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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

LEVEL, STRUCTURES, RISK FACTORS AND WAYS OF PREVENTING OF COMPLICATIONS OF ENDOSCOPIC SURGERIES IN GYNECOLOGY

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GENERAL DESCRIPTION OF THE STUDY

Actuality of the topic and the degree of its development:

Scientific and technological progress determined the development of medicine in all periods of history. The last half century in developed countries is characterized by the rapid development of endoscopic surgery. Currently, laparoscopy occupies a special place in the daily practice of a gynecologist. It is believed that there is a fundamental difference between laparoscopic and laparoscopic approaches due to the fact that the initial stage of laparoscopy is performed blindly. This can lead to damage of blood vessels, internal organs.^{1;2;3;4}

Therefore, the researchers' data on the frequency of endoscopic complications differ from each other (0.4 - 3.0%). Currently, there are alternative options for performing of endoscopic operations, experience of robotic radical hysterectomy has been collected.^{5;6;7;8;4}

¹ Lonnerfors, C., Reynisson, P., Persson, J. A randomized trial comparing vaginal and laparoscopic hysterectomy vs robot-assisted hysterectomy // *J Minim Invasive Gynecol.*, - 2015. 22, - p.78–86.

² Allan, C., Ilic, D. Laparoscopic versus Robotic-Assisted Radical Prostatectomy for the Treatment of Localised Prostate Cancer: A Systematic Review // *Urol Int.*, - 2016. 96, - p. 373–378.

³ Akhverdiev, B. D., İsaev, H.B. Endoscopic examination fundoplication cuff for comparison of different of results laparoscopic antireflux surgery // *Ulusal Hepato Gastroenteroloji Kongresi. 5. Ulusal Gastroenteroloji Kongresi, 1st Euroasian Gastroenterological Assosiation Symposium*, - Hebipa: - 2017, - p. 254.

⁴ Gallotta, V. Robotic versus laparoscopic radical hysterectomy in early cervical cancer: A case matched control study // *Eur. J. Surg. Oncol.*, - 2018. Pii: S0748 – 7983 (18) 30129 – X.

⁵ Ulker, K., Huseyinoglu U., Kılıç, N. Management of benign ovarian cysts by a novel, gasless, single-incision laparoscopic technique: keyless abdominal rope-lifting surgery (KARS). // *Surg Endosc.*, - 2013. 27, - p.189-198

⁶ George S. et al. Retrospective cohort study evaluating the impact of intraperitoneal morcellation on outcomes of localized uterine leiomyosarcoma // *Cancer.*, - 2014. 120, 3154–2158.

⁷ Bogani G., Cliby W.A., Aletti G.D. Impact of morcellation on survival outcomes of patients with unexpected uterine leiomyosarcoma: a systematic review and meta-analysis // *Gynecologic Oncology*, - 2015. Vol.137, №1, - p.167–172.

This is another reason for the unequal complication rate in endoscopic surgery. The lack of a unified approach to the concept of "complications of surgery" also leads to different interpretations of the outcomes of endoscopic operations. The authors of the original study of complications in laparoscopic gynecological surgery⁴ distinguish acute (bowel and kidney perforation, vascular injury with severe bleeding, pulmonary edema, death) and mild (moderate anemia, minor bleeding, abscesses, and other) complications and separately evaluate their risk.

Russian scientists^{9;10} describe such serious complications as injury to the vessels of the anterior abdominal wall, damage to the intestines, urinary organs, bleeding from the pelvic organs, and pay attention to the need for a careful analysis of the causes of their occurrence. After surgery on the pelvic organs, women in 1.83% of cases have wound complications (peritonitis, intra-abdominal bleeding, intestinal obstruction). At the same time, it is believed that the use of laparoscopy as an endo-video surgical technique can increase the level of safety.

It is noted that,¹¹ during the first year of developing of the method of laparoscopic surgery the frequency of complications was 49.5%. Increasing of experience of using of laparoscopic access leads to decreasing of complications frequency for 2.5 times. According to the author's data, the most dangerous complications are intraoperative bleedings (4.86 ‰).

⁸ Galvao A. et al. Mini – laporoscopic hysterectomy for adenocar chrome in sitn of the uterine sewix using interchangeable 5 – mm end effectors: a way to cross the line of minimally invasive surgery in gynecologic oncology // Facts views vis obgyn., - 2017. 9 (3), -p. 163 – 166.

⁹ Дивакова, Т.С., Елисеенко, Л.Н. Осложнения лапароскопической хирургии в гинекологической практике // Вестник ВГМУ, - 2012. Т. 11, № 1, - с. 96 – 101.

¹⁰ Галимов, О.В. Профилактика послеоперационных осложнений и возможность контроля её эффективности и др // Эндоскопическая хирургия, - 2013. № 2, - с. 48 – 57.

¹¹ Сазанова, Е.О. Осложнения лапароскопических операций на органы малого таза у женщин // Эндоскопическая хирургия, - 2007. № 5. - с. 49 – 57.

A Turkish scientist² provides more extensive information about the complications of laparoscopic operations: damage of large blood vessels caused by the insertion of a Veress needle or trocar (0.1 - 0.4%); intestinal trauma (0.04%). The most common visceral lesions include damage of the intestines, bladder, and ureter. These complications also can happen with hysterectomy.² Large intestinal injuries during gynecological laparoscopy have been noted in the research works of K. Ulker et al.⁵. It is believed that 50% of bowel damages are not diagnosed during surgery, thus the risk of sepsis and death-increases.

