медичної допомоги був основним для постраждалих з пошкодженнями нервово-судинного пучка та пораненнями колінного суглобу, що було виявлено у 5,9% та 9,5% відповідно і на подальших етапах їх кількість зменшувалась. На етапі спеціалізованої медичної допомоги концентрувались постраждалі з пораненнями гомілки, яких на цьому етапі було виявлено у 41,0%, що у 1,3 рази більше ніж на етапі кваліфікованої допомоги та майже удвічі більше ніж на етапі високоспеціалізованої медичної допомоги. Етап високоспеціалізованої медичної допомоги був основним для постраждалих з пораненнями тазу (4,8%), сідниці (7,8%), стегна (34,9%), стопи (16,5%) та травматичними відривами гомілки (1,9%) та стопи (3,8%).

Ключові слова: Постраждалі, вогнепальні поранення, кінцівки, мінно-вибухова травма.

Стаття надійшла 20.04.2019 р.

квалифицированной медицинской помощи был основным для пострадавших с повреждениями нервно-сосудистого пучка и ранениями коленного сустава, что было выявлено в 5,9% и 9,5% соответственно и на последующих этапах их количество уменьшалось. На этапе специализированной медицинской помощи концентрировались пострадавшие с ранениями голени, которых на этом этапе было выявлено в 41,0%, что в 1,3 раза больше чем на этапе квалифицированной помощи и вдвое больше чем на этапе высокоспециализированной медицинской помощи. Этап высокоспециализированной медицинской помощи был основным для пострадавших с ранениями таза (4,8%), ягодицы (7,8%), бедра (34,9%), стопы (16,5%) и травматическими отрывами голени (1,9%) и стопы (3,8%).

Ключевые слова: Пострадавшие, огнестрельные ранения, конечности, минно-взрывная травма.

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DOI 10.26724/2079-8334-2020-1-71-44-49
UDC 618.3-071-06:616-053.31-003.96

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PERINATAL CONSEQUENCES OF ADAPTATION DISORDER WITH BURDENED OBSTETRIC HISTORY

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Stress experienced against the background of perinatal losses (PL) can adversely affect the course of subsequent pregnancy. The study of the heart rate variability (HRV) of the fetus by cardiointervalography (CIG) of the fetus in women with burdened obstetric history (PL in anamnesis) at 32-34 weeks of pregnancy was performed. The total of 200 pregnant women with PL and 100 pregnant women without PL in the history were examined. Comparison of the cardiotocography and dopplerometry results with fetal CIG data showed that when the adaptation of the fetal regulatory systems was disrupted, distress was diagnosed in 90.0% of women, and when the fetal regulatory systems showed marked stress in 27.3%, i.e. results of the fetus CIG after 32 weeks of pregnancy may be diagnostic markers of its distress. The overwhelming majority (76.1%) of infants from mothers with PL in the history after intrauterine distress are born in a state of asphyxiation, that causes a high incidence of disadaptation syndromes, often including CNS disorders (73.9%) and the cardiovascular system disadaptosis (41, 3%).

Key words: perinatal losses, cadiointervalography, adaptation, distress of the fetus, newborn.

The work is a fragment of the research project "Reducing the incidence of major obstetric syndromes in high-risk pregnancies from a single genesis position by implementing a pathogenetically targeted prevention and treatment complex", state registration No. 0118U001138.

Perinatal losses (PL), such as pre-natal fetal death and stillbirth, account for 2.65 million cases per year worldwide [9]. Unfortunately, the risk of recurrence in subsequent pregnancies grows up to ten times depending on the cause of stillbirth [11].

Complications of obstetric history with perinatal losses are accompanied by depletion of the body's adaptation reserves against the background of prolonged and intense influence of psycho-emotional stress, causing the development of psycho-emotional diseases and disorder of neurovegetative regulation. The stress experienced against the background of PL can negatively affect the course of the next pregnancy [1, 3, 4].

Despite advances in the diagnosis and treatment of many gestational complications, only in 20-30% of newborns timely started treatment of post-hypoxic CNS changes ensure complete recovery, and treatment of fetal distress after diagnosis due to profound pathomorphological changes is ineffective. As a result, the morbidity and mortality of such infants is steadily increasing [2, 10]. Therefore, the prognosis and the possibility of prevention, rather than the diagnosis of the already disturbed fetal state, is a reserve for reducing perinatal morbidity and mortality [5, 6].

