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HYPOTHYROIDISM DIET PLAN

©*Evseev A.*, ORCID: 0000-0001-9155-1518, SPIN-code: 7490-5556, Ph.D.,
Vladimir State University, Vladimir, Russia, andrej.yevsejev@rambler.ru

РЕЖИМ ПИТАНИЯ ПРИ ГИПОТИРЕОЗЕ

©*Евсеев А. Б.*, ORCID: 0000-0001-9155-1518, SPIN-код: 7490-5556, канд. пед. наук,
Владимирский государственный университет им. А.Г. и Н.Г. Столетовых, г. Владимир,
Россия, andrej.yevsejev@rambler.ru

Abstract. The paper deals with the issue linked with thyroid malfunctions, in particular, the incidence of hypothyroidism. Iodine deficiency statistics is presented; the study proposes the possible ways of solving the issue. The author draws special attention to a specialized hypothyroidism diet plan which may help patients to treat metabolic disorders.

Аннотация. В статье рассматриваются проблемы, связанные с патологиями щитовидной железы, в частности, заболеваемость гипотиреозом. Представлена статистическая картина йододефицита в РФ; предложены пути решения данного вопроса. Основное внимание автор уделяет специальной программе питания при гипотиреозе, которая может помочь пациентам скорректировать имеющиеся метаболические нарушения.

Keywords: hypothyroidism, iodine deficiency, symptom, nutrition, diet.

Ключевые слова: гипотиреоз, йододефицит, симптом, питание, диета.

Introduction

Hormonal imbalance caused by the pathologies in endocrine glands can trigger serious diseases. Among them are: diabetes mellitus, thyrotoxicosis, hypothyroidism, etc. Excess or lack of hormones leads to changes in redox processes and metabolic disorders in the body. Iodine deficiency is one of them. The extreme degree of iodine deficiency is manifested in the form of hypothyroidism (underactive thyroid) — a clinical syndrome caused by a persistent deficiency in thyroid hormones [1].

Iodine deficiency statistics in Russia

The average prevalence rate of endemic and other forms of non-toxic goiter in adults in the period of 2009 to 2015 in the Russian Federation amounted to 931 cases per 100,000 population, the study conducted by the National Medical Research Centre for Endocrinology federal state budgetary institution in 2019 said. It ranged from 903 (in 2010) to 978 cases per 100,000 (in 2015). The incidence in adolescents aged 15-17 with endemic and other forms of non-toxic goiter over the same period of time totalled an average of 20 cases per 100,000, up from 17 in 2009 to 23 in 2014. The actual prevalence of diffuse non-toxic goiter in Russian schoolchildren aged 8-10 is ten times higher than officially registered, the study added. More noteworthy is that goiter prevalence rate

exceeded the threshold of 5 per cent across the country, with the exception of St Petersburg. In other regions, goiter incidence in children equalled the moderate severity of iodine deficiency diseases, ranging from 20 to 29.9 per cent. In Irkutsk, Khakassia, Krasnoyarsk Territory, Tyva, some territories of the North Caucasus and the Republic of Mordovia, a severe degree of iodine endemic was reported.

The incidence rate of an enlarged thyroid gland in children is over 30 per cent. These data are subject to the presence or lack of iodine deficiency prevention programme introduced in the region. Health communication and advisory work held among the population may improve the iodine deficiency situation. However, it does not allow to achieve optimal provision of iodine to the population.

Researchers sound alarm about inconsequent and unsystematic preventive steps taken in the country. They do not focus on the entire population, and the precautions often fail to meet international standards. In early 2018, of all the countries of the former USSR, only Russia and Ukraine lacked iodine prophylaxis legislation. The main reason for the lack of significant progress in Russia in eliminating iodine deficiency in food and related diseases is the lack of a law on the prevention of iodine deficiency and a centralized system (both at the federal and regional levels) that monitors preventive measures, the study said. A change for the worse is observed in the iodine deficiency incidence rate in case of lessening of supervision over the prophylaxis, the scholars summarized [2].

