ORIGINAL RESEARCH

Assessment of CRP level in diabetes mellitus patients

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ABSTRACT
Background: The status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people. The present study was conducted to assess CRP level in diabetes mellitus patients. **Materials & Methods:** 50 type 2 diabetic patients and 50 were apparently healthy non-diabetic persons of both genderswere subjected to an assessment of fasting blood glucose, random blood glucose and CRP level. **Results:** Out of 50 patients, males were 30 and females were 20. The mean FBG in group I and group II was 176.2 mg/dl and 90.4 mg/dl, RBG was 242.6 mg/dl and 146.8 mg/dl and CRP was 15.7 mg/l and 6.0 mg/l respectively. The difference was significant (P< 0.05). **Conclusion:** There was increased level of high-sensitivity C-reactive protein in type II diabetes patients.

Key words: C-reactive protein, diabetes, cardiovascular disease

INTRODUCTION

The status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people.[1] The rise in C-reactive protein (CRP) as a response to the increase in the secretion of cytokines of adipose origin detected in obese individuals has been used as a marker of cardiovascular risk and diabetes in adults.[2] When measured with new high-sensitivity assays, the levels of CRP have proven to predict future cardiovascular risk. Among apparently healthy men and women, the levels of high-sensitivity-CRP (hs-CRP) <1, 1-3 of and >3 mg/l distinguish between those at low, moderate and high risk of future cardiovascular disease.[3]

Type 2 diabetes mellitus is associated with chronic low-grade inflammation, possibly through a pathway involving a cytokine-mediated acute-phase response to infection and other inflammatory processes.[4] C-reactive protein (CRP) is an acute-phase reactant produced primarily in the liver under the stimulation of adipocyte-derived pro-inflammatory cytokines, including IL-6 and TNF-α. CRP is the most commonly measured circulating marker for subclinical inflammation, with widely available, stable and standardised assays for its measurement.[5]The present study was conducted to assess CRP level in diabetes mellitus patients.

MATERIALS & METHODS

The present study consisted of 50 type 2 diabetic patients and 50 were apparently healthy non-diabetic personsof both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were kept in group I and healthy non-diabetic persons in group II. All were subjected to an assessment of fasting blood glucose, random blood glucose and CRP level. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 50		
Gender	**Male**	**Female**
Number	30	20

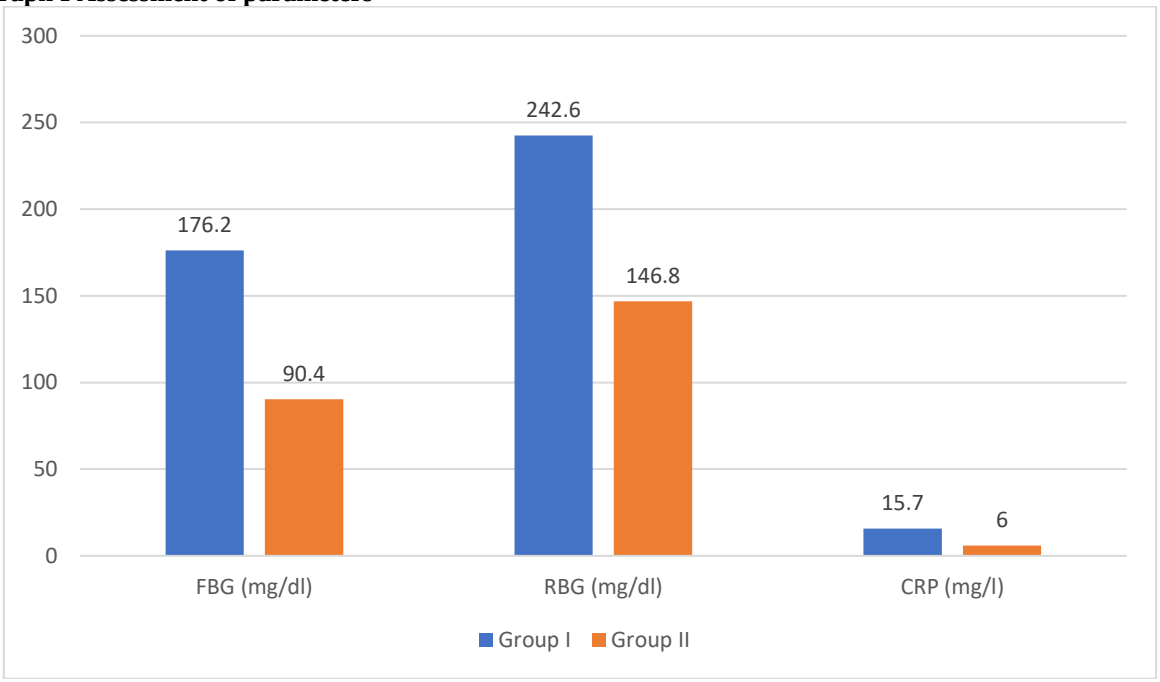
Table I shows that out of 50 patients, males were 30 and females were 20.

