



Research Article

EVALUATION OF SERUM HS-CRP IN TYPE 2 DIABETES MELLITUS WITH DYSLIPIDEMIA

¹Kumar Rajesh, ¹Soni Yogita, ¹Verma Anita and ²Soni N.R

¹Department of Biochemistry, S.P. Medical College, Bikaner. Rajasthan, India

²Department of Biochemistry, J.L.N. Medical College, Ajmer. Rajasthan, India

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ABSTRACT

Aim: The aim of this study was to evaluate hs-CRP level in type 2 diabetic mellitus (T2DM) subjects associated with dyslipidemia. **Methodology:** The cross-sectional study was conducted in Department of Biochemistry and Medicine, S.P. Medical College & Associated group of PBM Hospitals, Bikaner. The serum fasting plasma glucose (FPG) and lipid profile were estimated by a fully automated Beckman coulter analyzer and hs-CRP was estimated by an electro-chemiluminescence system. **Results:** The mean levels of FPG, lipid profile and hs-CRP were significantly higher in diabetic patients associated with dyslipidemia. It was found that there was a significant positive correlation ($p < 0.05$) of increased hs-CRP with a raised level of FPG & lipid parameters while HDL-C in cases. **Conclusion:** hs-CRP and lipid profile measurements for vascular risk assessment in the diabetic patients for preventing cardiovascular complications. Chronic inflammation may have a role in vascular toxicity resulting in endothelial damage in T2DM. The early stage of diagnosis of T2DM may have an important role for preventing cardiovascular disease in these patients.

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INTRODUCTION

Diabetes is associated with significant morbidity and mortality due to cardiovascular complications. The incidence of cardiovascular disease (CVD) is more common in patients with type 2 diabetes than in the general population. The increased prevalence of CVD in diabetes has been attributed in large part to the acceleration of coronary atherosclerosis, which occurs at an earlier age and advances more rapidly to clinical cardiovascular events in individuals with diabetes and contribution from conventional risk factors for cardiovascular disease such as hypertension, dyslipidemia and smoking¹. The lipid changes represent the major link between diabetes and the increased cardiovascular risk of diabetic patients. Dyslipidemia is a well recognized and modifiable risk factor that if recognized early can result in instituting aggressive cardiovascular preventive management². Inflammation plays an important role in atherosclerosis and is one of the vital risk factors in the development of CVD^{3,4}. There are many systemic markers available for the diagnosis of inflammation, among them high-sensitivity C-reactive protein (hs-CRP) is considered a promising marker. In comparison to numerous other biomarkers that reveal the pathophysiology of inflammation and insulin resistance, hs-CRP assessment is economical, standardized and wide-ly available. Many studies have reported a strong relationship between hs-CRP and coronary heart disease (CHD) even in non-diabetic population.⁵⁻⁷ On the other hand patients with type 2 diabetes

have shown significantly increased risk for developing CHD and majority of them die with CHD⁸. The risk of major cardiovascular events in patients with type 2 diabetes without history of CHD is comparable with the non-diabetic patients with history of chronic heart disease. High levels of hs-CRP have been associated with the development of CHD in diabetes⁹.

METHODOLOGY

The present study was conducted on 117 newly diagnosed T2DM cases associated with dyslipidemia attending the Medicine Department of S.P. Medical College and Hospitals, Bikaner. The results of cases were compared with 117 healthy controls of either sex of a similar age group between 30-70 years. Patients having history of type 1 diabetes mellitus, systemic disease like heart disease, arthritis, Patients who are under intensive care and patients who are not willing to participate were excluded. The study was approved by the Ethics committee of our college. Informed consent was taken from all the participants. All the anthropometric measurements were performed. Blood sample collection was done by aseptic technique and subjected to biochemical estimations. The FPG and lipid profile were estimated by fully automated Beckman coulter analyzer and hs-CRP was estimated by electro-chemiluminescence system. p-values < 0.05 were considered significant.

*Corresponding author: **Soni N.R.**

Department of Biochemistry, J.L.N. Medical College, Ajmer. Rajasthan, India.

