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Dynamics of biochemical indicators of patients with climacteric syndrome associated with hypothyroidism under the influence of complex therapy with application of physiotherapeutic methods of treatment

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Abstract

Treatment with estrogen of various forms of climacteric syndrome, according to modern guidelines, is etiopathogenetically grounded. At the same time, the use of estrogen monotherapy in women with thyroid disease, along with the reverse development of clinical symptomatology of the climacteric syndrome, stabilization of the parameters of the autonomic nervous system, does not affect the parameters of thyroid homeostasis. The purpose of the study is comparing the effectiveness of complex treatment methods for climacteric syndrome of patients with concomitant hypothyroidism, by analyzing biochemical parameters before and after complex therapy using physiotherapeutic methods of treatment. 62 patients aged 45 – 55 years with a climacteric syndrome and concomitant hypothyroidism were examined. In order to compare the effectiveness of the treatment methods used in the study, the patients were divided into 2 groups. The 1st group (28 patients) with hypothyroidism on the background of climacteric syndrome who received only baseline therapy. Group 2 consists of 34 patients who, in addition to basic therapy, received physical therapy (ultrasound therapy and contrast baths 2 times / week for 2 months). Comparing the overall treatment efficacy of both groups of patients, it turned out that the effectiveness of the baseline therapy was 42.9%, with the use of complex with the use of physiotherapy treatments – 76.5%. At the same time, when using basic therapy, 35.7% of patients did not observe an objective improvement of the condition, and 21.4% even a slight deterioration. The group of patients receiving combined treatment with contrast baths and ultrasound therapy, showed much better rate of patients who completed the treatment without objective changes – 17.6%, as well as those with somewhat deteriorated status – 5, 9%. During the examination of patients with climacteric syndrome and concomitant hypothyroidism, we observe an increase in all researched biochemical parameters of the blood prior to the completion of two courses of complex therapy. In assessing the dynamics of biochemical indicators after two treatment cycles, there was a tendency for the indexes to decline in both treatment groups, but in the group with the use of integrated treatment methods, the rates were closer to the normative values.

Keywords: Climacteric syndrome, hypothyroidism, complex therapy, physiotherapeutic methods

Introduction

As you know, a modern woman one third of life lives after the onset of menopause [7]. This problem is particularly acute in our country, where women over the age of 50 make up more than a third of the female population and almost a fifth of the total population as a whole [6].

The physiological flow of climacterium is characterized by normal adaptation processes and is not accompanied by a deterioration in the general condition of a woman [5]. Pathological climax, the frequency of which reaches 60%, is accompanied by vascular, endo

Crine-metabolic and neuropsychiatric disorders. In addition, his rejuvenation and overburdening of disorders from the internal organs, which contributes to the development of somatic pathology and significantly reduces the quality of life [13]. Today, pathological climax is considered as multifactorial disease, in the development of which the leading role is played by disorders of autonomic and hormonal regulation, reducing the adaptive reserves of the hypothalamus and its lack of adaptability to the functioning of the hypothalamic-pituitary-ovarian system in the changed conditions [14].

In recent years, new indicators associated with the thyroid gland (thyroid gland), in particular hypothyroidism [2], have been included as additional factors in the already known factors of risk of the pathological course of the menopause (overweight, lability of arterial pressure, burden of heredity, metabolic disorders, etc.). It was found that the peak incidence of thyroid

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disease among women falls on the age after 40 years and coincides with the appearance of dys hormonal disorders associated with the climacteric [12]. In addition, women today have a clear tendency to decrease the functional activity of the thyroid gland and its compensation reserves, which is primarily due to unfavorable environmental factors, since a significant part of the territory of Ukraine is endemic in the areas of the horn, as well as the consequences of the Chernobyl accident [8].

Thyroid hormones maintain a certain level of metabolism in the body, their age decreases leads to serious metabolic changes: lipid metabolism, atherosclerosis, vascular insufficiency, etc. [3].

