ORIGINAL RESEARCH

Assessment of high sensitive CRP and lipid profile in early phase of acute coronary syndrome

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Abstract
Background: Coronary heart disease (CHD) is one of the leading causes of mortality and morbidity all over the world, including India. The present study was conducted to assess high sensitive CRP and lipid profile in early phase of acute coronary syndrome (ACS).
Materials & Methods: 72 ACS patients of both genders were included. Group I comprised of ACS patients and group I had healthy subjects. Parameters such as diabetes, systolic blood pressure, diastolic blood pressure, body mass index (BMI) were calculated. Venous blood was drawn and serum levels of hs-CRP were determined by latex enhanced immunoturbidimetric assay. Lipid profile, comprising TC, triglycerides (TG), LDL-C, and high-density lipoprotein cholesterol (HDL-C) was analyzed by enzymatic colorimetric methods.
Results: Group I had 42 males and 30 females and group II had 36 males and 36 females. In group I and group II, the mean hs-CRP was 9.12 and 1.06, TC was 168.4 and 158.4, TG was 142.5 and 116.8, LDL-C was 104.2 and 88.5, HDL-C was 40.6 and 49.2, VLDL-C was 27.6 and 23.1, TC:HDL-C ratio was 4.1 and 3.41 and LDL-C:HDL-C ratio was 2.89 and 1.92 respectively. The difference was significant (P< 0.05).
Conclusion: hs-CRP play an important inflammatory processes role in ACS. It is significantly higher in the patient's group during the early phase of ACS.
Key words: Acute coronary syndrome, Coronary heart disease, hs- CRP

Introduction

Coronary heart disease (CHD) is one of the leading causes of mortality and morbidity all over the world, including India. It is now generally accepted that inflammation and inflammatory processes contribute significantly in different stages in the pathogenesis of CHD, including the lifelong process of atherogenesis, the acute atherothrombotic event, which causes ischemic necrosis in acute myocardial infarction (AMI) and the myocardial damage following ischemia.

Several modifiable and non-modifiable risk factors have been identified to cause CVD. The major modifiable risk factors include hypertension (HTN), diabetes (DM), smoking and hyperlipidemia and whereas non-modifiable risk factors include age, gender and family history of premature CAD. However, not all coronary events can be predicted by these risk factors. In particular, nearly half of all myocardial infarctions or stroke occurs among individuals without hyperlipidemia. Consequently, alternate risk assessment approaches are being explored to facilitate early and accurate identification of individuals at risk of having CVD. Since atherosclerosis is an inflammatory process, several markers of inflammation have been evaluated for this purpose. Among them, high-sensitive C-reactive protein (hs-CRP) has emerged as the most important CV risk marker.

Dyslipidemia is recognized as one of the major risk factors for CHD. The role of lipids in the development and progression of atherosclerosis is well established, and low-density lipoprotein cholesterol (LDL-C) and total cholesterol (TC) have been associated with CHD risk consistently in multiple clinical investigations. The present study was conducted to assess high sensitive CRP and lipid profile in early phase of acute coronary syndrome (ACS).

Materials & Methods

The present study comprised of 72 ACS patients of both genders. All were included after they gave their written consent.

Data such as name, age, gender etc. was recorded. Group I comprised of ACS patients and group I had healthy subjects. Parameters such as diabetes, systolic blood pressure, diastolic blood pressure, body mass index (BMI) were calculated. Venous blood was drawn and serum levels of hs-CRP were determined by latex enhanced immunoturbidimetric assay. Lipid profile, comprising TC, triglycerides (TG), LDL-C, and high-density lipoprotein cholesterol (HDL-C) was analyzed by enzymatic colorimetric methods. Results were tabulated and assessed statistically. P value less than 0.05 was considered significant.

## Results

Table I Distribution of patients

Group	Group I	Group II
Number	ACS	Control
M:F	42:30	36:36

Group I had 42 males and 30 females and group II had 36 males and 36 females.

