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N.V. Pasyechko, V.M. Kulchinska
I. Horbachevsky Ternopil National Medical University, Ternopil, Ukraine

The effect of the combined use of myo-inositol, vitamin D and selenium on the cytokine status in women of reproductive age with autoimmune thyroiditis

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Abstract. ***Background.*** *In recent years, in Ukraine and other countries of the world, there has been an increase in the frequency of autoimmune thyropathies. A significant role in the pathogenesis of autoimmune thyroiditis (AIT) is played by cytokines whose production is increased significantly during immunopathological reactions. The purpose of study was to investigate the effect of the combined use of myo-inositol, vitamin D and selenium on the cytokine status of women with euthyroidism, subclinical hypothyroidism and overt hypothyroidism against the background of autoimmune thyroiditis.* ***Materials and methods.*** *One hundred and forty-seven women aged 18–43 with AIT and 30 women of the control group were under observation. Patients of first group (n = 74) received myo-inositol at a dose of 2000 mg/day, cholecalciferol 2000 IU/day, and selenium 100 μg/day additionally to the main treatment. Patients of the second group (n = 73) received only cholecalciferol at a dose of 2000 IU/day and selenium 100 μg/day additionally to the main treatment. The functional state of the thyroid gland was studied by determining the levels of thyroid-stimulating hormone, free thyroxine, free triiodothyronine, antibodies to thyroid peroxidase (Ab-TPO) and antibodies to thyroglobulin (Ab-TG). The state of the systemic and local inflammatory process was evaluated according to parameters of tumor necrosis factor α, interleukins 6, 10, 17, and 23.* ***Results.*** *It should be noted all patients with AIT had changes in cytokine status, with some differences depending on the clinical variant of autoimmune thyroid disease. After three months of treatment of patients of the first group with myo-inositol at a dose of 2000 mg/day, cholecalciferol 2000 IU/day and selenium 100 μg/day, and patients of the second group only with cholecalciferol at a dose of 2000 IU/day and selenium at 100 μg /day, a significant difference was found between the indicators in both studied cohorts.* ***Conclusions.*** *The administration of myo-inositol, vitamin D, and selenium had a combination effect on the reduction of cytokine indicators, Ab-TPO and Ab-TG levels, which contributed to the compensation of the underlying disease.*

Keywords: *autoimmune thyroiditis; myo-inositol; vitamin D; selenium; cytokine status*

Introduction

Thyroid disease is one of the most common pathologies in the world, with two of the most clinically important subgroups being iodine deficiency and thyroid goiter, and thyroid cancer [1]. Thyroid dysfunction is one of the leading endocrine disorders. Previous data show that about half of the population with thyroid dysfunction remains undiagnosed [2]. Ongoing monitoring of patients on thyroxine replacement therapy is important, given that 25 % of treated patients had an abnormal thyroid-stimulating hormone (TSH) [3].

A comparative analysis of thyroid cancer incidence in Ukraine after the Chernobyl accident was done in a cohort that is almost as large as the general population. On the basis of thyroid doses from radioactive iodine in individuals aged 1–18 years at the time of accident, geographic regions of Ukraine with low and high average accumulated thyroid doses were established and designated “low-exposure” and “high-exposure” territories, respectively [4].

In recent years, in Ukraine and other countries of the world, there has been an increase in the frequency of auto-

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For correspondence: Kulchinska Veronika Mykolaiivna, Graduate Student of the Internal Medicine Department 1, I. Horbachevsky Ternopil National Medical University, Freedom Square, 1, Ternopil, 46001, Ukraine, e-mail: v.m.kulchinska@gmail.com, phone: +38 (097) 848 42 06.
Full list of authors’ information is available at the end of the article.

immune genesis thyropathies, among which hypofunctional states predominate [5]. Among people of working age, autoimmune thyroiditis (AIT) is 4–8 times more common for women than for men, and there is also a trend towards an increase in incidence in younger age groups [6]. Subclinical hypothyroidism against the background of autoimmune thyroiditis is diagnosed in 10–15 % of practically healthy individuals who are in a state of euthyroidism [5, 6].

