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Assessment of immune-hormonal balance in women of reproductive age after urgent surgical interventions

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The majority of urgent gynecological operations are performed on patients of childbearing age, which requires the development of individualized rehabilitation therapy in view of the heterogeneity of the «acute abdomen» symptom complex
The objective: **work was to evaluate the immuno-hormonal homeostasis in women of reproductive age who underwent urgent gynecological operations in the dynamics of the six-month postoperative period.**
Materials and methods. **The studied cohort included 90 women aged 19 to 40 years. The main group consisted of 60 women who were urgently operated on for ectopic pregnancy, ovarian apoplexy, complicated ovarian neoplasm. The control group consisted of 30 women of reproductive age without somatic and gynecological pathology. The comprehensive examination included the determination of the level of 25(OH)D, estradiol, free testosterone index, follicle-stimulating and luteinizing hormone, prolactin, progesterone in blood, serum concentrations of TNF , IL10, IL8 and IL4. Examinations were carried out one and six months after surgery.**
Results. **Before this surgical intervention, premenstrual syndrome (15.0%), dysmenorrhea (28.3%), abnormal uterine bleeding (23.3%), pelvic inflammatory diseases (23.3%) were experienced by were observed in the patients of the main group. In the postoperative period, the predominant violation of the menstrual cycle was an increase in its duration in 56.7% patients. 63.3% patients after urgent gynecological operations, normogonadotropic dysfunction of the ovaries was observed, which was characterized by anovulation, insufficiency of the luteal phase against the background of ovarian blood flow disorders. Transient hyperprolactinemia (31.6±1.2 ng/m) was detected in 15.0% patients, which persisted up to 3 months after surgery. An unfavorable prognostic factor was the detection of an imbalance of pro- and anti-inflammatory cytokines in blood serum in 27.8% operated patients one month after surgery, which correlated (r=0.876) with the development of pain syndrome in half (56.0%) of this layer of women.**
Conclusions. **In the postoperative period, 56.7% of patients experience an increase in the duration of the menstrual cycle, and 13.3% of women experience a delay in menstruation of up to 3.4±1.5 months. An unfavorable prognostic factor was the detection of an imbalance of pro- and anti-inflammatory cytokines in blood serum in 25 (27.8%) operated patients one month after surgery, which correlated with the development of pain syndrome in 56.0%.**
Keywords: *immune-hormonal balance, women, reproductive age, urgent surgical.*

In the genesis of women's reproductive health disorders, the growing role of "acute gynecological diseases" is attracting attention, which, as a rule, are characterized by the presence of the "acute abdomen" symptom complex and require urgent surgical treatment [1, 6, 9, 12, 14]. The majority of urgent gynecological operations are performed on patients of childbearing age, which requires the development of individualized rehabilitation therapy in view of the heterogeneity of the "acute abdomen" symptom complex [12, 17, 18].

Three groups of gynecological diseases are conditionally distinguished: those associated with intra-abdominal bleeding (ectopic pregnancy, ovarian apoplexy, ovarian cyst rupture); associated with impaired blood supply in the organ and its necrosis (twisting of the leg of the ovarian neoplasm); pelvic inflammatory diseases [13, 21, 25, 26].

When developing rehabilitation measures after urgent surgical interventions, it should be taken into account that the majority of patients have a history of gynecological pathology (early menarche, abnormal uterine bleeding, pelvic inflammatory diseases, ovarian retention formations, previous cavity surgeries), artificial abortions, rejection from contraception, and insufficient outpatient dispensary treatment and observation [4, 5, 10, 24]. Numerous clinical studies testify to the negative impact of acute gynecological pathology on reproductive health and the implementation of reproductive function [2, 15, 16, 20].

The objective: work was to evaluate the immuno-hormonal homeostasis in women of reproductive age who underwent urgent gynecological operations in the dynamics of the six-month postoperative period.

MATERIALS AND METHODS

The studied cohort included 90 women aged 19 to 40 years. The main group consisted of 60 women who were urgently operated on for ectopic pregnancy (23), ovarian apoplexy (18), complicated ovarian neoplasm (19). The control group consisted of 30 women of reproductive age without somatic and gynecological pathology.

