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Original Article

Prevalence and epidemiology of hepatitis C virus (HCV) infection in Rafsanjan

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Abstract

Background and Aims: Many individuals with chronic hepatitis C virus (HCV) infection are asymptomatic, population-based serologic studies are needed to estimate the prevalence of infection which will help to take necessary procedures for prevention and control the disease. This study was conducted to find out the prevalence, of HCV infection among patients referring to the hospital care in Rafsanjan, Iran.

Materials and Methods: A total of 940 blood samples (430 males and 510 females) were received and screened for hepatitis C infection during December 2015 to December 2016. After separation of serum from blood samples in local laboratory, all samples were tested for HCV Ag by ELISA tests. Liver enzymes [Alkalin Phosphatase (ALP), Alanine aminotrans¬ferase (ALT) and Aspartate aminotransferase (AST)] were determined using biochemical procedures.

Results: Amongst 940 collected samples, 18 (1.91%) were positive for HCV Antibody. Among the positive ones, HCV hepatitis was more prevalent in male patients than the females. The prevalence rate of HCV in male was 3.72% and 0.39% for female. Results related to age showed that higher rate of infection in 20-29 years old (%26.59), and the lowest was found in above 80 years old group (0.31%). Of the three enzymes, only ALP was significantly higher than the control group (P=0.003).

Conclusions: The prevalence of HCV in Rafsanjan was at an increasing rate. Findings from the current study will be helpful for better management and control of viral hepatitis C infection.

Keywords: Prevalence, Epidemiology, Hepatitis C.

Introduction

Hepatitis C virus (HCV) is a globally prevalent pathogen causing high rate of morbidity and mortality [1]. On a global basis, chronic infections of hepatitis B and C are responsible for nearly 60% of cases of cirrhosis and almost 80% of cases of hepatocellular carcinoma [2]. The virus can remain in the host for a long period [3, 4]. Hepatitis C virus is present in all regions of the world and about 170 million, which include about 3% of the world's population, are infected [5].

Because of the high prevalence of HCV in the world, it is critical to study the prevalence of the viral infection in each population which will effectively help health policy makers to implement appropriate programs to reduce the

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rate of infection [6]. The prevalence of hepatitis infection varies markedly according to the different geographical areas [7, 8]. The rate of HCV has been reported different in various regions, like 0.4 to 3% of populations in Western Europe and up to 15% in Mediterranean and East European countries. In developing countries, there is no access to reliable information about the prevalence, risk factors and burden of viral hepatitis [9]. About 2-8% in Mediterranean countries, Japan, central Asia, the Middle East, Latin and South America, 8-20% in southern Asia, China, and sub-Saharan Africa as intermediate and high prevalence areas [10]. Furthermore, It seems that the prevalence of this virus in the general population of Iran is less than 1% [11], which is lower than the reports of the neighboring countries [12]. For this reason, the current study was designed to report the epidemiologic features of HBV and HCV in Iranian peoples with positive hepatitis screening test [13-16].

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 travels in Western borders to Turkey, and illegal drug traffic from Eastern borders with Pakistan and Afghanistan have all affected epidemiology of HCV in our country [17]. The present study was carried out with the goal to survey and determine the prevalence of HCV inpatient who refer to hospitals of Rafsanjan city, Southwest of Iran in 2015.

Methods

This was a hospital-based cross-sectional study that included 940 inpatient and outpatient who referred to laboratory of Ali ebn Abitaleb hospital, Rafsanjan University of Medical Sciences, during December 2015 to December 2016. Informed consent was obtained and a questionnaire was filled in for each participant. Demographic information including age and sex were collected. Five milliliter of venous blood, in the fasting state was taken as sample from the brachial vein. After separation of serum from blood samples in local laboratory, serums were frozen at - 20°C for enzyme-linked immunosorbent assay (ELISA) and ELISA tests also were conducted on a weekly basis.

All samples were tested for HCV Antibody (Ab). The Ab to HCV 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. All assay protocols, cutoffs and results 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 comparisons were performed using the Chi square test and Fisher's exact test. The differences were considered significant if $P< 0.05$.

Results

Among 940 collected samples, 18 (1.91%) were positive for HCV Ab. Among the positive ones HCV infection was more prevalent (16 persons), in male patients, than the female (2 persons). The prevalence rates of HCV were 3.72% and 0.39% in males and females, respectively. There was no significant difference between males and females in terms of prevalence of hepatitis (P=0.351). Data is shown in Table 1.

The level of three enzymes ALP, AST and ALT of the participants were determined in this research. The average level of ALP enzyme in healthy samples was 26.66±2.39 and in patients 66.86±11.78. Similarly, the average level of AST enzyme in healthy samples was 26.76±2.19 and in patients was 57.00±15.21. Finally, the average level of ALT enzyme in healthy samples was 158.71±29.64 and in patients 225.26±31.29. Of the three enzymes ALP, AST and ALT, only ALP was significantly different (P=0.003) in the two groups of healthy and the patients. Data is shown in Table 2.

In this study, samples were divided into 9 groups according to the age. Results related to

Table 1: The rate of HCV infection among the studied population, Demographic characteristics of studied records

Sex	Total number of participant (N=)	HCV Ab (+)	prevalence rates (%)	average age of HCV Ab (+)	P- value
Male	430(45.74%)	16	3.72	40.18 ±1.99	0.351
Female	510(54.25%)	2	0.39	19.00 ±1.00	

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

	Healthy (Mean±SD)	Patient (Mean±SD)	P- value
ALP	26.66±2.39	66.86±11.78	0.003
AST	26.76±2.19	57.00±15.21	0.067
ALT	158.71±29.64	225.26±31.29	0.131

Table 3: The age range of participants' 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)	17	47	250	152	159	174	84	54	3
Percent of participant	%1.80	%4.79	%26.59	%16.17	%16.91	%18.51	%8.93	%5.74	%0.31

age showed that higher marginal viral loads found in the age groups of upper 20-29 years old (%26.59). And the lowest is in above 80 years groups (0.31%). Data is shown in Table 3.

Discussion

Hepatitis C virus (HCV) infection is a major global public health problem in both developed and developing countries [18]. It seems that the prevalence of this virus in the general population of Iran is less than 1% [11]. The overall prevalence of positive hepatitis C antibody in our study was 1.91% using ELISA method which is higher than the average in Iran. The association between the HCV antibody positivity and gender was not statistically significant but the prevalence among men was much higher than women, which is similar to the results of Merat (2005) [19]. In another study that was performed by Butterfield (2005) results show that, the rate of hepatitis C infection among men was nearly twice that of in women. Clear differences were noted in hepatitis C risk behaviors. Men had higher rates of lifetime drug-related risk behaviors: due to needle use needle sharing and crack cocaine use [20].

Recently, HCV prevalence studies have been reported from Pakistan and Middle East. The number of 751 out of 16,400 patients (4.57%) were found to be +HCV Ab from 1998-2002 with the largest age group from 41-50 [21]. But in our findings, the prevalence of antibodies against HCV increased in youth and the highest prevalence rate was 26.59% in the age group of 20 to 29 years. In the age groups below 9 years and over 80 years, the rate of antibody positivity was %1.80 and %0.31, respectively.

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. 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]. In our study three enzymes ALP, AST and ALT of participants were studied. Of these three enzymes only ALP showed significant difference (P=0.003) in the two groups healthy and patients.

In conclusion, the prevalence of HCV in Rafsanjan city is increasing. Countless studies are needed to understand the epidemiology of HCV infections. The data of the current study will help in the effective prevention and control measures against HCV infection in our study area.

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