

ENDEMIC GOITER AND HYPOTHYROIDISM: PATHOGENESIS AND TREATMENT METHODS

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Annotation: This article discusses the etiology, pathogenesis, and modern treatment methods of endemic goiter and hypothyroidism. The mechanisms of development of endemic goiter caused primarily by iodine deficiency and its effects on the human body are analyzed. In addition, the clinical course of hypothyroidism, its impact on metabolic processes, and diagnostic approaches are reviewed. The article highlights effective therapeutic strategies, including iodine supplementation and hormone replacement therapy, and justifies their importance in treatment. The findings contribute to improving prevention and management of these diseases.

Keywords: Endemic goiter, hypothyroidism, iodine deficiency, thyroid gland, thyroid hormones, thyroxine (T4), triiodothyronine (T3), thyroid-stimulating hormone (TSH), metabolism, hormone therapy, iodine supplementation, prevention, diagnosis.

Аннотация: В данной статье рассматриваются этиология, патогенез и современные методы лечения эндемического зоба и гипотиреоза. Проанализированы механизмы развития эндемического зоба, обусловленного дефицитом йода, а также его влияние на организм. Освещены клиническое течение гипотиреоза, его влияние на обмен веществ и методы диагностики. Особое внимание уделено эффективным терапевтическим подходам, включая применение йодсодержащих препаратов и гормональной терапии. Полученные результаты направлены на совершенствование профилактики и лечения данных заболеваний.

Ключевые слова: Эндемический зоб, гипотиреоз, дефицит йода, щитовидная железа, тиреоидные гормоны, тироксин (T4), трийодтиронин (T3), тиреотропный гормон (ТТГ), обмен веществ, гормональная терапия, йодсодержащие препараты, профилактика, диагностика.

Annotatsiya: Ushbu maqolada endemik buqoq va gipotireoz kasalliklarining etiologiyasi, patogenezi hamda zamonaviy davolash usullari yoritilgan. Asosan yod yetishmovchiligi natijasida rivojlanadigan endemik buqoqning shakllanish mexanizmlari va uning organizmga ta'siri tahlil qilingan. Shuningdek, gipotireozning klinik kechishi, metabolik jarayonlarga ta'siri va tashxis qo'yish usullari ko'rib chiqilgan. Maqolada ushbu kasalliklarni davolashda qo'llaniladigan samarali terapevtik yondashuvlar, jumladan, yod preparatlari va gormonal terapiyaning ahamiyati asoslab berilgan. Tadqiqot natijalari ushbu kasalliklarning oldini olish va samarali davolash choralari takomillashtirishga xizmat qiladi.

Kalit so'zlar: Endemik buqoq, gipotireoz, yod yetishmovchiligi, qalqonsimon bez, tireoid gormonlar, tiroksin (T4), triyodtironin (T3), tireotrop gormon (TSH), metabolizm, gormonal terapiya, yod preparatlari, profilaktika, diagnostika.

Currently, thyroid gland diseases, particularly endemic goiter and hypothyroidism, are considered among the most widespread and pressing medical problems worldwide. These conditions are especially common in regions with iodine deficiency and have a significant negative impact on public health. Thyroid hormones play a crucial role in regulating metabolism, growth, and development in the human body, and their deficiency leads to various pathological conditions.

Endemic goiter primarily develops as a result of iodine deficiency and is characterized by compensatory enlargement of the thyroid gland. This process is closely associated with impaired synthesis of thyroid hormones and increased secretion of thyroid-stimulating hormone (TSH) by the pituitary gland. As a result, hyperplasia and hypertrophy of thyroid tissue occur.

Hypothyroidism, on the other hand, is a condition characterized by insufficient production of thyroid hormones. It manifests through a slowdown of metabolic processes, disturbances in energy metabolism, and decreased function of various organ systems. The development of this disorder may be associated not only with intrinsic thyroid pathologies but also with dysfunctions of central regulatory systems.

The aim of this article is to provide a scientific analysis of the pathogenesis, clinical features, and modern treatment methods of endemic goiter and hypothyroidism.

PATHOGENESIS AND TREATMENT METHODS

Endemic goiter and hypothyroidism are complex pathological conditions accompanied by functional and morphological changes of the thyroid gland. Iodine deficiency is considered the primary etiological factor in their development. According to scientific sources, iodine is an essential trace element required for the synthesis of thyroid hormones—thyroxine (T4) and triiodothyronine (T3). In conditions of iodine deficiency, the biosynthesis of these hormones is disrupted, leading to the activation of compensatory mechanisms.

