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ABSTRACT

of the dissertation for the degree of Doctor of Science

THE USE OF MINIMALLY INVASIVE MODERN TECHNOLOGIES IN THE DIAGNOSIS AND CORRECTION OF VARIOUS FORMS OF INFERTILITY

Speciality: 3215.01 – Obstetrics and gynecology

Field of science: Medicine

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GENERAL DESCRIPTION OF WORK

Relevance of the problem. According to experts, dealing with infertility problem, the frequency of infertile marriages in the world is 8-29% and tends to rise[1]. Female infertility in the structure of infertile marriages is 47.5-53.5%[2]. Approximately 1 in 8 women aged 15 to 49 years receive infertility treatment[3]. In medical practice, the effectiveness of infertility treatment does not exceed 30-35%, after a comprehensive examination in 5-10% of couples, the cause of infertility may remain unknown[4]. The main factors of female infertility include obstruction of the fallopian tubes, various forms of endometriosis with adhesions in the small pelvis (or without them) and all types of ovulation disorders (infertility of endocrine origin)[5].

Studies have shown the predominance of inflammatory factors of infertility and causes leading to tubal-peritoneal infertility (adhesions, impaired patency of the fallopian tubes and their contractility)[6,7]. In the occurrence of infertility, both internal endometriosis (adenomyosis) and external genital endometriosis play a significant role, which is 40-48%. In more than half of the examined patients, the pathological process is accompanied by an

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[1]*Hamdamova, M.T.* The American Journal of Medical Sciences and Pharmaceutical Research, – 2020. 2 (08-11), – p. 77-81. doi:10.37547/TAJMSPR/Volume02

[2]*Бериханова, Р.Р.* Особенности течения беременности. Родов, послеродового периода у пациенток с метаболическим синдромом: / автореферат дисс. кандидата медицинских наук / – Волгоград, – 2009. – 22 с.

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[4]*Wilson, G.A., Sheikh-Ali, M.* Endocrinology. – 2016. 35, 817-866.e4

[5]*Barbieri, R.L.* Yen and Jaffe's Reproductive endocrinology (Eighth Edition). Physiology, Pathophysiology, and Clinical Management. Chapter 22 - Female Infertility. – 2019, p. 556-581.e7

[6]*Yuzko, A.M.* Female infertility of tubal origin (literature review) // Health of woman, – 2017. 2 (118), – p. 126-131.

[7]*Toreeva, Sh.M., Kosherbayeva, L.K., Aldangarova, G.A.* Tubal-peritoneal infertility. Treatment. (review). Part 2 // Bulletin of surgery in Kazakhstan, – 2020. 4, – p. 15-20.

adhesive process, tubal and endocrine factors of infertility[8]. Endocrine forms of infertility in most patients are manifested by anovulation and, to a lesser extent, by an inferior luteal phase. Among this contingent, a group of patients with polycystic ovary syndrome requires special attention[9]. Literary data and analysis of studies of centers dealing with infertility problems show that despite the use of endoscopic research methods in gynecological practice, diagnostic and operational hysteroscopy and the complex application of laparoscopy have not yet found their due place in the female infertility clinic.

Despite the high percentage of restoration of patency of the fallopian tubes when using endosurgery, the incidence of pregnancy is on average 18-35%[10]. The results of the restoration of reproductive function after reconstructive plastic surgery show that the problem of endoscopic correction of the tubal-peritoneal factor of infertility requires another study in terms of determining the maximum therapeutic potential of endoscopic surgery in various forms of tubal-peritoneal infertility. Undoubtedly, the value of the use of endovideoscopy in the diagnosis and treatment of various forms of endometriosis. In recent years, laparoscopy has also been the treatment of choice in the treatment of polycystic ovary syndrome. Various methods of surgical correction of polycystic ovaries have been proposed[11], but since the restoration of the ovulatory menstrual cycle and intrauterine pregnancy do not

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[8]*Белоусова, Т.Е., Холмогорова, И.Е.* Импульсная электротерапия в восстановительном лечении трубно-перитонеального бесплодия // Современные технологии в медицине, – 2010. № 1, – с. 35-38.

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[11]*Гинекология. Национальное руководство.* Краткое издание / гл. ред. Г.М.Савельева, Г.Т.Сухих, В.Н.Серов [и др.]. – 2-е изд., перераб. и доп. – Москва: ГЭОТАР-Медиа, – 2020. – 1056 с.

correspond to the expected results, the development of more effective methods of endosurgical treatment of polycystic ovary is required. One of the possible factors of infertility is intrauterine pathology, and the most common among them is chronic endometritis[12]. According to various authors, the frequency of detection of intrauterine pathology ranges from 8.5-62%[13], which indicates the absence of systemic studies in a group of women with various forms of infertility. The state of the endometrium plays an important role not only in the independent occurrence of pregnancy, but also in the use of assisted reproductive technologies in extracorporeal fertilization and embryo holding.

The attitude of authors dealing with the problems of infertility to such modern methods of determining the patency of the fallopian tubes[14,15] as hysterosalpingography, contrast ultrasound hysterosalpingography, laparoscopic chromosalpingoscopy, selective salpingography, recanalization of the fallopian tubes using a catheter and the conditions of their implementation are ambiguous, tk. in some cases, the use of one method does not complement, but excludes the use of another method[16]. Thus, the study of the features of chronic endometritis in women with various forms of infertility is promising

[12]*Puente, E.* Chronic endometritis: old problem, novel insights and future challenges / E.Puente, L.Alonso, A.S.Laganà [et al.] // Int. J. Fertil Steril., – 2020. Jan. 13 (4), – p. 250-256. doi: 10.22074/ijfs.2020.5779

[13]*Kimura, F.* Chronic endometritis and its effect on reproduction (review) / F.Kimura, A.Takebayashi, M.Ishida [et al.] // J. Obstet. Gynaecol. Res., – 2019. May. 45 (5), – p. 951-960. doi: 10.1111/jog.13937

[14]*Bosteels, J.* Hysteroscopy for treating subfertility associated with suspected major uterine cavity abnormalities / Bosteels, J., van Wessel, S., Weyers, S. [et al.] // Cochrane Database Syst Rev., – 2018. Dec; 5. 12 (12), – CD009461. doi:10.1002/14651858.CD009461.pub4.

[15]*Ben Abid, H.* Office hysteroscopy before first in vitro fertilization. A randomized controlled trial / H.Ben Abid, M.Fekih, K.Fathallah [et al.] // J. Gynecol. Obstet. Hum. Reprod., – 2021. Sep. 50 (7), – p. 102109. doi:10.1016/j.jogoh.2021.102109

[16]*Богданова, М.А.* Эффективность гистеросальпингографии и гистероскопии при выявлении внутриматочной патологии на стадии подготовки к ЭКО // Аспирантский вестник Поволжья, Медицина, №1-2, Самара, – 2013. – с. 181-186.

and will further increase the percentage of restoration of reproductive function in this contingent.

Object of the research: Women with various factors of infertility.

The purpose of the research: Improvement of diagnostic methods and treatment of patients with various factors of infertility based on a comprehensive examination, including hysteroscopy and laparoscopy.

Research objectives:

1. To study the structure of female infertility and evaluate the role of diagnostic methods in determining various factors of infertility;
2. To study the effect of previous surgical interventions on the organs of the abdominal cavity and small pelvis on the structure of infertility;
3. To study the severity of the adhesive process in previously operated women with infertility of various origins;
4. To study the structure of intrauterine pathologies in patients with various factors of infertility according to hysteroscopy data;
5. To study the structure of concomitant pathology and risk factors for the development of infertility according to laparoscopic studies;
6. To study the structure of external genital endometriosis according to laparoscopy data;
7. Conduct a comparative assessment of the state of the fallopian tubes according to contrast ultrasound hysterosalpingography and laparoscopic chromosalpingoscopy;
8. To determine the effectiveness of various methods of endosurgical treatment of patients with polycystic ovaries, including simultaneous wedge-shaped resection and cauterization, only wedge-shaped resection of polycystic ovaries and only cauterization of the ovaries;
9. To study the effectiveness of selective transcatheter recalinization to eliminate proximal occlusion of the fallopian tubes;

10. To improve laparoscopic surgical methods in patients with tuboperitoneal infertility;
11. To study the morphological and functional features of chronic endometritis in women with various forms of infertility, according to electron microscopy.

Research methods. Clinical and laboratory, instrumental research methods, including endoscopic diagnostic methods, electron microscopy, histological research methods.

The main provisions of the dissertation submitted for defense:

- The high frequency of detecting joint forms of infertility and concomitant gynecological pathology in women with various forms of infertility indicates the importance of the complex performance of hystero- and laparoscopy, as well as modern methods of visual diagnostics;
- Endosurgical correction of the tubo-peritoneal factor of infertility, which has arisen in connection with previous surgical interventions, is possible with the introduction of the Veress needle and the first "blind" trocar at safe points;
- Carrying out transcatheter recanalization of fallopian tubes in most cases allows to eliminate proximal occlusion;
- The method of wedge-shaped resection and simultaneous cauterization of polycystic ovaries allows you to study the morphological structure and adequately reduce the volume of polycystic ovaries;
- The high percentage of chronic endometritis detected in women with various forms of infertility, of course, is important as an intrauterine factor of reproductive dysfunction, this should be taken into account when carrying out treatment. Regardless of the form of infertility, microscopic examination of endometrial biopsy specimens revealed profound disorders, mainly of an atrophic nature;
- The use of complex endovideoscopic methods in the treatment of various forms of infertility makes it possible to assess the prospects for hystero- and laparoscopic therapy, as well as to determine the prospects for the restoration of

reproductive function in women with various forms of infertility;

- The complex of medical and diagnostic measures, developed at the stage of application of modern endoscopic methods, creates conditions for the effective restoration of reproductive function in patients with various forms of infertility.

Scientific novelty:

Using endoscopic and other modern research methods in women with various forms of infertility, a comprehensive approach to diagnosis and treatment was developed, which revealed the following indicators: in the structure of female infertility, tubal-peritoneal infertility occupies a leading place (57.4%), in second place is infertility due to various forms of endometriosis (30.9%), and in third place - polycystic ovary (11.1%).

Studies have shown that in patients with impaired reproductive function, several factors of infertility are manifested together, the identification of these factors is possible only with the use of hystero- and laparoscopy, and the electron-microscopic features of modern visual diagnostic methods have also been studied. For the first time, there were chronic endometritis in women with various forms of infertility and the following morphological variants were identified: atrophic, cystic, hypertrophic. Regardless of the form of infertility, during electron microscopic examination, the atrophic variant of chronic endometritis prevailed, characterized by pronounced dysgenerative, dystrophic and destructive changes in the endometrial glands, mosaic differentiation of stromal elements, and damage to endotheliocytes of blood capillaries. The role of chronic endometritis in women with various forms of infertility as an intrauterine factor in reproductive dysfunction is obvious. Histomorphological examination of endometrial biopsy specimens is important in the sense that this method improves the efficiency of restoration of reproductive function at the next stage of treatment, taking into account the state of the endometrium.

At the stage of application of endoscopic methods, a complex of therapeutic and diagnostic measures was developed and introduced into practice, which makes it possible to identify the causes of

infertility and make its endoscopic correction, as well as to determine the prospects for the restoration of reproductive function in women with various forms of infertility.

A method for performing laparoscopic operations in patients previously operated on for tubal-peritoneal factor infertility has also been developed and introduced into practice. Thus, the introduction of the Veress needle and the first "blind" trocar at the point of intersection of the midline of the abdomen and the upper apex of the umbilical ring made it possible to expand the indications of endoscopic correction of the tuboperitoneal factor of infertility.