Cardiointervalography is an efficient screening method that can be used to assess the fetal status. By studying variability of maternal and fetal heart rhythm in real time, it is possible to obtain information on the state of energy supply, humoral and neurovegetative regulation, their changes in stress and other conditions, the adaptive capability and reserves of the mother-placenta-fetus system [7, 8].

The purpose of the study was to assess the impaired fetal and infant adaptation, to determine the perinatal consequences of a burdened obstetric history.

Materials and methods. The study of fetal heart rate variability (HRV) was performed by cardiointervalography (CIG) of the fetus in women with the burdened obstetric history (PL in the history) at 32-34 weeks of pregnancy by means of "Cardiolab Baby Card" fetal monitor (Kharkiv, Ukraine). The methodology of HRV analysis adopted in the system lies in measuring the HRV parameters and their interpretation. We examined 200 pregnant women with PL (main group) and 100 pregnant women without PL with a history of physiological pregnancy (control group).

The following static characteristics of HRV were under study:

SDNN, ms - mean-square deviation of consecutive RR intervals;

CV - coefficient of variation;

RMSSD, ms - the square root of the consecutive RR intervals mean-square deviation;

pNN50 - the percentage of consecutive cardio intervals pairs that differ more than by 50 ms.

Indices of HRV geometric analysis:

Mo - mode;

AMo - mode amplitude, the percentage of cardio intervals that occur most frequently;

VAR - the variation range, ms - the difference between the duration of the largest and smallest RR interval.

According to the indices of statistical analysis methods, the following indices are calculated: the index of vegetative equilibrium (IVE = AMo/VAR), the vegetative index of rhythm (VIR = 1/AMo* VAR), the stress index (SI = AMo/2Mo x VAR) or the stress index (SI):

The main indices of cardiac rhythm spectrum power were also determined:

TP (total power) - the total power of the spectrum

HF (High Frequency) - the heart rhythm power of high-frequency oscillation.

LF (Low Frequency) - the heart rhythm power of low frequency oscillation.

ELF (Extremely Low Frequency) - an extremely low frequency component of the spectrum.

According to the spectral analysis of cardiac rhythm, the index of centralization: IC = (HF + LF)/ELF and the index of vagosympathetic interaction LF/HF, which reflect the sympathetic-parasympathetic balance of the vegetative nervous system (VNS), were also calculated.

This method of HRV analysis was also used as correlation rhythmography or scatterography, the essence of which is the graphical representation of successive cardio intervals pairs, the totality of points obtained forms an ellipse. Scatterogram indices are calculated: the length of the main (excluding extrasystoles and artefacts) ellipse - L, which corresponds to the variation range, its width - W, and their L/W ratio.

Doppler ultrasound study (US) was performed with Samsung Master 793DF "RADMIR" apparatus. The standard assessment of the fetal functional status was performed by cardiotoctography (CTG) with "Avalon FM20" device.

The numerical data are presented as median (interquartile range) Med (LQ-UQ). Statistic processing of the results was performed using the methods of variational statistics, the Mann-Whitney test and the Fisher test.

Results of the study and their discussion. Analysis of indices obtained by temporal HRV assessment methods, characterizing the general level of the vegetative nervous system (VNS) regulation - the balance of the central and autonomous circuits (table 1), showed a significant decrease in the indices: standard mean-square deviation of consecutive RR intervals SDNN and coefficient of variations CV, indicating the increased activity of the central regulatory circuit.

Table 1

General level of fetal VNS regulation in women with PL in history

Index	Main group		Control group		p
	Med	LQ-UQ	Med	LQ-UQ	
SDNN, ms	33	22-84	56	32-71	p = 0.037
CV, %	13	8-29	39	36-44	p = 0.0091
VAR, ms	156	74-318	258	117-303	p = 0.043
L, ms	337.0	193-334	383.5	119-477	p = 0.114
TP, ms^2	2558	1044-3678	6266	4592-8316	p= 0.015

The use of geometric methods (variational pulse oximetry) showed that the median value of the variance range (VAR) was also significantly reduced in the main group. In addition, the index had a much wider range (74-318 ms vs. 117-303 ms), indicating cases with both an increase in VAR (predominance of the central regulatory circuit), and with its decrease, i.e., a certain imbalance of the system, whereas in most women of the control group, there is a balanced regulation of fetal VNS.