Ultrasound (transvaginal) examination (ultrasound) of the pelvic organs, thyroid gland, and mammary glands was performed using an ultrasound diagnostic system HDI 5000 Sono CT (Philips Ultrasound, USA) according to a standard technique in real time on days 5–6 and 18–20 of the MC [19]. The levels of estradiol (E), free testosterone index (T), follicle-stimulating hormone (FSH) and luteinizing hormone (LH), prolactin (PI), and progesterone (P) were studied on days 3–5 of MC in blood serum by an immunochemical method with electrochemiluminescence detection (ECLIA) (Cobas 6000 analyzer, Roche Diagnostics test systems, Switzerland). Serum concentrations of TNFα, IL10, IL8 and IL4 were determined by solid-phase enzyme-linked immunosorbent assay.

The evaluation of the ovarian reserve was carried out by determining the anti-Müllerian hormone (AMH) in the blood serum by the ELISA method (ELISA, IBL) (Germany) and counting the number of antral follicles (CAF) [3, 7, 8, 11, 22]. The level of 25(OH)D in blood serum was determined by an immunochemical method with chemiluminescence detection (CMIA) on an Architect i2000 analyzer (ABBOT Diagnostics test systems, USA). Examinations were carried out one and six months after surgery.

Statistical processing of the results was carried out using standard Microsoft Excel 5.0 and "Statistica 6.0" programs.

RESULTS AND THEIR DISCUSSION

The average age of the patients was 26.4±3.5 years. There was no significant difference between the formed groups in life history, social status, somatic pathology, and age (27.2±2.5 and 26.7±1.6 years, respectively, p>0.05).

Before this surgical intervention, premenstrual syndrome (9; 15.0%), dysmenorrhea (17; 28.3%), and abnormal uterine bleeding (14; 23.3%) were observed in the patients of the main group. Pelvic inflammatory diseases were experienced by 14 (23.3%) women of the main group. An ovarian neoplasm was diagnosed before surgery in 9 (15.0%) patients of the main group.

In the postoperative period, the predominant violation of the menstrual cycle was an increase in its duration (41.4±4.5 days) in 34 (56.7%) patients, in 8 (13.3%) women, the delay in menstruation after surgery was 3.4±1,5 months. The data obtained by us show that in 38 (63.3%) patients after urgent gynecological operations, normogonadotropic dysfunction of the ovaries was observed, which was characterized by anovulation, insufficiency of the luteal phase against the background of ovarian blood flow disorders. In the absence of hormonal correction, restoration of a normal biphasic menstrual cycle after 6 months was observed only in 13 (34.2%) of the examined patients.

In 11 (18.3%) patients with ovulatory MC, the insufficiency of the luteal phase was characterized by a decrease in the concentration of progesterone in blood serum (4.14±0.95 ng/ml versus 18.6±2.12 ng/ml) on day 18–20 MC and inconsistency of the structure of the endometrium. Transient hyperprolactinemia (31.6±1.2 ng/m) was detected in 9 (15.0%) patients of the main group, which persisted up to 3 months after surgery.

Surgical injury of the ovary leads to the development of disorders of innervation and blood supply to the organ, which in some patients, regardless of the type of surgical intervention, leads to a decrease in the ovarian reserve [24]. Thus, AMH indicators in 11 (61.1%) patients with the effect of surgical energies on the affected ovary were probably reduced (0.67±0.4 ng/ml) compared to controls (2.1±0.3 ng/ml) ($p<0.01$) up to the 6th month after surgery. Similar dynamics were absent in patients operated on for a broken tubal pregnancy.

Restoration of the normal menstrual cycle and reproductive function is an important factor in the postoperative rehabilitation of patients with torsion of the tumor pedicle or tumor-like neoplasm of the ovary. However, during the six-month follow-up, we established the restoration of the biphasic menstrual cycle in only 9 (47.4%) of this group of patients.

The increasingly widespread use of modern organ-preserving surgical techniques in urgent gynecological surgical interventions does not reduce the relevance of determining the scope, duration and feasibility of hormonal rehabilitation of reproductive function after surgery and prevention of relapses of acute gynecological diseases [3, 5, 7, 8, 24].

