

Hs-CRP and Haptoglobin Levels in Iraqi Patients with Coronary Artery Disease

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Abstract:

Background: Acute phase proteins which include C-reactive protein (CRP) and haptoglobin (Hp) are associated with inflammatory diseases such as injury, infection or malignancy, cardiovascular disease and obesity. Atherogenic index of plasma (AIP) evaluated as the atherogenicity index is correlated with different diseases.

Objective : The study was to investigate hs-CRP and Hp concentration in Iraqi patients with coronary artery disease (CAD) and calculate AIP which predicts this disease.

Subject and Method: The study included 64 subjects (39 patients with CAD and 25 healthy subjects as a control group). The markers of inflammatory hs-CRP and Hp levels were measured. Lipid profile (Total cholesterol TC, Triglyceride TG, High density lipoprotein HDLc, and Low density lipoprotein LDLc) was measured also. Atherogenic Index was calculated for both patients and control groups.

Results: The study showed that there was a significant increase in hs-CRP and Hp concentrations in patients with CAD compared to healthy group. A significant increase in TC, TG and LDL was found in patients compared to control group. AIP values were (0.61 ± 0.13) and (0.09 ± 0.06) for patients and control groups respectively, showed high significant differences between the two groups.

Conclusions: Results suggested that increasing concentration of hs-CRP and Hp in patients with CAD can be considered as a risk marker for the disease. Results of AIP concluded that it can provide information and predicate CAD disease.

Key words: Inflammation, Coronary Artery Disease, hs-CRP and Haptoglobin, AIP.

*J Fac Med Baghdad
2015; Vol.57, No .1
Received Dec. 2014
Accepted Jan.2015*

Introduction:

Coronary artery disease (CAD) is a widespread in the world and is a contributor to morbidity and mortality. CAD is cause not only by atherosclerosis but also by several other risk factors associated with the disease such as age, sex, smoking, diabetes, hypertension, serum lipid concentrations and inflammatory(1,2). Acute phase proteins such as CRP and Hp are considered as inflammatory markers(3). High sensitive CRP (hs-CRP) is a prognostic value in patients with acute coronary syndrome(1,2). While Hp scavenges free hemoglobin (Hb) which is usually released into the blood stream during hemolysis or normal red blood cell turnover and prevents iron loss and kidney damage(4). Also prevents free reactive oxygen species to initiate oxidative stress(5). In addition, the (Hp) functions in modulating the immune response autoimmune disease and major inflammatory disorders(6). In human, three common phenotypes are represented Hp1-1, Hp2-2 and Hp2-1. Several studies demonstrated that Hp2-2 phenotype may be associated with cardiovascular disease(7). Lipid profile known as routinely biochemical test which consists of total cholesterol (TC), triglycerides (TG), high density lipoprotein (HDL) and low density lipoprotein (LDL). Elevated levels of TG, LDL and decrease level of HDL are correlated with increase incidence of CAD(8). Atherogenic

index plasma (AIP), is based on both TG and HDL by logarithmic ratio(9). AIP has recently been proposed as a marker of atherogenicity and increased with high risk of CAD(10). The present study was conducted to demonstrate the relationship between the concentration of hs-CRP and Hp in Iraqi patients with coronary artery disease. Lipid profile and atherogenic index related to the patients were included in this study.

Subjects and Methods:

The study included 39 subjects with CAD as patients group and 25 healthy subjects as a control group. The patients were taken from Al-Kadymia Teaching Hospital for the period from January 2014 to April 2014 and the healthy controls were volunteers. Blood samples were drawn from all subjects after 12 hours fasting. The levels of serum hs-CRP were measured by using an enzyme linked immune sorbent assay (ELISA), according to manufacturer's instruction (CUSABBI|O). The Hp concentrations were determined by endpoint method with clinical application of radial immunodiffusion (RID), according to the method manufacture's instruction (Bindarid, UK). Other measurements of total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDLc), low density lipoprotein (LDLc) were estimated by commercially available kit from Biosysteme. It was estimated by enzymatic method. Atherogenic index (AIP) were calculated from relation $(AIP = \log TG/HDL)$ (10).

Statistical Analysis:

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The data were given as the mean \pm SD and analyzed by an ANOVA. Correlation was used to examine the relation between hs-CRP and Hp for patients with CAD. The P values were considered to be statistically significant ($P \leq 0.05$).

