High sensitive CRP as a predictor of Coronary Artery Disease Severity on Coronary Angiography

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Abstract

Background: Inflammation in the arterial intima has the main role for the pathogenesis of atherosclerosis.

Objective: To determine the correlation between serum hsCRP levels and severity of coronary artery disease in a sample of patients referring to Surgical specialty Hospital-Cardiac center in Erbil City 2018.

Patients and Methods: In this cross sectional study 120 patients (78 male and 42 female patients) were studied who had undergone coronary angiography procedure among them 80 patients (57 male and 23 female) had Coronary artery disease and the remain 40 patients had normal coronary angiography result. The blood samples from (120) patients were taken and transferred to the laboratory after clotting hsCRP was measured using cobas automated assay.

Results: Here we detected a significant difference in the level of hsCRP between patients with coronary artery diseases and patients with normal coronary artery on angiography in addition to that fact the association for the severity of coronary artery disease and hsCRP level between single, two vessels and three vessels diseases, was statistically significant as well a finding which was comparable with other studies that detected a significant difference between hsCRP among patients with more severe coronary artery lesions.

Conclusion: The study concluded that high level of hsCRP is a predictor of atherosclerosis and is wise to be done for patients as a risk factor and it is not only a predictor of coronary artery disease but it predicts it is severity as well.

Keywords: hsCRP (high sensitive C-reactive protein), CAD (coronary artery disease), COA (coronary angiography).

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Introduction

Coronary artery diseases are the leading cause of death in the world, for being the commonest prevalent disease among mankind, with more than half a million newly diagnosed coronary artery disease patients each year [1, 2].

Inflammation of the arteries due to elevated inflammatory markers found to be independent risk factors for atherosclerosis that is why the level of these biomarkers can be used to assess the risk of vascular events and is going to be a risk stratification measure [3]. Among all the markers hs-CRP (C-reactive protein) has been found to be associated with coronary artery atherosclerosis and even more to be associated with its severity according to many trials [4, 5]. Acute coronary syndromes is a clinical presentation of plaque rupture in the coronary arteries, this plaque is a result of chronic inflammatory process in patients with risk factors of atherosclerosis. As there are powerful evidences that atherosclerosis are related to inflammation and the pathogenesis of atherosclerosis is linked to that inflammation. Inflammatory markers are usually assessed to find the association between there level and atherosclerosis. CRP is a sensitive acute-phase reactant for many inflammations though is nonspecific for any of them [6].

While increases in the CRP levels by assays with expanded sensitivity to a very low level of, the so-called high-sensitivity C-reactive protein is an independent risk factor of cardiovascular diseases and their future events in otherwise healthy individual specially when elevated to ≥3 mg/L [7].

Though the relation between hsCRP and atherosclorsis is well documented, still the association between its level and the severity of atherosclerosis is controversial [8].

Considering these controversies, the increasing incidence and severity of coronary atherosclerosis, and the importance of knowing about these biomarkers, the present study aims to determine the correlation between serum hsCRP levels with presence of CAD and its severity in a sample of patients referring to Surgical specialty Hospital-Cardiac center in Erbil City 2018.

Patients and Methods

This study was conducted at Surgical Specialized-cardiac center in Erbil City / Iraqi Kurdistan from March 2018 to June 2018. In this cross sectional study 120 patients (78 male and 42 female) were studied who had undergone coronary angiography procedure among them 80 patients (57 male and 23 female) had Coronary artery disease. While among the 40 patients had normal coronary angiography.

All patients underwent coronary angiography in the Catheterization lab according to a special form.

Angiographic finding classified as following:
Normal (no lesion)
One vessel involved (1 artery having lesion)
Two vessels involved (2 artries having lesion)
Three vessels involved (3artries having lesion)

The blood samples were taken from patients and were transferred to the laboratory after clotting hsCRP was measured using cobas automated assay (cobas c311- Roche, Germany). The study protocol was approved by the ethical committee of Erbil Polytechnic University/ Erbil Medical Technical Institute.

Statistical analysis

We used statistical package for social sciences (SPSS) version 19 to analyzing the data. P-value of < 0.05 was considered as statistically significant.

Results

This study was conducted on 120 candidates (78) male and (42)Female for coronary angiography with the different mean age groups Table (1) shows the characteristics of the patients with normal coronary arteries and patients with coronary artery lesion.

Table (1): Shows the relation of hsCRP of patients with normal coronary artery and patient's coronary artery disease

			Patient control No. 40	Patient No. 80	P. value
	Age (Mean±SD)		54.45±10.05	58.35±10.27	0.452
Gender	Male		21	57	0.042
	Female		19	23	
Degree of severity	1 vessel blockage	Yes	0	49	0.00
	2 vessel blockage	Yes	0	20	0.00
	3 vessel blockage	Yes	0	11	0.009
	hsCRP (Mean±SD)		4.04±4.39	22.75±26.91	0.000

