

Neurotransmitter Content in Women with Polycystic Ovary Syndrome

Simrok VV^{1*} and Melnikova DV²

¹Rostov State Medical University, Russia

²Clinic "Lifeline", Russia

***Corresponding Author:** Simrok VV, Department of Obstetrics and Gynecology No. 1, Rostov State Medical University, Russia.

Received: July 26, 2022; **Published:** January 25, 2023

Abstract

Women with PCOS develop disorders of the opioid system, which is manifested by changes in the level of beta-endorphins in the blood plasma of these women. The duration of PCOS affects the level of beta-endorphins in blood plasma: in the first phase of the disease, there is an increase in endorphins (duration from 1 to 5 years), in the second phase (duration of PCOS more than 5 years), the neurotransmitters system is depleted and the level of endorphins decreases.

Keywords: Neurotransmitters; Endorphins; Polycystic Ovary Syndrome

Statement of the problem in a general form and its connection with important scientific or practical tasks

Polycystic ovary syndrome (PCOS) is a pathology of the structure and function of the ovaries, the main criteria for which are chronic anovulation and hyperandrogenism. The incidence of PCOS is almost 30% among patients of gynecologists-endocrinologists, and in the structure of endocrine infertility reaches 75%. PCOS is a multifactorial pathology, possibly genetically determined, in the pathogenesis of which central mechanisms of pituitary gonadotropic function (from puberty), local ovarian factors, extra-ovarian endocrine and metabolic disorders determine clinical symptoms and morphological changes in the ovaries are involved [1,2]. Neuropeptides play an important role in the regulation of hypothalamic-pituitary function. It has been shown that women with impaired reproductive function have disorders of neuropeptides [3]. Therefore, the study of any link in the hypothalamic-pituitary-ovarian axis in PCOS is relevant and will make a significant contribution to solving the problem of reproductive health in women with PCOS.

Analysis of recent research and publications

The body's neuropeptide system is the most important control system. It is well known that endorphins are "pleasure hormones". They are the main link in the body's analgesic system. Their involvement in immune regulation and regeneration is less well known. There is even less data on their effect on the associative-dissociative processes of the central nervous system [3]. Hypothalamic β -endorphin is secreted into the portal system in measurable amounts, and this secretion increases under the influence of estrogens and progesterone. In addition, this neuropeptide performs tonic inhibition of pulsed secretion of gonadotropin-releasing hormone. Impaired endorphin secretion can cause both mood and behavior disorders, as well as psychogenic diseases in combination with reproductive system dysfunction [3].

Parts of the overall problem are not solved

According to T. V. Ovsyannikova [1], PCOS is still a mystery and has many unresolved questions regarding the diagnosis and treatment of this pathology. Previously, we found [4-6] that patients with PCOS on the reader scale have a high level of psychoemotional stress, sub-depressions and depressions. Therefore, there is a need to study the mechanisms of these disorders. Given the close interaction of all parts of the hypothalamic-pituitary-ovarian system, it becomes necessary to study the state of endorphins in PCOS.

Aim of the Study

The aim of our study was to study the plasma levels of β -endorphin in women with polycystic ovary syndrome.

Materials and Methods

To achieve this goal, we examined 31 women with PCOS aged 18 to 35 years. The control group consisted of 20 healthy women of the same age in the same population. The diagnosis of PCOS was made on the basis of characteristic clinical data and transvaginal ultrasound, in accordance with the resolution adopted in Rotterdam [2]. In addition to detailed clinical examinations, we performed plasma determination of co-endorphin. Blood sampling for the study was performed on an empty stomach, in the morning, in the supine position.

The level of endorphins was determined using peninsula, S-1134 (EIAH-8616) test systems using the MSR-1000 photometer device (No. 1006, Syntron, wavelength range 405-650 Nm.). The research was performed in the Endocrinology Laboratory of the PAG Institute of the National Academy of Medical Sciences of Ukraine. The obtained data was processed using the variational statistics method (version 5.5).

Research Results and their Discussion

Studies have shown that the level of po-endorphin in the blood plasma of healthy women ranges from 0.41 to 1.73 ng/mL, and on average is 0.77 ng/mL. When determining the level of endorphins in women with PCOS, we divided the main group into two subgroups, depending on the duration of PCOS. The first subgroup (A) included 15 women with a disease duration of up to 5 years, the second subgroup (B) consisted of 16 women with a PCOS duration of more than 5 years. Studies have shown that in women of group 1A, the level of K-endorphin significantly exceeded the level of healthy women and ranged from 0.43 to 2.1 ng/mL, and on average was 0.98 ng/mL. In women who were ill for more than 5 years (group 1b), the level of C-endorphin was significantly lower than in healthy women and even more different from the level in women in Group 1A (0.46 ng/mL). The obtained data are shown in the table 1.