A significant role in the pathogenesis of AIT is played by cytokines, the production of which increases significantly during immunopathological reactions. In particular, pro-inflammatory cytokines have a direct effect on the synthesis of thyroid hormones by thyroid cells [7, 8]. In recent years, the growing interest in the role of myo-inositol in the pathophysiology of the thyroid gland has become the impetus for new research on its possible involvement in AIT, and combination with vitamin D and selenium will improve the compensation of the underlying disease [9, 10].

This approach avoids the progression of overt hypothyroidism and slows the onset of, or postpones, an increase in the dose of ongoing hormone therapy in these patients, expanding the therapeutic use of myoinositol and shaping future clinical trials in the treatment of subclinical hypothyroidism.

The purpose of study is to investigate the effectiveness of the combined use of myo-inositol, vitamin D and selenium on the cytokine status of women with euthyroidism, subclinical hypothyroidism and overt hypothyroidism against the background of autoimmune thyroiditis.

Materials and methods

One hundred and forty-seven women aged 18–43 years with AIT and 30 women of the control group were under observation. Patients with concomitant chronic somatic diseases with a severe or progressive course, pregnant women were excluded from the study.

Patients of the first group (n = 74) received myo-inositol at a dose of 2000 mg/day, cholecalciferol at a dose of 2000 IU/day, and selenium 100 μg/day additionally to the main treatment. Patients of the second group (n = 73) received only cholecalciferol at a dose of 2000 IU/day and selenium 100 μg/day additionally to the main treatment.

The patients included in the study underwent clinical, anthropometric and biochemical examination. Height (cm), body weight (kg), body mass index (kg/m^2) were measured. The functional state of the thyroid gland was studied by determining the levels of TSH, free thyroxine (fT_4), free triiodothyronine (fT_3) in blood serum using the electrochemiluminescence method on the automatic analyzer Roche Cobas-411 using reagents from the company Roche Diagnostics (Germany).

The level of antibodies to thyroid peroxidase (Ab-TPO) and antibodies to thyroglobulin (Ab-TG) was determined using a kit from Orgentec GmbH (Germany). The diagnosis of AIT was established on the basis two of the three criteria: an elevated TSH level, an increased at least twice the titer of Ab-TPO, and data from thyroid ultrasound.

The state of the systemic and local inflammatory process was evaluated according to parameters of tumor necrosis factor α (TNF-α), interleukin (IL) 6, IL-10, IL-17, IL-23. The concentration of cytokines was studied by the method of solid-phase enzyme immunoassay by according to the manufacturer's instructions (Diaclone, Besançon, France). The concentration of TNF-α, IL-1β, IL-6, and IL-10, IL-17, IL-23 was expressed in pg/ml.

Local ethics committee approval was obtained for the study (Number: 2021-38).

The statistical processing of the obtained results was carried out using the package of programs for statistical analysis Statistica 12. To assess the degree of relationship, a correlation analysis was carried out with the calculation of the linear correlation coefficient (r) and its reliability (p). The significance of the differences between values was considered reliable at $p < 0.05$.

Results

Of the 147 examined patients with AIT, 48 had preserved thyroid function: their TSH level was 2.48 ± 0.81 mIU/ml, the fT_4 level was within 15.83 ± 2.71 pmol/l, the level of fT_3 was within 3.33 ± 0.37 pg/ml, the level of Ab-TPO in this group was 371.54 ± 199.08 IU/ml, and the level of Ab-TG was 335.43 ± 177.04 IU/ml.

Subclinical hypothyroidism was detected in 49 patients out of 147 examined, TSH level was 5.27 ± 0.96 mIU/ml, fT_4 level was within 12.08 ± 1.50 pmol/l, fT_3 level was 3.19 ± 0.28 pg/ml, Ab-TPO level was 739.53 ± 206.93 IU/ml, Ab-TG level was 721.98 ± 139.35 IU/ml.

Overt hypothyroidism was diagnosed in 50 patients out of 147 examined, their TSH level was within 13.30 ± 4.06 mIU/ml, fT_4 level was 9.79 ± 0.87 pmol/l, fT_3 level was 3.04 ± 0.54 pg/ml, Ab-TPO level — 940.62 ± 476.41 IU/ml, and Ab-TG — 721.27 ± 159.05 IU/ml.

