Minerals, vitamin D and diseases of the thyroid gland in Ukraine

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Abstract The paper presents studies of the iodine status of the population of Ukraine conducted under the auspices of the WHO in the "Steps" chronic disease research program, studies of thyroid function, elements, nodular goiter (NG), immune indicators in autoimmune thyroiditis (AIT) and Graves' disease (GD), studies of the effect of vitamin D on these diseases. A conclusion was made about the need for a legislative solution to the problem of iodine deficiency in Ukraine, the need to identify and use elements in the presence of their deficiency, the need to use vitamin D in patients with AIT and DG.

Introduction. Esential elements calcium, magnesium, iron, copper, as well as microelements iodine, selenium, zinc play an important role in the work of many organs and systems of body, and a violation of their supply can be the cause of diseases. The thyroid gland (thyroid gland), which directs many biochemical and physiological processes in the body through thyroid hormones, largely depends on the supply of these elements to it. In particular, iodine deficiency causes not only thyroid diseases, but also a whole spectrum of iodine deficiency diseases (IDDs). The problem of iodine deficiency is relevant for most countries of the world, where it has been solved.. Ukraine is on this path and needs research on the iodine status of the population. Studies on the provision of selenium, iron, zinc, and magnesium are relevant for understanding thyroid diseases and solving the issue of their treatment

Materials. Examined: 1. iodine status - 263 people; . 2. NG - 55/125; 3.AIT: latent -32|72; with hypothyroidism subclinical-108, overt-90|/93; 4.AIT with overt hypothyreos +Vitamin D (4000 mU) -92/92; 4.GD -60/42, 5. GD-tyrosol+Vit D and tyrosol -70/73 (дослід/контроль) ; * - P -<0,05

Methods. Selection of research participants according to the duration of the disease, biochemical studies of iodine content in urine [1], selenium in blood serum, mass spectrometric studies of the level of micro- and macroelements in blood serum [2], calculation of risks of changes. in the titer of antibodies depending on the level of selenium and other studied factors.

Results. The poster shows the results of the research by employees of the Department of Epidemiology of Endocrine Diseases of the Institute of Endocrinology and Metabolism of the National Academy of Medical Sciences of Ukraine, which were carried out with the technical support of the European Regional Office of WHO and WHO of Ukraine in 2019 within the framework of the WHO project "STEPS" and the scientific topic "Develop and research effectiveness of new means of prevention of diseases of the endocrine system with the aim of introducing them into clinical practice" during 2019-2022. The developed drugs are tested in the clinic of the institute, and are not included in the poster

Fig. 1 Iodine status of the population in the regions of Ukraine according to the data of ioduria (µg/l) and daily iodine excretion in brackets (µg/day)

Fig. 2. thyroid status of patients with nodular goiter in the northern region of Ukraine, compared to the control group of the examined

Fig. 2a The content of elements in the serum of patients with nodular goiter and in persons without thyroid pathology

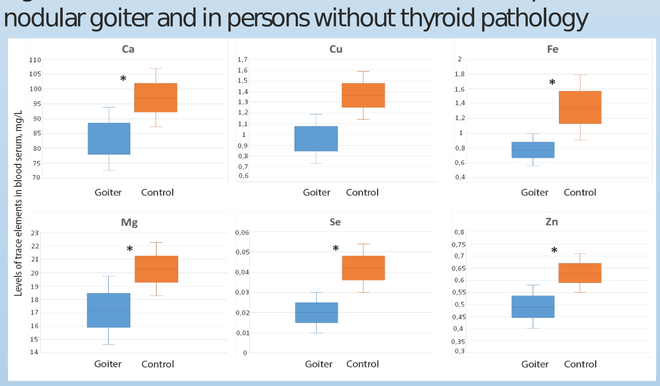


Fig. 2b Relative risk of exposure (RR) of macro- and microelements to the occurrence of nodular goiter

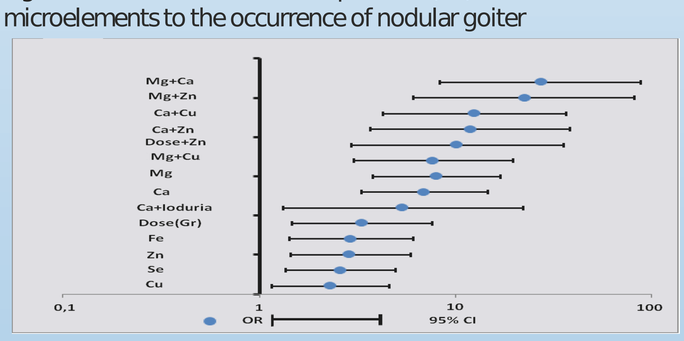


Fig. 3 Thyroid status among patients with latent AIT in the Northern region of Ukraine compared to controls.