A method of wedge-shaped resection and cauterization of polycystic ovaries has been developed and introduced into practice, which makes it possible to study the morphological structure and adequately reduce the volume of polycystic ovaries, as well as effectively increase the restoration of reproductive function in women with polycystic ovaries.

Practical significance of the research:

An intervention method has been developed for conducting laparoscopic operations in patients who have previously operated on the abdominal and pelvic organs.

The method of recanalization with a catheter of the proximal part of the fallopian tubes has been improved and the optimal conditions for its implementation have been established.

The method of wedge-shaped resection and cauterization of polycystic ovaries has been improved and its effectiveness has been proven in comparison with other endosurgical methods for correcting polycystic ovary syndrome.

Complex therapeutic and diagnostic measures have been developed at the stage of endoscopy in women with various forms of infertility.

Approbation. Work was tested at a meeting of the Department of Obstetrics and Gynecology-1 of Azerbaijan Medical University (AMU) (protocol № 3, 21.09.2018), in research workshop Dissertation Board E D AMU at 2.06 (protocol № 7, 20.05. 2021).

Implementation of research results into practice. The results of the study were introduced into the educational process of the

Department of Obstetrics and Gynecology-1 of AMU, as well as the clinical work of the Research Institute of Obstetrics and Gynecology, the Scientific Surgical Center named after M. Topchibashov and the private clinic "Caspian Hospital".

The name of the organization where the dissertation has been accomplished. The research work was carried out at the Department of Obstetrics and Gynecology-1 of AMU at the Educational-Surgical Clinic of the Azerbaijan Medical University, on the basis of the endoscopic department of the Research Institute of Obstetrics and Gynecology, the Scientific Surgical Center named after M. Topchibashov and the private clinic "Caspian Hospital".

Publications. On the topic of the dissertation work, 22 works have been published, of which 18 articles (of which 6 are abroad) and 3 theses (of which 1 are abroad) and 1 textbook.

The structure and scope of research work. The dissertation work consists of 267 pages (374396 symbols) of computer text. Consists of an introduction (7 pages), a literature review (53 pages), a chapter describing materials and methods (38 pages), 3 chapters of its own research (107 pages), conclusions (20 pages), findings (3 pages), practical recommendations (2 pages) and a list of references (32 pages). The thesis is illustrated with 23 tables, 41 figures, 5 charts and 3 schemes. The list of references contains 290 sources.

MATERIAL AND RESEARCH METHODS

The material of the study consists of a prospective analysis of the case histories of 611 patients, who in 2008-2018. diagnostic, hysteroscopic and laparoscopic operations were carried out at the Scientific Research Institute of Obstetrics and Gynecology, on the basis of the Department of Obstetrics and Gynecology-1 of Azerbaijan Medical University and the private clinic “Caspian Hospital”.

Indications for endovideoscopic interventions in 254 (41.6%) cases were primary infertility, in 357 (58.4%) cases - secondary infertility. The age of women ranged from 20 to 43 years. Before

entering the clinic, all women underwent various examinations in the city of Baku.

From the analysis of the data of an outpatient study, it was found that all patients, regardless of the form of infertility, received complex anti-inflammatory treatment two or more times, in 31.5% of cases - hormonal treatment, in 39.3% of cases, stimulation of ovulation was prescribed, in 11.2% of cases hydroturbation courses were carried out (with various medicinal mixtures), in 19.4% of cases - IVF. The average duration of the outpatient study was 3.6±1.4 years.

According to the indicators of the history and the tests of the functional diagnostics of the reproductive system, the results of hormonal examination, as well as according to the indicators of the GHA and ultrasound of the small pelvis (in the presence of a conclusion about the husband's fertility), the patients were preliminarily divided into three groups according to various forms of infertility:

Group I - 312 (51.1%) women with tuboperitoneal infertility (TPI);

Group II - 154 (25.2%) women with newly diagnosed various forms of endometriosis;

Group III - 145 (23.7%) women with polycystic ovary syndrome (PCOS).

The advantage of operative hysteroscopy according to the Bettocchi method over hysteroresectoscopy, the insignificant information in the existing literature regarding this issue allowed us to improve and apply the algorithm of a differentiated approach to the choice of the method of operative hysteroscopy in benign intrauterine pathology.

Ultrasonography of the pelvic organs. Each of the 611 patients underwent an ultrasound examination to assess the condition of the uterus and appendages. Real-scale ultrasound scanning was performed on a Corevision ultrasound device (Japan), the device is equipped with 3.5 and 7.5 Hz convex transabdominal and transvaginal transducers. In the postoperative period, all women underwent repeated ultrasound examination of the pelvic organs.

Contrast ultrasound hysterosalpingography. 57 women with tubo-peritoneal infertility to determine the patency of the fallopian tubes, in addition to the usual X-ray examination methods, underwent contrast ultrasound hysterosalpingography (CUSHSG). CUSHSG was carried out in the proliferative phase of the menstrual cycle (on the 7-10th day). The studies were carried out on a Kombison apparatus (Hungary) with a 7.5 MHz transvaginal conductor.

Endoscopic laparoscopy was performed on days 7-10 of the menstrual cycle according to the generally accepted technique with a set of endovideoscopic devices Karl Storz (Germany). In previously operated patients (entrance: lower middle and according to Pfannenstiel) trocars were installed atypically. The Veress needle and the first trocar are located at the point of intersection of the midline and at the upper point of the umbilical ring, and the rest - depending on the localization of the adhesive process.

Endoscopic hysteroscopy. Hysteroscopy was performed in all patients along with laparoscopy using aKarl Storzhysteroscope (Germany). Diagnostic hysteroscopy was performed with d-4 rigid hysteroscope, surgical hysteroscopy with d-7 hysteroresectoscope.

X-ray research methods. The standard technique was used (Thurnund and Rosch). All interventional radiological studies were performed in an X-ray operating room equipped with a digital angiographic unit MULTISTAR (Siemens, Germany), with the possibility of serial imaging and the presence of a subtraction mode. To carry out the studies, we used non-ionic contrast agents ultravist or omnipak with an iodine content of 300 or 340 mg / ml.

Hysterosalpingography. To assess the patency of the fallopian tubes, hysterosalpingography (HSG) was used, which was performed in 312 patients. The studies were carried out on days 7-10 of the menstrual cycle.

Selective salpingography and transcatheter recanalization of the proximal fallopian tubes. In addition to the standard HSG, with obstruction of the proximal fallopian tubes, selective salpingography (SSG) and transcatheter recanalization were performed. Standard angiographic adapters and catheters were used to manipulate the

fallopian tubes. These methods were performed on an outpatient basis, on an empty stomach, in the first phase of the menstrual cycle between 7 and 11 days, in order to avoid exposure to possible early pregnancy.

For HSG and subsequent access to the uterine cavity, a metal hysterograph (Storz, Germany) and a double-lumen balloon 9 F hysterosalpingographic catheter (Cook, USA) were used. To perform selective salpingography under fluoroscopy control, a 4 F or 5 F catheter (Cook, USA). To perform selective salpingography under fluoroscopy control, a 4 F or 5 F catheter (Cook, USA) , preformed in the form of a hook or a hockey stick, was inserted into the uterine cavity through the channel of the used hysterograph or balloon catheter into the uterine cavity.

Ultrasonography. All patients with infertility and PCOS underwent ultrasound examination of the pelvic organs during the initial visit. Signs of polycystic ovaries and anovulation were detected in all 100% of patients based on the following diagnostic criteria: the presence of many anechoic follicles (more than 10) with a diameter of 4-10 mm, an increase in ovarian volume due to the hyperechoic stroma. The structure of the ovaries was carefully studied, the size of the uterus and the thickness of the endometrium were determined.

In 78% of patients, an increased echogenicity of the ovarian capsule was determined, which indicates its thickening, ranging in size from 0.3 to 0.6 cm.In 98% of patients, there was a significant increase in ovarian volume from 15 to 31 cm 3 (on average, up to 23.1±2.1 cm^3). In all patients, small cystic changes in the follicular apparatus were detected. A decrease in the size of the uterus was observed in 35% of patients. In some patients, concomitant pathology was found: uterine myoma of small size (from 1 to 2 cm) with subserous or interstitial localization in 4% of patients, malformations of the uterus in 4% of cases, adhesions in the small pelvis.

Particular attention was paid to the extreme variability of endometrial thickness in these patients: less than normal (0.76±0.01

cm) in 61% of patients, close to normal values (0.91±0.15 cm) in 27% and 12% endometrial hyperplasia (1.6±0.2 cm) was detected.

Magnetic resonance imaging (MRI) of the pelvic organs was performed on a Toshiba tomograph with a superconducting magnet field strength of 1.5 Tl, without the introduction of MR contrast agents. We examined 19 women from group II, who were diagnosed with adenomyosis according to ultrasound, HSG, HS, LS.

Hormonal research. The main features of hormonal disorders in PCOS leading to infertility were: an increase in LH levels of more than 10 IU/L in 78% of patients; LH / FSH ratio> 2.5 in 73% of cases and LH/FSH> 3 was detected in 37%; an increase in the level of total testosterone did not depend on body weight and was detected in 84% of patients.

Histomorphological research method. All tissues removed during the operation were sent for morphological examination. A histological examination of an endometrial biopsy taken from 210 women was carried out, in 57 cases a histological examination of the resected ovarian tissue was carried out. Tissues were fixed in a 10% solution of neutral formalin, then carried out in alcohol - paraffin wiring, conventional and histochemical staining methods (hematoxylin and eosin-profuchsin according to Van Gieson, fuchselin according to Weigert, silver nitrate according to Gomori, azur-eosin). The severity and extent of fibrotic changes, angiomatosis, cellular composition of the inflammatory infiltrate, signs of follicular maturation were assessed.

Electron-microscopic research method. During hysteroscopy, endometrial tissue samples were taken from women for electron microscopic examination. Biopsies were fixed in a 2.5% solution of glutaraldehyde, postified in a 1% solution of osmium tetroxide. It was carried out according to the generally accepted technique and placed in an epon. Semi-thin and ultrathin sections were prepared in a Reyxter ultramicrotome (Austria). Semi-thin sections were stained with methylene blue-azure-P and basic fuchsin. Ultrathin sections were contrasted with uranyl acetate and lead citrate according to Reynolds. Sections were examined and photographed with an EHM-100L electron microscope.

Statistical processing of results. The obtained digital indicators were statistically processed by the method of medical statistics, taking into account modern requirements. Statistical analysis of quantitative data was carried out using nonparametric methods - the Wilcoxon-Mann-Whitney test, the sign method and the Wilcoxon rank method. Calculations were carried out on a computer using an MS EXCEL spreadsheet.

RESEARCH RESULTS AND THEIR DISCUSSION

Considering that the effectiveness of treatment depends on the age of the woman and the duration of infertility, the women in the groups were divided by age group.

According to the study of menstrual function and examination indicators based on functional diagnostics tests, it was found that in this group, 182 (58.3±2.79%) women had a regular menstrual cycle, 34 (10.9±1.76%) women had anovulatory cycle. Insufficiency of the luteal phase of the menstrual cycle was detected in 96 (30.8±2.61%) women.

Menstrual irregularities of the type of algodismenorrhea were detected in 43 (40.6±4.77%) patients, polymenorrhea - in 29 (27.4±4.33%) patients, opsomenorrhea - in 11 (10.4±2.96 %) women and dysfunctional uterine bleeding - in 3 (21.7±1.3%) women.

When analyzing the structure of gynecological diseases among 151 (48.4±2.83%) women with TBI, 65 (43.1±4.03%) had chronic salpingo-oophoritis (CSO), 14 (9.27±2.36%) women - ovarian cysts, in 9 (5,96±1,93%) - hysteromyoma with subserous and subserous-interstitial - nym location nodes, 8 (5,3±1,82%) women - endometrial polyps.