Table 1. Characteristics of laboratory indicators in the first group of patients

Indicators	AIT, euthyroidism (n = 24)	AIT, subclinical hypothyroidism (n= 25)	AIT, overt hypothyroidism (n = 25)
TSH, mIU/ml	2.69 ± 0.78	5.34 ± 1.07	13.46 ± 4.85
fT_4, pmol/L	16.02 ± 3.02	11.85 ± 0.81	9.72 ± 0.78
fT_3, pg/ml	3.32 ± 0.45	3.23 ± 0.32	3.08 ± 0.72
Ab-TPO, IU/ml	355.41 ± 119.84	763.40 ± 214.32	962.30 ± 499.36
Ab-TG, IU/ml	297.95 ± 182.00	730.16 ± 133.70	716.61 ± 181.70
25(OH)D, ng/ml	21.75 ± 3.61	12.86 ± 3.08	11.63 ± 3.68

The level of 25(OH)D was determined in all patients. 25(OH)D was evaluated in the autumn-winter period. In patients with euthyroidism on the background of AIT, the level of 25(OH)D was 21.24 ± 3.78 ng/ml; in patients with subclinical hypothyroidism the level of 25(OH)D was 12.89 ± 2.69 ng/ml; and in patients with overt hypothyroidism on the background of AIT, the level of 25(OH)D was 11.97 ± 4.00 ng/ml.

After the examination, the patients were divided into two groups. The first group included 74 patients with AIT, among whom 24 people (32.44 %) were euthyroid, 25 women (33.78 %) were diagnosed with subclinical hypothyroidism, and in 25 people (33.78 %) — overt hypothyroidism was detected. The characteristics of laboratory indicators in this group are presented in Table 1.

The second group included 73 patients with AIT, among whom 24 people (32.88 %) were euthyroid, 24 women (32.88 %) were diagnosed with subclinical hypothyroidism, and 25 people (34.24 %) had overt hypothyroidism. The characteristics of laboratory indicators in this group are presented in Table 2.

Indicators of cytokine status were determined in both examined groups. It should be noted that in all patients with AIT, changes in cytokine status were detected, while there were some differences in cytokine status depending on the clinical variant of autoimmune thyroid disease. The results of the cytokine status indicators of the status in both examined groups are presented in Tables 3, 4.

Among the patients of the first group (n = 74), women with subclinical hypothyroidism and manifest hypothyroidism received the main treatment with levothyroxine at a dose of 1 μg/kg in case of subclinical hypothyroidism and 1.6 μg/kg in case of overt hypothyroidism, and additionally to the main treatment they received myo-inositol at a dose of 2000 mg/day, cholecalciferol at a dose of 2000 IU/day and selenium at a dose of 100 μg/day.

Among the patients of the second group (n = 73), women with subclinical hypothyroidism and overt hypothyroidism received the main treatment with levothyroxine at a dose of 1 μg/kg for subclinical hypothyroidism and 1.6 μg/kg for overt hypothyroidism, and additionally to the main treatment they received only cholecalciferol at a dose of 2000 IU/day and selenium at a dose of 100 μg/day.

After three months of treatment of patients of the first group (myo-inositol at a dose of 2000 mg/day, cholecalciferol at a dose of 2000 IU/day and selenium at a dose of 100 μg/day), and patients of the second group only with cholecalciferol at a dose of 2000 IU/day and selenium at a dose of 100 μg/day, a significant difference was found between the indicators in both studied groups (Tables 5, 6).

After analyzing the results of the study, it was proved that the combination of myo-inositol at a dose of 2000 mg/day,

Table 2. Characteristics of laboratory indicators in the second group of patients

Indicators	AIT, euthyroidism (n = 24)	AIT, subclinical hypothyroidism (n = 24)	AIT, overt hypothyroidism (n = 25)
TSH, mIU/ml	2.98 ± 0.83	5.19 ± 0.84	13.15 ± 3.18
fT_4, pmol/L	15.65 ± 3.02	12.32 ± 1.97	9.86 ± 0.97
fT_3, pg/ml	3.35 ± 0.29	3.16 ± 0.25	2.99 ± 0.25
Ab-TPO, IU/ml	387.66 ± 179.21	714.66 ± 200.43	918.95 ± 461.58
Ab-TG, IU/ml	328.08 ± 92.91	713.45 ± 147.40	725.93 ± 136.33
25(OH)D, ng/ml	20.73 ± 3.95	12.92 ± 2.29	11.84 ± 3.40