The risk of complications of laparoscopic operations is multi-vector, its size depends on the experience of the surgeon, the adequacy of the technology, the complexity and volume of the operation, the state of the body and the conditions of the clinic^{12;4} et al.. A high level of complications cannot be regarded as a failure of laparoscopic operations, since the difficult laparoscopic operations in severe clinical situations are performed by more experienced and successful surgeons. That is why, the superficial attitude to assessment of risk of complication of laparoscopic operations can be a reason for false decisions.

Information about complications of endoscopic gynecological operations get according the requirements of evidence-based medicine in modern literature is limited^{13;14}, although endoscopic surgery is widely developed in the country such researches have not been conducted in Azerbaijan at all^{15;16;17}. All these information indicate the relevance of the topic of the dissertation.

¹² Fuentes M.N. et al. Complications of laparoscopic gynecologic surgery // JSLs, - 2014. Volume 18, issue 3, e2014. 00058, - p.1-9.

¹³ Bogani G., Cliby W.A., Aletti G.D. Impact of morcellation on survival outcomes of patients with unexpected uterine leiomyosarcoma: a systematic review and meta-analysis // Gynecologic Oncology, - 2015. Vol.137, №1, - p.167–172.

¹⁴ Gallotta, V. Robotic versus laparoscopic radical hysterectomy in early cervical cancer: A case matched control study // Eur. J. Surg. Oncol., - 2018. Pii: S0748 – 7983 (18) 30129 – X.

¹⁵ Məmmədov, A.M., Qasımov N.A. Kəskin və xroniki daşlı xolesistitlərdə laparoskopik cərrahiyyənin tətbiqi // Sağlamlıq, - 2016. №3, - s.181-187.

Object and subject. The object of the study was a woman operated on with an endoscopic approach for pathologies of the genital organs. The subject of observation was diseases of the female genital organs, types of surgery, complications during and after surgery.

The purpose of the study. To substantiate the methods for preventing the complications of endoscopic gynecological operations on the basis of studying the risk factors of their prevalence and structural variability.

Tasks of the study:

- To obtain characteristics of endoscopic gynecological operations by type, cause and complications;
- To study the dependence of the risk of intra- and postoperative complications on the clinical situation, type and reason of endoscopic operations;
- To assess the role of the preoperative state of coagulation and platelet hemostasis in the formation of the risk of blood loss during endoscopic gynecological operations;
- To substantiate the ways of preventing complications of endoscopic gynecological operations.

Methods of the study. General clinical examination, gynecological examination, clinical analysis of blood, urine, biochemical blood test, electrocardiogram, vaginal smear for oncology; coagulogram; transvaginal ultrasound; laparoscopic examinations: echohysterophia, magnetic resonance imaging.

Theses of the dissertation submitted for defense:

- Development of endoscopic surgery in Azerbaijan lead to effective use of laparoscopic and hysteroscopic complex operations in the practice of gynecologists;

¹⁶ Ахвердиев, Б.Д., Исаев, Г.Б. Отдаленные результаты одновременной лапароскопической коррекции хронической дуоденальной непроходимости и холецистэктомии при желчнокаменной болезни // Georgian medical news, - 2016. №5 (254), - с. 19-25

¹⁷ Albright, B.B. Robotic Versus Laparoscopic Hysterectomy for Benign Disease: A Systematic Review and Meta-Analysis of Randomized Trials / B.B.Albright, T.Witte, A.N.Tofte [et. al] // J Minim Invasive Gynecol., - 2016. 23, - p.18–27. <https://doi.org/10.1016/j.jmig.2015.08.003> PMID: 26272688

- The complication risk during endoscopic operations is changeable, depend on clinical situation, methods of surgical access, type of operation and can be managed;
- Pre-operational indicators of coagulation and platelet hemostasis changes within the wide interval. The extreme values of these indicators should be considered as predictors of the risk of complications in endoscopic operations.

Scientific novelty of the achieved results:

- For the first time, the feature of the use of endoscopic gynecological operations in Azerbaijan has been shown, which is characterized by a high specific gravity of complex laparoscopic and hysteroscopic operations on the uterus;
- For the first time, the frequency of acute and semi-acute complications during different types of laparoscopic and hysteroscopic operations, which shows the place of endoscopic surgery in gynecology in Azerbaijan among similar services in world countries;
- Dependence of complication risk on clinical situation (age, parity, history of burden, comorbidity, reasons for surgery) and volume (type) of endoscopic interventions and for the first time it was determined the rate of relative and attributive risk of complications;
- The significance of the indicators of coagulation and platelet hemostasis within the extreme centiles and quartiles as a risk of blood loss during endoscopic gynecological operations was established and their sensitivity, specificity and prognostic value were assessed.

Practical significance of achieved results:

- The revealed causal dependence of the rate and structure of complication on risk factors contains the scientific basis for formation of conception safety provision for conducting of endoscopic gynecological operations;
- The established dynamics of the rate of complications of endoscopic gynecological operations during 15 years directs the health care system to choose ways to improve en-

- doscopy technology and improve the skills of obstetricians and gynecologists in the field of endoscopic surgery;
- The established variability of patterns of complication risk at endoscopic gynecological operations allows adequately assess the work of doctors, health care services and specialized clinics, dealing with endoscopic gynecological operations;
 - The methodology of identification of the dependence of the risk of complications of endoscopic operations, discussed in the given dissertation, can be used in future scientific research works.