According to the GHA indicators, in group I before endoscopic examination in 84 (57.5±4.09%) women obstruction of the fallopian tubes (partial or complete) was diagnosed, and 46 (54.7%) of them showed signs of adhesions. In group II, which ranks second in terms of quantitative indicators of patients hospitalized for infertility, 19 (12.3±2.65%) women were preliminarily diagnosed with endometriosis of various forms.

141 (45.2±2.82%) women had a history of sexually transmitted diseases, of which 42 (29.8±3.85%) women had urogenital chlamydia, 36 (25.5±3.67%) - mycoplasmosis, in 31 (22±3.49%) - ureaplasmosis, in 11 (7.8±2.26%) - gonorrhea, in 12 (8.5±2.35%) - gardnerellosis and 9 (6.38±2.06%) women have trichomoniasis.

The preliminary diagnosis of certain forms of endometriosis was made on the basis of the following clinical symptoms: painful menstruation, polymenorrhea, bloody discharge before menstruation, dyspareunia, and also, on the basis of ultrasound findings of the pelvic organs (heterogeneity of the myometrium structure - a "patchy" picture) and HSH expansion uterine surface - "posterior contour" shadows. The preliminary diagnosis of endometriosis was made with a regular menstrual cycle, patency of the fallopian tubes by the GHA, and the presence of her husband's fertile sperm.

From the results of the analysis of menstrual function and tests of functional diagnostics, it turned out that in this group 124 (80.5±3.19%) women had a regular menstrual cycle, 8 (5.2±1.79%) women had anovulatory cycle, 96 (30.8±2.61%) women had luteal phase insufficiency. 88 (57.1±3.99%) women suffered from primary infertility, 66 (42.9±3.99%) - secondary infertility. 9 (13.6±4.22%) women with secondary infertility had medical abortions and spontaneous miscarriages, 2 (3.03±2.11%) had ectopic pregnancies, 5 (7.58±3.26%) - childbirth.

From the gynecological anamnesis it turns out that 9 (29±8.15%) women from group II had chronic salpingo-oophoritis, 1 (3.23±3.17 %) women had ovarian cysts, 2 (6.45±4 , 41%) women - uterine myoma with subserous and subserous-interstitial arrangement of nodes, in 2 (6.45±4.41%) women - endometrial polyps.

In group II, a history of 19 (12.3±2.65%) patients had previous surgeries. Of these, 11 (57.9±11.3%) - operations on the uterine appendages, 2 (10.5±7.04%) women - appendectomy, 3 (15.8±8.37%) women - operations on the uterine appendages and cecum, in 3 (15.8±8.37%) women - cesarean section and operations on the uterine appendages . Sexually transmitted diseases were noted in 23 (15±2.87%) women from this group. Of these, 7 (30.4±9.95%) people have chlamydia, 4 (17.4±7.9%) women

have ureaplasmosis, 5 (21.7±8.6%) have mycoplasmosis, 2 (8.7±5.88%) - gardnerellosis, 2 (8.7±5.88%) - trichomoniasis and 3 (13±7.02%) women - gonorrhea.

From the analysis of menstrual and reproductive functions, it turns out that in group III with PCOS, 27 (60±7.3%) women had oligomenorrhea, and 18 (40.0±7.3%) women had amenorrhea (primary and secondary). Primary infertility was found in 63 (43.5±4.12%) cases. 82 (56.5±4.12%) women suffered from secondary infertility and had a history of miscarriages at an early stage of pregnancy . As a result of hormonal screening carried out in this group, the following was revealed: in 48 (46.6±4.92 %) women, a high index of the ratio of gonadotropins (LH / FSH> 3.5), in 27 (26.2±4, 33 %) - a high level of testosterone, in 16 (15.5±3.57 %) women - prolactin, in 12 (11.6±3.16 %) women - a high level of cortisol.

From the gynecological history of patients with PCOS, it turned out that 8 (26.7±8.07%) of them had chronic salpingo-oophoritis, 9 (30±8.37%) patients had chronic endometritis + chronic salpingo-oophoritis, 3 (10±5.48%) - uterine myoma, in 1 (3.33±3.28%) - ovarian cysts. In 15 (8.33±2.06%) patients, operations were performed earlier. Of these, 8 (53.3±12.9%) people underwent laparotomy, and the remaining 4 (26.7±11.4%) underwent appendectomy.

In the anamnesis of 43 (29.7±3.79%) patients in group III, sexually transmitted diseases were noted. At 17 (11,8±7,46%) women marked chlamydia, 8 (5.93±5,5%) - mycoplasmosis, 7 (4,8±5,63%) - ureaplasmosis, 5 (3 , 4±4.89%) - gardnerellosis, in 3 (2±3.88%) - gonorrhea and in 3 (2±3.88%) - trichomoniasis. 33 (22.8%) patients had ultrasound criteria for PCOS. So, with transvaginal and transabdominal ultrasound examination, an increase in the volume was determinedovaries (4.8x3.0x4.8 cm), thickening of the capsule (>2 mm), numerous echoes - negative inclusions (on average 7-11). This group of patients was repeatedly subjected to ovulation stimulation, of which 23 (16%) people were unsuccessful. They also received anti-inflammatory treatment.

According to the results of clinical and anamnestic indicators, it was found that women suffering from infertility make up a complex contingent of patients receiving long-term and ineffective treatment without specifying the reasons for reproductive dysfunction. The average duration of outpatient studies and treatment was 3.6±1.4 years. There were no significant differences in the distribution of patients with various forms of infertility by age group. In about half of the observations - in 352 (57.6±2.0%) cases - the age of patients in the study groups was 25-30 years. The number of patients under the age of 25 and 31-35 years was 35% of the total number of patients. Least of all were women over the age of 36. Their percentage by groups was 7.3%, 10.4% and 4.1%, respectively. In the subgroup of patients with a duration of infertility up to 3 years in groups II and III, there were significant differences and amounted to 10.4% and 7.6%. In the subgroup of patients with a duration of infertility of 3-5 years, there were significant differences in I and II, as well as II and III groups and amounted to 67.6%, 66.2% and 67.6%, respectively. There were no significant differences in the subgroup of patients with a duration of infertility over 5 years. In patients with various forms of infertility, a high percentage of concomitant gynecological diseases was revealed, which in groups was 48.4%, 20.1% and 20.7%, respectively. In the structure of concomitant gynecological diseases, chronic salpingo-oophoritis is the most common pathology, which accounted for 43.1%, 29% and 26.7% in groups, respectively. The percentage of operated patients was 46.8%, 12.3% and 10.3% in groups. Among them, the number of patients who underwent surgery on the uterine appendages prevailed; in groups, this indicator was 57.5%, 57.9% and 53.3%, respectively. From the analysis of the course of pregnancy in patients with secondary infertility, it turned out that in groups I and II, medical abortions occupied a special place and amounted to 45.5% and 75.8%.

The results of the enzyme-linked immunosorbent assay (ELI) and molecular genetic studies (MHO) reveal a high percentage of women susceptible to infection - 45.2%, 15% and 29.7%, along with this mixed infection was noted in 4 people. At the final stage of the

research, in order to confirm the forms of infertility in all patients, endovideoscopic studies (hysteroscopy and laparoscopy) were carried out, along with this, various research methods were carried out to determine the obstruction of the tubes in women with TBI, including cytomorphological studies of the endometrium, ovaries and other biopsies. According to the obtained indicators, it can be proved that patients with tubo-peritoneal infertility prevailed. Their number was 312 (51.1±2.02%) people and they made up group I. In terms of frequency, patients with various forms of endometriosis took second place - 154 (25.2±1.76%) people and they made up group II. The third place was taken by patients with PCOS, their quantitative indicator was 145 (23.7±1.72%) people. These patients were group III.

Algorithm for a differentiated approach to the choice of the method of operative hysteroscopy in benign intrauterine pathology. We have proposed a differentiated approach to the choice of the method of operative hysteroscopy, based on the established advantages of operative hysteroscopy according to S. Bettocchi over hysteroresectoscopy, as well as the lack of information on this issue in the available literature. In the presence of intrauterine pathology according to ultrasound data, the first step of the algorithm is to carry out diagnostic hysteroscopy according to the method of S. Bettocchi, in which the features of intrauterine pathology are established, as well as subjective feelings of tolerance of hysteroscopy without anesthesia. The second step of the algorithm is the choice of the method of operative hysteroscopy for a specific intrauterine pathology.

Endometrial polyps up to 2 cm in diameter can be removed by the method of surgical hysteroscopy according to S. Bettocchi without anesthesia or under intravenous anesthesia; if the polyp is more than 2 cm in size, it can be removed by hysteroresectoscopy. With intrauterine synechiae, all patients undergo dissection by the method of surgical hysteroscopy according to S. Bettocchi without anesthesia, or under intravenous anesthesia. With a thin septum of the uterine cavity and recurrent miscarriage, dissection was performed using the method of surgical hysteroscopy according to S.

Bettocchi. With a thin septum of the uterine cavity in combination with infertility, the dissection is performed by the method of operative hysteroscopy according to the method of S. Bettocchi in combination with laparoscopy, or by the method of hysteroresectoscopy under the control of laparoscopy with a thick septum.

The structure of intrauterine pathology in women with various forms of infertility according to hysteroscopy. Hysteroscopy was performed simultaneously with laparoscopy for all patients. During hysteroscopy, the state of the endometrium (color, thickness, severity of the vascular picture, the state of the mouth of the fallopian tubes, synechiae and polyps of the endometrium, foci of adenomyosis and submucous nodes) and malformations (intrauterine septa) were assessed.

The most common pathology in hysteroscopy was chronic endometritis.

A significantly high frequency of this pathology in group I was registered in 50 (42.4±4.55%) cases and in group III and amounted to 13 (38.2±8.33%) (chart 1).

Chronic endometritis was identified by one or another pronounced feature: mucous membrane with injected vessels, uneven color of the proliferative area, these colors alternate with areas of thinned endometrium with increased vascular pattern, uneven hyperemia and some expansion of the uterine cavity (Fig. 1).

Hysteroscopic criteria for endometriosis of the uterus are point or slit single or multiple passages in the form of eyes of dark red color, a change in the relief of the uterine cavity, an uneven "rocky" picture. Signs of internal endometriosis were recorded in group II in 4 (21.1±9.35%) cases.

During hysteroscopy, the endometrial polyps were in the form of oval or irregular formations, similar in color to the endometrium protruding on its surface and associated with it by a “leg”.