According to our data, the median TP of the fetus (an index of the general regulation characterizing the wave structure of the heart rhythm) was reduced by 2 times, while in the main group the lower quartile was reduced by 4 times, i.e. in the main group the proportion of women with predominance of the fetal VNS central regulatory circuit was much higher.

Analysis of the activity indices in different divisions of the VNS (table 2) revealed an increase in the activity of the fetal sympathetic nervous system (SNS) and a decrease in the parasympathetic nervous system (PSNS). We found that the power of low-frequency oscillations of the fetal heart rate LF in women with PL in the history was reduced more than by 5 times. The amplitude of the mode (AMo) and a decrease in RMSSD and PNN50 also testify in favor of the fetal SNS activating, although it is not reliable due to the range width of the indices.

According to our data (table 2), the median absolute power of the high frequency (HF) spectrum is significantly reduced in the fetuses of the main group women, indicating a decrease in the effect of PSNS, mainly due to humoral effects, since no significant decrease in HFnorm was observed.

Also, in the fetuses of women in the main group, a significant decrease in the width of the scattertogram W ellipse was established, which in its turn confirms the attenuation of the fetal VNS parasympathetic link influence against the background of the tendency towards hypersympaticotonia.

Table 2

Fetal VNS activity in women with PL in history

Index	Main group		Control group		P
SNS activity					
	Med	LQ-UQ	Med	LQ-UQ	
LF, ms ^{2}	261	146-644	1267.5	637-1437	p = 0.002
AMo, %	57	46-62	35	25-50	p = 0.074
PSNS activity					
RMSSD, ms	12	9-59	32	15-49	p = 0.058
pNN50, %	11	0-17	28	3-35	p = 0.061
HF, ms^2	315.5	25-443	1399	818-2155	p = 0.0005
HF norm, %	28	13-41	47.5	36-62	p = 0.089
W, ms	154	117-284	394.5	107-494	p = 0.035

The indices of IC centralization and the index of vagosympathetic LF/HF interaction, which reflects the sympathetic-parasympathetic balance of the VNS, were also calculated by the spectral analysis data of cardiac rhythm (table 3). According to our data, fetal IC in the women of the main group are by 3 times higher than those of the pregnant in the control group, and LF/HF is by 2 times higher, which corresponds to a shift in the balance of the VNS toward sympathetic regulation.

Determination of indices calculated according to the data of statistical analysis methods (VIR and SI) showed the following. The growth of the vegetative equilibrium index is established. Significantly elevated (1.5 times) was the stress index (SI): 754 (262-979) against 505 (356-656), p <0.05. No significant difference in the length and width of the scatterograph ellipse (L/W) was detected.

Table 3

Sympathetic-parasympathetic balance of VNS in women with PL in history

Index	Main group		Control group		p
	Med	LQ-UQ	Med	LQ-UQ	
IC	16.1	5.5-27.5	5.2	2.8-5.8	p=0.001
LF/HF	2.6	1.47-6.41	1.2	0.61-1.81	p=0.032
VIR	373	284-867	222	104-498	p=0.044
SI	754	262-979	505	356-656	p=0.043
L/W	1.5	1-5	1.1	1-2	p=0.062

Thus, the sympatho-parasympathetic balance of the fetus in most women with PL in the history is assessed as sympathicotonia with elevated level of stress.

We identified 4 SI ranges to assess the fetal VNS regulation status:

- a sharp decrease in the total activity of the SNS at SI below 50 relative value units (RVU);
- reduction of activity of SNS at SI from 50 to 150 RVU;
- normotonia at SI from 150 to 500 RVU,
- sympathicotonia at SI from 500 to 900 RVU;
- hypersymaticotonia at SI more than 900 RVU.

Analysis of the total SNS activity in the fetus (fig. 1) showed that the majority of the main group demonstrated sympathico- and hypersympathicotonia, the incidence of these conditions being almost by 2

times higher than the index of the comparison group (58.0% versus 32.0%, respectively, p < 0.05), which indicates a certain stress of the adaptation systems.

In more than half of the women - 58.0% (116/200) - in the comparison group, the total SNS activity of the fetus was assessed as normotonia, among women in the main group this proportion was only 26.0% (26/100, p <0.05). It is important to note that in 4.0% (8/200) of women in the main group there is a sharp decrease in the total SNS activity of the fetus, which is an unfavorable index, indicating a failure of adaptive capacity. In women without a perinatal loss in the history, such conditions were not observed.