Table 3. Indicators of cytokine status in the first group of patients, pg/ml

Indicators	AIT, euthyroidism (n = 24)	AIT, subclinical hypothyroidism (n= 25)	AIT, overt hypothyroidism (n = 25)
TNF-α	5.54 ± 0.67	6.94 ± 0.55	7.33 ± 0.40
IL-6	21.24 ± 2.00	23.79 ± 1.47	26.82 ± 0.69
IL-10	40.74 ± 1.68	43.02 ± 1.38	47.14 ± 1.95
IL-17	4.35 ± 0.34	4.99 ± 0.28	6.59 ± 0.63
IL-23	20.98 ± 1.46	24.23 ± 1.14	29.00 ± 1.34

Table 4. Indicators of cytokine status in the second group of patients, pg/ml

Indicators	AIT, euthyroidism (n = 24)	AIT, subclinical hypothyroidism (n = 24)	AIT, overt hypothyroidism (n = 25)
TNF-α	5.99 ± 0.81	7.09 ± 0.47	7.91 ± 0.39
IL-6	21.80 ± 2.27	24.21 ± 0.93	27.21 ± 0.76
IL-10	41.54 ± 1.93	43.51 ± 1.13	47.77 ± 1.55
IL-17	4.60 ± 0.47	4.90 ± 0.25	6.47 ± 0.41
IL-23	22.18 ± 1.76	23.92 ± 0.81	28.43 ± 1.13

cholecalciferol at a dose of 2000 IU/day and selenium at a dose of 100 μg/day in the first group of patients compared to the patients of the second group, against the background of the main treatment, contributed to the probable lowering the levels of interleukins, levels of TSH, Ab-TPO, Ab-TG, as well as increasing the level of 25(OH)D. In patients with euthyroidism on the background of AIT, who did not use levothyroxine, the use of myo-inositol, cholecalciferol, and selenium significantly reduced the level of TSH, compared to the second group of patients, which will allow delaying the start of hormone replacement therapy with levothyroxine.

Discussion

The aim of this study was to study the effectiveness of the use of myo-inositol, selenium and vitamin D to achieve compensation of thyroid function in women of reproductive age with autoimmune pathology. The results of the study confirm the positive effect of the use of combination treatment in women of reproductive age, which was confirmed by a significant decrease in the levels of TSH, Ab-TPO and Ab-TG in this group of patients.

Our research results correlate with modern scientific research. For example, the results of the study of S.R. Paparo et al. [11], in which 21 patients with AIT treated with myo-inositol and selenium (600 mg/83 mg) twice daily for six months, showed that after treatment, TSH levels significantly decreased in patients with an initial value of TSH in the high normal range (2.1 < TSH < 4.0), which indicates that combined treatment can reduce the risk of progression to hypothyroidism in patients with autoimmune thyroid diseases. Antithyroid autoantibody levels were found to decrease after treatment. In addition, the immunomodulatory effect was first confirmed by the fact that IL-10 levels also decreased after treatment [11].

Similar results were shown by a study by M. Nordio et al., in which the efficacy of a combination of myo-inositol and selenium in patients with subclinical hypo-

