

Nutrition in selected thyroid diseases

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Summary

The most important course in thyroid diseases is pharmacological treatment - thyroid hormone supplementation or inhibition of gland function in case of its hyperactivity. There is more and more evidence for the beneficial effect of a proper diet on the course of the disease and the effectiveness of the therapy. There are also a lot of scientifically unjustified myths functioning in society, mistakenly imposing too restrictive approaches to people's diet. Nutrition in thyroid diseases should be individualized and adapted to the needs and preferences of a particular patient. Great attention should be paid to the caloric content of meals and the content of micronutrients, especially iodine. A properly developed diet can significantly improve the course of the disease and the quality of life of patients. There is no justification for introducing a gluten-free or lactose-free diet in all cases of Hashimoto's disease.

Introduction

Thyroid gland is an odd endocrine gland, located in the anterolateral lower part of the neck. It is made of two lobes, connected with each other by a isthmus. Sometimes there is an additional mass of gland, departing from the isthmus, called the pyramidal lob [1]

The hormones produced by thyroid are thyroxine (T4) and, secreted in a much smaller extent- triiodothyronine (T3), which is an active form. Their secretion is controlled directly by the hypothalamic-pituitary axis and indirectly by other factors - temperature, vasopressin, adrenaline, the amount of iodine in food and others. Free hormones, after entering the cell, show anabolic effects, regulate body temperature and control the level of metabolism.[2] Abnormal functioning of the thyroid gland is diagnosed in significant parts of the population. Overt hypothyroidism affects about 5% of people in Europe. Almost ten times more often affects women. About 5% of the population has subclinical hypothyroidism.[3] Hyperthyroidism occurs in 0.5 to 1% of the general population. Subclinical hyperthyroidism affects 1-3%, its frequency increases with age. About 5 times more often affects women. [4]

Hypothyroidism and hyperthyroidism usually result from pathological processes occurring in the gland (primary hypothyroidism), however, the cause may also be disorders in the functioning of the hypothalamus and pituitary gland, or ectopic production of hormones. The most important course in thyroid diseases is, of course, pharmacological treatment - thyroid hormone supplementation or inhibition of gland function in case of its hyperactivity. There is more and more evidence for the beneficial effect of a proper diet on the course of the disease and the effectiveness of the therapy. There are also a lot of scientifically unjustified myths functioning in society, mistakenly imposing too restrictive approaches to people's diet.

In this publication, we will follow the nutritional recommendations for hypothyroidism, especially autoimmune hypothyroidism (Hashimoto) and hyperthyroidism. [9]

Hypothyroidism

The most common cause of primary hypothyroidism is Hashimoto's disease. This is chronic autoimmune thyroiditis. Nutrition in Hashimoto's disease aims to support drug therapy. Very important in oral hormonal supplementation is taking the medicine after awakening, 30 minutes before breakfast. After a meal there is a significant decrease in the bioavailability of the drug. You should also carefully analyze other medicines taken by the patient because thyroxine comes in a lot of interaction. For example, aluminum-containing medicines or proton pump inhibitors may reduce the absorption of the drug, as well as contraceptives. Androgens and anabolic steroids may increase the concentration of free thyroxine. Also, some diet components

affect the absorption of the drug, e.g. products containing soy may reduce absorption in the intestines, which may necessitate dose modification. [5]

The hypothyroid diet should be optimally balanced and varied. If possible, adapt it to the preferences and habits of the patient. The energy value should be adjusted to the patient's body weight, in the case of overweight reduced by 500-1000kcal per day [6]. Starvation and a significant reduction in food intake result in a reduction in the activity of the hypothalamic-pituitary-thyroid axis, thus further dysregulation of the thyroid function occurs. [7] The distribution of basic nutrients should be similar to that in the general population. The protein should cover 15-25% of the daily requirement; more of it can acidify the body and act catabolically. Very good sources of protein are lean poultry meat, eggs, fish, yoghurts and dairy products [8]. It is important to provide the right amount of essential fatty acids from the omega-3 group, which have anti-inflammatory properties as well as dietary fiber (for the prevention of constipation).

Iodine supplementation should not be routinely used in patients, although an adequate supply of this element is extremely important. In many cases, the amount of iodine delivered with food covers the daily requirement (150g). In pregnant women the amount of iodine in the diet should be increased to 220-290 g [9]. Good sources of this element are mackerel, mussels, cod, oysters, bran, mineral water and iodized salt. The amount of daily intake of salt should be limited in the diet of people with hypothyroidism, due to the tendency to edema and hypertension which often co-occur with the disease.

Selenium is a component of deiodinase enzyme, necessary for the conversion of thyroxine to triiodothyronine. Thyroid is an organ with the highest concentration of selenium. Supplementation of this element seems to have a modulating effect on autoimmune processes probably by reducing the amount of toxic hydrogen peroxide that is formed in the synthesis of hormones. [10] Its deficiency can cause destruction of thyroid follicular cells and fibrosis of the organ [11]. There are studies in which selenium supplementation has been shown to lower the concentration of anti-TPO and anti-TG antibodies, but this did not translate into a percentage of persistent remissions. Current recommendations suggest consumption of 55g of selenium per day. The best sources of this element are Brazil nuts, oysters, sunflower seeds, whole grain bread, mushrooms and meat. [12]

Iron is a component of iodinating peroxidase, which is responsible for the conversion of thyroglobulin to thyroxin and T3. Thus, iron deficiency can lead to a decrease in T3 and an increase in TSH [13]. Good sources of iron are flax seeds, pumpkin seeds, red meat, egg yolks, pistachios [8].