Fig. 3a – The content of elements in the serum of patients with latent AIT and in people without thyroid pathology

Fig. 3b Relative risk of influence (RR) of lack of elements on the occurrence of latent AIT

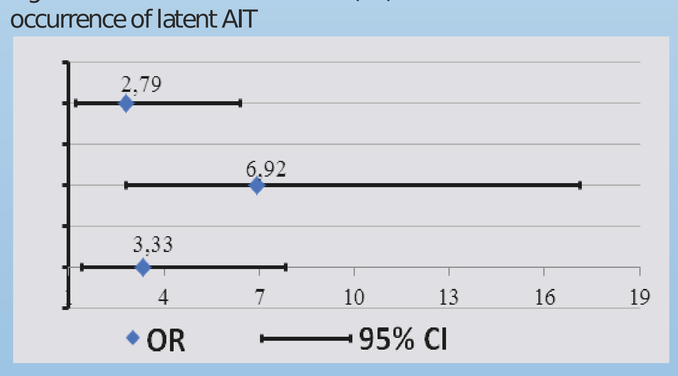


Table The effect of vitamin D on thyroid and immune status in patients with AIT with overt hypothyroidism

Indicator	Before	after prescribing vitamin D	p
n	92	92	
Thyroid Volume	29,06 (24,53-33,01)	25,68 (21,6-30,22)	<0,001
TSH	2,84±0,07	1,88±0,07	<0,001
Free T4	14,1 (12,4-15,6)	14,29 (13,2-15,28)	0,107
AbTPO	300,0 (250,0-500,0)	300,0 (242,5-500,0)	0,001
AbTG	216,5 (176,5-311,75)	199,9 (145,25-227,0)	<0,001
Vitamin D	29,0 (22,13-38,9)	47,95 (38,75-58,78)	<0,001

Fig. 4. Correlation between the content of vitamin D and the function of the thyroid gland and the immune status of patients with AIT with overt hypothyroidism before the appointment of the vitamin

Fig. 4a. Correlation between the content of vitamin D and thyroid function and immune status of patients with overt hypothyroidism 3 months after the appointment of the vitamin

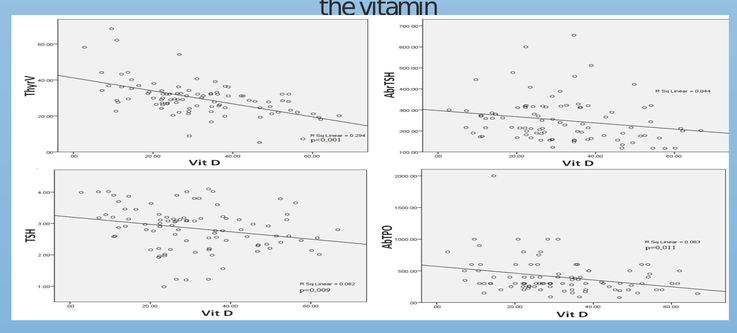


Fig. 5 Thyroid function and immune status in GD compared to controls

Fig. 5a Dynamics of changes in thyroid function and immune status in GD under the influence of selenium

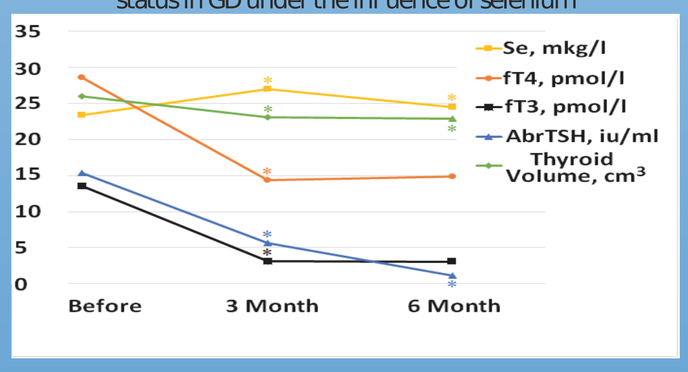


Figure 5b. The risk of increasing AbrTSH from selenium deficiency and indicators of thyroid status in GD