Hypo function of the thyroid gland has a specific effect on the clinical course of the climacteric syndrome, which becomes earlier ($42,4 \pm 1,5$ years), the prevalence of the total frequency of the main symptoms (fever, sweating, sleep disturbance, paresthesia, emotional instability, depressive mood and weakness, fluctuations in blood pressure, headache, etc.). Endocrinological changes among patients with climacteric syndrome on the background of hypothyroidism are characterized by more pronounced dys hormonal disorders [9]. The peculiarity of climacteric syndrome among women with hypothyroidism is the prevalence of moderate and severe forms, which significantly exceeds this figure in patients of the corresponding age without thyroid disease and indicates the pathogenetic role of thyroid homeostasis disorders in the context of hypothyroidism in the development of climacteric disorders. In the clinical picture predominate vegetative-vascular and psycho-emotional symptom-complexes. This is due to a decrease in the vegetostabilizing effect of thyroid hormones with a corresponding increase in sensitivity to deficiency of sex steroids. The severity of the climacteric syndrome is in direct relation to the TTG [4, 10].

Treatment with estrogen of various forms of climacteric syndrome, according to modern guidelines, is etiopathogenetically grounded [16]. At the same time, the use of estrogen monotherapy in women with thyroid disease, along with the reverse development of clinical symptomatology of the climacteric syndrome, stabilization of the parameters of the autonomic nervous system, does not affect the parameters of thyroid homeostasis. The appointment of estrogen-progestogen therapy among these patients, reducing the severity of the climacteric syndrome, also contributes to the stabilization of thyroid homeostasis [4]. However, among the women with hypothyroidism, the issue of complex (thyroid hormones and sex steroids) substitution hormonal therapy remains unclear [15].

In addition, in 43% of cases, substitution hormone therapy has side effects that greatly impair the patient's condition, which dictates the need to search for new, both drug and non-medicated treatments [1]. Using complex physical therapy programs can prevent the development of age-related changes in the body, reduce manifestations of menopause syndrome and improve the quality of life of women [11].

Thus, despite a large number of scientific publications on the problem of climacteric syndrome, all issues cannot be considered completely resolved. Especially in our opinion, this concerns the research of mechanisms of mutual influence of thyroid disorders and hormonal dysfunction of the pituitary-ovarian system during menopause, features of the clinical course of climacteric disorders in women with thyroid hypo function and the possibilities of their adequate correction, including means of complex substitution hormonal

therapy with using physiotherapeutic methods of treatment. Such an approach will significantly reduce the frequency and degree of severity of vegetative and psycho-emotional violations on the background of simultaneous changes in endocrinological status and disorders of homeostasis.

Purpose

To compare the effectiveness of complex treatment methods for climacteric syndrome of patients with concomitant hypothyroidism, by analyzing biochemical parameters before and after complex therapy using physiotherapeutic methods of treatment.

Materials and methods of research

62 patients aged 45 - 55 years with a climacteric syndrome and concomitant hypothyroidism were examined. Duration of hypothyroidism - from 1 to 5 years, on average ($3,8 \pm 0,4$ years). Patients received substitution therapy with L - thyroxine.

In order to compare the effectiveness of the treatment methods used in the study, the patients were divided into 2 groups.

In the 1st group (28 patients) with hypothyroidism on the background of climacteric syndrome who received only baseline therapy in accordance with the National Consensus on the management of patients in the climacteric population (hereinafter referred to as "basic therapy").

Group 2 consists of 34 patients who, in addition to basic therapy, received physical therapy (ultrasound therapy and contrast baths 2 times / week for 2 months).

Clinical examination included complaints of patients and anamnesis of the disease; objective data and gynecological examination. Also, the data of ambulatory and stationary maps, extracts from the history of the disease, determination of biochemical and hormonal parameters of blood, results of special methods of examination were taken into account.