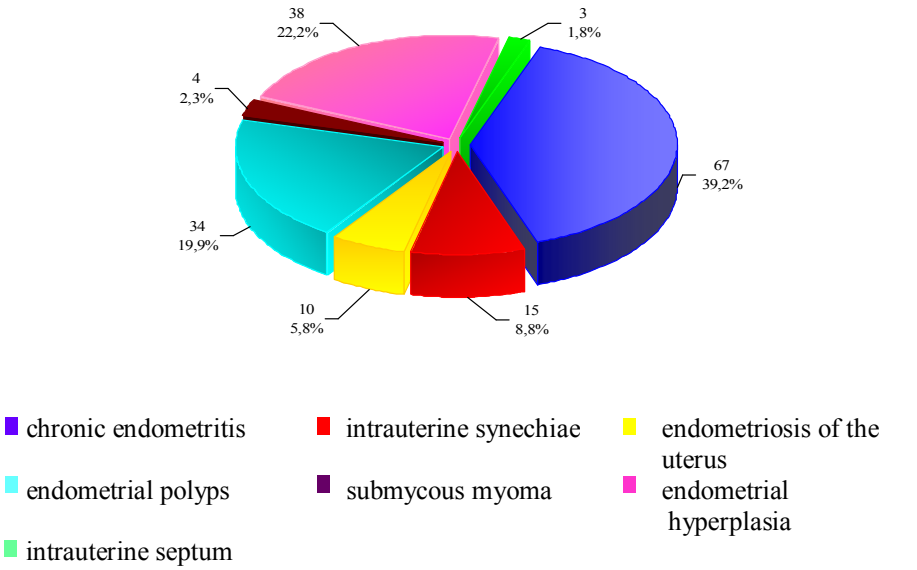

Chart 1. Percentage distribution intrauterine pathology

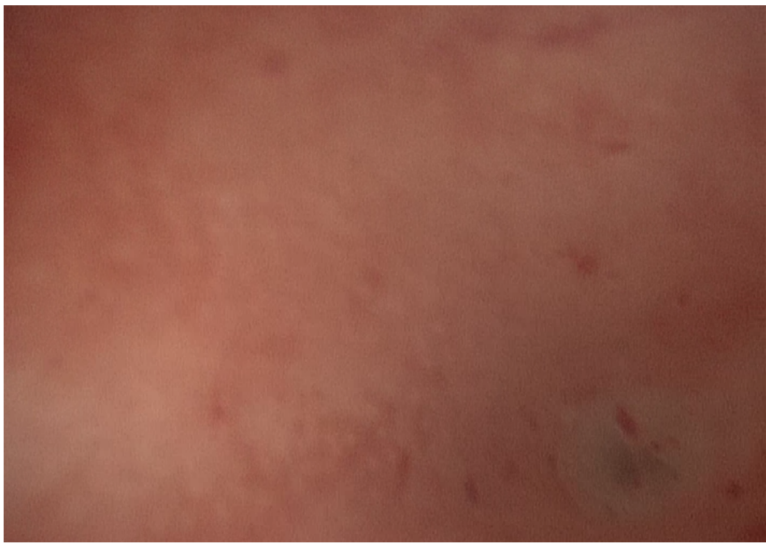

Fig. 1. Hysteroscopic picture chronic atrophic endometritis

Endometrial polyps in group III were diagnosed with a reliably high frequency and amounted to 10 (29.4±7.84%). In groups I and II, there were no significant differences in the frequency of polyps detection; this indicator was 21 (17.4±3.44%) and 3 (15.8±8.37%), respectively. Intrauterine synechiae were detected in the form of strands of a certain degree of severity and located both parietally and directly in the uterine cavity. In the studied groups, there were no significant differences in connection with the frequency of this pathology and amounted to 9 (7.63±2.44%), 3 (15.8±8.37%) and 3 (8.82±4.86%) respectively. During hysteroscopy, submucous myoma was identified as whitish, oval-shaped formations that deform the uterine cavity. In our observations, submucous nodes were identified in group I 2 (1.69±1.19%) and in group II 2 (10.5±7.04%).

Irregular proliferation of the mucous membrane of the uterine cavity, causing thickening of the endometrium, is assessed as endometrial hyperplasia. Endometrial hyperplasia in the group of patients with PCOS was detected with the highest frequency (23.5±7.27%), in groups I and II with the frequency of this pathology, there were no significant differences (22.9±3.87% and 15.8±8.37%, respectively). In 3 (2.54±1.45%) women from group I, intrauterine septa were found among uterine malformations, in 3 (2.54±1.45%) women - a rudimentary horn.

In all women, the condition of the orifices of the fallopian tubes was assessed during hysteroscopy. Pathological changes in the fallopian tubes (ranging from thin synechiae and narrowing of varying degrees to their complete blockage) in all three groups were revealed , practically, with the following frequency: in group I 37.8%, in group II 12.3% and in III group 23.5%.

Features of laparoscopy in patients previously operated on the abdominal and pelvic organs. Of the 312 patients referred for endovideoscopic examination, 118 (37.8±2.75%) women had previously undergone operations on the pelvic organs (abdominal cavity), of which 33 (28%) had two operations in the anamnesis. In 48.5% of patients, surgical approaches were according to Pfannenstiel, in 39.4% of patients - by a lower middle incision, in 12.1% of patients - by an incision in the right iliac region.

To conduct laparoscopy in previously operated women with adhesive infertility, the method proposed by our universite was used. The operation was performed in the following way: under conditions of endotracheal anesthesia, the umbilical ring was grasped and fixed with a pin, and the formed dome-shaped fold was lifted up and pulled up as much as possible. Along the midline of the abdomen, starting from the upper edge of the umbilical ring, a 10 mm long incision was made in the skin, subcutaneous tissue and aponeurosis (lapaport), the lower edge of which was the point of intersection of the upper border of the umbilical ring and the midline of the abdomen. The Veress needle was inserted at an angle of 45-60 degrees to the aponeurosis into the upper point of the incision. The direction of the needle is towards the xiphoid process. A pneumoperioneum was created (pressure 12-15 mm Hg). Instead of a Veress needle, a 10 mm trocar was inserted, the stylet was removed, and a video laparoscope was inserted into the abdominal cavity.

An examination of the abdominal cavity and pelvic organs is carried out. The operating table was brought in the Trendelenburg position. Lapaport was performed at the points freed from the adhesions. Trocars for instruments used for laparoscopic surgery were inserted through the lapaport. The expediency of choosing the above zone for the Veress needle and the first "blind" trocar is determined in the following way. The safest site for the epigastric vessels, arteries, and veins is considered to be a 2 cm radius around the umbilical ring.

The umbilical ring is fixed with a holder and allows you to pull up the resulting dome-shaped fold as much as possible. As a result of the described manipulations, the elasticity of the anterior surface of the abdominal cavity increases, the aponeurosis is maximally fixed, and the distance between the abdominal wall and the spine increases, thereby reducing the risk of damage to organs and vessels located in the retroperitoneal space.

The nature of concomitant pathology in women with various forms of infertility, diagnosed during laparoscopy. According to the indices of laparoscopy in previously operated women, the degree of spread of the adhesive process, depending on the surgical access,

looked as follows: out of 13 (39.4±8.51%) women who were operated on with a lower middle incision, in 12 (41.4±9.15%) of women in the projection of the postoperative scar, an adhesive process of varying severity was noted - the mesentery and intestinal loops were soldered to the anterior abdominal wall. In 3 (10.3%) women operated on with a Pfannenstiel incision, there were no adhesions, in 5 (17.2%) people, adhesions were observed only in the small pelvis, in 6 (20.7%) people, adhesions were observed as in the projection of the postoperative scar, and from the midline of the abdomen to the umbilical ring. Depending on the surgical approach, according to the above characteristics, one can come to the conclusion that in the majority of patients during operations on the Pfannenstiel access (87.9%) and all operations on the lower middle incision are accompanied by pronounced adhesive processes. Conducting laparoscopy in this contingent at the traditional points of passage of the trocar is fraught with damage to the mesentery and intestinal loops. The technique we have proposed for performing laparoscopy makes it possible to conduct endovideoscopic examinations in a safer environment. With the introduction of the Veress needle and the first "blind" trocar, according to the proposed technique, no damage to internal organs or bleeding was observed.

Therapeutic and diagnostic laparoscopy with chromosalpingoscopy (CS), performed with surgical operations, depending on the diagnosed pathology, was performed in women with various forms of infertility. During laparoscopy, in the group of women with tubal-peritoneal infertility, 121 (38.8±2.76%) women had cases of chronic salpingo-oophoritis, in other cases (35.6%), various forms of external genital endometriosis were observed, and they were attributed to Group II.

During laparoscopy, in all patients from group I, along with chronic salpingo-oophoritis of varying severity, an adhesive process of varying degrees was observed. Inflammatory changes in the uterine appendages were characterized by cases of endo- and perisalpingitis, peritubal adhesions of varying severity, fully or partially preserved fimbria - hydrosalpinx (6.41±1.39%). With severe

endosalpingitis, expansion and occlusion of the ampullar sections of the fallopian tubes - sactosalpinxes - were noted, which was recorded in 21 (6.73±1.42%) patients.

Ovarian cysts were detected in 35 (5.7±1.32%) cases. The cysts were of the following nature: in 32 (5.23±1.21%) women - follicular, in 3 (0.5±0.55%) women - dermoid cysts. The diameter of the cysts ranged from 2 to 6 cm. Fibroids of subserous, subserous-interstitial and interstitial forms were recorded in 34 (5.6±2.14%) patients. The diameter of the myomatous nodes was 0.5-8 cm.After hysteroscopic and laparoscopic examinations, 4 out of 5 women had a preliminary diagnosis of the saddle uterus, intrauterine septa (complete in 1 person, incomplete in 3 people) and one person was diagnosed with rudimentary horn.

The simultaneous carrying out of endoscopic examinations made it possible to include in the II group both patients with adenomyosis, revealed by hysteroscopy, and women with external genital endometriosis of various forms. In this regard, in group II, the number of women with external genital endometriosis of various forms was 10 (1.6±3.59%). Adenomyosis along with external genital endometriosis was reported in 38.4% of cases. In the structure of external genital endometriosis, most often - in 51 (61.5±5.34%) cases, there were "small" forms of endometriosis, and endometrioid heterotopies in the abdominal cavity in the uterine-rectal region - in 6 (7.23±2, 84%) cases. In addition to the aforementioned endometrioid heterotopies of the typical form, atypical forms of "small" endometriosis were noted, which were in the abdominal cavity, on the ovaries and appendages in the form of yellow-brown spots, petechial and pervascular zones.

Endometrioid ovarian cysts in this group were observed in 19 (22.9±4.61%) women, and in 1/3 of cases bilateral cysts were noted. The diameter of endometrioid cysts ranged within 1.0-5-6 cm. In 3 (3.6±2.05%) patients, endometriosis of the uterus was observed along with endometrioid cysts. The spread of endometriosis to the sacro-uterine ligaments and to the rectal mucosa, that is, grade III retrocervical endometriosis was recorded in 4 (4.8±2.35%) cases (chart 2).

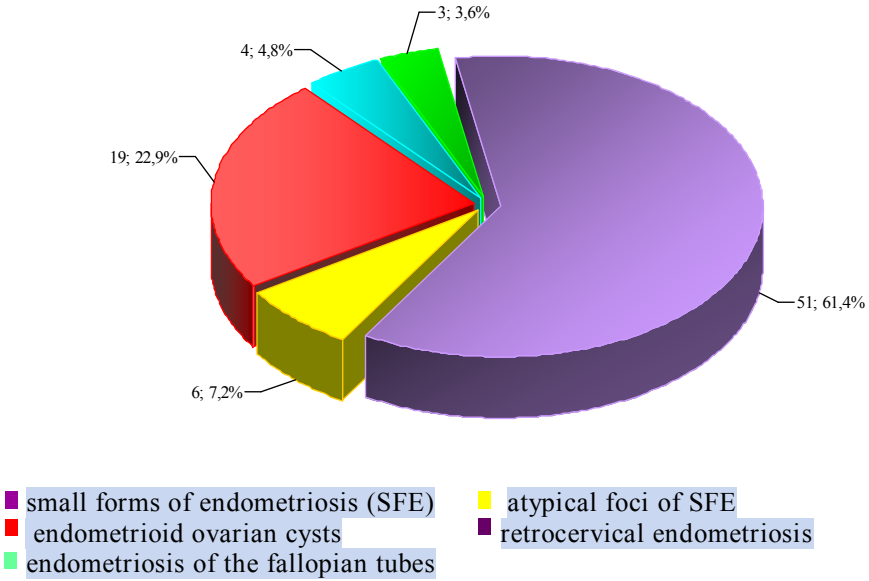

Chart 2. The structure of the external genital endometriosis

The prevalence (stage) of external genital endometriosis has been established according to the classification of the American Fertility Association. In 40 (8.85±1.4%) women, I and II degrees were observed, in 33 (7.30±1.22%) people - III and IV degrees.