Table 5. Effectiveness of combination treatment in the first group of patients

Indicators	AIT, euthyroidism (n = 24)			AIT, subclinical hypothyroidism (n = 25)			AIT, overt hypothyroidism (n = 25)		
	Before treatment	After treatment	P	Before treatment	After treatment	P	Before treatment	After treatment	P
TSH, mIU/ml	2.69 ± 0.78	1.24 ± 0.54	< 0.05	5.34 ± 1.07	1.82 ± 0.61	< 0.05	13.46 ± 4.85	2.50 ± 0.84	< 0.05
fT_4, pmol/L	16.02 ± 3.02	16.27 ± 2.26	> 0.05	11.85 ± 0.81	15.35 ± 1.36	< 0.05	9.72 ± 0.78	12.29 ± 1.75	< 0.05
fT_3, pg/ml	3.32 ± 0.45	3.17 ± 0.36	> 0.05	3.23 ± 0.32	3.48 ± 0.28	< 0.05	3.08 ± 0.72	3.10 ± 0.59	< 0.05
Ab-TPO, IU/ml	355.41 ± 119.84	213.20 ± 102.02	< 0.05	763.40 ± 214.32	402.36 ± 138.95	< 0.05	962.30 ± 499.36	461.80 ± 171.80	< 0.05
Ab-TG, IU/ml	297.95 ± 182.00	198.95 ± 110.56	< 0.05	730.16 ± 133.70	380.96 ± 74.08	< 0.05	716.61 ± 181.70	394.44 ± 145.17	< 0.05
25(OH)D, ng/ml	21.75 ± 3.61	32.27 ± 2.45	< 0.05	12.86 ± 3.08	32.64 ± 2.83	< 0.05	11.63 ± 3.68	29.68 ± 3.14	< 0.05
TNF-α, pg/ml	5.54 ± 0.67	2.61 ± 0.74	< 0.05	6.94 ± 0.55	3.43 ± 0.47	< 0.05	7.33 ± 0.40	3.36 ± 0.32	< 0.05
IL-6, pg/ml	21.24 ± 2.00	14.03 ± 1.74	< 0.05	23.79 ± 1.47	17.29 ± 1.21	< 0.05	26.82 ± 0.69	19.78 ± 1.02	< 0.05
IL-10, pg/ml	40.74 ± 1.68	35.82 ± 1.73	< 0.05	43.02 ± 1.38	37.64 ± 1.55	< 0.05	47.14 ± 1.95	40.92 ± 1.74	< 0.05
IL-17, pg/ml	4.35 ± 0.34	3.34 ± 0.40	< 0.05	4.99 ± 0.28	4.00 ± 0.25	< 0.05	6.59 ± 0.63	5.16 ± 0.55	< 0.05
IL-23, pg/ml	20.98 ± 1.46	16.66 ± 1.29	< 0.05	24.23 ± 1.14	18.08 ± 0.67	< 0.05	29.00 ± 1.34	21.76 ± 1.03	< 0.05

Table 6. Effectiveness of combination treatment in the second group of patients

Indicators	AIT, euthyroidism (n = 24)			AIT, subclinical hypothyroidism (n = 24)			AIT, overt hypothyroidism (n = 25)		
	Before treatment	After treatment	P	Before treatment	After treatment	P	Before treatment	After treatment	P
TSH, mIU/ml	2.98 ± 0.83	2.01 ± 0.64	< 0.05	5.19 ± 0.84	2.21 ± 0.70	< 0.05	13.15 ± 3.18	2.98 ± 0.80	< 0.05
fT_4, pmol/L	15.65 ± 3.02	15.31 ± 2.17	> 0.05	12.32 ± 1.97	13.86 ± 2.03	< 0.05	9.86 ± 0.97	12.24 ± 1.39	< 0.05
fT_3, pg/ml	3.35 ± 0.29	3.26 ± 0.29	> 0.05	3.16 ± 0.25	3.21 ± 0.25	> 0.05	2.99 ± 0.25	3.34 ± 0.28	> 0.05
Ab-TPO, IU/ml	387.66 ± 179.21	325.37 ± 138.30	< 0.05	714.66 ± 200.43	524.50 ± 147.97	< 0.05	918.95 ± 461.58	695.93 ± 191.04	< 0.05
Ab-TG, IU/ml	328.08 ± 92.91	314.75 ± 145.27	< 0.05	713.45 ± 147.40	523.08 ± 123.16	< 0.05	725.93 ± 136.33	592.92 ± 121.10	< 0.05
25(OH)D, ng/ml	20.73 ± 3.95	32.21 ± 3.09	< 0.05	12.92 ± 2.29	30.86 ± 2.37	< 0.05	11.84 ± 3.40	29.20 ± 2.65	< 0.05
TNF-α, pg/ml	5.99 ± 0.81	4.85 ± 0.65	< 0.05	7.09 ± 0.47	5.44 ± 0.53	< 0.05	7.91 ± 0.39	5.87 ± 0.38	< 0.05
IL-6, pg/ml	21.80 ± 2.27	19.95 ± 2.25	> 0.05	24.21 ± 0.93	21.94 ± 0.87	< 0.05	27.21 ± 0.76	24.83 ± 0.73	< 0.05
IL-10, pg/ml	41.54 ± 1.93	40.47 ± 1.80	> 0.05	43.51 ± 1.13	40.84 ± 1.20	< 0.05	47.77 ± 1.55	44.82 ± 2.79	< 0.05
IL-17, pg/ml	4.60 ± 0.47	3.98 ± 0.39	> 0.05	4.90 ± 0.25	4.14 ± 0.19	> 0.05	6.47 ± 0.41	5.85 ± 0.38	> 0.05
IL-23, pg/ml	22.18 ± 1.76	19.17 ± 1.15	< 0.05	23.92 ± 0.81	21.54 ± 0.80	< 0.05	28.43 ± 1.13	25.85 ± 1.19	< 0.05

