

Association of C Reactive Protein with Insulin Resistance in Type 2 Diabetic

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Abstract—Background and aim: It is hypothesized that Inflammation play an importance role in development of type 2 diabetes mellitus. However, clinical data addressing this issue are limited. To determine whether elevated levels of the C-reactive protein (CRP) as proinflammatory markers is associated with development insulin resistance in type 2 diabetes mellitus in adult-aged men. **Material and methods:** we measure fasting C reactive protein, glucose, and insulin in a total 30 adult men with type 2 diabetic (40- 50 years of age) and thirty healthy men that matched as control group. From fasting insulin and glucose used for measuring insulin resistance. The statistical significance of differences in CRP, insulin resistance and other variables between the study groups and control was estimated by Independent T test used. A multiple regression used for determine relation between CRP and insulin resistance in diabetic patients. **Results:** C - reactive protein levels in diabetic subjects were significantly higher than those of control group. We also found that insulin resistance of patients were higher in type 2 diabetes patients than normal subjects ($p=0.023$). There was a positive significantly correlation between CRP and insulin resistance in patients. **Conclusion:** Our study findings showed that C reactive protein correlated highly with insulin resistance in these patients. Therefore, we confirm that CRP is a precise predictor for insulin resistance in diabetic patients.

Keywords—C-reactive protein, insulin resistance, diabetic

I. INTRODUCTION

The prevalence of type 2 diabetes has been rapidly rising worldwide. That is a metabolic disease with inappropriate hyperglycemia either due to deficiency of insulin secretion or reduction in the biologic effectiveness of insulin. Elevated inflammatory marker, and altered adipokine concentrations have been observed in obese type 2 diabetes patients (1). Although the main physiological abnormalities in type 2 diabetic are insulin resistance and impaired insulin secretion (2), but the some specific underlying determinants of these metabolic defects remain uncertain yet. Some studies suggests that inflammation have a crucial intermediary role in pathogenesis type 2 diabetic, thereby linking diabetes with a number of commonly coexisting conditions thought to originate through inflammatory mechanisms(3). Among proinflammatory markers, C-reactive protein (CRP) a sensitive physiological markers of subclinical systemic inflammation, is associated with hyperglycemia, insulin resistance, and overt type 2diabetic (4). Several studies have reported positive associations between inflammatory

biomarkers and main factors of diabetic diagnosis such as insulin resistance and HbA1C. C reactive protein (CRP) is a main inflammatory factor that produced by the liver during acute infection or inflammation and its concentration in plasma can increase as much as 1000-fold during injury and infection (5). CRP and may be independent risk factors for chronic kidney disease in patients with type 2 diabetes (6). CRP, leptin, and triglyceride levels are significantly higher in the obese diabetes patients compare with the healthy normoglycemic controls (1). Elevated levels of CRP and IL-6 predict the development of type 2 diabetic. These data support a possible role for inflammation in diabetogenesis. Experimental evidence and some cross sectional data demonstrated that C-reactive protein as a sensitive physiological marker of subclinical systemic inflammation is associated with hyperglycemia, insulin resistance, and overt type 2 diabetic. But Su et al stated that there is no relationship between CRP and insulin resistance in type 2 diabetes (7). Therefore, the objective of this study is comparison CRP and insulin resistance and determination relation between CRP and insulin resistance in adult men with type 2 diabetic.

II. MATERIAL AND METHOD

A total of 30 adult men with type 2 diabetic (40- 50 years of age) enrolled in this study. Also, thirty healthy men selected as control group. Insulin, glucose and CRP measured in baseline after 10 -12 hours overnight fasting in 2 groups. Insulin resistance calculated with use insulin and glucose values. Statistical analysis was performed using SPSS 16.0 for windows software. The statistical significance of differences in CRP, insulin resistance and other variables between the study groups and control was estimated by Independent T test used. A multiple regression used for determine relation between CRP and insulin resistance in diabetic patients. *P* values smaller than 0.05 were accepted a significant.

III. RESULTS

This study examined the serum CRP concentration in relation to insulin resistance in type 2 diabetic patients. The statistical findings showed that serum CRP concentration in diabetic subjects were also significantly higher than those of control ($p=0.002$). We also found that insulin resistance of patients were higher in type 2 diabetes patients than normal

subjects ($p=0.023$). There was a positive significantly correlation between CRP and insulin resistance in patients.