Physiotherapeutic methods of treatment can be widely used both for the reduction of symptoms of climacteric syndrome and for the treatment of endocrine disorders. Scientific research and clinical practice have shown that treatment in the early stages of the development of climacteric syndrome positively affects the quality of life of women in subsequent years.

Method of conducting contrast baths: cold water temperature $24-22^{\circ} \text{C}$, hot $38-39^{\circ} \text{C}$, temperature contrast - $12-15^{\circ} \text{C}$. The ratio of patients' staying in hot and cold water during the procedure was 1 and 3 minutes. The number of procedures is 10-12.

After 40-60 minutes after the bath, an ultrasound therapy session with U.S.T. 1.01F apparatus with a frequency of 880 kHz in pulsed mode (10 msec) was paravertebral to the thoracic and cervical spine of the spine with an intensity of $0.2-0.4 \text{ W} / \text{cm}^2$ for 5 minutes on the field. The procedures were carried out in accordance with the lab method, the contact environment "Ultragel", the course was prescribed 10-12 procedures daily.

A comparative analysis of the biochemical parameters of blood in the examined patients with COP and concomitant hypothyroidism, before and after a certain type of treatment, comparison of indicators with each other and with norms.

Individual glyceemic control was performed using the One Touch Basic Plus Express Express (Johnson and Johnson, USA), CHEKMATE (Caskade Medical inc., USA), Elite. (Bayer, Germany)The glycosylated hemoglobin (HbA1c) was

determined by the ion exchange method using commercial test kits Glyco-chemoglobin HbA1-test No. 10657 or 10658, control serum No. 10259 Human in Germany, on the Beckman US DH-7 spectrophotometer.

Serum electrolytes (K^+ , Ca^{2+}) were investigated using standard spectrophotometry. Concentration of cytosolic Ca^{2+} (in blood leukocytes) was investigated by luminescent microscopy. Cholesterol was determined on serum from KFK-2MP (Russia). The glucose content in the peripheral blood was examined by a standardized glucose oxidant method for the oxidation of ortho-toluidine.

The activity of total alkaline phosphatase (ZLF), expressed in OD/L, was determined in the biochemical analyzer Co-BAS-MIRAS (Switzerland).

The standards of biochemical laboratories were used as standard indicators in analyzing the results of laboratory studies.

The statistical processing of the obtained results is carried out in the statistical package "STATISTICA 6.1" using parametric and non-parametric methods for evaluating the obtained results.

Results of the study and its discussion

By comparing the data of the biochemical study of patients with concomitant hypothyroidism before and after treatment, we can conclude that none of the laboratory parameters met the norm before the appointment of therapy. Indicators of carbohydrate metabolism, namely the level of glucose in the blood and HbA1c, exceeded the norm in both groups.

Also, the difference between the value of the atherogenic index and the activity of the total alkaline phosphatase in the blood was significant. A decrease in the concentration of ionized calcium was noted, while the level of cytosolic calcium was significantly increased.

Thus, analyzing the initial data, we can see that the patients with perimenopause with concomitant hypothyroidism of the thyroid gland manifested significant metabolic changes that affected the carbohydrate, lipid and mineral metabolism. These changes are obviously related to the hormonal reorganization characteristic of the menopause and associated hypothyroidism.

The results of the use of basic therapy and integrated with the inclusion in the treatment of physiotherapeutic treatment in patients with climacteric syndrome and associated hypothyroidism are given in Table 1.

