

Original Article

Seroprevalence of Hepatitis B&C in coronary artery disease patients in Urmia, Northwest of Iran

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Abstract

Background: Coronary artery disease (CAD) is one of the main causes of death all over the world. Predisposing factors comprise some infectious etiologies with systemic effects such as the hepatitis C virus and HBV-infection might be related to CAD from chronic inflammation process. The relationships between hepatitis B&C virus (HBV&HCV) infections and CAD considered a noticeable health problem. In the present study, we evaluated the seropositivity of HCV&HCB in CAD patients from the Iranian population. **Materials and Methods:** We conducted a cohort study including 192 CAD subjects. To identify HCV&HCB -infected subjects, a serologic examination comprising Hepatitis B surface antigen (HBsAg) and anti-HCV antibodies (HCV-Ab) tests performed by ELISA method. Also, we examined the biochemical blood parameters such as lipid profile, glycemic parameters, and blood inflammatory factor (C-reactive protein). **Results:** We identified a very low percent of HBV-infected cases (1.04%). All examined CAD patients indicate the HCV Ab-negative results. The HBV-infected subject had not, hyperlipidemia, and diabetes. HBV infection was not related to the increased risk of CAD. Also, CAD risk factors were not associated with the prevalence of HBV&HCV. **Conclusion:** According to the results, HCV&HCB infections had very low prevalence in examined subjects and there was not any association between CAD and prevalence of HCV&HCB infections.

Keywords: Hepatitis B virus, Hepatitis C virus, Coronary Artery Disease, Iran.

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Introduction

Coronary artery disease (CAD) as the main public health issue is related to the high death rate in the Iranian population. CAD recognized by the existence of atherosclerosis in the epicardial coronary arteries. Atherosclerotic plaques, the main characteristic of atherosclerosis, gradually led to antegrade myocardial blood flow impairment [1]. Previous reports indicated that chronic inflammatory conditions are related to chronic infection including chronic hepatitis C virus (HCV) infection, which

could be considered as an autonomous risk factor for CAD [2-6]. Besides, as chronic inflammation, HBV-infected subjects might have an elevated susceptibility to CAD [2]. Based on the meta-analysis conducted in 2016, the pooled prevalence of HBV infection among the general population in Iran was 2.2% [7]. About HCV infection in Iran, reports indicate that there are different incidence patterns of HCV in various societies and areas of Iran [8].

HBV-infection might be related to CAD from the chronic inflammation process [2]. Also,

predisposing factors comprise some infectious etiologies such as the hepatitis C virus have a systemic effect [9].

A few current types of research have confirmed that HCV infection was related to CAD. Although, many previous studies did not endorse this correlation a meta-analysis displayed that HCV infection is a possible risk factor for CAD [10].

Current reports indicated that HCV infection is a risk factor for cardiovascular disorder. Overall these findings are controversial [11]. On the other side, the association between HBV and CAD also are questionable [2]. In this study, we evaluate the HBs Antigen (HBS Ag) and the presence of anti-HCV antibodies (HCV Ab) in the serum of CAD patients to find the association of HCV and HBV infection with Cardiovascular disease.

Methods

A presented cohort study was carried out on 192 CAD patients with a mean age of 57.43 ± 11.078 years from Urmia Seyedoshohada heart hospital during august 2012-December 2013. The studied subjects evaluated for the seropositivity of HBsAg and HCV Ab. All the patients underwent physical examinations by the cardiologist and their CAD was confirmed. CAD was detected by the presence of myocardial infarction or congestive heart failure or every sign for coronary artery bypass grafting [12] and all subjects underwent coronary angiography. The patient's characteristic parameters were obtained based on National Care information. Subjects, which have a history of prior liver illnesses, diabetes, and, were omitted from the survey.

Permission forms were distributed with adequate descriptions for patients about research protocols and experimental tests.

After physical examination of each subject, 5 ml blood samples were drawn which divided into serum (without anticoagulation EDTA) and plasma (with anticoagulation EDTA) using the centrifugation method. Then separated sera & plasma were stored at -20°C until use.

The serum levels of HBS Ag and presence of HCV Ab in CAD patients were assessed by enzyme-linked immunosorbent assay (ELISA) technique.

HBsAg was tested by the ELISA method

(DIA. PRO, Milan, Italy) based on the manufacturer's protocol. HCV Ab was assessed using an anti-HCV antibody ELISA kit (Anti HCV ELISA, DIAsource, Belgium) according to the instruction of the kit.

Dyslipidemia was detected by evaluation of the following parameters: plasma total cholesterol level, plasma total triglycerides, high-density lipoproteins (HDL-c), which were done by spectrophotometry and commercially available kits (Pars Azmoon kit, Pars Azmoon Inc., Tehran, Iran), and low-density lipoproteins (LDL-c), that measured by enzyme colorimetric method after omitting HDL-c, VLDL and chylomicron lipoproteins (Pars Azmoon kit, Pars Azmoon Inc., Tehran, Iran). was considered statistically significant.

Other blood biochemical factors including fasting blood sugar (FBS), blood sugar (BS) as glycemic parameters, detected by spectrophotometry, and commercially available kits (Pars Azmoon kit, Pars Azmoon Inc., Tehran, Iran). Also, an inflammatory marker of serum levels of C reactive protein (CRP) was determined using immunoturbidimetric methods with a commercially available latex kit (Aniston).

Statistical analysis. For data analysis, we utilized the SPSS software version 21. To measure the main value of quantitative variables and frequency (percentage %), T-test was applied. For comparison, the mean concentrations of each quantitative factors and significant difference between patients ANOVA/Chi-square test were used.

