On the basis of the binding parameters of peptide 2438 it can be hypothesized that the peptide receptor is a low-affinity binding site for IF-α. This hypothesis will be tested in further investigations.

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Pathogenetic Factors of Menstrual Function Disturbances in Women with Pathological Puberty

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A correlation is shown between the peculiarities of puberty and clinical and laboratory parameters during reproductive period. Differences in the state of receptor apparatus in ovaries of examined patients attest to different pathogenesis of menstrual function disturbances with and without mild virilization in anamnesis. The patients with mild virilization and changed pattern of menstrual disturbances probably reflecting desensitization of the endometrium to hormone stimulation have the worst prognosis.

Key Words: *puberty; menstrual function*

The majority of endocrine gynecological disorders is formed during puberty [1,3]. There are several reports on the state of the reproductive system in women with menstrual disturbances at puberty [2,4]. However, in the available literature we found practically no data on the pathogenesis of gynecological disorders as an outcome of pathological puberty. Hence, the objective of the present study was to determine the clinicolaboratory parameters allowing one to reveal the peculiarities of the pathogenesis gynecological disorders depending on the course of puberty.

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MATERIALS AND METHODS

We analyzed the data on complex dynamic examination of 32 women aged 22-34 with a history of menstrual disturbances at puberty. Group 1 comprised 21 patients with disorders of menstrual function: 12 patients with oligomenorrhea-amenorrhea and 9 with dysfunctional uterine bleeding with signs of mild virilization. Group 2 consisted of 11 patients with dysfunctional uterine bleeding without virilization.

The examination included analysis of anamnestic and clinical data, measurement of plasma steroid hormones, endometrial hysteroscopy and biopsy, laparoscopy with ovarial biopsy, and morphological examination of the obtained specimens. The contents of steroid hormone receptors in the specimens were

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measured by competitive radioligand method with separation on dextran-coated charcoal.

RESULTS

Examination of patients of group 1 revealed the following disorders of menstrual function: amenorrhea (3), oligomenorrhea (11), acyclic bleeding (6), and one woman had regular menstrual cycle; transformation of the type of disturbances in comparison with those occurring in puberty was recorded in 6 patients. Hormonal profile was characterized by hypoestrogenism — serum estradiol 65.0 (56.7-81.6) pg/ml, low level of progesterone 0.91 (0.6-1.4) ng/ml; hyperandrogynism of the ovarian-adrenal origin (from the data of hormone tests) — serum testosterone 1.3 (1.0-1.4) ng/ml; cortisol was within normal. In 16 patients, laparoscopy and morphological examination of biopsy specimens revealed the signs of sustained anovulation. Histological study of the endometrium showed defective stage of secretion in 3 patients, stage of proliferation against the background of delay in menses in 2 patients, glandular and cystic glandular hyperplasia in 7, and adenomatous hyperplasia in 9 patients.

Patients of group 2 either had no menstrual cycle disturbances at the time of examination (2) or had oligomenorrhea (3) or dysfunctional uterine bleeding (6). The level of estradiol was within normal or slightly elevated: 94.9-127.3 (108.4) pg/ml; the content of progesterone was decreased compared with the norm: 2.4 (1.6-3.5) ng/ml; the mean level of androgens did not differ from the normal: testosterone 0.7 (0.6-0.75) ng/ml; cortisol was normal. Laparoscopy and histological examination of ovarian biopsy revealed follicular cysts in 6 cases and the signs of sustained anovulation in 4 cases. Morphological study of the endometrium showed the stage of secretion in 3 cases, in one woman the stage of proliferation and a glandular polyp were found, 6 patients had glandular and cystic glandular hyperplasia, and one patient had adenomatous hyperplasia.

The receptor binding assay revealed the absence of estrogen receptors in the ovaries of group 1 patients. Progesterone receptors were found in 15 of 16 patients, the mean level of progesterone receptors was 93.6±25 fmol/mg protein; androgen receptors were detected in 12 women (15.2±3.6 fmol/mg protein), and glucocorticoid receptors were identified in 13 patients (23.4±8.5 fmol/mg protein).

The content of steroid receptors in group 2 considerably differed from that in group 1. Estrogen receptors were found in 7 out of 10 patients (6 of these patients had follicular cysts; in 2 cases estrogen receptors were found only in the cyst, and in 4 cases they were present both in the cyst and in the other ovary). The mean level of estrogen receptors was 16.4±4.3 fmol/mg protein. Progesterone receptors were detected in all patients; their mean level was 90.1±22.4 fmol/mg protein and did not differ from that in group 1. Androgen receptors were found only in one woman, and glucocorticoid receptors were found in 2 patients.

