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ORGAN-PRESERVING SURGERY ON UTERINE APPENDAGES IN WOMEN WITH INFERTILITY AND FUNCTIONAL ACTIVITY OF THE OVARIES

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Summary

Key words: infertility, surgical treatment, appendages of the uterus, ovarian reserve.

The article presents data on the status of functional activity of the ovaries in women with infertility after organ-preserving operations on the pelvic organs.

The aim of the study was to analyze the organ-saving operations on the uterine appendages in women with infertility and to study their effect on the ovarian functional activity.

Materials and methods. *A total of 120 women of childbearing age with a tubal peritoneal infertility factor and benign ovarian formations, an ectopic pregnancy, who underwent surgical treatment for uterine appendages, were divided into groups: I group - 76 (63.7%) women, surgical treatment was carried out in the planned order on the ovaries (group 1a) and on the fallopian tubes (group 1b), 44 (36.7%) to the patients (group II) - surgical treatment was performed urgently on the ovaries (group 2a) and on the fallopian tubes (group 2)). OV The arid reserve was studied on the basis of the definition of antimulylerovogo hormone, the level of FSH, counting the number of antral follicles, determining the volume of ovaries.*

Results. *Operative interventions in the tubal peritoneal factor of infertility inhibit the OR within the first month after the operation, which is manifested by a decrease in the concentration of AMH in all groups. It was revealed that in the 2 nd group after urgent surgery the value of this ghoul was 2.2 times lower than in group 1 in patients, the operation was carried out in a planned order (2.1 ± 0.1 ng / ml), ($p \leq 0,05$) and the volume of ovaries decreased to 5.9 ± 0.4 cm³ due to cystectomy and ovarian resection. A decrease in the AF was found to be 4.6 ± 0.2. In group 2b, in patients with urgent surgery performed on the fallopian tubes and ovaries, the concentration of AMG ranged from 1 to 1.5 g / ml, averaging 1.1 ± 0.2 ng / ml. The data obtained correspond to the ultrasound parameters of the assessment of the ovarian reserve. In the 2nd group, the volume of the ovaries decreased to 5.9 ± 0.4 cm³ due to cystectomy and ovarian resection. There was a decrease in AF to 4.6 ± 0.2, a decrease in AMH to 1.6 ± 0.3 ng / ml.*

The conclusion. *The functional condition of the ovaries in women with infertility after organ-preserving operations on the uterine appendages largely depends on the planned surgical treatment and the concomitant volume of surgical intervention.*

Резюме

ОРГАНОСОХРАНЯЮЩИЕ ОПЕРАЦИИ НА ПРИДАТКАХ МАТКИ У ЖЕНЩИН С БЕСПЛОДИЕМ И ФУНКЦИОНАЛЬНАЯ АКТИВНОСТЬ ЯИЧНИКОВ

Ключевые слова: бесплодие, хирургическое лечение, придатки матки, овариальный резерв.

Материалы и методы. *Обследовано 120 женщин репродуктивного возраста с трубно-перитонеальным фактором бесплодия и доброкачественными образованиями яичников, внематочной беременностью, которым проведено хирургическое лечение на придатках матки, они были распределены на группы: I группа – 76 (63,7%) женщин, хирургическое лечение которым было проведено в плановом порядке на яичниках (1а группа) и на маточных трубах (1б группа), 44 (36,7%) пациенткам (II группа) - хирургическое лечение было проведено в ургентном порядке на яичниках (2а группа) и на маточных трубах (2бгруппа).Овариальный резерв изучен на основании определения антимюллерова гормона, уровня ФСГ, подсчета количества антральных фолликулов, определения объема яичников.*