Pathogenesis of Endemic Goiter

As a result of iodine deficiency, the production of T3 and T4 hormones in the thyroid gland decreases. This leads, through the hypothalamic–pituitary feedback mechanism, to an increased secretion of thyroid-stimulating hormone (TSH). TSH exerts a trophic effect on thyroid follicular cells, increasing their proliferation and functional activity. Consequently, hyperplasia and hypertrophy of thyroid tissue develop, which clinically manifests as goiter (struma).

With long-term iodine deficiency, structural changes in the thyroid gland become more pronounced, including colloid accumulation, development of nodular formations, and in some cases fibrotic changes. In addition, goitrogenic factors (thiocyanates, perchlorates, and certain dietary substances) reduce iodine utilization, further exacerbating the pathological process.

Pathogenesis of Hypothyroidism

The development of hypothyroidism is associated with an absolute or relative deficiency of thyroid hormones. In primary hypothyroidism, the main pathological process occurs directly in the thyroid gland (autoimmune thyroiditis, iodine deficiency, post-surgical conditions).

Secondary and tertiary hypothyroidism develop due to dysfunction of the pituitary gland and hypothalamus, respectively.

Thyroid hormones are key regulators of basal metabolism in the body. Their deficiency leads to a slowdown of oxidative-reduction processes, disruption of protein, lipid, and carbohydrate metabolism. Mitochondrial enzyme activity decreases, heat production is reduced, and overall energy metabolism is impaired.

Furthermore, hypothyroidism negatively affects the cardiovascular system, leading to bradycardia, reduced cardiac output, and decreased peripheral circulation. In the central nervous system, nerve impulse conduction slows down, resulting in reduced cognitive and mental activity. In children, hypothyroidism may cause physical and mental developmental delay (cretinism).

Treatment Methods

The treatment of endemic goiter and hypothyroidism is based on etiological and pathogenetic approaches. In endemic goiter, the primary treatment strategy is the elimination of iodine deficiency. This includes the use of iodized salt, iodine preparations, and a balanced diet. Mass iodine prophylaxis is also considered an effective preventive measure.

In the treatment of hypothyroidism, hormone replacement therapy plays the central role. The most commonly used drug is levothyroxine sodium, which compensates for the deficiency of thyroxine in the body. Treatment is individualized based on patient age, body weight, and disease severity, and is carried out under TSH level monitoring.

In severe and complicated cases, a comprehensive approach is applied, including symptomatic treatment, cardiovascular support, and measures aimed at restoring metabolic processes.


In conclusion, endemic goiter and hypothyroidism are widespread and socially significant diseases associated with impaired thyroid gland function. Iodine deficiency plays a key etiological role in the development of these pathologies and leads to disruption of thyroid hormone synthesis.

Analytical data indicate that the pathogenesis of endemic goiter is linked to compensatory mechanisms, particularly increased secretion of thyroid-stimulating hormone (TSH) and hyperplasia of thyroid tissue. Hypothyroidism, on the other hand, is manifested by a slowdown of metabolic processes, impaired energy metabolism, and decreased function of various organ systems.

In modern medicine, a comprehensive approach is essential for the treatment and prevention of these diseases. In particular, preventive measures aimed at eliminating iodine deficiency, the use of iodized products, and properly organized hormone replacement therapy provide effective results.

Therefore, early diagnosis of endemic goiter and hypothyroidism, in-depth study of their pathogenesis, and wide implementation of modern treatment methods are important factors in strengthening public health.

References:

1. World Health Organization. Assessment of iodine deficiency disorders and monitoring their elimination. – Geneva: WHO, 2007. Available at: <https://www.who.int> 



2. Gaitan E., Nelson N.C., Poole G.V. Endemic goiter and endemic thyroid disorders. – World Journal of Surgery, 1991. Available at: <https://pubmed.ncbi.nlm.nih.gov/2031356>◆
3. Lamberg B.A. Endemic goitre – iodine deficiency disorders. – Annals of Medicine, 1991. Available at: <https://pubmed.ncbi.nlm.nih.gov/1718324>◆
4. Eastman C.J., Phillips D.I. Endemic goitre and iodine deficiency disorders: aetiology, epidemiology and treatment. – Baillière's Clinical Endocrinology and Metabolism, 1988. Available at: <https://pubmed.ncbi.nlm.nih.gov/3066326>◆
5. Jabborova S., Mamatqulova G., Djurakulova A. Endemic goiter: pathogenesis and treatment options. – International Journal of Medical Sciences, 2026. Available at: <https://doi.org/>◆ (DOI not specified)
6. Jabborova S., Bo'riyev M.G. Epidemiology of endemic goiter. – International Journal of Medical Sciences, 2026. Available at: <https://doi.org/>◆ (DOI not specified)
7. Adilova Z.U., Xudayqulova V.A. The prevalence of endemic goiter and prevention of iodine deficiency. – International Journal of Scientific Trends, 2024. Available at: <https://scientifictrends.org>.