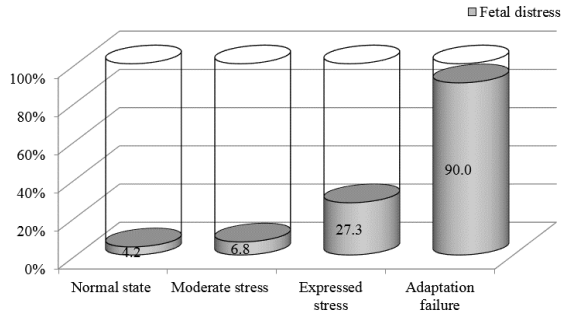

Fig. 1. - Distribution of women in groups by total fetal SNS activity, %

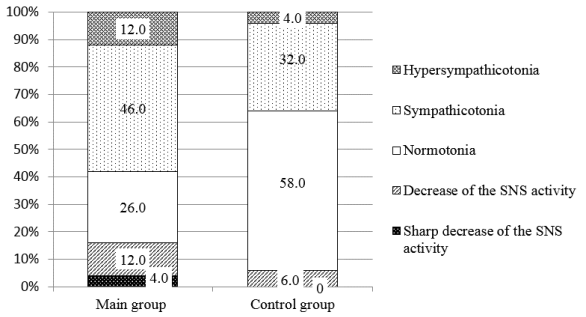

Fig. 2. –Incidence of fetal distress in women with PL in the history depending on the state of fetal regulatory systems, %

Characterizing the condition of the fetus as a whole, according to the cardiointervalography, 3 consecutive stages of its disturbance can be noted in women with a perinatal loss in the history:

- moderate stress of regulatory systems - in 44.0% (88/200) cases;
- expressed stress of regulatory systems - in 22.0% (44/200);
- reduction of regulatory systems activity (failure of adaptation) - by 10.0% (20/200).

In 24.0% (48/200) of women with a history of perinatal loss, fetal distress was diagnosed using a set of instrumental diagnostic methods (cardiotocography, ultrasonography, Doppler ultrasonography).

Comparing these results with the cardiointervalography (CIG) data (fig. 2), it can be noted that in the fetal regulatory systems adaptation failure, distress of the fetus was diagnosed in 90.0% (18/20) of women, with a pronounced stress of the regulatory systems in the fetus - in 27.3% (12/44), at moderate stress - in 6.8% (6/88), at the normal state of regulatory systems - in 4.2% (2/48) of pregnant women with PL in history. Thus, fetal CIG results after 32 weeks of pregnancy may be diagnostic markers of fetal distress.

In women with a perinatal loss in the history, 198 live children were born (one case of antenatal fetal death and one case of stillbirth with fetal distress), and all 100 women of the control group gave birth to live children. Premature preterm birth losses were 6.6% (10/152) of newborns without pre-natal distress and 32.6% (15/46) after distress versus 2.0% (2/100) in the control group (p < 0.05).

Almost all children (91.0%, 91/100) in the control group were assessed by Apgar score of more than 7 points, which corresponds to the normal state of the child (fig. 3). Most children from mothers with PL with status post distress (76.1%, 35/46) were born in asphyxia of varying severity, whereas in mothers with PL there were 37.5% of such infants (57/152). At the same time, severe asphyxia was noted in 23.9% (11/46) of children after intrauterine distress.