Результаты. *Оперативные вмешательства при трубно-перитонеальном факторе бесплодия угнетают ОР в течении первого месяца после операции, что проявляется снижением концентрации АМГ во всех группах. Выявлено, что во 2-а группе после ургентных операций значение этого гомона было ниже в 2,2 раза, чем в 1-а группе у пациенток, котрым операция проводилась в плановом порядке, (2,1±0,1 нг/мл), (p≤0,05) а объем яичников уменьшился до 5,9±0,4 см³ за счет цистэктомий и резекции яичников. Выявлено снижение АФ до 4,6±0,2. Во 2б группе у пациенток, у которых ургентные операции проводились на маточных трубах и яичниках, концентрация АМГ варьировала от 1 до 1,5нг/мл, составляя в среднем 1,1±0,2 нг/мл. Полученные данные соответствуют УЗ параметрам проведенной оценки овариального резерва. Во 2-а группе объем яичников уменьшился до 5,9±0,4 см³ за счет цистэктомий и резекции яичников. Выявлено снижение АФ до 4,6±0,2, снижение АМГ до 1,6±0,3 нг / мл.*

Заключение. *Функциональное состояние яичников у женщин с бесплодием после органосохраняющих операций на придатках матки в значительной степени зависит от плановости хирургического лечения и сопутствующего объема оперативного вмешательства.*

Nowdays, the preservation of the reproductive function of women after surgical treatment of gynecological diseases acquires a great social and medical importance due to increased incidence among young women and lack of sufficiently clear ideas about the women health condition after such surgery.[1, 2]. The frequency of organ-preserving surgery varies widely in reproductive age women (7-26% in relation to all gynecological operations on pelvic organs). It is determined by the specialization of the hospital - emergency care, treatment of infertile couples, endocrinology department and other [3]. Until now, surgical intervention is the main method of treatment the tumor-like formations of the ovaries and allows to establish a pathomorphologic diagnosis [4]. Surgical treatment does not exclude recurrence of the disease, damage of healthy ovarian tissue and a pronounced inflammatory reaction in the perifocal zones of exposure [5]. Besides, surgery on the ovaries reduces their functional and morphological reserve, causes subsequent inefficiency in the use of assisted reproductive technologies [4, 5].

An important part of the reproductive potential of women is the functional status of the ovaries, or ovarian reserve (OR) - the ability of the ovaries to provide growth of full-blown follicles [6] with fertile eggs. It is the OR that reflects the functional state of the reproductive system and determines the success of infertility treatment [1, 6-9].

Chronic inflammatory diseases of the pelvic organs reduce the reproductive potential of woman, violate the ovarian blood flow, damage autoimmune tissue, lead to hormonal disorders in the tissues of the ovaries [1, 10, 11]. The age of the woman, the nature of the menstrual cycle, the concentration of FSH, inhibin B, AMG, the volume of the ovaries and the number of antral follicles are the main markers of ovarian functional activity. [3, 12].

The aim of the study was to analyze the organpresrving operations on the ovaries and fallopian tubes among the women with infertility and to study its effect on the functional activity of the ovaries.

Materials and methods

120 women of reproductive age with a tubal peritoneal factor of infertility, benign ovarian formations, an ectopic pregnancy, who underwent organ-preserving surgical intervention on the ovaries and fallopian tubes, (the main group) were examined. The control group (group 3), (n = 20) consisted of conditionally healthy women of similar age who did not have surgical interventions on the ovaries in the anamnesis.

All operations on the ovaries and fallopian tubes, which are made by laparotomy, were performed according to Pfannensthil. A different synthetic suture material was used through the surgery. Skin stitching was carried out by applying a cosmetic suture. Laparoscopy was performed according to the traditional method, under endotracheal anesthesia using the laparoscope Karl Storz 7 (Germany) and Olimpus (Japan) after appropriate examination and training of women.

The following indicators and methods suh as serum FSH concentration, AMG blood content, ultra-

sonic ovarian volume determination, counting the number of antral follicleswere used to determine the ovarian functional activity. Hormonal studies were performed on day 2-3 of the menstrual cycle or on the 2nd-3rd day of menstrual reactions after surgery and 30 days after surgery.