Results:

Table (1) descriptive characteristics of sex, age, TC, TG, HDLc, LDLc and atherogenic index for patients and control groups. The mean age was (52.15 \pm 4.09) years in patients group while control group was (48.64 \pm 4.17213) and there was no significant differences between the two groups. The result of serum TC showed highly significant differences between patients and control groups ($P \leq 0.05$), the mean value was (228.58 \pm 20.46) and (169.16 \pm 5.04) for the two groups respectively. There were high significant differences in TG and LDLc between the two groups and the mean values were (200.13 \pm 45.10), (139.3 \pm 23.04) for patients group compared with the (73.84 \pm 7.5) and (96.15 \pm 6.92) for healthy group. The mean values of HDLc were (49.25 \pm 11.70) and (58.24 \pm 3.85) for patients and healthy control groups respectively. Compression of these values showed significant differences between these two groups ($P \leq 0.05$). The results for AIP were (0.61 \pm 0.13) and (0.09 \pm 0.06) for patients and control groups, which indicated high differences between the two groups.

Table (1): Characteristics and some biochemical parameters in patients and healthy control groups

Characteristics	Patients	Control	P value
Age (years)	52.15 \pm 4.09	48.64 \pm 4.17	
Sex (male/female)	26/13	14/11	
TC (mg/dl)	228.59 \pm 20.46	169.16 \pm 5.05	$P \leq 0.05$
TG (mg/dl)	200.13 \pm 45.10	73.84 \pm 7.47	$P \leq 0.05$
HDLc (mg/dl)	49.25 \pm 11.70	58.24 \pm 3.85	$P \leq 0.05$
LDLc (mg/dl)	139.30 \pm 23.04	96.15 \pm 6.92	$P \leq 0.05$
AIP	0.61 \pm 0.13	0.09 \pm 0.06	$P \leq 0.05$

The data are gives as the mean \pm SD

Table (2) showed the mean values of hs-CRP in patients and control groups (4.30 \pm 0.77) and (0.77 \pm 0.27) respectively. There was a significant difference between the two groups ($P \leq 0.05$). Also table (2) showed highly significant increase between the patients compared with control groups ($P \leq 0.05$) and the mean values of Hp were (1880.51 \pm 206.64) for patients and (918.44 \pm 85.50) for control group.

Table (2): Serum levels of hs-CRP and Hp in patients and healthy control groups

Characteristics	Patients	Control	P value
Hs-CRP (mg/l)	4.30 \pm 0.77	0.77 \pm 0.27	$P \leq 0.05$
Hp (ng/ml)	1880.51 \pm 206.64	918.44 \pm 85.50	$P \leq 0.05$

The data are gives as the mean \pm SD

Discussion:

The present study revealed that hs-CRP and Hp concentrations were significantly higher in patients with CAD compared with the control group. According to the Center for Disease Control (CDC) and the American heart Association (AHA), hs-CRP level >3.0 mg/L, 1-3 mg/L, and <1 mg/L correspond with high, moderate and low risk for cardiovascular disease(2). The high levels of CRP are correlated with increased risk of higher incidence of CAD(12). CRP was produced with in vascular smooth muscle of diseased coronary arteries. This locally produced CRP within inflamed vessel wall may play an important role and contributed in atherogenesis and development of cardiovascular complication(13). Results of the study are in agreement with previous reports which referred to that hs-CRP serum level is increased in patients with acute coronary syndrome and may directly and actively participate in atherogenesis(14). In contrast, Hp concentration was increased during infection, trauma, neoplasia, late pregnancy and myocardial infarction (15). The present results agreed with previously reported finding that Hp concentration increased in patients with abdominal aortic aneurysm(16). The elevated levels of Hp in CAD may be attributed to regulatory response to atherosclerotic progression and Hp may play a proatherogenic role(17). Also the results showed significantly differences in TC, TG LDL and AIP between patients group and healthy control. However, no significant differences in HDL level was found between the two groups. Cholesterol assumed as a primary factor in the development of atherosclerosis and previous studies showed that coronary atherosclerosis is positively correlated with TC, TG, LDL and negatively correlated with HDL(18). The concentration of HDL correlates inversely to the development of CAD. HDL is cardioprotective against atherosclerosis through removing cholesterol from artery (reverse cholesterol transport) to liver(19). In contrast elevated level of LDL correlated positively with incidence and promotes heart diseases(20). Durnig inflammation, levels of HDL can be reduced because of increased HDL catabolism, decreased apolipoprotein A1(major constituent of HDL) synthesis and then converted into atherogenic form(20)

Conclusion:

The elevated levels of the inflammatory marker CRP and the acute phase protein Hp associated with CAD in Iraqi patients. Routinely lipid profile test correlated with incidence CAD and the high values of AIP in patients with CAD compared with control group could be used as predictor and identifying high risk of CAD.

Authors Conclusion:

Warkaa T.Alsaad, Raad abdulmunem and Hussam S. Jasim: conception and substantial design and collection samples and statistical analysis data.

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