Typical visual signs of PCOS during laparoscopy are an increase in the ovaries by 5-6 cm in length and up to 4 cm in width, a shiny surface color with a pearl tint, a treelike vascular picture of varying severity, a stretched surface of the gonads, a thickening of the whitish layer and the presence of subcapsular cysts. In the group of women with PCOS during laparoscopy, in 27 (33.3±5.24%) cases, signs of chronic salpingo-oophoritis were recorded. In 14 (17.3±4.20%) people among women with PCOS and previously undergoing surgery, grade I-II adhesions were detected, in 8 (9.88±3.31%) patients - grade III-IV. Follicular ovarian cysts were found in 5 (6.17±2.67%) women with PCOS; in addition, cysts were observed in women with a history of ovulation stimulation.

Thus, from the therapeutic and diagnostic laparoscopy carried out in the studied groups, it turned out that in group I all women had chronic salpingo-oophoritis. Chronic salpingo-oophoritis with an equally high frequency was also observed in groups I and II. The frequency of follicular cysts detected in the study groups was 4.81; 3.39 and 6.17%, respectively. Uterine fibroids in groups I and II were registered in 11.2 and 6.78% of cases, respectively.

Comparative characteristics of the information content of hysterosalpingography, contrast ultrasound hysterosalpingography, laparoscopic chromosalpingoscopy. This study compares the results of hysterosalpingography (HSG) and laparoscopic chromosalpingoscopy (LHS) in the study of fallopian tubes in a group of women with tuboperitoneal infertility, as well as in 54 cases - the results of contrast ultrasound hysterosalpingography (KUSGSG) and laparoscopic chromosalpingoscopy (LHS). When comparing the results of various tests carried out to determine the patency of the fallopian tubes, the indicators obtained with LSHS were considered objective. Violation of the patency of the fallopian tubes by the HSG was recorded in 44 (81.5±5.3%) cases. Along with this, violations of the fallopian tubes were at the following level: interstitial and isthmic - 17 (31.5±6.3%); ampullary - 18 (33.3±6.4%); various departments of MT - 9 (16.7±5.1%); in 10 (18.5±5.3%) women, the tubes were patent. On chromosalpingoscopy performed during laparoscopy, violations of the patency of the fallopian tubes were detected in 33.3% of cases. The degree of impaired patency of the fallopian tubes looked as follows: interstitial and isthmic parts - 9 (16.7±5.1%); ampullary - 6 (11.1±4.3%); various departments of MT - 3 (5.6±3.1%); in 36 (66.7±6.4%) women, the tubes were patent.

Indicators of hysterosalpingography and laparoscopic chromosalpingoscopy on the patency of the fallopian tubes. It was found that when performing the HSG, obstruction in the interstitial and ampullar regions prevailed and amounted to 17 (31.5±6.3%) and 18 (33.3±6.4%), respectively. Then there are women with obstruction of various departments, which amounted to 9 (16.7±5.1%). The number of women with problems in the isthmic

department was less - 5.0%. In 5.7% of cases, the pipes were partially passable. With laparoscopic chromosalpingoscopy, women with problems in the interstitial region were 9 (16.7±5.1%). Then there are women with obstruction in the ampulla and in various parts of the tubes, which amounted to 6 (11.1±4.3%) and 3 (5.6±3.1%) person respectively. The least amount of obstruction was in the isthmic department and amounted to 2.9%. Partial obstruction of the fallopian tubes was observed in 2.5% of cases. When determining the patency of the fallopian tubes by the GHA and LSHS, there were significant differences among the results (0.001; $p<0.01$).

In 26 (48.2±6.8%) cases, the indicators of GHA and LSHS did not coincide. The results differed the most with obstruction of the fallopian tubes in the ampulla and interstitial regions. In 54 cases, the results of contrast ultrasound hysterosalpingography (CUSHSG) and laparoscopic chromosalpingoscopy (LSCS) were compared. In CUSHSG, obstruction of the fallopian tubes was observed in 44 (81.5±5.3%) women.

Women with obstruction in the interstitial and ampullar regions predominated, accounting for 31.5 and 33.3%, respectively. The least obstruction of various parts of the fallopian tubes was observed - in 16.7% of cases. Pipes were passable at CUSHSG for 10 (18.5±5.3%) people, and at LSHS - 36 (66.7±6.4%) people.

Despite the fact that women with patency of the fallopian tubes predominated in LSCS, women with obstruction in the ampullar section predominated in CUZGS and amounted to 12 (22.2±5.66%) people.

In comparison with CUSHSG by LSHS, the lowest incidence was 11.1±4.28% (6 patients) with obstruction of various parts of the fallopian tubes (Chart 3).

In 26 (48.2±6.8%) cases, the results of CUSHSG and LSHS coincided. The most erroneous indicators turned out to be due to obstruction of the ampullary sections of the fallopian tubes.

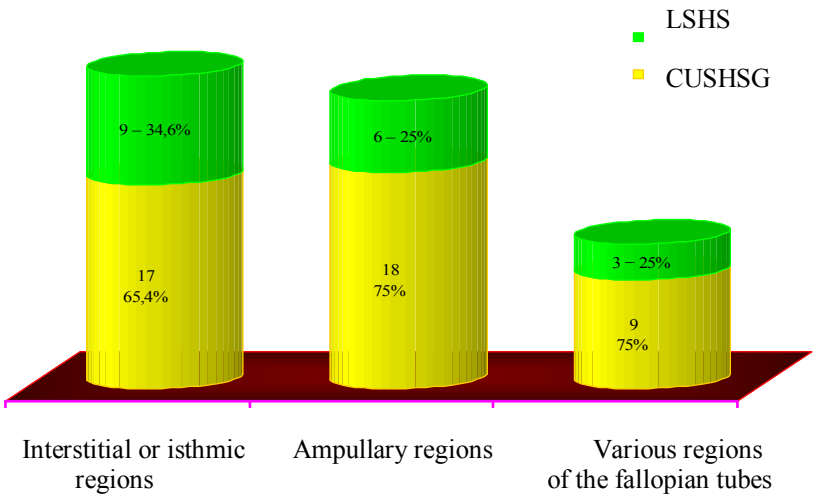

Chart 3. The discrepancy between the indicators of contrast ultrasound hysterosalpingography and laparoscopic chromosalpingoscopy

Thus, upon establishing tubal obstruction, the literature data on the diagnostic informativeness of the HSG and CUSHSG was confirmed. Based on comparison of the HSG, CUSHSG, LSHS and results and the results of the use of complex endoscopic methods, it can be concluded that CUSHSG and HSG do not have sufficient diagnostic information among the women with tuboperitoneal infertility. For this reason, when establishing tubal patency, complex use of these methods is mandatory.

The use of selective salpingography and recanalization using a catheter for proximal occlusion of the fallopian tubes. As a result of direct injection of a contrast agent into the lumen of the tube, the occlusion in the proximal part of the fallopian tube was eliminated for 14 (31.1%) women, out of 45. 25 out of 31 patients with occlusion of the proximal fallopian tube underwent transcatheter recanalization, 8 of which had bilateral occlusion. 13 (52.0%) women underwent standard technique of transcatheter recanalization and 12 (48.0%) women - according to our proposed technique. In

addition to the method of bougienage of the fallopian tube segment proposed by Thurmond and Rosch, we administered recanalization method without the use of a coaxial system.

Successful recanalization of the proximal fallopian tubes was performed on 12 (48.0%) patients, the recanalization was performed according to our proposed method, 9 (36.0%) of which had it performed according to the standard method. For 4 (16.0%) women with tubo-peritoneal infertility, thr recanalization was ineffective. No complications after selective salpingography and transcatheter recanalization were observed. In order to prevent infectious complications, a broad-spectrum antibiotic was prescribed on a one-off basis - Sumamed 500 mg (2 tablets). In case of occlusion of the proximal fallopian tubes, transcatheter recanalization was performed. 6 months after successful recanalization, pregnancy occurred in cases of 7 (33.3%) women. Control hysterosalpingography was performed on 11 patients in 6 months after recanalization. Tubal occlusion was revealed in cases of 2 (9.5%) women, upon control hysterosalpingography. They were recommended to undergo repeated recanalization or in vitro fertilization.

Therefore, selective salpingography and transcatheter recanalization are considered effective therapy in the treatment and diagnosis of women with tuboperitoneal infertility and occlusion of the proximal fallopian tubes.

Results of histological examination of ovarian biopsies of women with PCOS. In case of wedge resection of the ovaries, histological examination of biopsies in 54 out of 57 (39.3±4.06%) women confirmed the diagnosis of polycystic ovary syndrome, established both clinically and laparoscopically. The reliability of the laparoscopic diagnosis of this pathology was 94.7%.

Morphologically, polycystic ovary syndrome was characterized by uniform fibrosis of the capsule and the cortical layer of the ovaries. Multiple small follicular cysts were noted, as well as primordial follicles without signs of maturation. In 26 (45.6±6.6%) cases, polycystic ovary was combined with chronic oophoritis, which was characterized by uneven fibrous thickening of the capsule, macrophage, lymphocytic and plasmocytic focal infiltration. Atrophy

of the corpus stroma and follicular apparatus was identified along with obliteration of the vascular lumen and damage to elastic fibers. In 3 (5.26±2.96) cases, morphological abnormalities in the structure of the ovaries, specific to follicular cysts + chronic oophoritis, were revealed: there are atresized follicles along with numerous primordial follicles in the cortical layer.

Around the vessels, an increase in the proliferation of epithelial cells was noted, which determines the hypertrophy of the ovarian stromal tissue.

A total of 58 aspiration biopsies were taken from the endometrium of women with a history of chronic endometritis.

Also performed 148 diagnostic curettage for hyperplasia and endometrial polyps, diagnosed in the uterine cavity during hysteroscopy. During the morphological examination of the endometrium, the most common regular pathology was atrophic, which was found with a reliably high frequency in group I – in 118 (37.8±2.75%) cases, in groups II and III - in 44 (28.6±3.64%) and 16 (11.0±2.6%) cases, respectively (Table 1, Fig. 2).

The most common regular pathology in the morphological examination of the endometrium is hyperplasia, in group III with a significantly high frequency - 8 (23.5±7.27%) cases, in groups I and II, 27 (22.3±3, 79%) and 3 (15.8±8.37%) cases (Fig. 3).

Adenomatous endometrial polyp in group I was detected in a significant high frequency - in 43.8% of cases.

Fibrous polyp in group I was detected in 18.8% of cases.

It should be noted that in group III, endometrial hyperplasia of the glandular-cystic form is presented with a reliably high frequency in 63.2%.

According to the results of histological studies in group III endometrial polyps were detected with a significantly high frequency in 63.2% of the cases, and in groups I and II - in 43.8% and 62.5% of cases, respectively.

There were no significant differences in the frequency of glandular-cystic and glandular-fibrous polyps in the study groups in the histological and morphological variants.

