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A study on C reactive protein among diabetic patients

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Abstract
CRP has a relatively long half-life of 18 to 20 h, owing to its stable pentraxin structure. In addition, CRP levels are stable as these do not exhibit diurnal variations or variations in relation to food intake. In the past decade, high-sensitivity assays with rapid turnaround times for measurement have become available. High-sensitivity assay techniques such as immunonephelometry, immunoturbidimetry, high-sensitivity enzyme-linked immunosorbent assay (ELISA) and resonant acoustic profiling (RAP) can detect CRP with a sensitivity range of 0.01 to 10 mg/ l. The previously formulated proforma used to collect the clinical and demographic details of the samples. Detailed history related to the present as well as a thorough history pertaining to other diseases were taken. Each patient was enquired about previous drug history, coronary artery disease, hypertension, diabetes and any other comorbid conditions.

Keywords: CRP, high-sensitivity assay techniques, diabetes

Introduction
A marker of systemic inflammation and is emerging as an independent risk factor for cardiovascular disease. High hsCRP levels have been attributed to the increased risk of thrombotic episodes including myocardial infarction [1].

"C-reactive protein (CRP) is a member belonging to pentraxin family of proteins. It is an acute phase reactant and synthesized by the liver. Serum levels are elevated in a response to acute infections, inflammations and trauma. In those clinical situations, the serum CRP levels increase rapidly generally beyond 10 mg/l with a concomitant elevation of erythrocyte sedimentation rates (ESR). CRP has a relatively long half-life of 18 to 20 h, owing to its stable pentraxin structure. In addition, CRP levels are stable as these do not exhibit diurnal variations or variations in relation to food intake. In the past decade, high-sensitivity assays with rapid turnaround times for measurement have become available. High-sensitivity assay techniques such as immunonephelometry, immunoturbidimetry, high-sensitivity enzyme-linked immunosorbent assay (ELISA) and resonant acoustic profiling (RAP) can detect CRP with a sensitivity range of 0.01 to 10 mg/ l. These high-sensitivity assays help quantify low grades of systemic inflammation, in the absence of overt systemic inflammatory or immunologic disorders [2, 3]."

Elevated hsCRP levels have also been linked to an increased risk of future development of diabetes. Furthermore, hsCRP levels are increased in people with diabetes compared with those non diabetes. So far Studies have conducted on hscrp recommends that (hsCRP) is a significant biomarker for prediction of global cardiovascular risk [4].

The hsCRP has been noted to have opsonizing properties, increasing the recruitment of monocytes into atheromatous plaque and also inducing endothelial dysfunction by suppressing basal and induced nitric oxide release. The hsCRP *per se* has also been found to increase the expression of vascular endothelial plasminogen activator inhibitor-1 (PAI-1) and other adhesion molecules and alter LDL uptake by macrophages. However, interventions that directly inhibit hsCRP would have to be evaluated before conclusively establishing hsCRP as a direct contributor to the atherosclerotic process [5].

On the basis of data obtained from population based studies, the AHA/CDC (American Heart Association/Centres for Disease Control) Working Group on markers of inflammation in CVD has classified serum hsCRP levels <1, 1–3 and >3 mg/l as low-, intermediate, and high-risk groups for global CVD, respectively [6].

Methodology

Inclusion criteria

1. All Type 2 Diabetes patients as defined by ADA.
2. Age >40 yrs.
3. Duration of Diabetes >5yrs.
4. Family history of CAD**.**
5. Hypertenstion
6. Dyslipidemia
7. Current Tobacco smoking.
8. BMI >23 kg/m2
9. hsCRP levels.
10. Patients with normal ECG and Echocardiogram.

Exclusion criteria

1. Previous history of CAD/undergone coronary intervention.
2. Patients with abnormal ECG and Echocardiogram suggestive of ischemia.
3. Patient Refusal to give consent.
4. Age <40 yrs.
5. Recently discovered Diabetes and type 1 diabetes
6. Severe valvular heart disease.
7. Patients with chronic inflammatory condition.

Data collection

The previously formulated proforma used to collect the clinical and demographic details of the samples. Detailed history related to the present as well as a thorough history pertaining to other diseases were taken. Each patient was enquired about previous drug history, coronary artery disease, hypertension, diabetes and any other comorbid conditions.

A thorough clinical test and biochemical investigations were done to categorise the patients into diabetic with asymptomatic and associated risk factors for coronary artery disease.

An Electrocardiography was recorded for all patients and they were subjected to Trans thoracic Echocardiography.

Patients with normal ECG and ECHO will be undergoing to exercise treadmill test (TMT).

Results

Table 1: Age distribution

Age group	Frequency	Percentage
40 - 50	29	29%
51 - 60	51	51%
> 60	20	20%
Total	100	100%

Table 2: Gender distribution

Gender	Positive	Negative
Male	72	72%
Female	28	28%
Total	100	100%
P value	0.009	Significant

Table 3: CRP distribution

CRP	Positive	Negative
<3	2	69
> 3	29	0
Mean	4.71	1.72
SD	1.21	0.157
p value	< 0.001	Significant

Discussion

Diabetes is one of the main risk factors for coronary atherosclerosis since it accelerates its progression, causes endothelial dysfunction and increases platelets activity.

Recent clinical trials have demonstrated the various markers for prediction of CAD in diabetic populations such as micro albuminuria, glycosylated haemoglobin (HbA1c), high sensitivity C-reactive protein (HsCRP) and other parameters [7].

These laboratory parameters now in emerging field of medicine and various clinical trials have been conducted to prove their role in screening and early diagnosis of CAD in diabetes patients.

"Diabetes increases the risk of CAD by two to four folds and Myocardial ischemia is a major complication in the course of diabetes, causing 75% of diabetes-related deaths. Moreover, patients with diabetes have a higher rate of sudden death and poorer outcomes after myocardial infarction [8, 9]."

Hae chong geong *et al*., conducted study with 445 diabetes patients with for detection of subclinical atherosclerosis patients using TMT,MDCT and HsCRp and found that prevalence of CAD in that group is 49% and the all the patients with TMT positivity are having the hscrp levels of 1+_7 mg/l [7].

In our study we have measured the hscrp levels in all 100 diabetes patients without any symptoms of CAD and finally found that the levls of hscrp elevated with reference range of >3 mg/l in those patients with TMT positivity.

Conclusion

Hence this study concludes that levels of Hscrp is elevated in type 2 diabetes patients with underlying CAD even though they are clinically asymptomatic and this can be used as supportive marker for detection of underlying CAD in patients with type2 diabetes patient.

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