Features of Thyroid Function in Patients with Metabolic Syndrome

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Abstract

According to the results of the largest epidemiological studies, the prevalence of hypothyroidism in women is 4-21% and 3-16% in men and is characterized by a significant increase in its frequency among older people. In this connection, the study of the relationship of these diseases is relevant in order to improve diagnosis and treatment. We came to the conclusion that in patients suffering from MS average TSH level is higher than in people of the same age without metabolic syndrome, and with an increase in the number of MS components, a decrease in the functional activity of the thyroid gland occurs.

Keywords: Endocrinology, Metabolic Syndrome, Thyroid Gland, Thyroid Function.

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Introduction

Currently, diseases of the thyroid gland (TG) in their prevalence occupy the first place among endocrine pathologies. According to the results of the largest epidemiological studies, the prevalence of hypothyroidism in women is 4-21% and 3-16% in men and is characterized by a significant increase in its frequency among older people.[1,2] In women, subclinical hypothyroidism occurs 2-2.5 times more often than in men. The prevalence of subclinical thyrotoxicosis, according to various studies, varies from 0.6% to 3.9%, depending on the sensitivity of the method used to determine TSH and the iodine supply of the region. The prevalence of diffuse toxic goiter in the general population is relatively high and reaches 1–2%.[3,4,5]

The level of TSH in the blood is an objective reflection of the existing iodine deficiency. Of interest is the research on screening programs conducted in various countries of the world, which can be used to judge the frequency of congenital hypothyroidism and the adequacy of iodine supply. With overt hypothyroidism, cardiovascular diseases often occur and progress faster.[5,6] As is known, the presence of thyroid disorders in women 45-55 years old increases the risk of developing metabolic syndrome in them over the next five years, especially in the presence of progressive obesity in combination with hyperglycemia, bilateral oophorectomy and aggravated heredity for obesity, hypertension and diabetes mellitus.[7,8,9,10] The thyroid gland itself also suffers from insulin resistance syndrome. Elevated circulating insulin levels cause increased thyroid proliferation. Clinical manifestations are a larger volume of the thyroid gland and the formation of nodules. A strong relationship has been found between insulin resistance and differentiated thyroid cancer.[11,12,13]

The prevalence of metabolic syndrome worldwide ranges from 25% to 35%.[14,15] The relationship between the various components of the metabolic syndrome and thyroid function is ambiguous. On the one hand, there are numerous studies confirming the relationship of hypothyroidism with arterial hypertension, coronary heart disease (CHD) and lipid metabolism disorders, on the other hand, carbohydrate metabolism disorders and hypersympathicotonia are closely correlated with hyperthyroidism. At the same time, insulin resistance occurs in both hypo- and hyperthyroidism.[16]

The above data indicate the widespread prevalence of thyroid pathology and metabolic syndrome among the population. In this connection, the study of the relationship of these diseases is relevant in order to improve diagnosis and treatment.

Purpose of the study:
Assess the functional state of the thyroid gland in patients with metabolic syndrome.

Subjects and Methods

The study was conducted on the basis of the Department of Endocrinology of the State Medical Institute. The study included 160 patients aged 20 to 60 years, including 100 women and 60 men. All patients were divided into 2 groups: group 1 consisted of patients with thyroid dysfunction without signs of metabolic syndrome (73 patients), group 2 - patients with thyroid dysfunction and metabolic syndrome (87 patients). All patients underwent the following studies: to study thyroid function, the levels of thyroid-stimulating hormone (TSH) and thyroxine (T4) in the blood were determined. For the diagnosis of metabolic syndrome, the following were examined: fasting glycemia, blood lipid profile, measurement of waist circumference, and measurement of blood pressure.

Results & Discussion

The analysis of thyroid function in men and women with the presence and absence of the metabolic syndrome according to the criteria of GFCA (2008) was carried out. In the examined patients diagnosed with MS, the average TSH levels were 2.7 ± 0.4 mU/l, which is significantly higher than in men and women without MS TSH - 1.6 ± 0.1 mU/l (p<0.05). Next, an analysis was made of the nature of changes in the average values of TSH, T4, in the presence of individual components of MS. When evaluating TSH, T4 at different values of WC, it was found that in men with any values of WC, the average values of TSH, T4 did not differ significantly, in women with abdominal obesity, T4 was significantly higher at values of WC > 88 cm (97.4 ± 2.1 nmol /l) than with OT <88 cm(89.9±1.9 nmol/l) (p=0.01). In women, a positive correlation between WC and T4 r = 0.170 *, (p<0.05) was determined, in men no such data were obtained. In the correlation analysis between the level of TSH and blood pressure indicators, the relationship was not revealed. The absence of a correlation between the level of TSH and the levels of blood pressure is probably due to the predominantly euthyroid state of the majority of the examined. When analyzing the average values of TSH, T4 and indicators of total cholesterol, the average level of TSH with total cholesterol >6.0 mmol/l was 2.3 ± 0.3 mU/l, and with levels of total cholesterol - <5.0 mmol/l (1 .3 ± 0.2) (p=0.046). In the group of those surveyed with the level of total cholesterol >6.0 mmol/l, the average T4 was 90.6 ± 1.4 mU/l, then with the level of total cholesterol - 5.0 - 5.9 mmol/l (96.2 ± 2.2 mU/l) (p=0.025). When assessing the average values of the level of TSH, T4, according to the levels of TG, LDL-C, HDL-C, it was revealed that that at TG levels >1.7 mmol/l, the content of TSH in the blood averaged 2.6 ± 0.5 mU/l, which is significantly higher than in individuals with TG levels <1.7 mmol/l - 1, 6 ± 0.3 mU/l (p=0.03).

Correlation analysis revealed a weak positive relationship between the level of total cholesterol and TSH r = -0.127* (p<0.05). There is a weak negative relationship between TC and T4 r = -0.12* (p<0.05). Between the level of HDL-C and T4 g = -0.147* (p<0.05). In the study of glycemia, the average values of T4 in individuals with blood glycemia> 6.1 mmol / l (97.8 ± 2.9 nmol / l), with blood glycemia <6.1 mmol / l (91.7 ± 1.4 nmol/l) (p<0.05). There are also significant differences in T4 values (95.7 ± 1.7 nmol / l) in both sexes with blood glycemia > 5.6 mmol / l and in the group without an increase in plasma glycemia (92.1 ± 1.3 nmol / l). k) (p<0.05). the content of TSH in the blood averaged 2.6 ± 0.5 mU/l, which is significantly higher than in individuals with TG levels <1.7 mmol/l - 1.6 ± 0.3 mU/l (p=0 .03). When conducting a correlation analysis, a weak positive relationship was revealed between the level of total cholesterol and TSH r = - 0.127* (p<0.05).

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and two other components of MS. The highest mean TSH values were found in combinations of OT + LDL-C + TG; OT + AG + TG and OT + TG + HDL-C, which significantly differed from the mean TSH values in patients without MS. The average values of TSH in the presence of these combinations were in the range of 2.6-3.1 mU/l. The highest TSH values were found in combinations of abdominal obesity with hypertriglyceridemia and hyper LDL-C.

Conclusion

Thus, summing up the results of our study, we came to the conclusion that in patients suffering fromMS average TSH level is higher than in people of the same age without metabolic syndrome, and with an increase in the number of MS components, a decrease in the functional activity of the thyroid gland occurs. The data obtained may recommend the determination of the level of TSH in patients with MS to exclude the functional pathology of the thyroid gland.

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