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MODERN CLASSIFICATION OF THYROID GLAND TUMORS AND METHODS OF THEIR TREATMENT

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Annotation

Thyroid gland tumors are among the most common oncological diseases within endocrine system disorders. In recent years, the detection rate of these diseases has increased significantly worldwide. This trend is explained, on the one hand, by improvements in diagnostic methods—particularly the widespread use of ultrasound imaging—and, on the other hand, by environmental factors, genetic predisposition, and exposure to radiation.

In modern medicine, early detection of thyroid tumors, accurate assessment of their morphological and molecular characteristics, and the selection of individualized treatment strategies are of crucial importance for improving patient survival and quality of life. Therefore, conducting scientific research in this field remains an urgent priority.

According to data from the World Health Organization, the incidence of this disease has increased several-fold over the past 30 years. Notably, forms classified as carcinoma are increasingly being observed among younger populations. Clinically, thyroid tumors are often asymptomatic or present with mild symptoms, which can lead to delays in diagnosis.

How to Cite

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The following objectives were pursued in conducting this scientific research:

1. To study the anatomical and physiological characteristics of the thyroid gland;
2. To investigate genetic and molecular factors;
3. To perform a comparative analysis of modern treatment methods.

The results of this study may serve as a practical guide for endocrinologists, oncologists, and general practitioners.

The thyroid gland is one of the most important endocrine organs in the human body, located in the anterior part of the neck, covering the upper parts of the trachea. It consists of two lateral parts (right and left) and an isthmus connecting them. In some people, a third part, a pyramidal gland, is also found. In an adult, the thyroid gland weighs an average of 15–25 grams. The gland is surrounded by a thin capsule, and the inner part is divided into lobes by fibrous septa. Each lobe consists of numerous follicles. Follicles are the main functional unit of the thyroid gland. They contain a colloid substance, which stores thyroglobulin. Follicular cells (thyrocytes) surround the follicle and participate in the synthesis of hormones. The gland

also contains parafollicular or C-cells, which produce the hormone calcitonin. These cells are the source of medullary cancer.

The thyroid gland produces two hormones: thyroxine and triiodothyronine. These hormones are synthesized with the participation of iodine ions. Accelerates metabolism - increases the basal metabolic rate. Accelerates energy production in cells. Improves the functioning of the nervous system, especially important for brain development in childhood. Affects the cardiovascular system - increases heart rate. Controls the growth and development of tissues. The thyroid gland also produces the hormone calcitonin, which reduces the amount of calcium in the blood and ensures the retention of calcium in the bones.

The activity of the thyroid gland is tightly controlled by the central nervous and endocrine systems. This system is called the hypothalamus-pituitary-thyroid axis. The hypothalamus produces TRH (thyrotropin-releasing hormone). The pituitary gland, under the influence of TRH, releases TSH (thyroid-stimulating hormone). The thyroid gland, under the influence of TSH, synthesizes the hormones T3 and T4. When T3 and T4 increase in the blood, they provide negative feedback to the pituitary and hypothalamus, reducing the release of TSH. This system maintains the balance of hormones in the body.

Thyroid cancer is considered one of the fastest-growing oncological diseases worldwide. According to data from the World Health Organization (WHO) and GLOBOCAN, more than 580,000 new cases of thyroid cancer are diagnosed globally each year. Over the past 30 years, the incidence of this disease has increased by 3–4 times. This rise is primarily attributed to improved early detection through modern ultrasound imaging and biopsy techniques.

In Central Asian countries, including Uzbekistan, Kazakhstan, and Kyrgyzstan, thyroid diseases are also widespread, particularly in iodine-deficient regions. Iodine deficiency is considered one of the main contributing factors to the development of endemic goiter and subsequent tumor formation. Thyroid tumors occur 3–5 times more frequently in women than in men, which is thought to be associated with hormonal factors, particularly the influence of estrogen.

Differentiated cancers (papillary, follicular) are most often diagnosed between the ages of 30 and 55. Medullary cancer can also occur in childhood and adolescence (especially in hereditary forms). Anaplastic cancer, on the other hand, usually occurs after the age of 60.