Approbation and implementation of research results. The initial discussion of the work was held at the interdepartmental conference of the departments: "Obstetrics and Gynecology", "General surgery with a course of pediatric and plastic surgery", "General surgery with a course of cardiovascular and neurosurgery" 04.30.2021 (prot. No. 4). The approbation of the work was carried out at the Scientific Seminar of the Dissertation Council FD 2.11 (05.27.2021, prot. No. 4) of the Azerbaijan State Advanced Training Institute for Doctors named after. A.Aliyeva. N.K. Alizade published 6 scientific articles as single author. In addition, she has published 3 articles together with her supervisor. 2 articles were published in the "Azerbaijan Medical Journal" indexed by SCOPUS. One of the dissertation articles is indexed in SCOPUS and published in a prestigious journal published in the Russian Federation. In addition, the author has published in journals recommended by the Higher Attestation Commission of the Azerbaijan Republic.

The dissertation article was published in the collection of the international scientific-practical conference in city Novosibirsk of the Russian Federation.

Results of the study are implemented by doctors of "Leyla Medical Center" and "Aveaziya" Clinic «Avrasia», also in education process in the State Advanced Training Institute for Doctors named after A. Aliyev.

Name of the organization where the dissertation work is performed. Azerbaijan State Advanced Training Institute for Doctors named after A.Aliyev.

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Volume and structure of the dissertation. The thesis is presented on 165 pages, typed on a personal computer, includes 26 tables, 12 diagrams. The work consists of an introduction (9201- characters), a literature review (Chapter I - 37849 characters), a description of materials and research methods (Chapter II - 13080), 4 chapters (III - 20584 characters, IV - 55904 characters, V - 30216 characters, VI - 25086 characters) own results, conclusions - 1218 characters, practical suggestions - 852 characters, a list of references, which includes 206 sources, of which 7 are in Azerbaijani, 51 in Russian, 148 in English. The total number of characters is 193990.

MATERIALS AND METHODS OF THE STUDY

The object of the study was formed, without exception, with the coverage of all patients operated during 2002 – 2016 years and consisted of 2476 observation units.

The women's age was in the range of 14 - 73 years and average amount was 37.85 ± 0.21 .

All women underwent anthropometric examinations before the operation, and the body mass index (BMI) was calculated for each of them according to the form $= M / h^2$, where M is body weight in her, h is height in meters.

While preparation for planned surgical treatment, the patients were given:

- Clinical examinations;
- Gynecological examination;
- Clinical analysis of blood, urine, biochemical blood test, electrocardiogram, vaginal smear on oncocytopology;
- Coagulogram (activated recalcification time, activated partial thromboplastin time, thrombin time, prothrombin ratio, international normal ratio, fibrinogen, soluble fibrin - mon-

omeric complexes, platelet count, anti-thrombin III, plasminogen reserve index and blood clotting time).

All patients underwent transabdominal and transvaginal ultrasound examination (US) at the prehospital stage. Women diagnosed with infertility (102) were tested for female sex hormones (anti-Müllerian hormone, follicle-stimulating hormone, luteinizing hormone, estradiol, and testosterone). The Wong-Baker visual pain scale was used for women with diagnosis "chronic pelvic pain" (141), to assess pain at the pre-hospital level.

Laparoscopic and hysteroscopic operations used for the treatment of the underlying pathology were grouped according to the following types:

- Operations on the uterine appendages, which are not technically difficult operations – 495 (adnexectomy, ovarian resection, tubectomy, ovariectomy, reconstructive plastic surgery);
- Surgeries on the uterus, which, as a rule, are technically difficult operations - 1472 (total hysterectomy, subtotal hysterectomy, conservative myomectomy and polypectomy);
- Other surgeries -509 (coagulation of foci of endometriosis, removal of the fetal face under hysteroconical control and others).

The patients grouped according to the main reason for the operation also had concomitant pathologies of the genital organs, some of which required surgical treatment, which required simultaneous operations.

In laparoscopic and hysteroscopic operations, hemostasis was provided by methods, the grouping of which made it possible to distinguish three subgroups: monopolar, bipolar hemostasis and other types of hemostasis.

All significant complications were documented in medical records.

Methods of descriptive statistics of quantitative signs (age, indications of coagulation and platelet hemostasis) and qualitative signs (structure of types and causes of operations, frequency and structure of complications) were used to characterize the types and

causes of endoscopic operations and complications during and after the operation.

Methods of descriptive statistics of quantitative signs (age, indications of coagulation and thrombocytic hemostasis) and qualitative signs (structure of types and causes of operations, frequency and structure complications) have been implemented for characterizing of the types and causes of endoscopic operations and complications during and after the operation. 5 groups by age of, 13 groups by structure and type of operations, 3 groups by indications for surgery in 17 groups and by years were determined. The distribution of women by reproductive activity is given in 5 groups, and in 4 groups by body mass index.

The operated patients were divided into subgroups according to the characteristics of clinical and demographic information; the complication rate and its 95% confidence interval were determined in each subgroup. The difference between the subgroups was assessed by the χ^2 test.

Calculations of risk level were carried out to prove the significance of intergroup differences. The relative risk was determined by dividing the rate of complications in the main group by the level of the indicator in the control group, which characterizes the multiplicity of the ratio. The attributive risk was determined by the difference in the level of complications in the study and control groups.

Signs (risk factors) which are associated with increased complication rates were evaluated in terms of sensitivity, specificity, and predictive value.

