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HYPERTHYROIDISM: ETIOLOGY, DIAGNOSIS AND TREATMENT

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Abstract
Hyperthyroidism (Graves' disease, diffuse toxic goiter) is a pathological condition of the body, which is caused by an increased content of T3 and T4 hormones in the blood and characteristic changes in various body systems, in particular the cardiovascular and nervous systems, with the development of endocrine ophthalmoplegia.

Keywords: Hyperthyroidism, thyroid gland, diagnostics, hormones.

Introduction

The etiology of hyperthyroidism is varied and includes several main categories: autoimmune diseases, thyroid nodules, and other, less common causes:

- Graves' disease, an autoimmune disorder, is the most common cause of hyperthyroidism. In this disease, antibodies stimulate thyroid-stimulating hormone (TSH) receptors on thyroid cells, leading to excess synthesis and release of thyroid hormones.
- toxic multinodular goiter and toxic adenoma are characterized by autonomous production of thyroid hormones by individual thyroid nodules.
- other causes include thyroiditis (inflammation of the thyroid gland), thyroid hormone overdose, iodine-induced hyperthyroidism (Jodine-Basedow phenomenon) and, rarely, TSH-secreting pituitary adenomas or ovarian stroma. Determining the specific etiology is critical for choosing the optimal treatment strategy [4,15,10,17]. Hyperthyroidism is characterized by a wide range of clinical symptoms affecting various body systems. Cardiovascular manifestations include tachycardia, arrhythmias (especially atrial fibrillation), palpitations, and elevated blood pressure. The nervous system reacts with excitability, irritability, anxiety, insomnia and tremors.

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Metabolic changes cause increased appetite with simultaneous weight loss, increased sweating and heat intolerance. From the gastrointestinal tract, increased peristalsis is observed, leading to diarrhea. Women may notice menstrual irregularities.

Eye symptoms characteristic of Graves' disease include bulging eyes (exophthalmos), eyelid retraction, double vision, and a gritty sensation in the eyes. The skin becomes thin, moist and warm. Diffuse or nodular thyromegaly (enlargement of the thyroid gland) is characteristic. In elderly patients, symptoms are often atypical and manifest as depression, apathy and heart failure [1,3,4,7].

Laboratory diagnosis of hyperthyroidism is a key step in identifying and monitoring this endocrine disorder. Basic tests include determination of serum levels of thyroid stimulating hormone (TSH), free thyroxine (fT4), and free triiodothyronine (fT3). Decreased TSH levels in combination with elevated free T4 and/or free T3 levels usually confirm the diagnosis of hyperthyroidism [2,5,6,16]. Additional tests may include TSH receptor antibodies (TRAb) to diagnose Graves' disease, thyroglobulin (Tg), thyroglobulin antibodies (TgAb), and thyroid peroxidase antibodies (TPOAb) to clarify the etiology. A thyroid scan with radioactive iodine can help determine the pattern of iodine uptake and differentiate between various causes of hyperthyroidism, such as Graves' disease, toxic multinodular goiter, or thyroiditis.

In addition to routine tests and scans, in some cases more specialized tests may be ordered, such as a thyroid tissue biopsy to rule out malignancy. Careful and comprehensive laboratory diagnostics based on modern algorithms and taking into account the individual characteristics of the patient allows us to optimize the management of patients with hyperthyroidism.

Instrumental diagnostics of hyperthyroidism is aimed at visualizing the thyroid gland and determining its functional activity. The most common method is ultrasound examination (US) of the thyroid gland, which allows one to assess its size, structure, presence of nodes and their characteristics. Doppler ultrasound can reveal increased blood flow in the gland, which is characteristic of hyperthyroidism [2,14].

Thyroid scintigraphy with technetium-99m or iodine-123 allows one to assess the functional activity of various parts of the gland. In hyperthyroidism, increased uptake of the radiopharmaceutical is observed, which confirms increased production of hormones. This method is particularly useful for the differential diagnosis of various forms of hyperthyroidism, such as diffuse toxic goiter (Graves' disease) or toxic adenoma. In some cases, computed tomography (CT) or magnetic resonance imaging (MRI) of the neck may be ordered to more thoroughly evaluate the structure of the thyroid gland and surrounding tissues, especially in the presence of large nodules or suspected compression of adjacent organs [8,9,11].

Treatment for hyperthyroidism is aimed at reducing the production of thyroid hormones and eliminating symptoms. The main methods include drug therapy, radioiodine therapy and surgery. The choice of method depends on the cause of the disease, its severity, the patient’s age and the presence of concomitant diseases.

Drug therapy with antithyroid drugs such as thiamazole and propylthiouracil can reduce the synthesis of thyroid hormones. Radioiodine therapy involves taking radioactive iodine, which is absorbed by the thyroid tissue, causing the gradual destruction of hormone-producing cells.

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Surgical removal of the thyroid gland (thyroidectomy) may be recommended in cases of goiter, unresponsiveness to other treatments, or suspicion of malignancy [12,13,15].

Conclusion

Hyperthyroidism is a chronic disease that affects a person's quality of life. Knowing its causes, symptoms and diagnostic methods is crucial for early detection and effective treatment. Knowing its causes, symptoms and diagnostic methods is crucial for early detection and effective treatment. Laboratory tests, ultrasound examination and other methods help the doctor choose the optimal approach to treatment.

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