Ultrasonography plays an important role in evaluation of PR and monitoring the response of ovaries to stimulation. The volume of ovaries was determined on the 2nd-5th days of the cycle and was calculated on the basis of three measurements made in two perpendicular planes, according to the following formula:

$$V = 0.5236 \times L \times W \times T,$$

where L is the length, W is the width, and T is the thickness of the ovary.

The volume of the ovary is less than 3 cm, indicating a deficiency of RR [12]. Ultrasonic count of antral follicles is the most accurate method for evaluating OP. To predict the result of the IVF program and the transfer of embryos prior to the onset of stimulation, the number of small antral follicles (2-5 mm in diameter) is determined.

There are three options for interpretion this indicator: inactive ovaries (5 and fewer follicles), normal (5-15) and polycystic (more than 15) [12]. The authors indicate that the most predictive value for the outcome of ovarian stimulation is the number of antral follicles; but the woman's age and the volume of the ovaries are less significant. Ultrasonography and dopplerometric examination was performed with device Acuson X 300 (Siemens, Germany) transvaginal sensor(scanning frequency of 9-4 Hz) and device Verso (Siemens, Germany).

The data obtained were processed according to the rules of the parametric (t-test of the Student) and nonparametric statistics. Differences were considered significant at $p \leq 0.05$. The results were evaluated before and after the operation and 3 months after the surgical treatment for a set of clinical, laboratory indicator and sultrasound scan of the pelvic organs.

Results of the study and their discussion.

All the examined women were of reproductive age; the average age was 29.5 ± 1.3 years.There was no statistical difference between the age groups. The majority of those surveyed were aged 26-35 years (in group I - 77.7%, in II - 75.0%,). Almost half of the women did not become pregnant within 6-10 years (38 (50.0%)). Patients with infertility between 2 and 5 years were in slightly smaller percentage. A significant difference in the duration of infertility was not revealed in the examined women ($p > 0.05$). The early onset of sexual activity was the main reason of infertility in the first examined group and the chronic inflammatory disease was the main reason of infertility in the second examined group.

Due to the anamnesis 7 (9,2%) of the examined first group had an ectopic pregnancy, 1 (1.3%) of them - twice cases, in the examined 2 groups - 8 (18.2%) cases, in 2 (4.5%) twice. The missed pregnancy in fisrt trimester was in 2 (2.6%) patients of the first group, twice - in 1 (1.3%) of them; in 5 (11.3%) - in the second group, twice in 2 (4.5%) in women. First trimester spontaneous abortions were in 4 (5.3%)women from group 1, twice in 1 (1.3%) of the examined, in 5 women (11.4%) from 2 group,twice in 1 (1.3 %) of the examined 2 groups.There was a combination of several causes of infertility in 9 patients (11,8%) from first group and 19(27,2%)from second group.

Analysis of anamnestic data showed that the majority of patients in the main group had aggravated heredity (35.0%), familial oncological pathology (18.3%), various forms of family endocrinopathy mainly of autoimmune genesis (20.8%). Reasons for treatment the examined patients were benign ovarian formations, ovarian apoplexy, an ectopic pregnancy on the background of tubal peritoneal infertility.

76 (63.7%) from group 1 were undergo planned surgery and 44 (36.7%) patients from the 2 group had urgent surgical treatment. 40 women (Ia, main group) underwent operative intervention.18 had a cystectomy for the dermoid cyst and cyst of the yellow body, 16 women underwent biopsy, drills or ovarian resection for PCOS, 6 women had ovarian stitching or coagulation. Planned operative treatment on the fallopian tubes was routinely performed in 36 women (2-b group, main): 2(5,5%) of women underwent ectopic pregnancy or saktosalpinx 1 (2.8%), fimbrioplasty - in 8patients (22.2%), salpingo-preparation for ectopic pregnancy in 12 (33.3%) women, salpingo-ovariolysis in 18 (50.0%) women. Depending on the access, laparoscopy using monopolar or bipolar electrosurgery was performed in 54 women from group 1 (in 28 patients in the 1a group and 26 patients in the 1b group), and laparotomy in 22 patients from the 1st group (12 in 1a and 10 in the 1b group).