There is a correlation between vitamin D and thyroid disease; Vitamin D supplementation decreases anti-TPO antibodies (in people with an earlier vitamin D deficiency) [14] This vitamin plays a key role in the calcium-phosphate economy. Its deficiency causes the fragility of hair and nails, which are one of the more troublesome symptoms of hypothyroidism. The best sources are fatty fish and fish oil, however, additional supplementation is often necessary. The diet should limit the amount of goitrogens, which significant amounts are found in cruciferous vegetables, legumes (mainly soy), turnip, rutabaga, peanuts and mustard.

There is no justification for introducing a gluten-free diet in all cases of Hashimoto's disease. We distinguish several diseases in which there is hypersensitivity to gluten: celiac disease, where there is an immune response to ingested gluten in genetically predisposed individuals, gluten allergy, which is a typical food allergy IgE dependent and non-deleterious hypersensitivity to gluten (NCGS) - a variant of food intolerance diagnosed in patients who have excluded celiac disease and allergy to wheat. Patients with autoimmune thyroiditis are at risk for developing celiac disease - on average, 2-7% of patients with Hashimoto's disease or Graves-Basedow's disease suffer from celiac disease [15]. Patients at risk for developing celiac disease should be systematically examined for it, even without symptoms indicating this disease [16].

There are no data on the relationship between thyroid diseases and gluten allergy, as well as there is no research on their relationship to non-deleterious hypersensitivity to gluten. People with suspected gluten intolerance should be tested for celiac disease and allergies. In the case of negative results and positive effects of gluten-free diet in vivo, we can talk about hypersensitivity. There is no evidence of a positive effect of a gluten-free diet in people without coexisting celiac disease. In the case of celiac disease, a rigorous gluten-free diet must be used until the end of life, in the case of allergy and hypersensitivity to gluten, it can be used temporarily.

The use of a lactose-free diet in Hashimoto's disease is justified only in the case of lactose intolerance. In case of suspicion, a provocation attempt should be made; possibly genetic tests. Patients with known intolerance often tolerate milk products - fermented milk, yoghurts. There is no scientific evidence that a lactose-free diet has a beneficial effect on the course of the disease.

In connection with the symptoms that may occur in the disease, such as constipation, you should remember about the proper amount of fiber in the diet and eating a lot of fluids. Very sweet drinks, fatty animal products (lard, bacon), chocolate are contraindicated [17]

Hyperthyroidism

Hyperthyroidism can be caused by stimulating TSH receptor by autoantibodies in Graves' disease or activating TSH receptor mutation in the case of an autonomous tumor and hyperactive nodular goiter. Excessive release of hormones can also be caused by the destruction of the parenchyma in people with thyroiditis. [2]

Due to the thyroid hormone receptors are found in almost all cells, the symptoms of hyperactivity come from various organs and tissues. The severity of overactivity is assessed based on the severity of the symptoms. Full symptomatic hyperthyroidism is usually found in young people with severe hyperthyroidism. The most characteristic symptoms are thyroid orbitopathy, weight loss despite the preserved or increased appetite, diarrhea, abdominal pain. In the elderly, overt hyperactivity may be oligosymptomatic and occur in the form of thyroid-cardiac syndrome (atrial fibrillation, exacerbation of coronary insufficiency) or apathetic (severe depression, weight loss) [18] The goal of treatment is to achieve euthyrosis and then maintain it and prevent it recurrences of the disease. Thyrostatic drugs, surgical treatment and administration of radioactive iodine are used in the treatment.

In the diet of people with hyperthyroidism, attention should be paid first of all to increasing the caloric value of foods, on average by 20-25% in relation to the normal demand. Due to the dominant catabolic processes, the amount of protein in the diet should be increased. [19] The best sources are poultry meat, fish and eggs. The diet should be easy to digest, avoid fried or grilled dishes.

The supply of antioxidant vitamins (A, C, E) is important, because overactive thyroid promotes the formation of free radicals. They can be found in vegetables, fruits and vegetable oils. [20] Hyperthyroidism causes disorders of calcium metabolism and predisposes to osteoporosis. It is therefore necessary to include in the diet an increased supply of calcium including dairy products, canned fish, almonds, poppy seeds.

Iodine supply should be adjusted individually, depending on the amount of the element in a given person. Both its excess and deficiency adversely affect the course of the disease.

Persons with hyperthyroidism should avoid coffee, strong tea and energy drinks, as the caffeine contained in them may predispose (or worsen) cardiac arrhythmias.[8]

As in Hashimoto's disease, each patient should be approached individually and in case of suspected intolerance to lactose or celiac disease, perform appropriate tests before introducing dietary restrictions. [15]

Conclusions

Diet in thyroid diseases should be individualized and adapted to the needs and preferences of a particular patient. Great attention should be paid to the caloric content of meals and the content of micronutrients, especially iodine. A properly developed diet can significantly improve the course of the disease and the quality of life of patients.

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