CHARACTERISTIC OF THE TYPES AND CONDITIONS OF GYNECOLOGICAL ENDOSCOPIC SURGERY AND THE NEAREST INTRA - AND POSTOPERATIVE COMPLICATIONS

Generally young women had undergone endoscopic gynecological surgery. Share of women aged under 25 years, 25 – 34, 35 – 44, 45 – 54, 55 and more among operated patients was correspondingly 10,0±0,6; 30,0±0,0; 38,1±1,0; 15,9±0,7 and 6,0±0,5%. The minimum and maximum age of the patients was 14 and 73 years, re-

spectively (mean age 37.8 ± 2.1 years; median age 37 years, the age of tendency is 31 years). Most of patients were residents of the city of Baku (1337; $54.0 \pm 1.0\%$). The distribution of women by reproductive activity showed that $4,1 \pm 0,4\%$ (102) of them were nulliparous (suffered from infertility), one, two, three, four, five or more births in history were, respectively, in 402 ($16.2 \pm 0.7\%$), 931 ($37.6 \pm 1.0\%$), 521 ($21.0 \pm 0.8\%$), 385 ($15.6 \pm 0.7\%$) and 135 ($5.5 \pm 0, 5\%$) women.

A medical history of 480 women ($19.4 \pm 0.8\%$) which had operations in the abdominal cavity and pelvic organs. Distribution of the contingent by body mass index: ≤ 24.99 kg / m² at 612 women ($24.7 \pm 0.9\%$), 25 - 29.9 kg / m² at 1216 women ($49.1 \pm 1.0\%$); 30 - 34.99 kg / m² at 536 women ($21,7 \pm 0,7\%$), 35 kg / m² and more at 112 women ($4.5 \pm 0.4\%$).

The main reasons for surgical treatment were: adenominosis (75; $3.0 \pm 0.3\%$), ovarian apoplexy (78; $3.2 \pm 0.4\%$), infertility (102; $4.1 \pm 0,4\%$), ectopic pregnancy (28; $1.1 \pm 0.2\%$), genital endometriosis (101; $4.1 \pm 0.4\%$), ovarian cyst (152; $6.1 \pm 0.5\%$), uterine myoma (670; $27,1 \pm 0,9\%$), polyp of the cervical canal (151; $6,1 \pm 0,5\%$), recurrence of ovarian cysts (58; $2,3 \pm 0,5\%$), adhesions in the small pelvis (142; $5,7 \pm 0,5\%$), salpingo-ophoritis (37; $1,5 \pm 0,2\%$), tubo-ovarian tumors (32; $1,3 \pm 0,2\%$), endometrial hyperplasia (149; $6,0 \pm 0,5\%$), endometrial polyps (448; $18,1 \pm 0,8\%$), chronic pelvic pain (141; $5,7 \pm 0,5\%$), prolapse of female genital organs (28; $1,1 \pm 0,2\%$), others (84; $3,4 \pm 0,4\%$).

Besides the main reasons for surgical treatment among patients there are another side pathologies, which are recommendations for simultaneous operations. In particular, for 100 women with infertility (the main indication for endoscopic surgery) there were $25,5 \pm 4,3\%$ cases of adenomyosis, $27,5 \pm 4,4\%$ cases of genital endometriosis, $11,8 \pm 3,2\%$ cases of ovarian cyst, $4,9 \pm 2,1\%$ adenoma of the uterine appendages, $15,7 \pm 3,6\%$ cases of myoma, $11,8 \pm 4,4\%$ cases of endometrial hyperplasia, $9,8 \pm 2,9\%$ cases of other pathologies. Generally 1,32 pathologies of pathologies of the genital organs, for the treatment of which endoscopic operations are indicated.

The combination of reasons for endoscopic gynecological surgery is variable depending on the underlying reason. So, for example,

the combination of indications for simultaneous endoscopic operations is comparatively more for women with infertility there, and is comparatively less pronounced for women with prolapse of the pelvic organs. For 100 endoscopic operations, there were different numbers of concomitant pathologies, depending on the main reason: 132,5 pathologies with infertility, 26,6 pathologies with adenomyosis, 47,6 pathologies with genital endometriosis, 51,2 pathologies with ovarian cysts, 15,2 pathologies with uterine myoma, 31,6 pathologies with endometrial hyperplasia, 14,4 pathologies with an endometrial polyp, 2,4 pathologies in non-developing pregnancy, 75,1 pathologies with ectopic pregnancy, 26,6 pathologies with ovarian apoplexy, 21,2 pathologies with a polyp of the cervical canal, 29,2 pathologies with recurrent endometroid cystic foci, 24,7 pathologies in the spa process in the small pelvis, 54,0 pathologies in salpingo-opharitis, 28,1 pathologies in tubo-ovarian tumor.

We observed that, simultaneous operations were performed in $20,0 \pm 0,8\%$ of cases (95% confidence interval 18,4 - 21,6%). The following options were the most common options for simultaneous endoscopic surgery: + polypectomy + salpingo-ovariolysis + left-side salpingoectomy + removal of blue eyes; bilateral adnensectomy + uterine venterofixation + shortening of the round ligaments + levatoroplasty + anterior and posterior colporrhaphy; left-sided tubectomy + left-sided salpingectomy + bilateral salpingoovarioliosis; ovarian drilling + coagulation of foci of endometriosis.

The structure of hemostasis methods changed depending on the volume (type) of the operation. The proportion of monopolar, bipolar coagulation and other methods of hemostasis was respectively 28,7; 60,8 and 10,5% in case of conservative myomectomy, 26,8; 53,6 and 19,6% in case of removal of endometrial polyps, 14,1; 28,2 and 57,1% in case of subtotal hysterectomy, 72,2; 19,1 and 8,7% in case of tubectomy and ovariectomy, 8,0; 35,4 and 56,6% in case of total hysterectomy, 51,7; 48,3 and 0% in case of reconstructive plastic surgery, 40,9; 34,1 and 25,0% in case of adnexectomy, 51,7; 48,3 and 0% in case of ovarian resection.

