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Evaluation of Inflammatory State in Diabetic Patients by Measuring of Interleukin-6 and Tumor Necrosis Factor-α in Obese and Non-Obese Type 2 Diabetes Mellitus Patients as Compared with Control Subjects

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Abstract

Background Inflammation was one of the most important events in the biology of obesity; the obese subjects were recognized recently as characterized by low-grade chronic inflammation. It was thought that the mild inflammation associated with obesity, and particularly the production of inflammatory adipocytokines like interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α), was important in the etiology of the diseases associated with obesity. In particular, insulin resistance (IR) and type 2 diabetes mellitus (T2DM).

Objective To investigate whether IL-6 and TNF-α play an important role in the etiology of IR and T2DM.

Methods This study enrolled 70 T2DM patients randomly assigned into two subgroups, 35 non-obese (body mass index (BMI) < 30) diabetic group 1 and 35 obese (BMI ≥ 30) diabetic group 2 with another 50 healthy control volunteers, divided into two subgroups, 25 non-obese (BMI < 30) control group 1 and 25 obese (BMI ≥ 30) control group 2. Levels of IL-6, TNF-α, fasting glucose, fasting insulin, HbA1c, homeostasis model assessment of IR (HOMA-IR), homeostasis model assessment of β-cell function (HOMA-B%) were examined.

Results The serum concentration of IL-6 of obese and non-obese diabetic patients was significantly ($p < 0.05$) lower as compared with obese and non-obese controls in contrast to the serum concentration of TNF-α, which was significantly ($p < 0.05$) higher in non-obese diabetic patients in comparison to non-obese controls. No significant correlation was observed for the levels of IL-6 and TNF-α with BMI of study population

Conclusion The proposed link between serum inflammatory cytokines (IL-6 and TNF-α) and T2DM was more related to insulin sensitivity, insulin secretion and/or glycemic control than to adiposity. Therefore, the inflammatory cytokines may play an important role in the etiology of IR and T2DM.

Keywords IL-6, TNF-α, type 2 diabetes mellitus, obesity, insulin resistance.

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List of abbreviation: BMI = Body mass index, CG1 = Control group 1, CG2 = Control group 2, DG1 = Diabetic group 1, DG2 = Diabetic group 2, HOMA-IR = Homeostasis model assessment of insulin resistance, HOMA-B% = Homeostasis model assessment of pancreatic function, IL-6 = Interleukin-6, IR = Insulin resistance, T2DM = Type 2 diabetes mellitus, TNF-α = Tumor necrosis factor-alpha, WHR = Waist to hip ratio.