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Interaction of Rheumatoid Arthritis and Thyroid Disease

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Abstract: The thyroid gland (TG) is an iodine-producing (thyroid) hormone-producing gland that regulates the production of other hormones through secretions. Thyroid hormones influence the metabolism of all organs in the body and are involved in the growth and formation of all organs and tissues. First of all, it stimulates heat generation, increases the absorption of oxygen by tissues, and enhances oxidative processes in the body. In a physiological dose, thyroid hormones stimulate the synthesis of intracellular proteins, the excess of which accelerates the process of dissimilation.

Rheumatoid arthritis (RA) is a widespread (1% of the world's population) autoimmune disease characterized by symmetrical erosive arthritis (synovitis) and damage to organs other than joints. Manifestations of RA are: joint pain, dysfunction and progressive deformation of joints, irreversible changes in internal organs leading to early disability (one third of patients become disabled within 20 years from the onset of the disease) and reduced life expectancy of patients (on average 5-15 years)

It has been reported that goiter, hypothyroidism, chronic adrenal insufficiency and other pathologies of the endocrine glands are more common in patients with RA. Thyroid hormones increase the activity of metabolic processes, enhance lipogenesis, increase the absorption of glucose by adipose and muscle tissue, and activate gluconeogenesis and glycogenolysis.

Keywords: Thyroid gland, rheumatoid arthritis, hypothyroidism.

Relevance of the topic. The thyroid gland is an endocrine gland that produces iodine-containing (thyroid) hormones, and also, through secretion, regulates the release of other hormones in the body. Its work is the basis of all exchange mechanisms. Thyroid hormones are involved in the processes of growth, development and normal functioning of the whole organism. They are important for the functioning of human cellular and humoral immunity and its restoration at the cellular level. Therefore, the impeccable function of this organ is of great importance for the health of the entire body (1,8). Rheumatoid arthritis (RA) is a common (about 1% of the world's population) autoimmune rheumatic disease characterized by symmetrical erosive arthritis (synovitis) and a wide range of extra-articular (systemic) manifestations. Characteristic manifestations of RA are pain, impaired joint function and steadily progressive joint deformation, irreversible damage to internal organs, leading to early disability (about a third of patients become disabled within 20 years from the onset of the disease) and a reduction in the life expectancy of patients (on average by 5– 15 years) (2.10). Clinicians are aware of frequent manifestations of pathology of the function of the endocrine glands in patients with RA in the form of goiter, hypothyroidism, chronic adrenal insufficiency, etc. Thyroid hormones increase the activity of metabolic processes, stimulate lipogenesis, enhance the absorption of glucose by adipose and muscle tissue, activate gluconeogenesis and glycogenolysis (3.6). Thyroid hormones (triiodothyronine - T3, thyroxine - T4) enhance both resorption and synthesis of bone tissue, the production of glycosaminoglycans and proteoglycans in connective tissue. An increase in their number in the body leads to an acceleration of bone tissue metabolism due to an increase in the number and activity of osteoclasts, and also stimulates osteoblastic function, which is expressed in an increase in bone formation markers in the blood (1.7). With a lack of thyroid hormones, the activity of adenylate

cyclase in the synovial membranes increases, which increases the production of hyaluronic acid by fibroblasts, leading to the accumulation of synovial fluid in the joints, and causes clinical manifestations of synovitis (4.8). Patients with RA are subject to an increased incidence of thyroid pathology, which is explained by the common immunological mechanisms of development of these diseases. The prevalence of thyroid pathology in general among patients with RA reaches 28%. Endocrine disorders play a significant role in the occurrence and progression of rheumatic diseases. Often, endocrine changes serve as a background for the development of connective tissue diseases. At the same time, changes in neuroendocrine status are an integral part of the progression of rheumatic diseases (1.7)

Purpose of the study: a comprehensive study of clinical and laboratory parameters in RA patients with autoimmune thyroiditis to improve the effectiveness of early and differential diagnosis and timely treatment.

Materials and methods of research: The clinical part of the work will be carried out in the cardio-rheumatology department of SamGMO. The features of the articular syndrome, development, clinical picture and course of rheumatoid arthritis in 75 patients, including patients with AIT, were studied. Subsequently, the patients will be divided into two groups (the first group will be patients with RA, the second group will be patients with RA and AIT). Average age 25-65 years. The average duration of RA is 9 years. Everyone was assessed for a general blood test, a general urinalysis, rheumatic test, ACCP, radiography of the joints, ultrasound of the thyroid gland, thyroid hormones, antibody titer to thyroid peroxidase, VitD, densitometry,

Results of the study: All patients, depending on the functional state of the thyroid gland, were divided into two groups. Group 1 included 62(83%) patients without thyroid dysfunction. Hypothyroidism (2nd group) was diagnosed in 13 (17%) patients with RA. The main cause of hypothyroidism in all of them was naturally revealed to be autoimmune thyroiditis. An ultrasound examination of the thyroid gland revealed changes in 29 out of 75 patients. Of these, 55% (16) patients had thyroid hyperplasia, 24% (7) nodular goiter, 21% (6) thyroid atrophy.

Table 1. Main indicators of thyroid status and RA activity.

Таблица 1.Основные показатели тиреоидного статуса и активности РА.

Index	1st group	2 nd group
TTG, мME/l (H 0.3-4.5IU/ml)	2,2±0,2	6,6±1,3*
T3, ng/ml (2-4.2 pg/ml)	2.3±0,2	0.9±0,06*
T4, ng/ml (8.9-17.2 pg/ml)	12.4 ±2,7	4.5±1,2*
АТ-ТПО less than 30мЕд/ml d	28±2,5	85±15
SOE мм/s	30±5	45±10
Rheuma test 0-14ME\ml	20±6	32±6
ASSP positive >10Uml negative <10 Uml	30±5	45±5
C protein mg\l	12±4	18±4

In group 2, the number of patients with systemic manifestations of RA was statistically significantly greater than in group 1.

The study showed that RA patients with hypothyroidism had higher clinical and laboratory disease activity. In this group, ESR indicators and the number of swollen joints were significantly higher compared to patients without thyroid dysfunction.

Table 2. Frequency of detection of some systemic manifestations and complications of RA:

Index	1st group	2 nd group
Myocardial dystrophy	18%	62%
Nephritis	-	2%
Raynaud's syndrome	7%	15%
Osteoporosis	17%	27%
Anemia	12%	38%

A detailed analysis of the main systemic manifestations of RA and its complications revealed statistically significant differences between groups only in the incidence of myocardial dystrophy and anemia. Subclinical hypothyroidism in RA is a predictor of insulin resistance as well as dyslipidemia. RA thyroid hypofunction is accompanied by an increased risk of metabolic syndrome. Cardiovascular complications in RA with hypothyroidism were higher than in patients with normal hormone levels.

Conclusions.

Our data indicate a high frequency of hypothyroidism and carriage of TPO antibodies in RA. In patients with RA in combination with hypothyroidism, systemic manifestations and high activity of the articular process are more often observed. Compared to patients with RA without thyroid pathology. This means that the course of RA itself in the presence of hypothyroidism is regarded as more severe, with pronounced destructive changes in the joints.

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