Table (1) shows the relation of hsCRP level with the severity of coronary artery disease among patients with normal angiography and patients with coronary artery disease and there is a significant difference in the level and hsCRP between patients with normal coronary artery and patients with CAD.
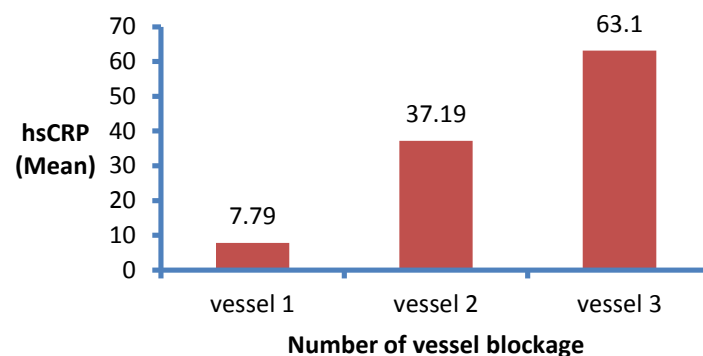

Figure (1): Association of hsCRP with severity of coronary artery disease among patient group with lesion

Figure (1) shows the relation between hsCRP level and the severity of coronary artery disease among patients documented to have CAD and it showed that there was a significant differences between single, double and three vessels of coronary artery disease (P value = 0.000).
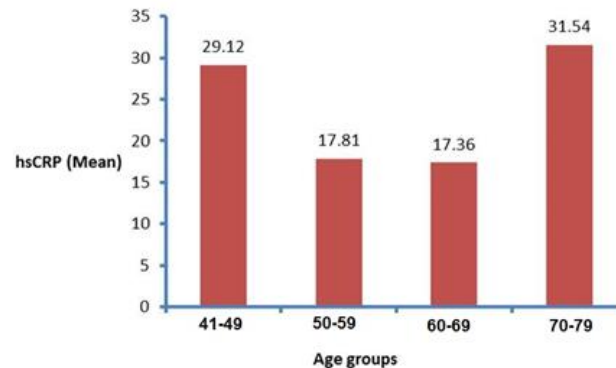

Figure (2): hsCRP level in patients with critical coronary artery lesion in different age groups

Figure (2) shows the differences between hsCRP level among different age groups although there was a numerical differences between them in which age group (70-79) have the more high hsCRP level but the difference was not statistically significant studied among other group (P value= 0.232).
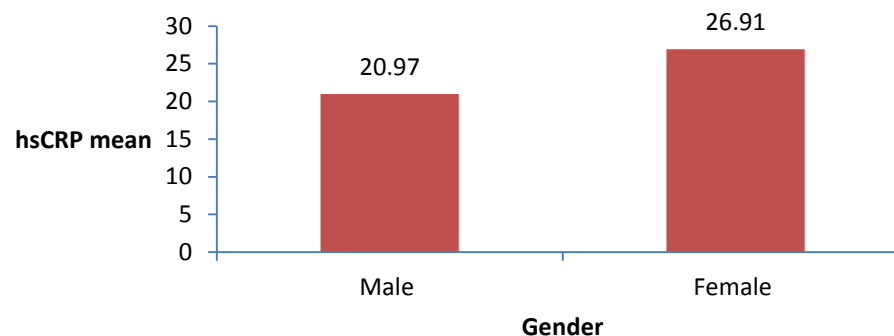

Figure (3): Gender difference of hsCRP level in patient with critical coronary artery lesion

Figure (3) shows the differences of hsCRP level between male and female but there is no statistically significant differences between them (P value=0.369).

Discussion

In this study we recruited 120 patients undergoing coronary angiography for being at risk of CAD due to the presence of risk factors other than hsCRP because it is not a routine test for risk assesses and we wanted to evaluated hsCRP being a risk predictor for CAD and the severity among patients with documented lesion angiographically.

Measurement of hs-CRP may provide additional information for detecting high-risk individuals among patients with or without traditional risk factors regarding atherosclerosis, for those with no significant traditional risk factors hsCRP may be the only known risk factors and for those with a well-known risk factor it may be a risk for the severity of atherosclerosis [9]. In this study we revealed statistically a significant difference in the level of hsCRP between patients with normal coronary arteries compared to those having angiographically atherosclerotic coronary artery lesions. A finding that was supported by earlier studies [10]. Here we detected as well a significant difference in the level of hsCRP between patients with single, two vessels and three vessels diseases, a finding which was comparable with other studies which detected higher hsCRP among patients with more severe coronary artery lesions, [11, 7]. Gender differences in cardiovascular risk make it interesting to assess any new cardiovascular risk factors for understanding the gender difference in having that disease. In our study a statistically non-significant finding of higher hsCRP among women may reflect a non-clinical significance or may reflect the need for a bigger study to assess statistical significance of this finding, as several studies support a significant difference between male and female [12,13,14] in which female had high size. We tried to find the difference of hsCRP among different age groups, the difference found to be not significant as some other studies found the same results [15]. Which raise the question that this inflammatory marker could be a predictor of premature atherosclerosis?

Conclusions

Patients with higher hsCRP had higher level of coronary artery atherosclerosis and among those with coronary artery diseases those with higher level of hsCRP had more severe form of atherosclerosis which makes hsCRP a good predictor for CAD and its severity.

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