

The influence of late onset hypogonadism on the formation of proinflammatory cytokines imbalance in patients with obesity and type 2 diabetes.

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Background:

Currently actively studied the role of certain inflammatory and proinflammatory cytokines in the pathogenesis of insulin resistance, type 2 diabetes, obesity, atherosclerosis. However, the influence of testosterone deficiency on the balance of proinflammatory cytokines is unexplored.

Objectives:

The aim of the work was to evaluate the influence of testosterone deficiency on metabolic parameters and levels of proinflammatory cytokines in patients with obesity and type 2 diabetes.

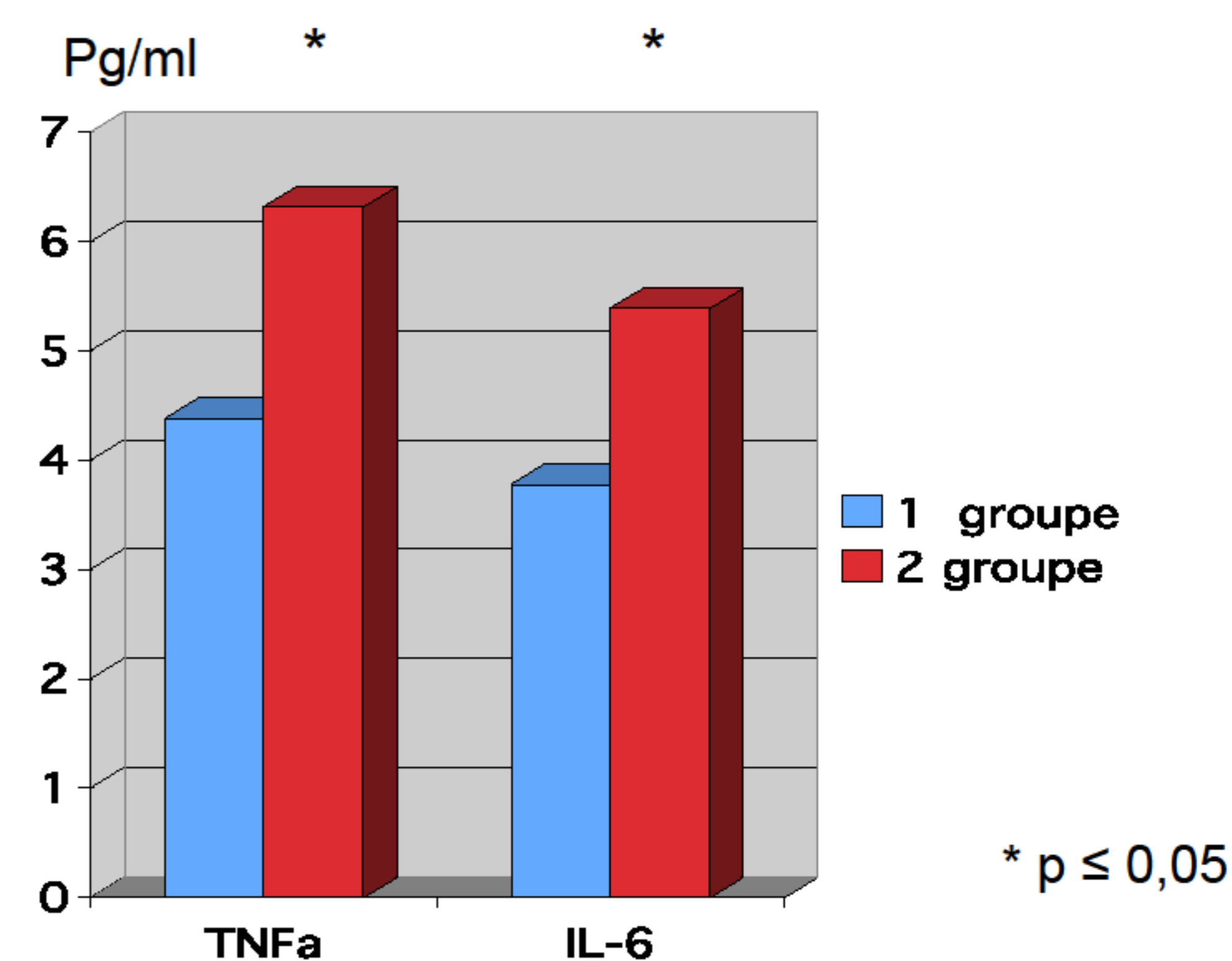
Methods:

We examined 85 male patients, aged 40-65 years with obesity and type 2 diabetes. Clinical examination included the measurement of body weight, height, hip and waist circumferences and blood pressure. A sample of fasting venous blood was taken to measure HbA1c, lipid profile, total testosterone, TNF- α and IL-6. All patients were divided into 2 groups, matched for age, according to the level of testosterone. The first group included 44 patients with testosterone levels above 12.1 nM/L, the second - 41 men with content of hormone less than 12,1 nM/L.

Table 1. The content of metabolic parameters and pro-inflammatory cytokines according to the level of testosterone

Parameter	Group 1 n=44	Group 2 n=41	P
IMC, kg / m ²	34,36 \pm 1,22	42,03 \pm 1,44*	0,032
HbA1C, %	6,17 \pm 0,16	7,55 \pm 0,22*	0,043
CT, mol / l	5,79 \pm 0,16	6,64 \pm 0,13*	0,047
TG, mol/l	1,72 \pm 0,17	2,31 \pm 0,31*	0,049
TNF α , pg/ml	4,38 \pm 0,37	6,32 \pm 0,49*	0,036
IL-6, pg/ml	3,78 \pm 0,36	5,39 \pm 0,89*	0,029

Picture 1. The concentration of TNF- α and IL-6 according to the level of testosterone.



Results:

Among the studied patients, 58% men had atherogenic dyslipidemia, manifesting as an increase in the content of TC, LDL, TG and atherogenic index. 62% of patients had arterial hypertension.

Analysis of the data shows a statistically more significant body mass index (BMI) in the group of hypogonadal patients (BMI 42,03 \pm 1,44 kg/m²), compared with eugonadal males (BMI 34,36 \pm 1,22 kg/m²). In the second group there were a statistically significant increases in the levels of HbA1c (7,55 \pm 0,22 vs 6,17 \pm 0,16%), serum TC (6,64 \pm 0,13 vs 5,79 \pm 0,16mM/l) and TG (2,31 \pm 0,31 vs 1,72 \pm 0,17mM/l).

In estimating the concentration of TNF- α in the serum was found that its level in patients with deficiency of testosterone (6,32 \pm 0,49 pg/ml) was significantly higher ($p \leq 0.05$) that those without hypogonadism (4 38 \pm 0,37 pg/ml). The results of the study of IL-6 showed a statistically significant increase in its content in the serum of patients with late onset hypogonadism (5,39 \pm 0,89 pg/ml) compared with eugonadal patients (3,78 \pm 0,36 pg/ml).

Conclusions:

Our study shows the deterioration of control of carbohydrate and lipid metabolisms in males with type 2 diabetes mellitus and late onset hypogonadism. Also the hypotestosteronemia was contributed to the activation of pro-inflammatory cytokines TNF- α and IL-6, which could reinforce the severity of metabolic disorders and progressing of cardiovascular pathology.

Thus, reduced serum testosterone level is a factor, contributing to manifestation of metabolic disorders and cytokine imbalance in patients with obesity and type 2 diabetes. Androgen deficiency may be regarded as an additional risk factor for cardiovascular disease and diabetes.

Acknowledgments:

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