Table 1

Morphological variants of chronic endometritis

Morphological variants of chronic endometritis	Group I		Group II		Group III		Total	
	n	%	n	%	n	%	n	%
Atrophic ChE	118	37,8±2,75	44	28,6±3,64	16	11,0±2,6*^^	178	64,7±2,88
Cystic ChE	37	11,9±1,83	19	12,3±2,65	7	4,83±1,78*^	63	22,9±2,53
Hypertrophic ChE	21	6,73±1,42	9	5,84±1,89	4	2,76±1,36	34	12,4±1,98
Total	176	56,4±2,81	72	46,8±4,02	27	18,6±3,23	275	100

Note: * – P(I-III): * – <0,05; ** – <0,001; ^ – P(II-III): ^ – <0,05; ^^ – I-III <0,001

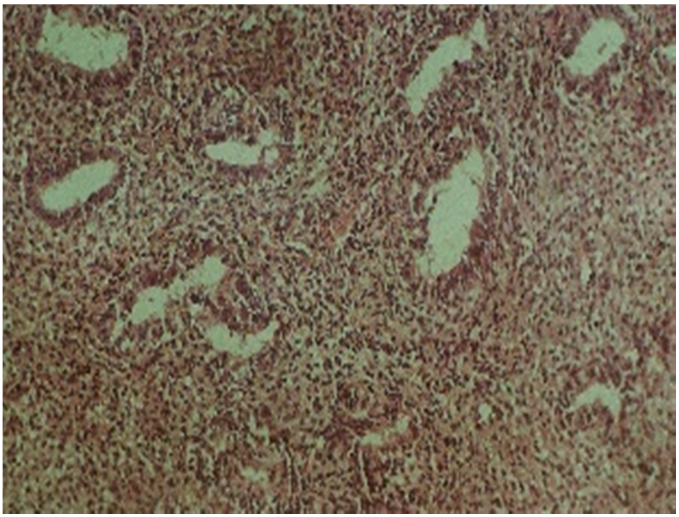

Fig. 2. Shows the expansion of the stroma on the basis of chronic endometritis and obliteration of small-caliber vessels. The predominance of mesenchymal-cambial elements is clearly revealed. Staining: hematoxillin-eosin; magnification x 200

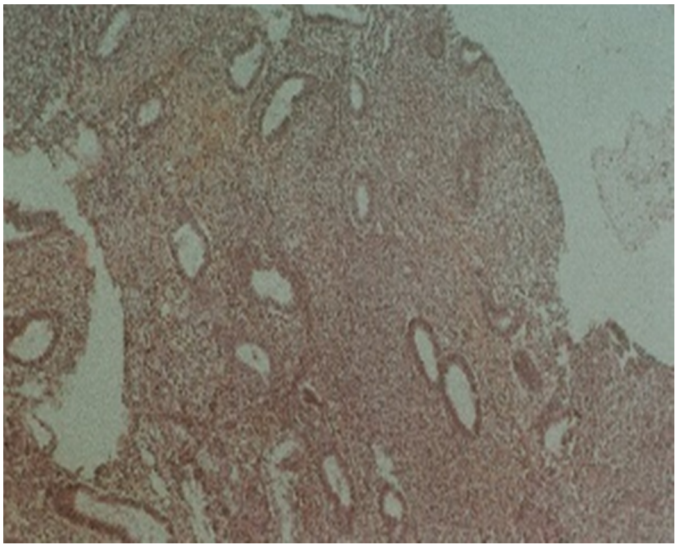

Fig. 3. Single cystic enlarged glands along with small glands are seen against endometrial hyperplasia. Staining: hematoxylin-eosin; magnification x 100

Electron microscopic examination of endometrial biopsies of women with various forms of infertility. Considering the high percentage of chronic endometritis detected according to the results of both hysteroscopic and histological studies, the latter underwent an electron microscopic examination. The following morphological variants of chronic endometritis were identified: atrophic, cystic and hypertrophic. Atrophic variants of chronic endometritis in group I were identified with a significant high frequency (37.8%), in groups II and III - in 28.6% and 11% of cases, respectively. In the diagnosis of cystic forms of chronic endometritis, there was no significant difference in groups I, II and III which amounted to 11.9; 12.3 and 4.83%, respectively. In groups I, II and III there were no noticeable differences in the frequency of the hypertrophic variant of chronic endometritis which amounted to 6.73; 5.84 and 2.76%, respectively. Thus, as a result of our morphological studies of the endometrial tissue, the prevalence of chronic endometritis in cases of women with various forms of endometriosis was established.

Taking into account the insufficient study of detection of polyps with epidermal metaplasia and structures with this type of polyproliferation, in this work, we consider it expedient to conduct a histological and electron microscopic examination of the described formations.

All studies were carried out in accordance with the European Council Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (03/18/1986).

The taken pieces were fixed in a solution prepared based on phosphate buffer (pH 7.4) and consisting of 2% aldehyde and 0.1% picric acid. Upon postfixation in a solution prepared based on phosphate buffer (pH 7.4) with 1% osmic acid for 2 hours, Araldite-Epon blocks were prepared from the material by general methods adopted in electron microscopy. Semi-thin sections (1-2 μm) obtained from these blocks on Leica EM UC7 ultrasounds were stained with methylene blue, azure II and fuchsin base, viewed in a Primo Star microscope (ZEISS), and the necessary parts were photographed with a Canon digital camera. Ultrathin sections with a thickness of 70-100 pm obtained from identical blocks were stained

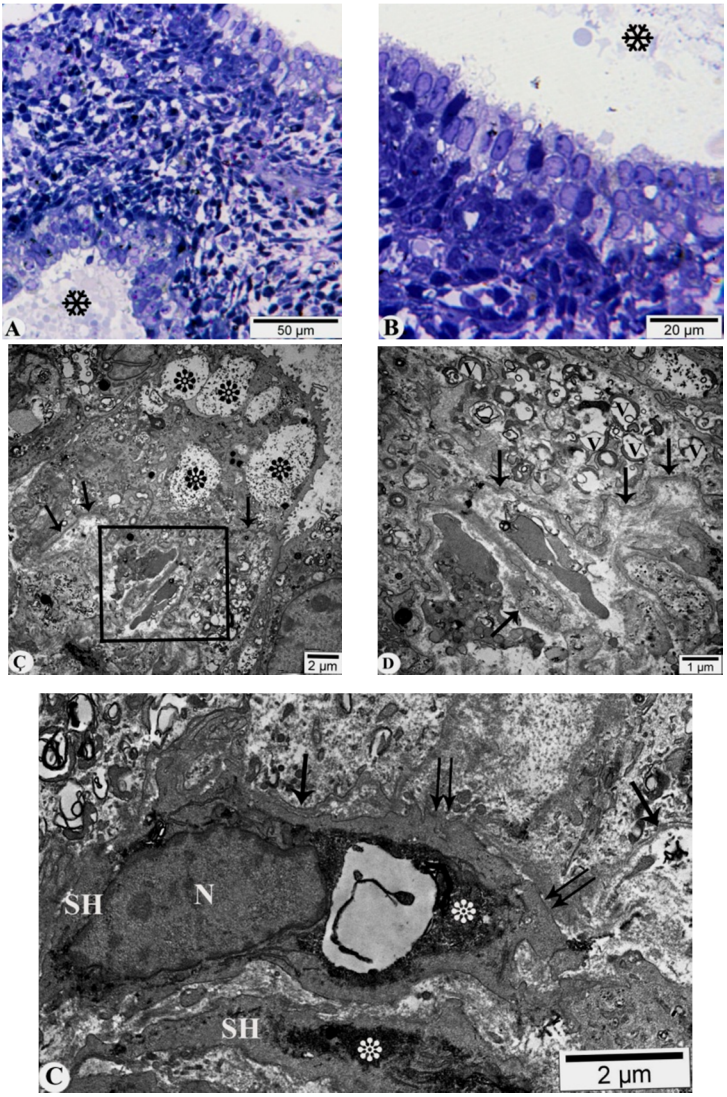

Fig. 4. Microscopic and ultrastructural images of the interaction between stromal elements and the epithelial layer of the endometrium in cases of infertile women in the middle of the proliferation phase (explained in the text). A-B - semi-thin sections, staining: methylene blue, azure II and fuchsin base, C-D - ultrathin section. Colorant: uranyl acetate and pure lead citrate

in 0.2% pure lead citrate, prepared initially in a 2% uranyl acetate solution, and then in a 0.1 N NaOH solution. Electrograms of ultrathin sections were photographed on a JEM-1400 transmission electron microscope at a voltage of 80-120 kv. Let us give the following example. A sharp proliferation of stromal cells of the endometrium and necrotic changes in it, led to the enveloping of the revealed parts of the single-layer by multilayer epithelium (Fig. 4A and B).

As it can be seen from the figures, cell fragments are identified, formed by the cytomy method as a result of the pressure of stromal cells that have not lost contact with the plasmalemmas directly surrounding the apical surfaces of epithelial cells, the nucleus of which is located at different levels, near the latter and inside the lumen of the uterus (shown by snowflakes). Thus, cell fragments with a delicate granular content, formed by the cytomy method, are found along with the stromal elements of the endometrium, as well as on its epithelial cover.

Failure to detect structures or their remnants related to the basal layer and not subjected to decidual differentiation, with revealed vacuole-like areas as a result of destruction of glycogenic accumulations in the cytoplasm (shown by arrows in Fig. 4C) should not raise doubts on the occurrence of desquamation of the epithelial cover of the endometrium. It is interesting that, as a result of pressure of the stromal structures, on the apical surface of epithelial cells with subjected to sharp deformation basal surface and the basal layer located around it (marked with arrows in Fig.4Ç
and D), projections (pinopods) are found in which there are secretory vacuoles with glycogenic grains, specific to the last stage of the secretory phase of the menstrual cycle. Along with this, total vacuolization as a result of destructive changes occurring in the organelles is observed in the epithelial cells contacting with the described cell (Fig. 4D).

Summing up the obtained data, it can be noted that with all infertile women, whose samples were objected to research both in the stromal and epithelial integument of the endometrium, the revealed microscopic and ultrastructural changes show a sharp difference

from the norm in the required conditions for blastocyst implantation.

This way, either the decidualization of the stromal elements specific for the middle stage of the proliferation phase in the endometrium does not occur, or the structural changes specific for the last stage of the secretory phase begin to form as a result of various reasons.

As noted by S. Nandeckor and colleagues (2015), the revealed changes in the biopsy materials taken together with data on the course of the menstrual process and the date of the biopsy are an analysis, while to clarify hormonal dysfunctions occurring in women and internal processes in the endometrium can turn into a diagnostic tool.

Thus, the atrophic variant of chronic endometritis is characterized by pronounced dysgenerative, dystrophic and destructive changes in the endometrium, damage to the stromal elements. Regardless of the history of intrauterine intervention in cases of women with various forms of infertility with a duration of 3 years and more and with mixed infection, the morphological variant of atrophic chronic endometritis prevails, which was verified during hysteroscopic studies. Accordingly, the hysteroscopy, as well as various histological examinations (according to indications) are the main stage in examining women with various forms of infertility, as well as women undergoing IVF training.

The use of MRI in order to determine the degree and form of adenomyosis and monitor the effectiveness of hormonal treatment.

In group II, 58 women were diagnosed with adenomyosis. It should be noted that X-ray indications of internal endometriosis (certain enlargements in the uterine cavity, "natural shadows") in the study group were detected in 62.0% of cases, echographically - in 37.3% of cases. In our study, hysteroscopic signs of adenomyosis (certain enlargements in the uterine cavity, a pattern of "rockiness" or "snowflakes", bleeding point "eyes"), laparoscopic signs (spherical shape of the uterus), as well as various forms of concomitant genital endometrosis were detected. Taking into account the above circumstances, as well as literature data on the 67.0% diagnostic accuracy of the degrees and forms of adenomyosis, to clarify 19

controversial observations, we performed magnetic resonance imaging. With all patients, MRI-tomograms showed an increase in the uterus, in particular its anteroposterior dimensions, and an enlargement of the uterine cavity 16 (84.2%). Also, in 14 (73.7%) cases, an asymmetry of the uterine wall was revealed, which averaged 1.2±0.3 cm) or low (nodal) intensity. In addition, adenomatous lesions with weak signal intensity (diffuse form) were identified in form of diffuse thickening along the entire length of the endometrium. In most cases, in 13 (68.4%) cases, a focal form of adenomyosis was observed. The degree of spread of endometriosis of the uterus was determined by the classification of A.N. Strizhakov. Adenomyosis of I degree was detected in 4 (21.0%) cases, I-II degree - in 12 (63.2%) cases. The identification of various forms of adenomyosis along with myomatous nodes and the involvement of all layers of the myometrium in the pathological process was noted in 3 (15.7%) cases, this circumstance was assessed as grade III endometriosis of the uterus (Fig. 5).