Table II Assessment of hs-CRP and lipid profile

Parameters	Group I	Group II	P value
hs-CRP	9.12	1.06	0.04
TC	168.4	158.4	0.02
TG	142.5	116.8	0.05
LDL-C	104.2	88.5	0.01
HDL-C	40.6	49.2	0.05
VLDL-C	27.6	23.1	0.04
TC:HDL-C ratio	4.1	3.41	0.02
LDL-C:HDL-C ratio	2.89	1.92	0.03

Table II, graph I shows that in group I and group II, the mean hs-CRP   was 9.12 and 1.06, TC was 168.4 and 158.4, TG was 142.5 and 116.8, LDL-C was 104.2 and 88.5, HDL-C was 40.6 and 49.2, VLDL-C was 27.6 and 23.1, TC:HDL-C ratio was 4.1 and 3.41 and LDL-C:HDL-C ratio was 2.89 and 1.92 respectively. The difference was significant (P< 0.05).

Graph IAssessment of hs-CRP and lipid profile
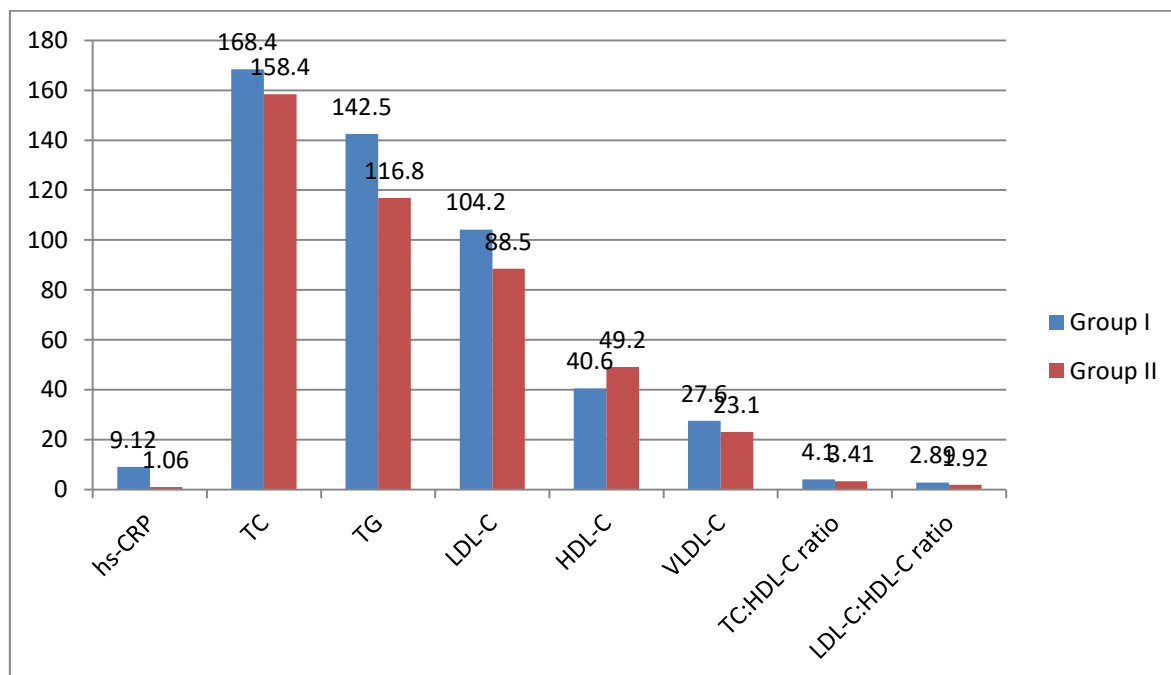
Discussion