Symptoms of hypothyroidism

The classical disease pattern of hypothyroidism can be described by means of the epithets as follows: “apathetic”, “retarded”, “deferred”, “slack”, “depressive”. Patients often complain of drowsiness, sluggishness, hypomnesia, paresthesia, polyneuropathy, decreased tendon reflexes, migraine-like headaches, cognitive impairment, bipolar disorder, depression.

Hypophrasia is a common symptom of severe hypothyroidism. Stumbled, slow speech in patients with hypothyroidism is sometimes compared with the speech of a drunken person. As well as that, epidermal syndrome is characteristic of hypothyroidism: thinning hair or hair loss; dry, brittle hairs; trichorrhea is observed with ordinary combing. Thinning of eyebrows and eyelashes is possible; hair growth retardation, beard and mustache thinning in men are reported. Yet another classic hypothyroidism syndrome is hyperkeratosis of the skin of the elbows. Patients also report of chilliness due to a body temperature lowering which is associated with both a general slowdown in metabolism and peripheral vasoconstriction (metabolic-hypothermic syndrome).

On the part of the digestive system and gastrointestinal tract patients complain of constipation, loss of appetite, nausea. Hepatomegaly, biliary dyskinesia, autoimmune gastritis, colon dyskinesia, atrophy of the mucous membrane of the stomach and, as a result, mucinous infiltration of the colon wall, and lowering of absorption of calcium and iron in the intestinal tract was reported. Hypofunction of the thyroid gland leads to pancreatic tissue fibrosis, decreased protein synthesis by pancreatic epithelium and β -cells of the islets of Langerhans [3].

On the part of the musculoskeletal system, hypothyroidism is typically characterized by a sharp slowdown (2-3 times) in bone remodeling processes: both bone resorption and bone formation are inhibited. Osteopenia, a moderately pronounced decrease in bone mineral density, is discovered in women with decompensated hypothyroidism [4].

On the part of the immune system, patients with hypothyroidism are susceptible to frequent respiratory viral infections and pneumonia, recurrence of herpes simplex and other infectious-dependent diseases [5].

At the cellular level, there is a decrease in oxygen consumption by tissues; energy expenditure and energy substrate consumption. Basal metabolic rate (BMR) may drop by 35 to 40 per cent. A combination of the aforementioned processes with hyporexia can lead to a slight increase in body weight.

With hypothyroidism, there is a decrease in protein synthesis and metabolism, while most patients have a positive nitrogen balance and an increase in serum albumin. A decrease in intestinal absorption of glucose is also observed, which causes a low glycemic peak in the oral glucose tolerance test. Thus, a decrease and delay in the peak level of insulin in response to a glucose load is recorded.

Hypothyroidism is characterized by a simultaneous decrease in both the synthesis of fatty acids and lipolysis. An increase in cholesterol is linked more with a slowdown in metabolism than with its synthesis. The level of LDL cholesterol (“bad” cholesterol) increases, since the expression of the T3-dependent LDL receptor for hepatocytes is suppressed. The severity of lipid metabolism disorders is inversely proportional to the level of T4, being in direct proportion to the level of thyrotropin. A certain role in the development of atherosclerosis, arterial and venous thromboembolism is assigned to homocysteine – its increase is observed in patients with hypothyroidism.

Hypothyroidism diet

Hypothyroidism dieting plays an auxiliary role in the disease therapy. However, patients with hypothyroidism should eat a diet to treat metabolic disorders. Diet therapy of hypothyroidism provides for a decrease in the energy value of the daily foods consumption and stimulation of oxidative processes in the body. The restriction of the energy value of the diet should be made mainly at the expense of carbohydrates (down to 200-250 g per day) and, to a lesser extent, fats (down to 80 g, of which 15 per cent are vegetable fats). To treat the impaired lipid metabolism and hypercholesterolemia, it is important to limit the use of foods rich in cholesterol (animal fats, fatty meats, fish, brains, fish caviar, butter, sour cream, etc.), easily digestible carbohydrates (sugar, honey, jam, flour products, etc.). Patients should opt for foods rich in plant fiber (vegetables, unsweetened fruits and berries). It delays the absorption of carbohydrates and promotes bowel evacuation. Due to its large volume, plant fiber gives a sense of saturation at a low energy value. The diet is to include foods and dishes that moderately stimulate gastric secretion, as well as having a laxative effect, namely vegetables, fruits, berries, dried fruits, juices, vegetable oils, sour-milk drinks, bran goods.