In urgent order were perfomed 19 surgical interventions on the ovaries (group 2, primary): ovary repair or coagulation for ovarian apoplexy in 11 patients and ovarian cystectomy in 8 women. 25 women from the main group were operated in urgent order (2 b group). Operative intervention was performed on the fallopian tubes: one of them (one-sided) was performed in 4 (16.0%) women for ectopic pregnancy (3 (12.0%) or saktosalpinks (1 (4.0%), salpingo-preparation for ectopic pregnancy in 21 (84.0) patients. Laparoscopy using monopolar or bipolar electrosurgery was in 24 women (11 patients 2a and 13 - 2b group), and laparotomy - in 20 patients from both groups (in 8 women 2a and in 12patients of group 2b).Operative intervention was carried out simultaneously on the ovaries and fallopian tubes in 55,8% of women.

When determining the volume of the ovarian tissue before the operation, it was established that the echographic pattern in the women of the first and second group was characterized by a decrease in the volume of the ovarian tissue adjacent to the formation, which ranged from 5.2 to 7.6 cm3, on the average, V = 6.9 ± 0, 6 cm3 in the first and V = 6.2 ± 0.2 cm3 in the second group, respectively (Table 1).

On the echogram, from 2 to 4 antral follicles were visualized (AF = 3.2 ± 0.2 in the first and 3.1 ± 0.3 in the second group). In patients of group 1-b, the echographic pattern was characterized by a decrease in the volume of the ovarian tissue, which ranged from 4.7 to 6.9 cm³, on average, V = 6.1 ± 0.3 cm³.Decrease in the number of antral follicles (AF = 4.8 ± 0.3) was revealed in comparison with the control group.

The volume of the ovaries was significantly lower in women who underwent cystectomy than in patients after resection the cyst with bipolar electrodes. The volume of the ovaries is one of the most reliable markers of its functional ability, so it is quite logical that the volume of the ovaries and antral follicles number decreases.

Analyzing the echographic pattern in patients 1-b group, we established the ovary volume of 6.1 ± 0.3 cm³ with a visualization of 6.1 ± 0.5 antral follicles and normal blood flow. In women from the 2-b group an increase in the volume of the ovaries was established to 7.2 ± 0.3 cm³. 6.2 ± 0.5 antrum follicles were visualized.

Prior to surgery, we did not find differences in groups among FSH and AMG levels, determined on the 2-4 day of the menstrual cycle (Table 1). Decrease in the volume of the ovaries and the amount of AF was revealed (Table 2) after surgical treatment in both groups., mainly due to ovarian resection and cystectomy.

Table 1.

Indicators of the ovarian reserve in the surveyed women before the operation.

Group	Ovarian reserve			
	V см³	AF	FSH, МО/л	AMG нг/мл
1-а (n=40)	5,6±0,8 о	6,6±0,1 Δ,о, в	6,4±0,2*,Δ	2,9±0,1*,в,Δ
1-б (n=36)	8,1±0,4* о	3,7±0,2 о	5,9±0,3	2,2±0,3 Δ
2-а (n=19)	5,9±0,3в о	3,4±0,4 о, в	8,1±0,3 о	0,9±0,2 о
2-б (n=25)	7,1±0,2 о	4,8±0,4 о	7,5±0,4	1,1±0,2 о
3 (п=20)	13,4±0,5	12,8±0,3	5,6±0,8	3,5±0,5

Notes: 1. * - the difference is reliable relative to 1-b group; 2. Δ - the difference is reliable relative to group 2a;
3. с - the difference is reliable relative to the 2-b group. 4. о - the difference is reliable relative to group 3