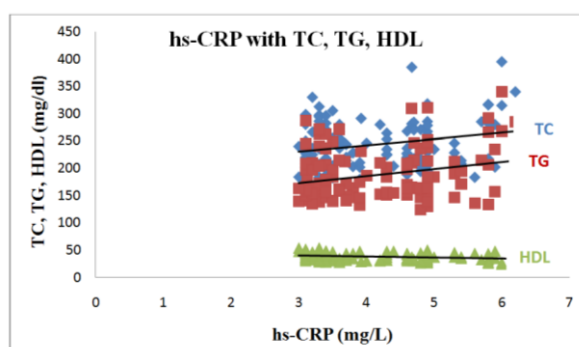
RESULTS

The Mean \pm SD levels of FPG, lipid parameters and hs-CRP were elevated in cases as compared with control group. The increases mean FPG, lipid parameters and hs-CRP values were highly significant ($p < 0.001$) and HDL-cholesterol level was decreased and statistically, it was highly significant ($p < 0.001$) in cases as compared to the healthy control subjects (Table:1). A significant positive correlation ($p < 0.05$) of increased hs-CRP with raised level of FPG, TC, TG & HDL and significant negative correlation ($p > 0.05$) found between serum hs-CRP and HDL were observed in case group (Graph:1).

Table 1 Comparison of Biochemical parameters in both study groups

S. no.	Parameters	Normal Healthy Controls (117) (Mean \pm S.D.)	Cases (117) (Mean \pm S.D.)	P-Value
1.	FPG (mg/dl)	86.74 \pm 11.50	185.06 \pm 50.17	$P < 0.001$
2.	TC (mg/dl)	177.15 \pm 12.70	243.72 \pm 42.64	
3.	TG (mg/dl)	115.32 \pm 24.64	187.13 \pm 46.22	
4.	HDL (mg/dl)	42.51 \pm 07.63	37.78 \pm 07.21	
5.	VLDL (mg/dl)	23.03 \pm 04.91	37.38 \pm 09.17	
6.	LDL (mg/dl)	110.54 \pm 15.51	168.21 \pm 40.58	
7.	hs-CRP (mg/L)	1.99 \pm 0.54	4.13 \pm 0.89	

Note: $p < 0.001$ = Highly significant (HS).



Graph 1 Correlation plot between hs-CRP and FPG & Lipid parameters (TC, TG, HDL) in cases.

DISCUSSION

Diabetes is characterized by chronic hyperglycemia and disturbances of carbohydrate, lipid and protein metabolism. Many studies have established that complications are mainly due to chronic hyperglycemia that exerts its effects through several mechanisms including dyslipidemia, platelet activation and altered endothelial metabolism¹⁰. Our findings which is showed significantly higher mean serum levels of FPG, TC, TG, VLDL, LDL-C, hs-CRP and lower HDL-C in T2DM patients when compared with control group (Table: 1). In diabetes, many factors may affect blood lipids levels because of the interrelationship between carbohydrate and lipid metabolism. Therefore, any disorder in carbohydrate metabolism leads to a disorder in lipid metabolism and vice versa. However, several studies showed that insulin affects the liver lipoproteins production and regulates the enzymatic activity of lipoprotein lipase and cholesterol ester transport protein, which is causes dyslipidemia in diabetes mellitus. Moreover, insulin deficiency may reduce the activity of hepatic lipase and several steps in the production of biologically active lipoprotein lipase¹¹.

High CRP, dyslipidemia and LDL-C are reported to be the main risk factors for the chronic complications of T2DM. Prevalence of obesity and overweight in our study, together with elevation of triglycerides and CRP, suggests the coexistence of dysregulated lipids metabolism and inflammation in diabetes patients. Obesity in diabetic patients affects the CRP levels probably through hormonal changes linked to obesity. The high serum CRP concentration in diabetes reported in this study and by other authors could be due to an increase in adipose tissue mass that enhances cytokines production by adipocytes, cytokines production is known to stimulate the hepatic synthesis of CRP¹².

CONCLUSION

Serum hs-CRP and lipid profile measurements for vascular risk assessment in diabetic patients for preventing cardiovascular complications. Chronic inflammation may have a role in vascular toxicity resulting in endothelial damage in T2DM. The early stage of diagnosis of T2DM, may have important role for preventing cardiovascular disease in T2DM patients.

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