Table II Assessment of parameters

Parameters	Group I	Group II	P value
FBG (mg/dl)	176.2	90.4	0.01
RBG (mg/dl)	242.6	146.8	0.03
CRP (mg/l)	15.7	6.0	0.01

Table II, graph I shows that the mean FBG in group I and group II was 176.2mg/dl and 90.4mg/dl, RBG was 242.6mg/dl and 146.8mg/dl and CRP was 15.7 mg/l and 6.0 mg/l respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

The major challenge in elucidating the aetiological role of CRP in the development of type 2 diabetes is confounding, i.e. the presence of other factors which might explain the association between CRP and diabetes risk.[6,7] Adjustment for different potentially confounding factors in regression models and imprecise measurement of the confounders that are included (residual confounding) could at least partly account for the inconsistencies in observed associations. Two potentially confounding factors are adiponectin concentrations and markers of liver dysfunction.[8] Emerging evidence suggests that plasma concentrations of the adipocytokine adiponectin and markers of liver injury, such as the hepatic enzyme γ-glutamyltransferase (GGT) predict the development of type 2 diabetes, independently of traditional risk factors. Adiponectin and GGT are also associated with CRP levels.[9,10]The present study was conducted to assess CRP level in diabetes mellitus patients.

We found that out of 50 patients, males were 30 and females were 20. Lee et al[11]examined the association between serum C-reactive protein (CRP) and incident diabetes. The serum CRP was associated with a higher risk of diabetes after adjusting for age, sex, BMI, family history of diabetes, smoking and physical activity (OR 1.49, comparing the extreme thirds of CRP distribution [95% CI 1.03–2.15], p=0.03). However, the association was completely attenuated after further adjustment for WHR, serum γ-glutamyltransferase and serum adiponectin (OR 1.00; 95% CI 0.66–1.51, p=1.0). In a meta-analysis of 16 published studies with 3,920 incident diabetes cases and 24,914 controls, the RR was 1.72 (95% CI 1.54–1.92), comparing the extreme thirds of CRP distribution, with substantial heterogeneity between studies.

We found that the mean FBG in group I and group II was 176.2 mg/dl and 90.4 mg/dl, RBG was 242.6 mg/dl and 146.8 mg/dl and CRP was 15.7 mg/l and 6.0 mg/l respectively. Pradhan et al[12] found that of the total cases, 60 were type 2 diabetic patients and 60 were apparently healthy non-diabetic persons recruited for the study. These diabetic and non-diabetic subjects were classified as male (50%) and female (50%). Fasting blood glucose and CRP were measured by following the standard laboratory methods. The mean CRP level was 16.48±12.69mg/L and <6.00±0.00mg/L in diabetic patients and non-diabetics respectively. The study revealed that fasting blood glucose and C-reactive protein were significantly higher in diabetic patients compared with age matched non-diabetic subjects. There was no

significant difference in CRP between diabetic males and diabetic females.

CRP originates in the liver and is increased in people with liver steatosis, suggesting a link between chronic inflammation and non-alcoholic fattyliver disease. The association of GGT with insulin resistance, fasting blood glucose and triacylglycerols and type 2 diabetes is well described. Low levels of adiponectin have similarly been associated with the development of type 2 diabetes. Plasma adiponectin levels are also inversely associated with CRP. It is possible that adiponectin may act as an intermediate between CRP and diabetes.[13]

Doi et al[14] in their study a total of 1,759 Japanese subjects, aged 40-79 years and without diabetes (according to American Diabetes Association fasting criteria), were stratified into three groups according to CRP tertiles by sex and followed up prospectively for a mean of 9.0 years. During the follow-up, 131 subjects (67 men and 64 women) developed diabetes. In both sexes, the age-adjusted cumulative incidence of diabetes increased significantly as the tertiles of CRP levels increased. In multivariate analyses, the risk of developing diabetes was significantly higher in the highest CRP tertile than in the lowest after adjustment for a number of confounding factors (odds ratio 2.63 [95% CI 1.23-5.65] for men and 2.25 [1.01-5.01] for women). In stratified analyses, this CRP-diabetes association was stronger in subjects without obesity or other risk factors related to insulin resistance and in nondrinking subjects.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that there was increased level of high-sensitivity C-reactive protein in type II diabetes patients.

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