Operative treatment due to the tubal peritoneal factor of infertility inhibit the OR within 1 month after the operation, which is manifested by a decrease in the concentration of AMG in all groups (Table 2)[1, 2]. The value of this hormone was 2.2 times lower (0.9 ± 0.2 ng / ml.) in the 2-nd group after urgent surgery comparing with the 1 st group of patients who underwent the planned surgical treatment. (2.1 ± 0.1 ng / ml), (p≤0.05). Analizing the amount of intervention on the ovary, we found that 18 patients in the 1st subgroup and in 8 women in the 2nd group who underwent a cystectomy with ovarian tissue left had the higher level of AMH than in women after resection, biopsy, ovarian doryling or bipolar electrodes(p≤0,05).The concentration of AMG ranged from 1 to 1.5 g / ml, averaging 1.1 ± 0.2 ng / ml. in patients from group2b after urgent surgical treatment on ovaries and fallopian tubes.The data obtained correspond to the ultrasound parameters of the assessment of the ovarian reserve.

Te volume of the ovaries decreased to 5.9 ± 0.4 cm³ due to cystectomy and ovarian resection in the second group. There was a decrease in AF to 4.6 ± 0.2, and decrease in AMH to 1.6 ± 0.3 ng / ml. Such changes in the ovarian reserve in the postoperative period can be explained by the volume of surgical intervention not only on the ovaries, but also on the fallopian tubes. Moreover, there were detected the endometrioid cysts in 7 women from 1-b group and in 6 women from 2-b group which also negatively affected the ovarian reserve of women.

Thus, it has been established that operative intervention on the ovaries and fallopian tubes, irrespective of nosology, is a provoking factor in the reduction of OR.

Evaluation of the OP 3 months after the surgery showed that 65 (85.5%) of the women from group 1, who underwent operative treatment on a routine basis, ovarian volume and the number of antral follicles corresponded to those of healthy women (Table 3).

Less pronounced normalization of ovarian reserve indicators was noted in women after urgent operations. The ovary volume and the number of antral follicles increased in comparison with the postoperative period in 27 among 44 women, although they remained below the values from the 1st group and the data of healthy women (see Table 3).It can be explained by the use of additional coagulation in connection with bleeding due to apoplexy of the ovary and ectopic pregnancy.

Thus, the conducted studies showed the decrease of OR parameters in a group of women who underwent ur-

Table 2.

Parameters of the ovarian reserve in the examined women one month after surgical treatment.

Group	Ovarian reserve			
	V см³	АФ	FSG, МО/л	AMG нг/мл
1-а (n=40)	5,6±0,8 о	6,6±0,1 Δ,о, в	6,4±0,2*,Δ	2,1 ±0,1*,в,Δ
1-б (n=36)	8,1±0,4* о	3,7±0,2 о	5,9±0,3	2,2±0,3 Δ
2-а (n=19)	5,9±0,4в о	3,4±0,4 о, в	8,1±0,3 о	0,9±0,2 о
2-б (n=25)	7,1±0,2 о	4,8±0,4 о	7,5±0,4	1,1±0,2 о
3 (п=20)	13,4±0,5	12,8±0,3	5,6±0,8	3,5±0,5

Notes: 1. * - the difference is reliable relative to 1-b group; 2. Δ - the difference is reliable relative to group 2a;
3. с - the difference is reliable relative to the 2-b group. 4. о - the difference is reliable relative to group 3

Table 3.

Indicators of ovarian reserve in the examined women 3 months after surgical treatment.

Group	Ovarian reserve			
	V, см³	AF	FSG, МО/л	AMG нг/мл
1-а (n=40)	10,6±0,5*,Δ, о	11,1±0,5 Δ,в	4,1±0,2	3,8±0,3 *,Δ
1-б (n=36)	12,4±0,4Δ	12,4±0,3 Δ	3,2±0,5Δ,в, о	2,3±0,2
2-а (n=19)	8,6±0,6 о	9,3±0,6 о	7,9±0,4 о	3,1±0,3
2-б (n=25)	9,4±0,3 о	8,4±0,2 о	6,3±0,1	1,9±0,1 о
3 (п=20)	13,4±0,5	12,8±0,3	5,6±0,8	3,5±0,5

Notes: 1. * - the difference is reliable relative to 1-b group; 2. Δ - the difference is reliable relative to group 2a;
3. с - the difference is reliable relative to the 2-b group. 4. о - the difference is reliable relative to group 3

gent surgical treatment due to ovarian cyst and ovarian apoplexy with use of coagulation.There was a decrease in the studied indicators of ovarian functional activity as a result of removal the part of the ovary tissue.