Fig. 5. Identification of various forms of adenomyosis along with myomatous nodes and the involvement of all layers of the myometrium in the pathological process was noted in 3 (15.7%) cases, this circumstance was assessed as endometriosis of the uterus of III degree

Upon a 6-month course of treatment, 89.2±1.2% regression of endometrioid foci was observed in 5 (45.5%) cases among 11 patients. 61.8±1.7% regression of adenomyosis in 3 (27.3%) cases was observed after a 6-month course of treatment. Resistance to hormonal treatment was detected in 3 (27.3%) cases, while a focal form of II degree adenomyosis, localized in the lower segment of the uterus, was noted. Thus, the use of magnetic resonance imaging is considered advisable for determining the form of adenomyosis and the degree of spread of the pathological process and monitoring the effectiveness of hormonal treatment in cases of women of reproductive age.

Morphofunctional assessment of the state of the endometrium in cases of women with polycystic ovary syndrome. Taking into account the variability of the echostructure of the endometrium, as well as its large role in the onset and development of pregnancy, in order to clarify its morphofunctional state for 37 patients with PCOS, a histological examination of pipe biopsy samples of the uterine mucosa was carried out on days 22-24 of the menstrual cycle or against the background of delayed menstruation.

Of these, in 25% (67.5%) patients, in pipel-biopsy specimens, compact fragments of the surface layer of endometrium with a characteristic histological picture were found. The linear course of the superficial uterine epithelium prevailed, which consisted of one row of columnar epithelial cells with a fragmented brush border. Above and below their nuclei, there were practically no zones of clearing (basal vacuolization); in addition, depletion of germ cells in the zone of the basal layer was revealed.

An essential feature of the uterine epithelium was the rare detection of the mouths of the endometrial glands over a large extent. This corresponded to a weak development of the uterine gland system; they were located at a distance from the uterine epithelium and appeared to be relatively narrow, rounded or oval canals, lined with high cylindrical channels with a small amount of secretion in the lumens (Fig. 6).

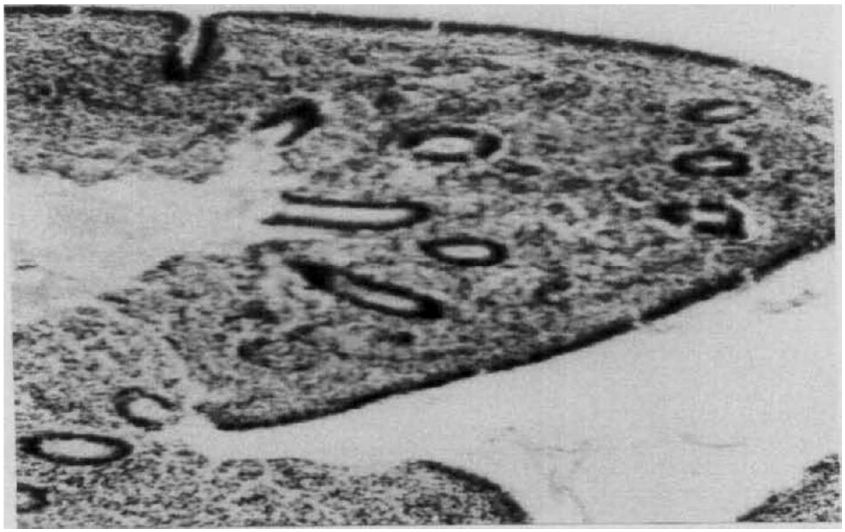

Fig. 6. Pipel biopsy. Lag of secretory transformations of the endometrium by 14 days in patient S. (24 day of the cycle). Stained with hematoxylin and eosin. Magnification x 100

In a continuous layer of epithelial cells, individual cells were found with significant clearing of the cytoplasm and a sharp basophilia of shriveled nuclei, that is, in a state of pronounced dystrophy.

The stromal component of the endometrium was represented by loosely located fibroblasts and diffusely scattered small lymphocytes. Only a small number of narrow, newly formed capillaries were detected, and spiral arteries were practically absent, as well as structural signs of the predicament reaction.

A feature of the endometrium in cases of these patients was the lagging of its restructuring by about 12-14 days, the lack of sufficient branching of the uterine glands, the depletion of the secretion in them and the absence of signs of a predecidual stromal reaction, which corresponded to a proliferative phase, that is, the anovulatory cycle. This was confirmed. It should be noted that among these patients,

pipel - a biopsy was performed in only 10 cases on the 22-24th day of the spontaneous menstrual cycle, in the rest, against the background of a delay of 12 to 43 days.

In 12 (32.5%) cases, glandular hyperplasia of the endometrium was revealed, presented by active proliferation of the endometrial glands and stroma. The number of glands is sharply increased, their shape and sizes of glandular lumens are quite varied. The glandular epithelium is cylindrical; an increased number of mitoses was detected. The endometrial stroma is dense and in some places edematous, consisting of oval cells in a state of active proliferation.

Endometrial hyperplasia was more often (9 out of 12) observed against a background of delayed menstruation from 18 to 36 days. However, in cases of 3 patients with an identified hyperplastic process of the endometrium, its biopsy was performed on the 22-24th day of the menstrual cycle.

Thus, the histological structure of the endometrium in female patients with infertility on the background of PCOS is diverse and is characterized by both the absence of secretory endometrial transformations and excessive proliferation of the glandular component. Despite this, a common morphological feature is the inferiority of the glandular and stromal components of the endometrium.

The nature of surgical treatment performed during laparoscopy in cases of women with various forms of infertility. Depending on the pathology detected during laparoscopy (adhesions in the small pelvis, sacto- and hydrosalpinxes, peri-tubar periovarian adhesions, polycystic and ovarian cysts, subserous and subserous-interstitial myomatous nodes), the patients underwent surgical operations corresponding to various forms of external genital endometriosis: endosurgical reconstructive operations (salpingoovariolysis, fimbriolysis, salpingostomy), as well as adhesiolysis, electrodestruction of endometriosis foci, ovarian resection, cystectomy, myomectomy (table 2).

One of the frequent endosurgical interventions performed in cases of women with various forms is salpingo-ovariolysis, which was most often performed in group I - in 40 (31.0±4.07%) cases, as well

Table 2

The nature of laparoscopic surgical interventions, performed on women with various forms of infertility

Surgical treatment	Group I		Group II		Group III		Total	
	n	%	n	%	n	%	n	%
Adhesiolysis	46	35,7± 4,22	27	39,1± 5,88	24	22,4± 4,03	97	20,6± 1,87
Salpingoovariolisis	40	31,0± 4,07	19	27,5± 5,38	17	15,9± 3,53	76	16,2± 1,70
Fimbryolysis	11	8,53± 2,46	–	–	7	6,54± 2,39	18	3,83± 0,89
Salpingostomy	14	10,9± 2,74	–	–	12	11,2± 3,05	26	5,53± 1,05
Resection of ovary	–	–	–	–	33	30,8± 4,46	33	7,02± 1,18
Cystectomy	18	14,0± 3,05	23	33,3± 5,68	14	13,1± 3,26	55	11,7± 1,48
Ovarian electrocautery	33	25,6± 3,84	27	39,1± 5,88	32	29,9± 4,43	92	19,6± 1,83
Electro Destruction of endometriosis focus	–	–	42	60,9± 5,88	–	–	42	8,94± 1,32
Myomectomy	15	11,6± 2,82	11	15,9± 4,41	–	–	26	5,53± 1,05
Tubectomy	3	2,33± 1,33	2	2,90± 2,02	–	–	5	1,06± 0,47
Total	129	41,4± 2,79	69	44,8± 4,01	107	73,8± 3,65	470	100

as in groups II and III in 19 (27.5±5.38%) and 17 (15.9±3.53%) cases, respectively. Fimbryoplasty was performed with fimbriae adhesions after chromosalpingoscopy. The fallopian tube was fixed with atraumatic forceps in the ampullar part 1-2 cm higher from the

stenotic opening. A needle coagulator in the cutting + coagulation mode was used to deaglutinate the adhesions between the fimbria.

Then the tube cavity was dilated. For this, atraumatic forceps were inserted at an angle into the cavity of the tube and then removed, moving forward in an open form. For hemostasis of bleeding areas, a point coagulator is used.

Salpingostomy was performed in case of occlusion in the distal part of the ampulla of the fallopian tubes. After identification of adhesions in the cavity of the tubes during chromosalpingoscopy, the latter were fixed with atraumatic forceps at a distance of 1-2 cm from the proposed stomy. Using a point coagulator in the "incision" mode in a predetermined place, cruciform incisions 2 cm long were made.

The patency of the tubes was assessed depending on the time of transition of indigo carmine from the ampullary part of the fallopian tubes to the abdominal cavity. Fimbriolysis / salpingostomy was performed only on women with tuboperitoneal infertility in 11 (8.53±2.46%) and 14 (10.9±2.74%) cases.

Salpingectomy was performed with a sactosalpinx diameter of more than 4 cm in group II of patients with endometriosis - in 23 (33.3±5.68%) people, in group I - in 18 (14.0±3.05%) people.

Ovarian surgery was performed on women with polycystic ovary syndrome, polycystic ovarian degeneration, and various ovarian cysts. These were 33 women from group III with PCOS and infertility duration up to 5 years. They did not have concomitant tubal-peritoneal infertility. Groups were allocated for the use of various endosurgical methods. Group A underwent 10 wedge resections. Cauterization of polycystic ovaries was carried out on women in group B. On 13 women in group C, joint resection and cauterization of the ovaries was carried out according to the technique developed by us. After the completion of the operation, the size of the ovaries is reduced to normal size. With polycystic ovarian degeneration, only electrocautery is performed using the above method. Electrocauterization was performed in group I on 33 (25.6±3.84%) women and in group II - on 27 (39.1±5.88%) women.

Laparoscopic cystectomy was performed in the presence of retention structures in the ovaries. This operation was most often

performed in group II, their number was 23 (33.3±5.68%). In I and III, they were carried out with the same frequency and amounted to 18 (14.0±3.05%) and 14 (13.1±3.26%) people, respectively. In minor forms of endometriosis (endometrioid ectopia in the abdominal cavity, in the small pelvis, fallopian tubes and ovaries) on women with endometriosis of various forms, depending on the severity of the latter, electro-destruction or excision of heterotopia was performed, followed by coagulation of the implant bed. In group II, 42 (60.9±5.88%) women underwent electro-destruction of endometrioid ectopia.

When subserous myomatous nodes were detected, laparoscopic myotomy was performed. After incision of the serous layer, the subserous node was exfoliated, the bed was coagulated. The sizes of the removed myomatous nodes ranged from 1-7 cm. In group II, in all cases, in addition, the electro-destruction of endometrioid ectopia was carried out.

Large nodes were initially accurately split into small ones, which were removed from the abdominal cavity using a trocar through a 12 mm counteropening (more often using a morcellator). Laparoscopic myotomy was performed in groups I and II on 15 (11.6±2.82%) and 11 (15.9±4.41%) women, respectively. All surgeries were completed with pelvic debridement, aspiration of blood clots and irrigated fluid.

Thus, laparoscopy, performed on women with infertility of various forms, makes it possible to clarify the cause of infertility, to determine the patency of the fallopian tubes, in the presence of obstruction, to establish the degree of violations of the patency of the tubes, to determine the severity of the adhesions and post-inflammatory changes in the fallopian tubes, to carry out the reconstruction of plastic surgery on the fallopian tubes. Also, the particular importance is the identification of concomitant pathology (ovarian cysts, uterine fibroids, etc.).