IV. DISCUSSION

Inflammation is hypothesized to play a role in development of type 2 diabetes mellitus (DM); however, clinical data addressing this issue are limited. C-reactive protein (CRP) is an inflammatory marker produced and released by the liver under the stimulation of cytokines such as tumor necrosis factor- α and interleukins 1 and 6(1). In this area, several studies have demonstrated elevated levels of IL-6 and CRP among individuals both with features of the insulin resistance syndrome and clinically overt type 2 diabetic (8). The results of a recent study suggest that CRP and tumor necrosis factor- α may be independent risk factors for chronic kidney disease in patients with type 2 diabetes (9). The present study showed indicated that the CRP as a proinflammatory cytokine were significantly higher in diabetic patients compared to normal people. Our study demonstrate that CRP level of diabetic patients is 2 fold upper than healthy people. In addition, we observed that C reactive protein also correlated highly with insulin resistance in these patients. Therefore, we confirm that CRP is a precise predictor for insulin resistance in diabetic patients.

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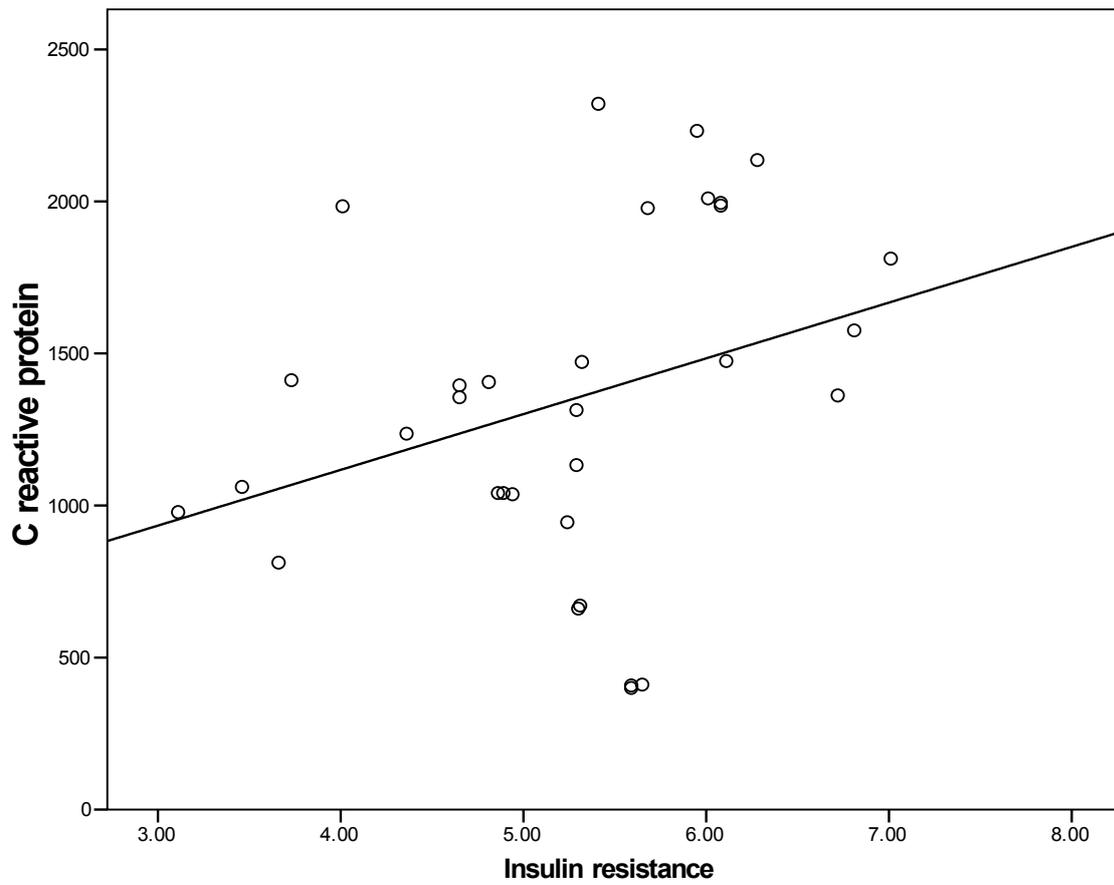


Figure 1. The regression pattern of CRP versus Insulin resistance in type 2 diabetic patients