Conclusions

The leading cause of infertility in women after urgent surgery was the previously transferred inflammatory process of genital tract, the formal and spontaneous abortions, the transferred operations on the pelvic organs and the abdominal cavity. The women who were operated in a planned manner - the early onset of sexual activity and the transferred inflammatory disease of geniatl tract

The majority of patients who underwent surgery on the ovaries and fallopian tubes had indications of burdened heredity, family oncological pathology, various forms of family endocrinopathies, mainly of autoimmune genesis.

The condition of the ovarian reserve in women with infertility after organ-preserving operations on the ovariea and fallopian tubes largely depends on the planned surgical treatment and the concomitant volume of surgical intervention. Cystectomy or ovarian resection, even in a sparing volume, is accompanied by a risk of a decrease in primordial and antral follicles. AMG is the most sensitive to intraoperative damage and the indicative marker of the ovarian reserve.Surgical treatment with maximum preservation of healthy tissue allows to save the functional activity of the ovaries and the reproductive health of women.

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ASPECTE ETIOPATOGENETICE AL ACCIDENTULUI VASCULAR CEREBRAL ISCHEMIC LA COPII

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Summary

ETIOPATHOGENETIC ASPECTS IN PEDIATRIC ISCHEMIC STROKE

Key words: etiopathogenesis, stroke, children, neuroinflammation.

In this article we will perform a bibliographic study on pediatric stroke etiopathogenesis. Pediatric stroke includes three subtypes: ischemic stroke, hemorrhagic and mixed. Ischemic stroke represent the loss of cerebral function caused by diminished cerebral blood flow in the affected area. Among the etiological factors in children we can mention: neonatal encephalopathies, some genetic syndromes, congenital heart malformations, hereditary dysplasia of connective tissue, vascular pathologies, cerebral vascular development abnormalities (the most common arterio-venous abnormalities), hereditary and acquired prothrombotic states, septicemia, sickle-cell disease etc.

Neuroinflammation is one of the main mechanisms underlying the development of stroke. In this context, it is important to study the inflammatory markers responsible for the onset and pathogenesis of stroke in children. Among the inflammatory biomarkers mentioned in the article are: proinflammatory cytokines such as IL-6, IL-1β, but also other biological molecules and factors including vascular endothelial growth factor, ciliary neurotrophic factor, S100B protein, CD105 endoglin, antiphospholipid antibodies. It is important to know the neuroinflammatory mechanisms responsible for the onset and pathogenesis of pediatric stroke, because this will help assess the post-stroke inflammatory responses in children.

Резюме

ЭТИОПАТОГЕНЕТИЧЕСКИЕ АСПЕКТЫ ИШЕМИЧЕСКОГО ЦЕРЕБРАЛЬНОГО ИНСУЛЬТА У ДЕТЕЙ

Ключевые слова: этиопатогенез, церебральный инсульт, дети, нейровоспаление.

В данной статье проводиться библиографическое исследование этиопатогенеза церебрального инсульта (ЦИ) у детей. ЦИ у детей состоит из трех типов: ишемический ЦИ, геморрагический ЦИ и смешанный. Ишемический ЦИ определяется потерей церебральной функции обусловленной уменьшением церебрального кровотока в пораженной области.

Среди этиологических факторов ЦИ у детей упомянем: неонатальные энцефалопатии, некоторые генетические синдромы, врожденные пороки развития сердца, наследственные дисплазии соединительной ткани, сосудистые патологии, нарушения мозгового сосудистого развития (чаще всего артериовенозные аномалии), наследственные и приобретенные протромботические состояния, септицемия, сиклемия и т. д.