Results

In our experiments, the age range of the CAD patients were 29 to 95 years (88 patients (49.7 %) were female and 89 (50.3 %) were male). The Mean age of the CAD subjects were 57.43 ± 11.078 years. Data from demographic, characteristics, and biochemical parameters, which obtained from blood examination, are presented in Table 1.

Table1. Demographic and biochemical parameters of CAD patients.

(N=192)

Parameters	Mean± Std. Deviation	Std. Error Mean
Age (year)	57.43 ±11.078	.799
HDL-c (mg/dl)	37.06 ±19.727	1.718
LDL-c (mg/dl)	47.27 ±51.372	3.883
TG (mg/dl)	180.37 ±104.265	7.882
TC (mg/dl)	125.62 ±67.385	7.307
BS (mg/dl)	123.46 ±101.199	7.739
FBS (mg/dl)	108.80 ±54.792	4.582

Data presented as Mean± Std. Deviation, TC: Total cholesterol, TG triglyceride, BS: blood sugar, FBS: fasting blood sugar, LDL-c: low-density lipoprotein cholesterol, HDL-c: high-density lipoprotein cholesterol

According to our results, there was any HCV Ab positive test in the studied population but two subjects had a positive HBsAg (1.04%) test. Based on the results, HBV infection had a low prevalence in patients with CAD. Data from the HBsAg and HCVAb tests, which classified as seronegative or seropositive were presented in Tables 2 and 3 respectively.

Table2. HBsAg seroprevalence in CAD patients.

Percent%	frequency	HBsAg
1.04	2	seropositive
98.95	190	seronegative
100.0	192	total

Table2. HCVAb seroprevalence in CAD patients.

Percent%	frequency	HBsAg
0	0	seropositive
100	192	seronegative
100.0	192	total

Mean plasma levels of total cholesterol, LDL-c, HDL-c, FBS, BS, and triglycerides were not any significant differences in the HBs Ag positive subjects in comparison with HBV-uninfected

patients($p>0.05$). Also, the levels of CRP in HBV positive cases have no significant differences versus uninfected persons ($p<0.05$). Regression analysis revealed that there was any correlation between biochemical parameters and the presence of HBV infection in CAD patients.

Discussion

The presented study aimed to evaluate the prevalence and the possible predisposing effect for Hepatitis B and C viruses among CAD patients attending the Urmia University of medical sciences, Iran.

According to our results, 2 (1.04%) and 0 (0%) out of 192 CAD subjects who participated in the study had positive tests for hepatitis HBS Ag and HCV Ab respectively. None of them had mixed infections of hepatitis B and C. Besides, in HBV infected individuals, any of the studied risk factors had no significant differences compared to uninfected cases.

In previous reports, the relationships among chronic inflammation and increased risk of atherosclerosis have been distinguished. Surveys have shown a higher risk of CAD between hepatitis C patients versus uninfected individuals [3, 13]. Nonetheless, in the presented survey, there was no significant correlation between CAD and HBV infection.

The cause behind the absence of relationships may be related to this fact that the inflammatory burden of chronic HBV infection is comparatively insignificant [2]. Indeed, mean CRP levels among HBV-infected patients were not any significant differences to HBs Ag-seronegative subjects.

In accordance with our findings, previous reports indicate that HBV-positive people did not show a higher incidence rate of customary risk factors of CAD such as diabetes, and hyperlipidemia. Indeed, in this study, which carried out in Madani Heart Hospital, Tabriz, Iran, researchers reported that the incidence of HBsAg positivity inclined to be more in CAD subjects versus healthy individuals, but the difference did not reach to statistically significant level [14].

The lack of metabolic disorders might be an additional feature for the absence of possible CAD risk between these individuals. In another study, Ishizaka et al confirmed the HBV infection in the carotid arteriosclerosis pathogenesis. Also, they indicated that the seropositivity of HBV surface antigen might be a risk factor for atherosclerosis [15] which are discordance to our results. Arcari et al. [16] in their cohort study with the investigation of 582 subjects, concluded that HCV infection has not any relationship with Acute Myocardial Infarction.

Another study in 2013, by Miyajima et al. [17] indicates that HCV can be related to atherosclerosis.

Also, Butt et al (12) showed that patients with HCV infection have lower lipid levels than healthy control subjects. Also, they concluded that HCV infection could be associated with developing CAD. Another study shows the positive association among HCV seropositivity and the complexity of coronary lesions in the light of the SYNTAX score [18].

These variations, among our study and other mentioned surveys, might be related to the particularities in the ways of transmission of HBV and HCV, which is related to socio-cultural and environmental factors. Furthermore, our findings showed a low frequency of hepatitis B infection among the CAD population of Urmia city.

Although the prevalence of HCV infection was reported to be zero in this population, screening strategies may be suitable. Also, further examination for HCV in the larger population is suggested. This low rate of seropositivity would be related to the low number of studied individuals in the present survey; therefore, evaluating a large sample is recommended.

Overall, it is vital to assess the HBV and HCV prevalence among CAD subjects as specific health policies can be invented and infected CAD individuals are counseled and treated.

Conclusion

We have concluded that the prevalence of HBsAg, HCVAb among CAD was lesser than in the

general population. The results of the presented study may be valuable for counseling and management of these patients, and further studies analyzing the risk for HBV and HCV transmission in Iranian CAD subjects. Higher standards of CAD patient's health and well-being increases not only their lives, but it also related to the health of their family and community.

Conflicts of Interest

There is no conflict of interest among authors.

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