Table 1: The results of the use of basic therapy and integrated with the inclusion in the treatment of physiotherapeutic treatment in patients with climacteric syndrome and associated hypothyroidism

Indicator, norm	Groups			
	1 (n=28)		2 (n=34)	
	1 course	2 course	1 course	2 course
Glycemia mmol/l	5,5±0,20	5,1±0,21	5,6±0,24	5,2±0,18
4,7±0,39	5,0±0,17	5,0±0,19	5,1±0,16	4,7±0,11
HbA1c%	5,2±0,24	5,4±0,21	5,7±0,18	5,5±0,13
5,2±0,17	5,0±0,16	5,5±0,35	5,4±0,11	5,1±0,12
Atherogenic index	5,7±0,11	5,0±0,12	5,4±0,15	4,9±0,16
4,1±0,07	4,9±0,14	4,5±0,09	4,8±0,11	4,3±0,12
Ca^{2+} -ion	0,76±0,02	0,83±0,03	0,86±0,04	0,94±0,02
mmol/l 1,21±0,03	0,84±0,05	0,91±0,06	0,92±0,07	1,01±0,05
Ca^{2+} cyt	46,2±2,4	45,5±2,1	45,9±2,4	44,0±2,1
mmol/l 42,9±3,28	44,9±2,6	44,4±1,9	43,7±2,5	41,5±1,9
K^+	5,2±0,1	4,7±0,13	5,0±0,10	5,1±0,13
mmol/l 4,2±0,37	4,7±0,3	4,6±0,09	4,4±0,08	4,4±0,08
ZLF	106,7±7,1	107,5±6,8	108,9±4,5	99,5±6,5
od/l 75,8±5,12	107,3±6,4	101,2±5,1	100,5±6,1	97,4±6,6

The assessment of the dynamics of biochemical parameters showed that reduction of glycemia was observed in both groups of patients. But nevertheless only the second group (4.7 ± 0.11) mmol / l, managed to reach the indicators corresponding to the regulatory value (4.7 ± 0.39) mmol / liter. Glycosylated hemoglobin also decreased in both groups (5.5 ± 0.35) and (5.1 ± 0.12) %, and also in the group with the use of physiotherapeutic methods of treatment, it reached norm. The tendency to decrease the index of atherogenic index was recorded in all observation groups, but none of the groups (4.5 ± 0.09) and (4.3 ± 0.12) failed to reach the normal level. The increase in Ca^{2+} -ionized was not reliable in all patients and was (0.91 ± 0.06) and (1.01 ± 0.05) mmol / l. Reductions in Ca^{2+} -cytosolic were observed in both treatment groups, but a significant reduction was observed in patients in the second group (41.5 ± 1.9), against (44.4 ± 1.9) nmol / l, in group 1. Under the influence of both the rates of treatment significantly decreased K^+ , but did not reach the norm in any treatment group. Significant dynamics of activity of total alkaline phosphatase of blood under the influence of the courses of treatment was not revealed. Yet in the second

group the indicator was closer to the norm.

Comparing the overall treatment efficacy of both groups of patients, it turned out that the effectiveness of the baseline therapy was 42.9%, with the use of complex with the use of physiotherapy treatments - 76.5%. At the same time, when using basic therapy, 35.7% of patients did not observe an objective improvement of the condition, and 21.4% even a slight deterioration. The group of patients receiving combined treatment with contrast baths and ultrasound therapy, showed much better rate of patients who completed the treatment without objective changes - 17.6%, as well as those with somewhat deteriorated status - 5, 9%.

Conclusion

During the examination of patients with climacteric syndrome and concomitant hypothyroidism, we observe an increase in all researched biochemical parameters of the blood prior to the completion of two courses of complex therapy.

2. In assessing the dynamics of biochemical indicators after two treatment cycles, there was a tendency for the indexes to decline in both treatment groups, but in the group with the use

of integrated treatment methods, the rates were closer to the normative values.

3. The overall effectiveness of the underlying therapy for climacteric syndrome with concomitant hypothyroidism was 42.9% of the women under research, with 35.7% of the patients having no objective improvement, and 21.4% of patients had some kind of deterioration in their well-being.

4. The effectiveness of integrated treatment with contrast baths and ultrasound therapy was more successful. Of the 34 patients who received comprehensive treatment at 76.5%, the general condition and biochemical parameters improved significantly, in 17.6%, the general condition and indices did not change and 5.9% of the patients had negative treatment outcomes.

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