thyroidism was investigated. The study was designed as a double-blind randomized controlled trial. The results demonstrated the beneficial effects obtained with selenomethionine treatment in subclinical hypothyroid patients with autoantibodies (Ab-TPO and Ab-TG) present, which are further enhanced by myo-inositol co-treatment. The level of TSH significantly decreased in the group treated with selenium and myo-inositol by 31 % (4.4 ± 0.9 vs. 3.1 ± 0.6 mIU/ml, $p < 0.01$), while no changes were observed in the group treated with selenium. Ab-TPO and Ab-TG levels decreased significantly in both groups. Ab-TG decreased below the threshold value in 11 patients in the myo-inositol plus selenium therapy, versus 3 patients in the selenium monotherapy group. In patients treated with myo-inositol and selenium ultrasound results of the thyroid gland normalized [9].

Myo-inositol affects the level of TSH. In fact, inositol regulates H_2O_2-mediated iodination, and it has been demonstrated that impaired inositol metabolism can cause TSH resistance and hypothyroidism. For this reason, myo-inositol therapy can increase the amount of the second messenger, which increases the sensitivity to TSH [12]. Disrupted inositol homeostasis is correlated with a variety of conditions, including thyroid disease, polycystic ovary syndrome, fertility disorders, diabetes, metabolic and neurological disorders [13].

The IFN-γ-inducible protein 10 (IP-10, also called CXCL10) was at first recognized as an IFN-γ-induced chemokine. CXCL10 binds to chemokine (C-X-C motif) receptor 3, contributing to the pathogenesis of various autoimmune diseases, organ specific (i.e. Graves' disease and ophthalmopathy, type 1 diabetes), or systemic (i.e. mixed cryoglobulinemia, systemic lupus erythematosus, Sjogren syndrome, or systemic sclerosis). The secretion of CXCL10 by CD4+, CD8+, and natural killer depends on IFN-γ. Stimulated by IFN-γ, CXCL10 is secreted by thyrocytes. Hence, high CXCL10 levels in peripheral fluids is a marker of a T helper 1-mediated immune response [14, 15].

Patients with AIT have high serum CXCL10, in particular, it is significantly higher in the ones with a hypoechoic ultrasonographic pattern (a sign of a more severe lymphomonocytic infiltration), and in those with hypothyroidism. Therefore, it is assumed that CXCL10 could be a marker of a stronger and more aggressive inflammatory response in the thyroid, causing then thyroid destruction and hypothyroidism [17, 18].

Recent scientific studies have demonstrated the presence of pro-inflammatory interleukins 1α, 1β, 2, 4, 6, 8, 10, 12, 13, 14, TNF-α and IFN-γ in follicular cells of the thyroid gland. The results of the study by F. Esfahanian et al. demonstrate a significant increase in the level of IL-17 in the serum of patients with autoimmune thyroiditis, which indicates the significant role of this cytokine in the pathogenesis of the disease [19]. The study of L. Siemińska et al. showed a significant increase in the level of IL-6 in patients with AIT compared to the control group [20]. In addition, R.C. Marchiori et al. showed that the level of IL-6 is increased in patients with uncompensated hypothyroidism on the background of an autoimmune disease and gradually decreases after treatment [21].