Proteins should be consumed in sufficient quantities, since they contribute to an increase in metabolism, having a pronounced specific dynamic effect. It is recommended to limit the use of salt and water; enrich the diet with ascorbic acid; replace regular table salt with iodized one. It is recommended to make use of one-day lactic acid products (yogurt), prunes, beet juice, rye bread in case of constipation [6].

Patients with hypothyroidism need to receive a sufficient amount of iodine through an alimentary route. The leaders in iodine content are seafood (seaweed, shrimps, mussels, crabs) and sea fish rich in omega-3 fatty acids (salmon, pink salmon, tuna).

Foods rich in iodine are:

- iodized salt,
- seaweed is characterized by high iodine content,
- sea fish,
- feijoa.

Iodization of salt and bread proved to be the most efficient and thrifty method for the prevention of hypothyroidism.

Currently, Russia has adopted a new standard, which involves the addition of 40 ± 15 mg of iodine per kilogram to sodium chloride (NaCl). The use of iodized salt in many cases can eliminate iodine deficiency. However, at certain periods of life (children and adolescents, pregnancy, breastfeeding), the body needs regular additional physiological doses of iodine.

The optimal iodine intake is approximately 150 mcg a day. In various regions of Russia, the daily intake of iodine ranges from 20 to 700 mcg. A decrease in the daily intake of iodine of less than 80 mcg is dangerous, since it does not allow maintaining the euthyroid state without stimulating the gland and forming its hyperplasia.

Drawing up individual nutrition plans, it should be borne in mind that the transport of iodine is blocked by thiocyanates, thiooxysolidones and rhodanides, which are contained in some products and have a goiter effect. These include plants of the Cruciferae, namely, radishes, turnips, rutabaga, cauliflower, watercress, kale, kohlrabi, collard greens, broccoli and red cabbage, mustard, etc. One should also limit the use of soy products, which can inhibit the absorption of thyroid hormones from the intestines, taken as hormone replacement therapy by the patient [7].

Coconut oil should become one of the important ingredients in the diet of people suffering from hypothyroidism, the researchers said. It contains medium chain fatty acids and has antioxidant properties. Sprouted flax and chia seeds saturate the body with alpha-lipoic acid (ALA) which regulates the function of the thyroid gland. Sprouted grains of cereals and legumes are useful as well.

Let us consider a diet menu with an increased amount of protein (IAP) for patients with hypothyroidism (normal BMI).

Culinary processing: Foods are cooked in a boiled, baked and chopped form with the addition of iodized salt.

The temperature of hot dishes equals $60-65^{\circ}\text{C}$, cold dishes — not lower than 15°C .

Meals to be taken 6 times a day.

First breakfast (8 a.m.)

1) still drinking water (200 ml)

2) buckwheat porridge (100 g) cooked in water with the addition of one teaspoonful of olive or linseed oil (5 g)

(100 g kcal 132: protein 4.5 g, fat 2.3 g, carbohydrate 25.0 g)

(5 g kcal 45: protein 0.0 g, fat 5.0 g, carbohydrate 0.0 g)

3) beef meatballs roasted or steamed (100 g)

(100 g kcal 260: protein 18.0 g, fat 20.0 g, carbohydrate 0.0 g)

4) a grain bun with bran (50 g)

(50 g kcal 111: protein 3.9 g, fat 0.9 g, carbohydrate 21.9 g)

Total: 455 g

Calories 548 kcal

protein 26.4 g

fat 28.2 g

carbohydrate 46.9 g

Second breakfast (11 a.m.)