The absence of comprehensive rehabilitation therapy leads to repeated operations for broken tubal pregnancy in almost 13.5% of patients, recurrence of apoplexy and/or ovarian neoplasms occurs in 25.8% of women. An unfavorable prognostic factor was the detection of an imbalance of pro- and anti-inflammatory cytokines in blood serum in 25 (27.8%) operated patients 1 month after surgery, which correlated (r=0.876) with the development of pain syndrome in half (14; 56.0%) of this layer of women.

Thus, despite numerous studies, the question of applying effective rehabilitation measures to women who have undergone emergency surgery for acute gynecological diseases in real clinical practice remains open. This confirms the need for an in-depth analysis of the specifics of providing medical care to patients with acute gynecological diseases at the postoperative stage.

Given the heterogeneity of the symptom complex of acute gynecological pathology, the presence of common pathogenetic determinants of impaired reproductive health should be taken into account when developing rehabilitation measures, since failures in the restoration of reproductive function are based on both general patterns and those specific to each disease.

CONCLUSIONS

Acute gynecological pathology that requires immediate surgical intervention occurs in 21% of patients due to existing disorders of the reproductive system.

In the postoperative period, 56.7% of patients experience an increase in the duration of the menstrual cycle, and 13.3% of women experience a delay in menstruation of up to 3.4±1.5 months.

After urgent gynecological operations in 63.3% of patients, normogonadotropic ovarian dysfunction was observed, which was characterized by anovulation, insufficiency of the luteal phase against the background of ovarian blood flow disorders.

An unfavorable prognostic factor was the detection of an imbalance of pro- and anti-inflammatory cytokines in blood serum in 25 (27.8%) operated patients 1 month after surgery, which correlated (r=0.876) with the development of pain syndrome in half (14; 56.0 %) of this layer of women.

Оцінка імуно-гормонального балансу у жінок репродуктивного віку після невідкладних оперативних втручань

Ю.Р. Дякунчак

Більшість невідкладних гінекологічних операцій виконують пацієнткам дітородного віку. Це потребує розроблення індивідуальної реабілітаційної терапії з огляду на неоднорідність симптомокомплексу «гострий живіт».

Мета дослідження: оцінювання імуно-гормонального гомеостазу у жінок репродуктивного віку, які перенесли термінові гінекологічні операції, в динаміці шестимісячного післяопераційного періоду.

Матеріали та методи. До досліджуваної когорти увійшли 90 жінок віком від 19 до 40 років. До основної групи увійшли 60 жінок, терміново прооперованих з приводу позаматкової вагітності, апоплексії яєчника, ускладненого новоутворення яєчника. У контрольну групу включено 30 жінок репродуктивного віку без соматичної та гінекологічної патології. Комплексне обстеження включало визначення рівня 25(OH)D, естрадіолу, індексу вільного тестостерону, фолікулостимулюючого та лютеїнізуючого гормонів, пролактину, прогестерону в крові, сироваткових концентрацій TNFα, IL10, IL8 та IL4. Обстеження проводили через 1 та 6 міс після операції.

Результати. До цього оперативного втручання у пацієнток основної групи спостерігався передменструальний синдром (15,0%), дисменорея (28,3%), патологічні маткові кровотечі (23,3%), запальні захворювання органів малого таза (23,3%). У післяопераційний період переважаючим порушенням менструального циклу було збільшення його тривалості у 56,7% пацієнток. У 63,3% пацієнток після невідкладних гінекологічних операцій фіксували нормогонадотропну дисфункцію яєчників, яка характеризувалася ановуляцією, недостатністю лютеїнової фази на тлі порушення яєчникового кровотоку. У 15,0% пацієнток виявлена транзиторна гіперпролактинемія, яка зберігалася до 3 міс після операції. Несприятливим прогностичним фактором було виявлення дисбалансу про- та протизапальних цитокінів у сироватці крові у 27,8% оперованих через місяць після операції, що корелювало (r=0,876) з розвитком больового синдрому у половини (56,0%) жінок.

Висновки. У післяопераційний період у 56,7% пацієнток спостерігається збільшення тривалості менструального циклу, у 13,3% жінок – затримка менструації до 3,4±1,5 міс. Несприятливим прогностичним фактором є виявлення дисбалансу про- та протизапальних цитокінів у сироватці крові у 25 (27,8%) оперованих пацієнток через місяць після операції.

Ключові слова: *імуно-гормональний баланс, жінки, репродуктивний вік, невідкладна хірургія.*

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