In our research the positive effects of combination treatment with the use of myo-inositol, vitamin D and selenium were confirmed by a significant decrease in the levels of IL-6, IL-17, IL-23, IL-10, which correlates with the data of modern scientific research. However, the results need to be confirmed by larger studies and clinical trials, as well as further elucidation of the biochemical mechanisms that would prove that myo-inositol treatment is a convincing approach for the treatment of subclinical AIT and hypothyroidism.

Conclusions

Among 147 examined patients with autoimmune thyroiditis, vitamin D deficiency was detected in 118 of them (80.27 %). Insufficiency or deficiency of vitamin D was determined depending on thyroid gland dysfunction on the background of autoimmune thyroiditis.

In patients with autoimmune thyroiditis, abnormalities in cytokine status were detected, and they were more pronounced in the group of women with hypothyroidism on the background of autoimmune thyroiditis.

The administration of myo-inositol, vitamin D, and selenium drugs had a combination effect on the reduction of cytokine status indicators, Ab-TPO and Ab-TG levels, which contributed to the compensation of the main disease.

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Information about authors
N. Pasyechko, MD, PhD, Professor, Head of the Department of Internal Medicine 1, I. Horbachevsky Ternopil National Medical University, Ternopil, Ukraine; e-mail: pasyechko@tdmu.edu.ua; https://orcid.org/0000-0002-2081-4269
V. Kulchinska, Graduate Student of the Internal Medicine Department 1, I. Horbachevsky Ternopil National Medical University, Ternopil, Ukraine, e-mail: v.m.kulchinska@gmail.com; https://orcid.org/0000-0003-2048-7576

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Пасєчко Н.В., Кульчінська В.М.
Тернопільський національний медичний університет імені І.Я. Горбачевського, м. Тернопіль, Україна

Вплив комплексного застосування міоінозитолу, вітаміну D та селену на цитокіновий статус в жінок репродуктивного віку з автоімунним тиреоїдитом

Резюме. ***Актуальність.*** Останніми роками в Україні та інших країнах світу спостерігається збільшення частоти тиреопатій автоімунного генезу. Значну роль у патогенезі автоімунного тиреоїдиту (АІТ) відіграють цитокіни, продукція яких значно підвищується при імунопатологічних реакціях. ***Мета дослідження***: вивчити вплив комплексного застосування міоінозитолу, вітаміну D і селену на цитокіновий статус жінок з еутиреозом, субклінічним гіпотиреозом і явним гіпотиреозом на тлі автоімунного тиреоїдиту. ***Матеріали та методи.*** Під спостереженням перебувало 147 жінок віком 18–43 роки з АІТ і 30 жінок контрольної групи. Хворі першої групи (n = 74) додатково до основного лікування отримували міоінозитол у дозі 2000 мг/добу, холекальциферол 2000 МО/добу та селен 100 мкг/добу. Пацієнти другої групи (n = 73) додатково до основного лікування отримували лише холекальциферол у дозі 2000 МО/добу та селен 100 мкг/добу. Функціональний стан щитоподібної залози вивчали шляхом визначення рівнів тиреотропного гормону, вільного тироксину, вільного трийодтироніну, антитіл до тиреоїдної пероксидази (АТ-ТПО) і антитіл до тиреоглобуліну (АТ-ТГ). Стан системного та місцевого запального процесу оцінювали за показниками фактора некрозу пухлини α, інтерлейкінів 6, 10, 17 та 23. ***Результати.*** Слід зазначити, що в усіх хворих на АІТ виявлено зміни цитокінового статусу, при цьому певні відмінності спостерігалися залежно від клінічного варіанта автоімунного захворювання щитоподібної залози. Через три місяці лікування хворих першої групи препаратами міоінозитолу в дозі 2000 мг/добу, холекальциферолу 2000 МО/добу та селену 100 мкг/добу, а також пацієнтів другої групи лише препаратами холекальциферолу в дозі 2000 МО/добу та селену 100 мкг/добу виявлено вірогідну різницю між показниками в обох досліджуваних когортах. ***Висновки.*** Призначення препаратів міоінозитолу, вітаміну D, селену комплексно впливало на зниження показників цитокінового статусу, рівнів АТ-ТПО та АТ-ТГ, що сприяло компенсації основного захворювання.

Ключові слова: автоімунний тиреоїдит; міоінозитол; вітамін D; селен; цитокіновий статус