1) low-fat cottage cheese (1.8% fat)

(100 g kcal 101: protein 18.0 g, fat 1.8 g, carbohydrate 3.3 g)

- 2) a slice of bread "8 cereals" (20 g)
(20 g kcal 33: protein 1.3 g, fat 0.2 g, carbohydrate 6.8 g)
- 3) dried fruit compote without sugar (200 g)
(200 g kcal 120: protein 1.6 g, fat 0.0 g, carbohydrate 28.4 g)

Total: 320 g

Calories 254 kcal

protein 20.9 g

fat 2 g

carbohydrate 38.5 g

Lunch (1.30 p.m.)

- 1) avocado salad with herbs (70 g)
(70 g kcal 104: protein 1.0 g, fat 10.0 g, carbohydrate 3.7 g)
- 2) vegetable soup (250 g)
(250 g kcal 108: protein 4.3 g, fat 4.5 g, carbohydrate 15.5 g)
- 3) mashed potatoes (100 g)
(100 g kcal 106: protein 2.5 g, fat 4.2 g, carbohydrate 14.7 g)
- 4) meatballs of low-fat ground beef (100 g)
(100 g kcal 139: protein 19 g, fat 7.5 g, carbohydrate 0.0 g)
- 5) apple juice (200 g)
(200 g kcal 84: protein 0.8 g, fat 0.8 g, carbohydrate 19.6 g)

Total: 720 g

Calories 541 kcal

protein 27.6 g

fat 27 g

carbohydrate 53.5 g

Afternoon snack (4 p.m.)

- 1) chicken breast boiled or baked (100 g)
(100 g kcal 137: protein 29.8 g, fat 1.8 g, carbohydrate 0.5 g)
- 2) weak green tea with sugar (200 ml + 2 tsp white crystalline sugar)
(200 ml kcal 28.4: protein 0.0 g, fat 0.0 g, carbohydrate 7.2 g)

Total: 300 g

Calories 165.4 kcal

protein 29.8 g

fat 1.8 g

carbohydrate 7.7 g

Dinner (6 p.m.)

- 1) seaweed salad with green peas (150 g)
(150 g kcal 89: protein 6.0 g, fat 8.1 g, carbohydrate 0.0 g)
- 2) ocean fish steamed or baked (100 g)
(100g kcal 141: protein 21.4 g, fat 6.2 g, carbohydrate 0.1 g)
- 3) pancakes with apple puree and cinnamon (100 g)
(100 g kcal 142.2: protein 4.2 g, fat 3.2 g, carbohydrate 24.2 g)
- 4) tangerine compote with vitamin C without sugar (100 ml)
(100 ml kcal 69: protein 0.1 g, fat 0.0 g, carbohydrate 18.1 g)

Total: 450 g

Calories 441.2 kcal

protein 31.7 g
fat 17.5 g
carbohydrate 42.4 g
Before bed (9 p.m.)
1) yoghurt 1% fat (250 g)
(250 g kcal 103: protein 8.3 g, fat 2.5 g, carbohydrate 9.0 g)
Total: 250 g
Calories 103 kcal
protein 8.3 g
fat 2.5 g
carbohydrate 9 g
TOTAL per day: 2,495 g
Calories 2,052.6 kcal
protein 144.7 g
fat 79 g
carbohydrate 198 g
iodized sodium chloride (NaCl): 4 g (160 mcg iodine)
free liquid: 1-1.2 l

If needed, the diet proposed above can be modified with vitamin-mineral complexes which contain vitamins A, B, C, D, E and trace elements, namely selenium, zinc, iron, copper, magnesium.

Conclusion

Timely correction of metabolic disorders makes the key aim of diet therapy for endocrine glands dysfunction. No universal diet exists for the patients with diseases of the endocrine system. Clinical nutrition for endocrine gland diseases is efficacious if the patient strictly observes the recommendations on diet therapy and strictly adheres to an individually approved diet.

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