When comparing the data on the content of receptors in the endometrium, we established the following relationships. Progesterone receptors solely (119.6±32.1 fmol/mg protein) were found in 9 women (5 of them were from group 1 and 4 were from group 2). This coincides with the stage of either secretion (6) or proliferation of the endometrium (3). It should be noted that at the moment of examination 3 women had regular menstruations and in 6 women menstrual cycle was spontaneously restored without hormone correction.

Histological examination of endometrial biopsy in 7 patients from group 2 (without virilization) and in 8 patients from group 1 (disturbances of menstrual function was noted in all patients) revealed proliferation stage in 2 patients, glandular and cystic glandular hyperplasia in 9 patients, and adenomatous hyperplasia in 4 patients. Apart from progesterone receptors (218±26.8 fmol/mg protein), the endometrium expressed receptors for estrogens (36.5±12.7 fmol/mg protein), androgens (14.3±2.5 fmol/mg protein), glucocorticoids (24.3±9.7 fmol/mg protein) in various combinations. In patients of group 1, only temporary or no spontaneous recovery of the menstrual cycle occurred even after biopsy of ovaries. This state should be corrected by hormone therapy (a satisfactory effect was noted).

The patients in whom no receptors were found in the endometrium had the worst prognosis. This group consisted of 8 patients from group 1, in 7 of them the type of menstrual function disturbances has changed in comparison with puberty: oligomenorrhea transformed into acyclic bleedings and vise versa. Histological examination of the endometrium revealed glandular and cystic glandular hyperplasia in 3 and adenomatous hyperplasia in 6 women. These pathological changes were practically resistant to hormone therapy.

These findings attest to a necessity of specific approaches in the treatment of disturbances of menstrual functions depending on the peculiarities of the pathological process during puberty. There is an obvious interrelationship between peculiarities of puberty and clinical and laboratory parameters during the reproductive period. The observed differences in the state of the ovarian receptor apparatus imply different mechanisms of menstrual disorders in patients with and without mild signs of virilization in the anamnesis. The level of receptors in the endo-

metrium is an important prognostic parameter. As follows from our data, the patients with mild virilization and transformation of the type of menstrual disturbances, which probably reflects desensitization of the endometrium to hormonal stimulation, have the highest risk of severe endometrial pathologies.

Thus, complex examination of women with menstrual disturbances provides new insights into pathogenesis of gynecological disorders and allows one to develop new strategy of the treatment of these disorders.

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Biological and Clinical Effects of Violet and Blue Light

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Biological and clinical effects of violet and blue light are described. Effect of photohemotherapy is evaluated in 31 patients with chronic arterial insufficiency of the lower extremities caused by atherosclerosis.

Key Words: *violet light; blue light; photohemotherapy*

Violet and blue light (VL and BL) are an electromagnetic irradiation with wavelength ranging within 380-440 and 440-495 nm, respectively.

Although the energy of VL and BL photons is much lower than that of γ-, x-, and UV-radiation, VL and BL exert strong biological effects due to numerous photoreceptors occurring in biological objects. One of them, riboflavin, is an integral part of the most important enzymes. It is a constituent of flavin nucleotides, prosthetic groups of dehydrogenases which absorb BL (450 nm). The final electron acceptor for the flavin-dependent dehydrogenases is the VL absorbing cytochrome system: cytochrome *b* (429 nm), cytochrome *c* (418 nm), cytochrome c_1 (415 nm), and cytochrome *a* (429 nm). The absorption of VL is due to iron-porphyrin prosthetic groups. Thus, the energy of VL and BL is absorbed by the energy-synthesizing system.

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The second group of VL and BL-absorbing compounds includes all forms and derivatives of hemoglobin and bilirubin. Thus, blood, which is extremely rich with these compounds, intensely absorbs BL and VL in the so-called Soret band.

The third large group of BL- and VL-absorbing substances is presented by carotenoids whose functions remain poorly understood. For instance, carotenoids of heart homogenate absorb at 450 nm, carotene at 440 nm, and neurosporine at 416 and 470 nm.

Studies of the biological effects VL and BL on various organisms (tadpoles, frogs, salamander embryos, fly larvae, trout eggs, piglets, etc.) have demonstrated their pronounced ability to stimulate metabolism, growth, and development [3,4]. It has been established that VL induces the maximum activation of vital processes accompanied by more perfect metamorphosis [2].

Damaging effects of BL on cell cultures have been noted. For instance, Schoroeter [19] observed accumulation of chromosome aberrations in cultured

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