$9,25 \pm 0,58$ complications, including $0,8 \pm 0,2$ large severe (vascular injuries, damage to the intestines and urinary organs, bleeding,

infections, hematomas, etc.), $3,35 \pm 0,36$ moderately severe complications (anemia, bleeding, infection), $3,03 \pm 0,34$ failed laparoscopy and $2,06 \pm 0,28$ conversion is observed at each 100 surgeries. The frequency of certain types of complications fluctuated within the interval $0,08 \pm 0,5$ - $1,07 \pm 0,20$ cases per 100 surgeries. The most common complications are mild and severe anemia ($1,0 \pm 0,2$ and $0,97 \pm 0,19$ per 100 operations), light bleeding ($0,48 \pm 0,13$ per 100 operations), postoperative hematoma ($0,44 \pm 0,13$ per 100 operations), infections ($0,16 \pm 0,08$ per 100 operations).

Special attention should be paid to combination of complications during endoscopic operations: bleeding + damage to the ureters, bleeding + hematoma in the small pelvis; bleeding + bowel damage; bleeding + damage to the bladder; bleeding + interintestinal abscess; bleeding + bladder injury + ureters. In general, the proportion of combined and single complications was respectively 20 and 80%,.

DEPENDENCE OF INTRA RISK AND POSTOPERATIVE COMPLICATIONS ON THE CLINICAL SITUATION, TYPE AND SUBSTANCE OF ENDOSCOPIC GYNECOLOGICAL SURGERIES

The postoperative complication rate depending on the clinical situation (characteristics of the contingent and types of operations) is shown in the table. The frequency of complications is significantly higher in the group of women operated by laparoscopic access with simultaneous operations ($12,3 \pm 4,0\%$ versus $0,6 \pm 0,4\%$ with non-simultaneous operations), with the number of myomatous nodes 4 or more ($3,9 \pm 1,4\%$ versus $1,1 \pm 0,8\%$ with the number of nodes less than 4), against the background of anemia ($8,2 \pm 2,9\%$ versus $1,0 \pm 0,58\%$ with normal hemoglobin content) and menstrual irregularities ($4,9 \pm 1,8\%$ versus $1,3 \pm 0,7\%$ with normal menstruation).

The risk of complications of moderate severity, as well as of severe complications, can be different depending on the clinical situation, which is determined by the clinical and demographic characteristics of the patient. In groups of women aged up to 40, 40 - 49, 50 years and older, the frequency of complications was respectively $2,2 \pm 0,9\%$, (95% confidence interval 0,4 - 4,0%), $6,0 \pm 1,5\%$ (95%

confidence interval 3,0 - 9,0%) and 8,3±2,1% (95% confidence interval 4,1 - 12,5%). The lowest risk of complications is observed in the group of women under the age of 40.

Table. The rate of severe postoperative complications depending on the characteristics of the contingent

Contingent with the association of appropriate signs	Laparoscopic operations	Hysteroscopic operations	P
Age	10/378(2,7±0,8)	6/292(2,1±0,8)	>0,05
Younger than 40	2/150(1,3±0,9)	2/118(1,7±1,1)	>0,05
40-49	3/122(2,5±1,4)	2/112(1,8±1,2)	>0,05
50 and older	5/106(4,7±2,1)	2/62(3,2±2,2)	>0,05
Types of surgery			
Extraction of the uterus	4/50(8,0±3,8)	2/16(12,5±8,2)	>0,05
Conservative myomectomy	4/260(1,5±0,75)	2/109(1,8±1,2)	>0,05
Supravaginal uterine resection	2/68(2,9±2,0)	2/167(1,2±0,8)	>0,05
Simultaneous Unstimulated	8/65(12,3±4,0)•	7/32(3,1±3,1)	>0,05
	2/313(0,6±0,4)	5/260(1,9±0,8)	>0,05
Number of knots			
1–3	2/175(1,1±0,8)	3/204(1,5±0,8)	>0,05
4 and more	8/203(3,9±1,4)•	3/88(3,4±1,9)	>0,05
Anemia existing	7/85(8,2±2,9)•	4/79(5,1±2,5)	>0,05
not existing	3/293(1,0±0,58)	2/213(0,9±0,64)	>0,05
Violation of menstruation existing	7/142(4,9±1,8)•	5/130(3,8±1,7)	>0,05
not existing	3/236(1,3±0,7)	1/162(0,6±0,6)	>0,05
• (p<0,05)–comparing intra group subgroups			

Moderate complication rates were comparatively lower among women with conservative myomectomies ($3,8 \pm 1,0\%$; 95% confidence interval 1,8 - 5,8%). Among women with supravaginal resection of the uterus ($4,3 \pm 1,3\%$; 95% confidence interval 1,7 - 6,9%), the complication rate was relatively higher, but when compared with conservative myomectomy, the validity of the null hypothesis is confirmed ($p > 0,05$). A statistically significantly high rate of complications is characteristic of cases of uterine extrination ($15,1 \pm 4,4\%$; 95% confidence interval 6,3 - 23,9%). The size of the relative and attributive risk of complications during uterine extrination (compared to conservative myomectomy) was 3,97 and 11,3%, respectively.

Simultaneous surgeries of uterine fibroids are often significantly more complicated in comparison with unstimulated surgeries ($12,3 \pm 3,3$ and $3,8 \pm 0,8\%$, respectively; $p < 0,05$). The size of the relative and attributive risk of moderate complications, respectively, was 3,24 and 8,5%. Quantity of complications per 100 was 7,5 in case of uterine fibroids (2,4 severe and 5,1 moderately severe complications), 2,9 in case of operations for endometrial polyps, 2,4 in case of operations on the uterine appendages, 1,9 in case of removing the ovum under hysteroscopic control, 3, 5 in case of operations for chronic pelvic pain.