Statistical indicators studied	Groups of respondents		
	Healthy women	1A	1B
Number of patients	20	15	16
Median (Me)	0,77	0,98	0,46
Minimum (Min)	0,41	0,43	0,40
Maximum (Max)	1,73	2,1	0,63
25th percentile (Q25)	0,525	0,60	0,425
75th percentile (Q75)	1,085	1,30	0,485
Shapiro-Wilcoxon Ratio (ShapiroWilk,W)	0,874	0,806	0,888
Mana-Whitney U-test Comparison groups (U;p)	(Healthy -1A) U = 33,6; p < 0,00014	(1A - 1B) U = 15,5; P < 0,000036	(1B-healthy) U = 38,5; p < 0,00011

Table 1: Plasma levels of β -endorphin in women with PCOS.

Given that the endorphin system plays an important role in activating the body during the stress response and countering the negative effects of stress, we regard the data obtained in women of the first a-group (increased endorphin levels) as a stress response. In the literature, there is an indication that an increase in beta-endorphins in blood plasma is inherent in various stressful effects: surgical, anesthetic, hypoxic, fasting, electroconvulsive therapy [7].

From this point of view, it is difficult to assess the indicators obtained in women of the first B-group, who have already been treated for more than 5 years, and have low levels of endorphins. In our opinion, such a reaction of the opioid system could occur in the absence of adequate therapy and depletion of the neuropeptide system.

Previously obtained data on some features of the clinical course of PCOS [4-6], can be estimated from the point of view of the imbalance of the neurotransmitter system in these women. Especially considering their role in the regulation of extrapyramidal, limbic systems and neuroendocrine functions. It is possible that the research we are conducting will help solve some medical and psycho-biological problems in PCOS.

Conclusion

1. Women with PCOS develop impaired functioning of the neurotransmitter system, which is manifested by changes in the level of beta-endorphins in the blood plasma of these women.
2. The duration of PCOS affects the level of beta-endorphins in blood plasma: in the first phase of the disease, there is an increase in endorphins (duration from 1 to 5 years), in the second phase (duration more than 5 years), the opioid system is depleted and the level of endorphins decreases.

Prospects for Further Research

In this area are to study the correlation links between neurotransmitter disorders and hormonal imbalance in women with PCOS.

The results obtained can be used to assess the mental health of women with PCOS, infertility, and unrealized motherhood syndrome. Insufficient or increased production of neurotransmitters leads to negative consequences, this phenomenon continues to be studied [8].

Bibliography

1. Ovsyannikova TV. "Polycystic ovary syndrome as a cause of reproductive dysfunction". *Russian Medical Journal* 7.7 (2000): 7-11.
2. Trumpolskaya AV. "Polycystic ovary syndrome: a modern concept, treatment and induction of ovulation". *Women's Health* 3 (2003): 150-152.
3. Reproductive endocrinology: In 2 volumes/Edited by S. S. K. Yen, R. B. Jaffe; Translated from the English by V. I. Kandror, R. M. Parkhovich; Edited by I. I. Dedov. M.: Medicine 22.1 (1998): 701.
4. Suprun ES and VV Simrok. "Analysis of the psychoemotional state of adolescent girls with polycystic ovary syndrome". *Bukovinsky Medical Journal* 8.4 (2004): 114-116.
5. Suprun ES. "Analysis of the quality of life of women of reproductive age with polycystic ovary syndrome". *Ukrainian Medical Almanac* 7.2 (2004): 156-157.
6. Simrok VV and Suprun ES. "The state of the endorphin system in women with polycystic ovary syndrome". Problems of reproduction. Special issue. Materials of the I International Congress on Reproductive Medicine. Moscow (2006): C134-135.

7. Aboud Th K., *et al. American Journal of Obstetrics and Gynecology* 8 (1988): 927-930.
8. Mitterauer B. "Imbalance of Glial-Neuronal Interaction in synapses: a possible Mechanism of the Pathophysiology of Bipolar Disorder". *Neuroscientist* 10 (2004): 199-206.

Volume 12 Issue 2 February 2023

©All rights reserved by Simrok VV and Melnikova DV.