to the results of Sali (2005) that Had expressed the risk factors for chronic hepatitis B were older age, male gender, marital status, history of contact with hepatitis, extramarital sexual activity, IV-drug use, major surgery, experimental dentist visit, and some jobs (police, barber, and driver) [32].
In our finding , the prevalence of HBS antigen increased in youth and the highest prevalence rate was 53.34% in the age group of 20 to 29 years. In the age groups below 9 years and over 80 years, the rate of antigen positivity was %1.67 and %1.08.
In our study three enzymes ALP,AST and ALT of participants were studied. Of the three enzymes ALP,AST and ALT ,only ALt significantly different in the two groups healthy and patient.
In conclusion, the prevalence of HBV in our city is at an increasing rate. Countless studies are needed to understand the epidemiology of HBV infections. The data of the current study will help in the effective prevention and control measures against HBV infection in our study area.

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