The risk of severe and moderate complications in laparoscopic and hysteroscopic operations on women with uterine fibroids is almost the same; there are $2,7 \pm 0,8$ and $2,1 \pm 0,8$ severe complications, $5,0 \pm 1,1$ and $5,0 \pm 1,3$ moderately severe complications per 100 corresponding surgeries. The complication risk on surgeries for uterine fibroids depends on age ($2,2 \pm 0,9\%$ under the age of 40, $8,3 \pm 2,1\%$ at the age of 50 and over), type of surgery ($15,1 \pm 4,4\%$ in case of uterine extrination and $3,8 \pm 1,0\%$ in case of conservative myomectomy), on the simultaneity of operations ($12,3 \pm 3,3\%$ for simultaneous operations and $3,8 \pm 0,8\%$ for non-simultaneous operations), on the number of myomatous nodes ($1,6 \pm 0,6$ and $9,6 \pm 1,7\%$ with the number of nodes ≤ 3 and ≥ 4) on the history of abdominal surgeries ($3,6 \pm 0,8$ and $9,8 \pm 2,3\%$ in the case of absence and in the presence), on violations of the menstrual cycle ($3,0 \pm 0,8\%$ in the case of absence and $8,8 \pm 1,6\%$ in the presence).

Hysteroscopic surgery for endometrial polyps is performed against the background of polymorbidity (19.64% endometrial hypertension, 28.6% myoma and fibrioma, 3.12% adenomyosis, 12.94% uterine scar, 2.9% cervical polyp; 9.59% anemia, 6.47% diabetes mellitus, 6.47% arterial hypertension), consist of polypectomy (71.4%), diagnostic curettage (87.3%) and fibroids and polypectomy (23.3%)), have severe complications in 1.8% of cases, relapses during years in 0.9% of cases. The risk of intra- and postoperative complications depends on the age, simultaneous operations, the shape and size of the polyp, and the polymorbidity of the patient's condition. Laparoscopic operations on the uterine appendages include adnexectomy (8.9%), ovarian resection (5.9%), reconstructive plastic surgery (24.3%), tubectomy and ovariectomy (56.0%), performed mainly for the ovaries (30.7%), infertility (20.6%), adenomyosis (15.2%), genital endometriosis (20.4%) against the background of polymorbidity of the patient's condition (16.2% colpitis, 24.2% endometritis and salpingoopharitis, 8.1% of uterine fibroids), are associated in 2.4% of cases of intra and postoperative complications and 5.1% of cases with blood loss in the volume of more than 200 ml. The complication risk depends on clinical situation. Removal of the ovum under the control of hysteroscopy in most cases is performed in condition of an unfavorable clinical situation (polymorbidity), infectious and inflammatory complications are observed in 1,9% of cases, and in 5,3% cases is associated with loss of blood in the amount of more than 200 ml. Chronic pelvic pain associated with endometriosis of different localization and adhesions requires laparoscopic operations for lesion destruction, adhesionolysis, salpingo ovariolysis, which are complicated in 3.5% of cases and in 7.1% of cases are associated with blood loss of more than 200 ml.

Laparoscopic total hysterectomy takes a special place among all endoscopic gynecological surgeries ($6.1\pm 0.5\%$), its share is $10,2\pm 0,8\%$ of all surgeries on the uterus, are often performed for uterine fibroids (86.7%), abnormal bleeding (41.3%) and pelvic pain (12.0%), which are mostly combined with each other. Performing in difficult clinical situations is the main feature of laparoscopic total hysterectomy (previous operations in the abdominal cavity, a history

of abdominal birth - 30 and 22.7%, respectively; obesity - 32%, anemia - 37.3%, arterial hypertension - 27.3%, diabetes mellitus - 16.0% and others), which are risk factors for complications: 12.0 ± 2.6 cases of complications, 14.7 ± 2.8 cases of delay in hospital for more than 3 days, 20.7 ± 3.3 cases of blood transfusion are observed per 100 laparoscopic total hysterectomy. Depending on the clinical situation, the risk of these phenomena fluctuates, respectively, in the intervals of 5.5 - 22.2; 6.5 - 31.1 and 87 - 48.8%.

THE STATE OF COAGULATION AND PLATE HEMOSTASIS AND THE RISK OF BLOOD LOSS IN ENDOSCOPIC GYNECOLOGICAL SURGERY

Indicators of coagulation and platelet hemostasis of patients before endoscopic surgeries change within the wide intervals: 42,5 – 70,4 seconds for activated recalcification time, 32,4 – 46,5 seconds for activated partially thromboplastin time, 14,3 – 26,0 seconds for thrombin time, 0,75 – 1,98 seconds for prothrombin ratio, 1,04 – 2,01 for 2,24 – 3,28 g/l for fibrinogen, 2,45 – 4,30 mg% for soluble fibrin - monomeric complexes, $165 - 375 \times 10^9/l$ for platelet quantity, 81,2 – 95,2 for antithrombin III, 96,4 – 112,5% for the index of the reserve of plasmogen, 5,2 – 11,0 minutes for blood clotting time. The groups of women with the level of hemostasis indices less and more than the median in terms of the frequency of bleeding during endoscopic gynecological operations significantly differ from each other. The upper quartile (75%), the 90th centile of hemostasis indicators are also associated with an increased risk of bleeding during endoscopic gynecological operations. Among the criteria for hemostasis the sensitivity of the predictors varies in the range of 50.0 - 83.3%, and the specificity changes in the range of 47.0 - 93.8%. The predictive value of the positivity of the predictors is low (1.2 - 5.3%), and the predictive value of the negativity of the predictors is high (94.7 - 98.6%).