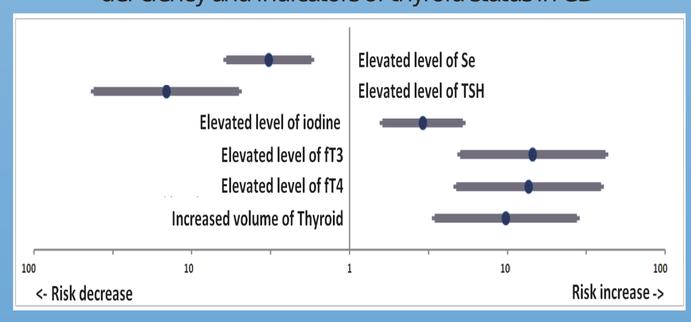


Fig. 6. The effect of vitamin D supplements on thyroid function and immunological indicators in patients with GD

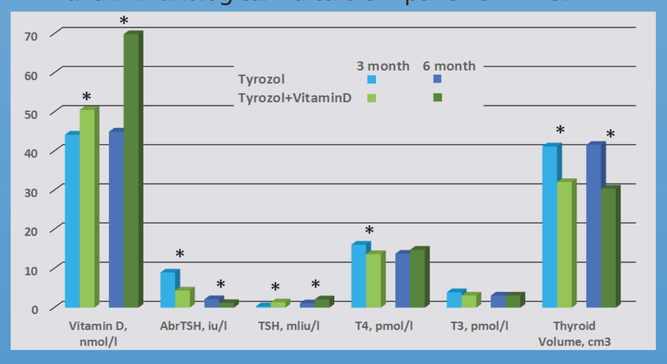


Fig. 6a Dependence of AbrTSH on quartile distribution of vitamin D content in the serum of patients with GD

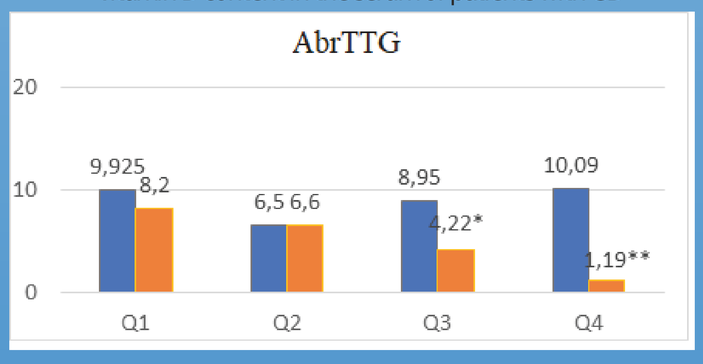
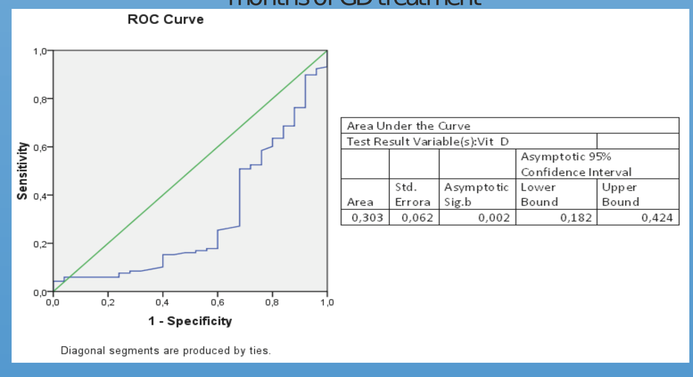


Fig. 6b ROK analysis of the effect of vitamin D on ATrTTH after 6 months of GD treatment



Area Under the Curve
Test Result Variable(s):Vit_D

Area	Std. Errora	Asymptotic Sig.b	Asymptotic 95% Confidence Interval Lower Bound	Upper Bound
0,303	0,062	0,002	0,182	0,424

Conclusion: A conclusion was made about the need for a legislative solution to the problem of iodine deficiency in Ukraine, the need to identify and use elements in the presence of their deficiency, the need to use vitamin D in patients with AIT and GD.

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