Factors that affect the development of thyroid tumors include: Radiation

Radiation exposure to the head and neck area (X-rays, accidents) in childhood is one of the strongest risk factors. Follicular cancer is more common in areas where iodine deficiency is endemic. Genetic factors RET, BRAF, RAS mutations play an important role in tumor development. Hereditary syndromes MEN2 syndrome is associated with medullary cancer. Hormonal changes in women increase the risk during pregnancy and menopause. Environmental factors include heavy metals, pesticides, radiation. Immune system diseases

Risk increases against the background of autoimmune thyroiditis. The development of thyroid tumors is associated with changes at the cellular genome level, which lead to uncontrolled cell proliferation. Genetic mutations and the signaling pathways activated by them play a key role in pathogenesis.

The following major genetic alterations have been identified in thyroid tumors: BRAF V600E — found in a large proportion of papillary carcinomas. This mutation leads to uncontrolled cell proliferation and is associated with an aggressive clinical course. RAS (HRAS, KRAS, NRAS) — more common in follicular and poorly differentiated tumors. RET/PTC rearrangements — in papillary carcinomas. RET point mutations — characteristic of medullary cancer. TERT promoter mutations — found in high-grade and anaplastic cancers. These mutations enhance cell proliferation, invasion, and metastasis. Genetic mutations activate two major cellular signaling pathways: the MAPK pathway, which is activated by BRAF, RAS, and RET mutations. This pathway controls cell division, differentiation, and survival. PI3K/AKT pathway This pathway is more active in follicular and anaplastic tumors. It increases cell growth, apoptosis escape, and metabolism. According to the 5th edition of the World Health Organization classification, updated in 2022, thyroid tumors are now grouped not only based on morphological features,

but also on molecular-genetic characteristics. This approach is of great importance in determining clinical prognosis and treatment tactics.

Differentiated carcinomas arise from follicular cells and account for 85–90% of all cases.

Papillary carcinoma (PTC) The most common form, slow-growing, with a good prognosis. Morphologically characterized by papillary structure, nuclear changes. Often associated with the BRAF V600E mutation.

Follicular carcinoma (FTC) Metastases through the blood vessels. More common in iodine-deficient areas. Associated with RAS mutations.

Medullary carcinoma arises from C-cells and produces calcitonin. Accounts for 3–5% of all cases. Associated with mutations in the RET gene. There are hereditary (MEN2) and sporadic forms.

Anaplastic carcinoma is the most aggressive type of thyroid cancer. It demonstrates rapid growth and invades adjacent tissues. Mutations in TP53 and TERT are characteristic. The prognosis is extremely poor.

Rare types include poorly differentiated carcinoma, highly differentiated carcinoma, NTRK fusion-positive tumors, mucoepidermoid carcinoma, and salivary gland–like carcinomas.

Clinically, thyroid tumors are often asymptomatic for a prolonged period, which complicates early detection. The clinical manifestations depend on the size, location, and histological type of the tumor.

In the early stages of the disease, patients may experience the following symptoms: A small, painless lump in the front of the neck; A feeling of pressure in the gland; Mild hoarseness in the voice; Fatigue, excessive sweating; Weight gain; Fast or slow heartbeat. These symptoms are often confused with other thyroid diseases.

As the tumor grows, the following symptoms appear: Change in neck shape; Difficulty swallowing (dysphagia); Difficulty breathing; Constant hoarseness; Enlarged cervical lymph nodes; Cough with blood; Bone pain (in metastasis).

The following complications are observed in calcaneal gland diseases: Lymphogenous and hematogenous metastases; Complications of the respiratory tract; Hypoparathyroidism (after surgery); Relapses; Psychological problems. Rapid diagnosis of thyroid gland is crucial in saving the patient's life and improving the effectiveness of treatment. Diagnostics is based on the complex use of clinical, instrumental, laboratory and molecular methods.

Diagnosis primarily begins with an assessment of the patient’s complaints and studying the lifestyle of the patient.

The doctor examines and palpates the neck area. Nodes, lymph nodes, pain, asymmetry, and voice changes are assessed.

Ultrasound is the main screening method. It determines the size, boundaries, echogenicity, and calcifications of the node. CT and MRI are used for large tumors, tracheal and esophageal invasion. PET-CT is used to detect metastasis and recurrence.

Fine-needle aspiration biopsy allows you to assess the cellular composition.

The results are divided into 6 groups (I–VI) according to the Bethesda system, each of which determines the level of risk. Laboratory markers used are TSH, T3, T4, Thyroglobulin, Calcitonin (in medullary cancer), CEA. BRAF, RAS, RET, NTRK mutations are detected, which is important in choosing targeted therapy.

Treatment of thyroid tumors is based on a comprehensive, individual approach and is determined depending on the histological type, stage, molecular characteristics of the tumor and the general condition of the patient.