JUSTIFICATION OF WAYS FOR PREVENTION OF COMPLICATIONS OF ENDOSCOPIC GYNECOLOGICAL SURGERY (DISCUSSION OF THE OBTAINED RESULTS AND CONCLUSION)

The list of surgeries during 2002-2016 years was expanded against the background of increase of their number, the peculiarity of laparoscopic gynecological surgery in Azerbaijan can be traced:

- Using of laparoscopic and hysteroscopic access for more complex interventions (59,5% surgeries on the uterus, including conservative myomectomy – 21,1%; removal of endometrial polyps – 18,1%; total hysterectomy – 7,1, subtotal hysterectomy – 13,2%);
- Relatively frequent use of hysteroscopic control when removing the ovum;
- Relatively frequent application of conservative myomectomy (proportion of total, subtotal hysterectomy and conservative myomectomy 3,14; 5,81 and 11,52% according to Sazanova E.O., and according to our data 7,1; 13,2 и 21,1%).

Two important organizational conclusions can be drawn considering the specific features:

- Expansion of the use of laparoscopic simple operations, which are currently performed by gynecologists who do not know the methods of endoscopic surgery (this is a statistical task);
- Taking into account the prevalence of complex operations in the structure of laparoscopic surgeries when analyzing the causes of complications during and after operations.

Outcome of laparoscopic surgeries, as outcomes of all surgical interventions, depends on clinical situation, which is characterized with health condition of a patients (age, other pathologies), indications (reasons) for surgery, timeliness and adequacy of the choice of treatment tactics and other conditions.

The structure of indications for gynecological laparoscopic surgeries is widely described in modern literature. According to our observations indications for laparoscopic surgeries have the follo-

wing order due to their priority rate: uterine fibroids ($27.1\pm 0.9\%$), endometrial polyps ($18.1\pm 0.8\%$), polyps of the cervical canal ($6.1\pm 0.5\%$), ovarian cyst ($6.1\pm 0.5\%$), endometrial hyperplasia ($6.0\pm 0.5\%$), chronic pelvic pain ($5.7\pm 0.5\%$), adhesions in the small pelvis ($5.7\pm 0.5\%$), genital endometriosis ($4.1\pm 0.4\%$), infertility ($4.1\pm 0.4\%$), ovarian apoplexy ($3.2\pm 0.4\%$) 0 adenomyosis ($3.0\pm 0.3\%$) and others. Currently there is no serious limitation for using of endoscopic operations. That is why the structure of indications for endoscopic operations are different, and it depends on general development of laparoscopic surgery in the country. This condition determines the difference in the structure of those operated on by the nature of the clinical situation. In countries where the service of endoscopic surgeries there is no limitations for the use of laparoscopic and hysteroscopic access in the treatment of surgical pathology of the pelvic organs. In this regard, there is a high probability of a difference in the level and structure of intra and postoperative complications.

In laparoscopic operations, there are cases when the laparoscopic approach fails to achieve the goal and conversion is used. Possible Cases of Unsuccessful Laparoscopy: Fuentes et al. believe that these cases should also be considered as complications of laparoscopic surgery. We observed conversion in $2,06\pm 0,28\%$ of cases and unsuccessful laparoscopy in $3,03\pm 0,34\%$ of cases. Directly observed by Fuentes et al. Conversion rate is 1,58% (1,3 times less than in our observations) and unsuccessful laparoscopy is 3,57% (1,2 times more than in our observations).

The frequency of injury of vessels ($0,12\pm 0,06\%$), intestines ($0,08\pm 0,05\%$) and urinary organs ($0,12\pm 0,06\%$), early bleeding from the pelvic organs ($0,08\pm 0,05\%$) in our work differed from that observed by Fuentes et al. ($\ll 0$; 0,35; 0,14; 1,28%) and Sazanova E.O. (0,18; 0,11; 0,22 и 0,48%). Although it is not possible to consider these differences as reliable, since these works do not provide data on the statistical error of the indicators.

The frequency of infectious complications in our work (0,16%), in observations of Sazanova E.O. (0,18%) and Fuentes et al. (0,10%) was similar.

Anemia (1.97 per 100 operations), light bleeding (0.48 per 100 operations) and postoperative hematoma (0.44%). In the observations of Fuentes et al., The incidence of these complications (2.05, 0.52 and 0%, respectively) is similar, except for the incidence of hematoma, which the authors did not distinguish dominated among the minor complications in our work.

Thus, the frequency and structure of complications during laparoscopic operations in our observation is basically similar to the data given in the literature, but there are noticeable special features:

- With a relatively low incidence of severe complications ($0.8 \pm 0.2\%$), the risk of vascular damage ($0.12 \pm 0.06\%$) is greater and the risk of early bleeding from the pelvic organs is less ($0.08 \pm 0.05\%$);
- With a relatively lower risk of mild complications, there is a high likelihood of developing hematoma after surgery, which may be of technical origin.

In general, the scope of observation and the incidence of complications in our work (2476 operations and 3% of complications) are adequate with the work of Fuentes et al. (2888 and 6.2%), which allows confidently look for risk factors for complications and propose ways to prevent them.

