

STUDY OF MICRONUTRIENTS INTAKE IN PATIENTS WITH VARIOUS THYROID DISEASES

Sergey F. Zinchuck, Ludmila V. Kvitkova, Darya S. Filimonova,

Valentina G. Zinchuck, Rinat A. Mukhamadiarov

Kemerovo medical academy, Kemerovo, Russia

650029, Russia, Kemerovo, Voroshilova-street, 22-a

Abstract

The study design included several groups of patients, who were divided according various thyroid diseases. A comparative study of trace element values (copper, selenium, magnesium and zinc) in nails was performed. Low median selenium content, suggesting its low consumption, has been observed in all groups of the study. The level of selenium intake may be characterized as severe deficit. Moreover, most patients included in the study have reported mild deficits of manganese and copper intake and a moderate zinc deficiency.

Key words: Pathology of Thyroid gland, microelementosis, status microelementos of organism

1. INTRODUCTION

Great interest of the researchers to Pathology of thyroid gland can lay between two layers from one side that is widely spread of this pathology, from another side that there are many lacks of our knowledge about pathogenesis of these diseases and low effectiveness of treatments. Many experiments and clinical studies showed us the main role of micronutrients in forming pathology of thyroid gland (1, 2, 5). In a number of studies their role is interpreted inconsistently (3,4), it may depend on different models of experiment construction and possibility of micronutrients imbalance and their mutual influence. We chose 4 micronutrients for research. Ferrum is a very important component of body oxygen supply. Oxygen-dependable process is to pinch iodine by thyroid gland. Magnesium and copper have very important role in enzyme systems for synthesis of the thyroid hormones. Selenium is a part of iodoperoxidases enzyme and it is a key element of iodine organification.

The diseases are chosen by us for researches mainly are differed in their influence on the generic metabolism of the organism.

The aim of this study is to evaluate the micronutrients intake in organism – selenium, copper, magnesium and ferrum in people of Kemerovo with presence of thyroid diseases.

2. MATERIALS AND STUDY METHODS

Research material is nails of 74 patients with thyroid diseases (nodular colloid goiter, Basedow disease, thyroid cancer and thyroid adenoma) and the comparison groups (35 persons), who don't have thyroid gland. Subjects' age is ranged from 20 to 69 years old. Nails study lets us evaluate the micronutrients intake in organism for a longer period in comparison with such substance as urine and blood. And daily fluctuations almost are smoothed due to ingestion.

Selected nails were burned to ash, further it was dissolved and in the mixture it was determined by ferrum, copper, magnesium and selenium potentiometric concentration method. The obtained data was defined in micrograms per gram of dry tissue. To interpret the data, the content medians, modes were rated and compared the groups to each other with criterion of Student's t- test. The most informative indicator of stereotypes estimation of the organism given elements is the content median.

3. RESULTS OF OUR OWN STUDIES

Tables 1-4 represent the results of the study for each micronutrient separately and for all studied disease entity. Median and content mode characterize mainly prevailing stereotype of the body intake which is specific for the experimental group. The presented data shows that is specific for ferrum intake because it is within the reference range 20 -100 micrograms per gram of tissue. We also see it is at the lower limit of normal level in both age groups except for the patients with thyroid cancer.

Table 1

The indices of ferrum median and mode concentrations in nails of subjects

Experimental groups	Ferrum concentration in $\mu\text{g/g}$ dry tissue			
	Age 40-50 лет		Age 51-60 лет	
	Concentration median	Concentration mode	Concentration median	Concentration mode
Basedow disease	39	35	24	23
Nontoxic nodular goiter	34	32	33	34
Thyroid cancer	77,5	74	89	85
Thyroid adenoma	45	55	43	45

The copper level of organism is in normal reference range (5-12.5 $\mu\text{g/g}$ tissue). While patients with thyroid adenoma have the lower limit from normal level, and for the rest that is the upper limit of normal level.

Table 2

The indices of copper median and mode concentrations in nails of subjects

Experimental groups	Ferrum concentration in $\mu\text{g/g}$ dry tissue			
	Age 40-50 лет		Age 51-60 лет	
	Concentration median	Concentration mode	Concentration median	Concentration mode
Basedow disease	7,4	7,3	7,1	9
Nontoxic nodular goiter	7,2	8,2	7,6	7,4
Thyroid cancer	8	9	7,8	8
Thyroid adenoma	6,2	5,8	5,8	5,6

For patients with Basedow disease magnesium prosperity is normal, but for the rest of disease entities whether a lower limit from normal (normal 45 - 300 mg/g tissue), or slightly below normal.

Come under notice the data of selenium prosperity. Almost all of them is below the normal concentration, and only results of the patients with thyroid cancer are at the acceptable level. These results indicate a specific selenium deficit in the region.

Table 3

The indices of magnesium median and mode concentrations in nails of subjects

Experimental groups	Ferrum concentration in $\mu\text{g/g}$ dry tissue			
	Age 40-50 лет		Age 51-60 лет	
	Concentration median	Concentration mode	Concentration median	Concentration mode
Basedow disease	109	109	98	98
Nontoxic nodular goiter	52	65	36	39
Thyroid cancer	40,5	37	24	26
Thyroid adenoma	32	49,8	54	48

Table 4

The indices of selenium median and mode concentrations in nails of subjects

Experimental groups	Ferrum concentration in $\mu\text{g/g}$ dry tissue			
	Age 40-50 лет		Age 51-60 лет	
	Concentration median	Concentration mode	Concentration median	Concentration mode
Basedow disease	0,24	0,19	0,23	0,34
Nontoxic nodular goiter	0,27	0,2	0,19	0,16
Thyroid cancer	0,28	0,28	0,31	0,27
Thyroid adenoma	0,27	0,27	0,27	0,27

By summing up all received data we need to note that the lowest association between selenium, copper, magnesium and ferrum organism intake and disease entity - thyroid disease is observed in patients with thyroid cancer.

Selenium has the lowest supply among studied micronutrients. But magnesium has the highest one. We observed some differences in micronutrients intake with patients who had different disease entities. You must consider the further received results and introduce programs in practice with optimization of preventive technologies.

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