During 2023-2025, we performed 120 thyroid cancer surgeries, of which more than 80 patients had complications. 40 patients were treated with our own folk remedies after surgery, using “Malham-A” 3 times a day, in addition, they were recommended to take 2 capsules of “Majmuiy Rahmoniy” 3 times a day, 2 capsules of “Askalsiy” 3 times a day, and 2 capsules of “Alkayon” 2 times a day. Of the 40 patients who underwent surgery, no complications were observed in 32 patients.

Total thyroidectomy or lobectomy is selected depending on the size and risk of the tumor. In case of metastasis, lymphoedema is performed.

I-131 is used to destroy residual cells in differentiated cancers. This method gives good results only in tumors that absorb iodine. When using levothyroxine, it lowers TSH and slows down tumor regrowth.

Targeted therapy methods such as Lenvatinib, Sorafenib, Selpercatinib, Pralsetinib are used. are selected depending on the molecular mutation. Radiotherapy is used in anaplastic and metastatic forms.

In conclusion, early diagnosis, accurate histological and molecular evaluation, comprehensive treatment, and continuous dynamic follow-up are of crucial importance in preserving the life of patients with thyroid tumors and improving their quality of life.

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O‘T HAYDOVCHI YIG‘MANING FLAVONOID TARKIBINI YUSSX USULI BILAN ANIQLASH

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Kalit so'zlar: YuSSX tahlili, flavonoidlar, rutin, gall kislotasi, antioksidant faollik.

Annotatsiya

O‘tkazilgan YuSSX tahlillari natijasida o‘t xaydovchi yig‘ma namunasi tarkibida biologik faol flavonoidlar va fenol kislotalarining mavjudligi aniqlandi. Tadqiqot natijalari mazkur namunaning flavonoid tarkibi jihatidan boy ekanligini ko‘rsatdi. Miqdoriy tahlilga ko‘ra, rutin flavonoidi eng yuqori miqdorda aniqlanib, u asosiy flavonoid komponent sifatida qayd etildi. Olingan natijalar o‘t xaydovchi yig‘ma namunasining antioksidant va farmakologik jihatdan istiqbolli ekanligini ko‘rsatadi

Havola uchun

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KIRISH. Ma’lumki, hozirgi kunda dunyo bo‘yicha jigar, o‘t yo‘llari va o‘t pufagi kasalliklari keng tarqalgan bo‘lib, ularni davolash tibbiyotning dolzarb muammolaridan biri hisoblanadi. Ushbu kasalliklarning kelib chiqishida markaziy asab tizimi faoliyatining buzilishi, ichki a’zolarning turli xastaliklari, ekologik omillar, yuqumli kasalliklar, noto‘g‘ri ovqatlanish hamda ayrim dori vositalarining uzoq muddat qo‘llanilishi hisoblanadi [1].

So‘nggi yillarda jigar va o‘t yo‘li kasalliklarini davolashda dorivor o‘simliklar asosida tayyorlangan preparatlarga bo‘lgan talab sezilarli darajada oshib bormoqda. Bu eng avvalo, o‘simlik xomashyosidan olingan dori vositalarining sintetik preparatlarga nisbatan kam zaharliligi, organizmga yumshoq ta’sir ko‘rsatishi va ularni uzoq muddat qo‘llash imkoniyati bilan izohlanadi. Dorivor o‘simliklar tarkibidagi flavonoidlar, fenol kislotalari va boshqa biologik faol moddalarning gepatoprotektiv, antioksidant va o‘t haydovchi xususiyatlari ilmiy tadqiqotlar bilan tasdiqlangan [2].

Shu munosabat bilan, ushbu tadqiqotda ilmiy va amaliy ma’lumotlarga asoslangan holda to‘rtta dorivor o‘simlik asosida o‘t haydovchi yig‘ma tayyorlandi va ularning flavonoid tarkibi yuqori samarali suyuqlik xromatografiyasi (YuSSX) usuli yordamida o‘rganildi.

Adabiyotlar tahlili va metodlar. Dorivor o‘simliklar va ularning biologik faol moddalari farmakognoziya va fitoterapiyada muhim o‘rin tutadi. Xususan, tirnoqgul (Calendula officinalis L.), na’matak (Rosa spp.), dastarbosh va moychechak (Matricaria chamomilla L.) kabi o‘simliklar xalq tabobati va zamonaviy tibbiyotda keng qo‘llaniladi [3].