Worldwide, atherosclerotic cardiovascular disease (CVD) including coronary artery disease (CAD) is estimated to be the leading cause of death and loss of disability-adjusted life years. Unfortunately, while the incidence and prevalence of CVD is now declining in the developed countries, it continues to increase exponentially in the developing nations.Present health transition from predominance of infections to the preponderance of cardiovascular disorders, such as HTN, DM and CVD is now responsible for 53% of all deaths in India. Indians have one of the highest rates of heart disease in the world and the disease also tends to be more aggressive and manifests at a younger age. Consequently, prevention of CVD has become one of the most important public health challenges of our times. Several modifiable and non-modifiable factors such as HT, DM, smoking etc are recognized as major risk factors for CVD and aggressive correction of these play vital role in CVD prevention. However, not all adverse CV events can be predicted or explained by these conventional risk factors, which limits our ability to accurately identify the individuals who are at "high risk" of developing CVD. The present study was conducted to assess high sensitive CRP and lipid profile in early phase of acute coronary syndrome (ACS).

We found that group I had 42 males and 30 females and group II had 36 males and 36 females.Pandey et al[7] examined the association of high-sensitive C-reactive protein (hs-CRP) and lipid profile within 24 hours of onset of symptoms in acute coronary syndrome (ACS) patients. 300 patients with ACS and 100 age- and sex-matched control subjects with no cardiac disease were recruited. Acute coronary syndrome patients were classified into two groups (I) onset of ACS symptoms < 0.001), along with altered lipid profile in patients than in control subjects. In subgroup analysis, serum concentrations of hs-CRP were approximately 3-fold higher in group I when compared with the control group (3.4 ± 2.08 vs 1.08 ± 0.7 mg/L, $p < 0.001$), and the levels of hs-CRP were almost 12-fold higher in group II than the controls (12.98 ± 4.26 vs 1.08 ± 0.7, $p < 0.001$). Between ACS patients subgroups, serum hs-CRP levels were almost 4-fold higher in group II when compared with group I ($p < 0.001$).

We found that in group I and group II, the mean hs-CRP   was 9.12 and 1.06, TC was 168.4 and 158.4, TG was 142.5 and 116.8, LDL-C was 104.2 and 88.5, HDL-C was   40.6   and 49.2, VLDL-C was 27.6 and 23.1, TC:HDL-C ratio was 4.1 and 3.41 and LDL-C:HDL-C ratio   was 2.89 and 1.92 respectively. He et al[8] in a meta-analysis have quantitatively assessed the relation between early blood hs-CRP after ACS and risk of adverse outcomes in 20 longitudinal studies comprising 2,789 cases from 17,422 patients. They found that patients with higher hs-CRP levels of 3.1–10.0 mg/dL and >10.0 (mg/L) after ACS were associated with 1.4-fold and 2.18-fold higher risks of adverse outcomes when compared with the referent (CRP $\leq$3.0 mg/L). Thus, the measurement of hs-CRP at the time of admission in patients with suspected CHD may be helpful in identifying a group of patients who may be at high risk of cardiac complications and these patients need aggressive cardiac management and close monitoring after discharge.

Gorecki et al[9]observedhigher levels of TC and LDL in patients with complicated vsthosewith the uncomplicated clinical course of infarction, suggestinghigher levels of these biomarkers during the first 24 hours of AMIhave a strong negative prognostic value. During tissue necrosis,acute phasic changes occur that alter the lipid profile levels postACS. Therefore, the validity of plasma lipids measured beyond 24hours from the onset of MI has been questioned by many studies.

Numerous studies have provided the evidence that inflammation plays a central role in the occurrence of CVD.[10]Accordingly, several mediators of the inflammatory response, including acute-phase proteins, cytokines and cellular adhesion molecules have been evaluated as potential indicators of the risk of a first acute atherothrombotic event, as well as of recurrent complications after initial presentation. As the prototypical acute-phase reactant, hs-CRP has been the focus of much of the clinical investigation.[11]

Conclusion
Authors found thaths-CRP play an important inflammatory processes role in ACS. It is significantly higher in the patient's group during the early phase of ACS.

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