The professional skill of the surgeon is a recognized risk factor for intra- and postoperative laparoscopic operations. Taking into account the role of this factor is methodologically simple, but organizationally difficult. As in the observation of Fuentes and co-authors, we used materials from one clinic for a long time (2002 - 2016 by us and 2000 - 2012 by the author). At the same time, time plays the role of a factor for improving the qualifications of a surgeon based on accumulated experience. Analyzing the dynamics during 2002 – 2006, 2007 – 2011, 2012 – 2016 years we observed decreasing of frequency of acute (from $1,1 \pm 0,5\%$ to $0,7 \pm 0,2\%$), mild (from $5,1 \pm 1,2\%$ to $3,9 \pm 0,5\%$) complications, conversion (from $4,3 \pm 1,1$ to $1,3 \pm 0,3\%$) and unsuccessful cases of laparoscopy. This suggests that as physicians' experience in endoscopic surgery grows, the risk of complications, conversions, and failed laparoscopy attempts decreases. A similar trend is reported by Fuentes et al.

Swedish National Register published data during 2009 – 2015 years, which includes results of 7485 abdominal, 3767 vaginal, 1539 laparoscopic and 1015 robotic hysterectomy. The frequency of complications was 7,6; 5,4; 6,6 and 8,7%. In comparison with these data we observed similar risk of complications of surgery (7,7% in laparoscopic and 7,2% in hysteroscopic surgery for uterine myoma).

Total laparoscopic hysterectomy is recommended based on different indications. Structure of these indications was determined according three main pathologies: myoma (46,7%), abnormal bleeding (41,3%) and pelvic pain (12,0%). In India the structure of reasons for total laparoscopic hysterectomy is different (fibroid myomas 48 - 51.2%; abnormal bleeding 30.4 - 28.0%; adenomas 16 - 19.2%; hypertension 1,6 – 5,6%). Against this background, the incidence of severe complications was $0,8 \pm 0,38\%$ in our observations, 1,6% in observation of indian authors. The frequency of mild complications in our observations also was less ($5,0 \pm 1,1\%$) than in observation results of noticed authors (7,1%).

Prevention of traumatic injuries of blood vessels and internal organs is possible if there is a scientifically grounded strategy and tactics of surgical treatment. The task of healthcare in this area is well known: licensing and accreditation of activities in the field of endoscopic surgery, strict adherence to the principles and rules of laparoscopic interventions (entry into the abdominal cavity, adequate pneumoperitonism, smooth introduction of the Veress needle and other technical aspects).

Prevention of infectious complications is more manageable with scientific substantiation of the role of risk factors. In our research work, such factors were concomitant pathologies, which are foci of infection (inflammatory diseases of the genitourinary, respiratory system, oral cavity, etc.) and form a state of named deficiency. Therefore, the preparation of the patient for laparoscopic and hysteroscopic surgery must guarantee a complete characterization of the state of health.

Prevention of intra and postoperative bleeding not associated with traumatic vascular injuries, possibly by high-quality monitoring of the hemostasis system before surgery and an effective system for

correcting disorders in the hemostasis system. In this case, special care is required when the patient's hemostasis indicators are closer to the boundaries of the standard values.

CONCLUSIONS

1. The proportion of technically complex operations on the uterus ($59.5 \pm 1.0\%$) and on the uterine appendages ($20.0 \pm 0.8\%$) in the structure of endoscopic gynecological surgeries is high, what indicates the formation of a developed endoscopic surgery service in the country.
The frequency of very severe (from $1,1 \pm 0,5\%$ to $0,7 \pm 0,2\%$) and moderately severe (from $5,1 \pm 1,2\%$ to $3,9 \pm 0,5\%$) complications of endoscopic gynecological operations, conversions (from $4,3 \pm 1,1\%$ to $1,3 \pm 0,3\%$) and unsuccessful laparoscopic surgeries (from $5,7 \pm 1,2$ to $1,5 \pm 0,3\%$) decreased during 2002 – 2016 years.
2. The risk of serious complications significantly depends on type of endoscopic surgeries ($14,9\%$ in total and $7,6\%$ in subtotal hysterectomy, $5,2\%$ in conservative myomeetomy and $\leq 2,9\%$ in other operations), on age ($2,5 \pm 0,8\%$ at age 45 – 54 years, $5,4 \pm 1,8\%$ at age 55 years and older), on clinical situation, quantity of myomatous nodes in case of uterine fibroids, on the form of endometrial polyps, on adhesions in connection with previously performed abdominal operations, on the use of simultaneous operations and concomitant comorbid pathologies.
3. The state of indicators of coagulation and platelet hemostasis at the level of extreme quartiles and centiles (> 22.5 sec for thrombin time, < 3.0 g / L for fibrinogen content in the blood, > 7.6 minutes for blood coagulation time and $< 250 \times 10^9$ / L platelet count) is a risk factor for blood loss during endoscopic operations.
4. The trend of reducing of the risk complications, conversion and unsuccessful laparoscopy during 2002 - 2016 indicates the possibility of optimizing the endoscopic surgical service by cur-

tailing technical equipment and professional training, which should be continued

PRACTICAL PROPOSALS

1. The planning of endoscopic gynecological operations is recommended to assess the risk of complications taking into account the clinical situation and take preventive measures.
2. Evaluation of platelet and coagulation hemostasis before endoscopic operations must be carried out continuously and in the future included in the protocols of endoscopic surgery.
3. In the preoperative stage, it is necessary to collect information about all abdominal manipulations (injuries and operations) that can form adhesions in the abdominal cavity.
4. For the prevention of infectious complications, it is necessary to sanitize foci of chronic infections and strengthen the body's defense mechanisms.

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