Results of endosurgical treatment of women with various forms of infertility. Minimally invasive techniques are being introduced deeper into all areas of surgical practice. Nowadays, endoscopic surgery is closely integrated into gynecology and reconstructive surgery and offers more advantages to patients in comparison with

conventional methods. It became possible to avoid large, non-cosmetic incisions and shorten the rehabilitation period. Currently, large operations, leading to such serious complications as adhesions in the abdominal cavity, have been replaced by the latest minimally invasive surgical technologies.

When studying the onset of pregnancy after endosurgical correction in a group of women with various forms of infertility, the age of the patients, the duration of infertility and the severity of the accompanying adhesions were taken into account. This distribution allows one to expect certain results in a certain subgroup and to assess the therapeutic potential of endoscopic correction in various forms of infertility. The total frequency of pregnancies within 5 years of patients with tubal-peritoneal infertility was 42.1%, which is slightly higher than the average statistical indicators provided by different authors (on average, from 18% to 35%).

Thus, endoscopic reconstructive plastic surgery allows for effective correction of tubal-peritoneal infertility. It is more expedient to evaluate the endosurgical treatment of TPI depending on the woman's age, duration of infertility, the severity of post-inflammatory changes and the type of interventions performed. In other words, to establish these results, the results of endosurgical treatment in subgroups are assessed according to the above indicators. According to the overall final indicator for the onset of intrauterine pregnancy, the therapeutic potential of endoscopic surgery in TPI can be confirmed.

Two-stage treatment, involving the sequential use of endosurgical correction of external endometriosis of various forms (electrodestruction of endometrioid tissues - ectopia, cystectomy, etc.) and correction of tubal-peritoneal infertility, as well as subsequent adequate hormonal treatment in 54.2% cases allows to restore reproductive function of women with various forms of endometriosis, which was higher than the average statistical indicators and in the opinion of different authors (within 30-60%). Therefore, the complex conduct of hystero- and laparoscopy makes it possible to identify various forms of endometriosis and carry out its endosurgical treatment, and the subsequent implementation of

adequate hormone therapy - to effectively restore the reproductive function.

The total incidence of pregnancy as a result of simultaneous wedge resection and cauterization of polycystic ovaries in patients with PCOS, as well as endosurgical correction of tuboperitoneal infertility was 69.4%, which was relatively higher than the results of separately performed wedge resection and cauterization of polycystic ovaries (37-58%). Simultaneous wedge resection and cauterization of polycystic ovaries allows us to study the morphostructure of altered ovaries and effectively restore the reproductive function of patients (PCOS). With a separate wedge resection and cauterization of polycystic ovaries, it was not possible to adequately reduce the volume of the ovaries, and when only cauterization of polycystic ovaries was carried out, it was not possible to study their morphostructure. Thus, the simultaneous wedge-shaped resection and cauterization of polycystic ovaries may become the method of choice in the endosurgical treatment of women (PCOS).

The above indicators made it possible to establish therapeutic and diagnostic measures at the stage of endoscopy - simultaneous hysteroscopy and laparoscopy:

- The complex use of various methods (HSG, CUSHSG, LSHS) on patients with tubal-peritoneal infertility makes it possible to establish the patency of the fallopian tubes: in the diagnosis of proximal occlusion by LSHS SSG and transcatheter recanalization of the fallopian tubes;
- Histomorphological examination of biopsy specimens of the endometrium and ovaries: to establish the degree and form of adenomyosis, MRI was performed depending on the patient's age, duration of infertility, inflammatory changes in the fallopian tubes and the severity of concomitant adhesions, the nature of the operation and the course of - postoperative period, forms of infertility.
- The results obtained allow us to conclude that in order to restore reproductive function of women with various forms of infertility, endovideoscopy should be applied in a comprehensive manner, as well as modern methods of visual

diagnostics, endosurgical treatment of the revealed pathology and the tactics of constant monitoring of patients.

FINDINGS

1. The high frequency of detection of concomitant pathologies of women with various factors of infertility (tubal-peritoneal infertility, infertility due to various forms of endometriosis, as well as polycystic ovary syndrome) suggests the need for complex hysteroscopy and laparoscopy in this contingent of patients [1, 3, 18].
2. In 57.5% of patients with tuboperitoneal factor of infertility, 57.9% of patients with various forms of endometriosis and 53.3% of patients with polycystic ovary syndrome in the history of previous operations, cystectomy, ovarian resection, tubectomy and adnexectomy are noted. In 15.1% of patients with tuboperitoneal infertility, 10.8% with various forms of endometriosis and 26.7% with polycystic ovary syndrome, appendectomy was noted, in 8.9% of patients with tuboperitoneal infertility, 15.8% with endometriosis and 20% with a history of polycystic ovaries, operations on the uterine appendages and cecum were noted [16, 19, 20].
3. Based on the data of hysteroscopic studies of patients with tubal peritoneal infertility, chronic endometritis was most often found in 42.4%, endometrial hyperplasia in 22.9% of patients, endometrial polyps in 17.8%, and 7, 63% - intrauterine synechiae. With various forms of endometriosis, 21.1% have chronic endometritis, 15.8% have intrauterine synechia, 21.1% have endometriosis of the fallopian tubes, 15.8% have endometrial polyps, 10.5% have submucous uterine myoma.

   Patients with polycystic ovary syndrome were diagnosed with chronic endometritis in 38.2%, with endometrial polyps in 29.4%, with endometrial hyperplasia in 23.5%, and intrauterine synechia in 8.82% [6, 10].
4. The study of the severity of the adhesions made it possible to establish that in previously operated women with infertility of

various origins, the Pfannenstiel incision has the adhesion process noted in 87.5%, with the lower middle incision - in 92.3%, and with incisions in the right iliac region - 75%, which reflects the high probability of the development of the adhesive process during laparotomy operations;

5. In 38.8% of patients with tubal-peritoneal infertility, according to laparoscopy, chronic salpingo-ophoritis is noted, in 9.62% - hydrosalpinx, in 6.73% - saktosalpinx. The frequency of adhesions in the small pelvis of varying severity is 20.2%. At the same time, patients with tubal-peritoneal infertility, were diagnosed with uterine fibroids in 17.3%, in 5.77% with tumors and tumor-like formations of the ovaries, in 1.6% with uterine malformations. Chronic salpingo-oophoritis was diagnosed in 50% of patients with various forms of endometriosis, and the frequency of adhesions in the small pelvis was 19.1%, the detection rate of tumors and tumor-like diseases of the ovaries was within 21.4%, and uterine myoma was diagnosed in 9.52%

   With polycystic ovary syndrome, 50% also have chronic salpingo-oophoritis, 40.8% have adhesions of varying severity, 9.26% have tumors and tumor-like formations of the ovaries [6, 10, 19].
6. Factors of high risk of infertility are chronic salpingo-oophoritis, the presence of an adhesive process in the small pelvis, as well as the presence of tumors and tumor-like formations of the ovaries and uterus [1, 5, 8, 16].
7. According to laparoscopy, the incidence of small forms of endometriosis was 68.75%, endometrioid ovarian cysts 22.9%, retrocervical endometriosis was diagnosed in 4.8% of cases, endometriosis of the fallopian tubes - 3.6% [5, 8].
8. Study of the patency of the fallopian tubes of women with infertility of various origins made it possible to determine a significant increase in their patency according to the data of laparoscopic chromosalpingoscopy (66.7%) in comparison with contrast ultrasound hysterosalpingography (18.5%). In 50% of women, obstruction of the fallopian tubes, according to laparoscopy data, was noted in the interstitial or isthmic

regions, compared with the indicators of contrast ultrasound hysterosalpingography (38.6%) [1, 3, 12].

9. The simultaneous use of modern wedge-shaped resection and cauterization of polycystic ovaries, the use of the endosurgical method allows to reduce the volume of polycystic ovaries and to study the morphological structure of the gonads [18, 19].
10. With the duration of infertility up to 5 years of patients with scleropolycystic ovaries, recovery of the menstrual cycle was 79.3%, while laparoscopic wedge resection and cauterization of polycystic ovaries were performed simultaneously, pregnancy was noted in 68.4% of patients of the same subgroup. With the duration of infertility over 5 years, these indicators were 77.7% and 21.1%, respectively, which reflects a decrease in the likelihood of pregnancy in infertility in the group of patients with polycystosis of the ovaries [2, 7, 10].
11. Performing transcatheter recanalization of the fallopian tubes (selective salpingography) allows to eliminate proximal occlusion in patients with tubal-peritoneal infertility and achieve pregnancy in 39.1% of cases [4].
12. Improved laparoscopic methods of surgical interventions of patients with a pronounced adhesive process in the small pelvis made it possible to avoid complications associated with injury to adjacent organs [3, 6, 9, 16].
13. Electron microscopic examination of patients with infertility, regardless of the form, in most cases, makes it possible to identify atrophic forms of chronic endometritis. Atrophic forms are characterized by pronounced disgenerator, dystrophic and destructive changes in the layers of the endometrium, mosaic differentiation of stromal elements, damage to the endotheliocytes of blood capillaries [11, 17, 21].

PRACTICAL RECOMMENDATIONS

1. In order to treat infertility of women under the age of 35 in the absence of other causes of infertility, it is recommended to restore uterine obstruction by selective salpingography and

transcatheter recanalization, the sequential alternation of which shows high efficiency in visualization and assessment of the state of the distal fallopian tubes.

2. The use of selective salpingography and transcatheter recanalization is also recommended in groups of patients above 35 years of age due to the fact that the efficiency indicators of these techniques do not depend on the age of the examined women.
3. Selective salpingography and transcatheter recanalization of fallopian tubes are safe procedures. The identified few side effects and complications were not severe and did not have clinical consequences.
4. Selective salpingography makes it possible to effectively assess the condition of the distal sections of the fallopian tubes. In case of detection of radiological signs of pathological changes in the distal parts of the tubes, the probability of spontaneous pregnancy is significantly reduced, even in the case of their adequate patency.
5. Effective intervention method has been developed for laparoscopic operations in patients previously operated on for tubal-peritoneal factor infertility.
6. The method of recanalization with a catheter of the proximal part of the fallopian tubes has been improved and optimal conditions for its implementation have been established.
7. The method of wedge-shaped resection and cauterization of polycystic ovaries has been improved and its effectiveness has been proven in comparison with other endosurgical methods of correction of polycystic ovary syndrome.
8. Operative hysteroscopy according to the S.Bettocchi method can be used for surgical treatment of endometrial polyps, intrauterine synechiae and septum of the uterine cavity in outpatient conditions or in "one-day hospitals".
9. The surgical intervention should be preceded by a diagnostic hysteroscopy using the S.Bettocchi method to clarify the nature of intrauterine pathology and assess the tolerability of surgery without anesthesia.

10. The indication for selective salpingography in patients suffering from infertility should be considered proximal obstruction of the fallopian tubes, detected with HSG, laparoscopic chromopertubation or sonohysterography.
11. In case of confirmation of proximal obstruction of the fallopian tubes by selective administration of a contrast agent, an attempt should be made to transcatheter recanalization of the occluded section of the tube.

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LIST OF ABBREVIATIONS

ChE – chronic endometritis
CUSHSG – contrast ultrasound hysterosalpingography
DUB – dysfunctional uterine bleeding
FSH – follicle stimulating hormone
FT – fallopian tubes
HRS – hysteroresectoscopy
HS – hysteroscopy
HSG – hysterosalpingography
IEI – immunoenzymometric immunoassay
IUD – intrauterine devices
LH – luteinizing hormone
LS – laparoscopy
LSHS – laparoscopic chromosalpingoscopy
PCOS – Polycystic Ovary Syndrome
SSG – selective salpingography
TPI – tubal peritoneal infertility

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