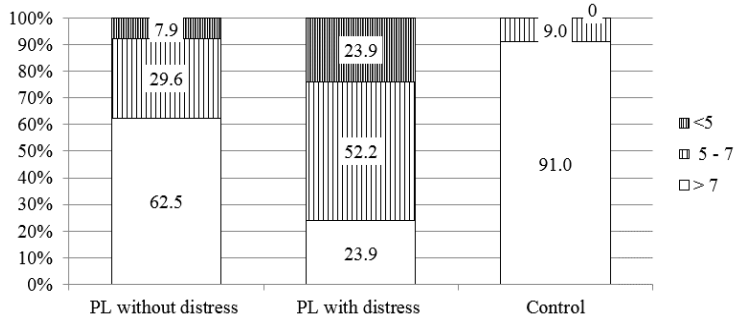

Fig. 3. - Distribution of newborns by their state at birth, %

High incidence of asphyxia at birth caused the incidence and severity of dysadaptation syndromes in infants of the main groups, the most frequent among them being CNS disorders: 73.9% (34/46) from mothers with PL in distress versus 19.1% (29/152) in infants from mothers with PL without distress and 5.0% (5/100) in the control group infants (p <0.05) and cardiovascular dysadaptosis: 41.3% (19/46) versus 15.1% (23 / 152) and 2.0% (2/100) of infants, respectively (p <0.05). In infants after fetal distress, clinical manifestations of hypoxic-ischemic CNS disorders were hyperexcitability syndrome or CNS depression syndrome. Among the clinical manifestations of cardiovascular dysadaptosis due to the status post hypoxia in newborns, the following can be noted: skin pallor with cutis marmorata, periodic

acrocyanosis, extension of the relative cardiac dullness borders, muffling of heart tone I, apical systolic murmur, arrhythmia.

The results obtained indicate a significant impairment of fetal heart rate variability in women with a history of perinatal loss, which is estimated as the tension of fetal adaptation systems in the vast majority (66.0%) of these women. Meanwhile, a group of patients (10.0%) is distinguished, whose hyperstress of the fetal regulatory systems goes into the stage of exhaustion and failure of adaptation, that caused fetal distress in 24.0% of cases and 2 (1.0%) cases of perinatal losses, high frequency of dysadaptation syndromes in newborns, which is consistent with other researchers' data on complications of subsequent pregnancies with previous perinatal losses [1, 4, 9].

It has been shown that in failure of adaptation of fetal regulatory systems (according to SI), its distress is diagnosed in 90.0% of women in the history, i.e. the value of fetal SI according to CIG after 32 weeks of pregnancy can be diagnostic markers of its distress, which is important for simplification and unification of heart rate variability assessment, which importance is emphasized by the authors of the review, where 70 different methods were analyzed [11]. Also, Ushakova G.A. and Petrich L. point out to the potential use of heart rate variability analysis for the assessment of gravid homeostasis [7].

Conclusions

1. The state of fetal VNS regulation in women with PL is characterized by an increase in the activity of the central regulatory circuit, the SNS activation with a tendency to hypersympaticotonia, which can generally be estimated as the stress of the adaptation systems in the fetus in the vast majority (66.0%) of these women (moderate in 44.0% and pronounced stress in 22.0%). The group of patients (10.0%) is distinguished, in which the hyperstress of the fetal regulatory systems goes into the stage of exhaustion and failure of adaptation, which is manifested by a sharp decrease in the activation of the fetal SNS, energy-deficient state. These particular indices are the most prognostically and diagnostically unfavorable in terms of perinatal losses, which is confirmed by the instrumental research data.

2. Comparison of the cardiotocography and dopplerometry results to CIG data showed that in failure of the fetal regulatory systems adaptation, its distress was diagnosed in 90.0% of women, with a pronounced stress of the fetal regulatory systems – in 27.3%, with moderate tension – 6.8%, with the normal state of regulatory systems - in 4.2% of pregnant women with PL in the history, i.e. the results of fetal CIG after 32 weeks of pregnancy can be diagnostic markers of its distress.

3. The overwhelming majority (76.1%) of infants from mothers with the history of perinatal loss after status post intrauterine distress are born in a state of asphyxia, which causes a high incidence of dysadaptation syndromes, the most frequent of which are CNS disorders (73.9%) and dysadaptosis of the cardiovascular system (41.3%).

The prospects of further research lie in development of clear criteria for impaired fetal and neonatal status based on the cardiovascular variability assessment.

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Реферати

ПЕРИНАТАЛЬНІ НАСЛІДКИ ПОРУШЕННЯ АДАПТАЦІЇ ПРИ ОБТЯЖЕНОМУ АКУШЕРСЬКОМУ АНАМНЕЗІ

Жданович О.І., Воробей Л.І., Аношина Т.М., Коломійченко Т.В.

Пережитий стрес на тлі перинатальних втрат (ПВ) може негативно впливати на перебіг наступної вагітності. Проведено дослідження варіабельності серцевого ритму плода шляхом кардіоінтервалографії (КІГ) плода жінок з обтяженим акушерським анамнезом (ПВ в анамнезі) у 32-34 тижні вагітності Обстежено 200 вагітних з ПВ та 100 вагітних без ПВ в анамнезі. Порівняння результатів кардіотокографії та допплерометрії з даними КІГ плода показало, що при зриві адаптації регуляторних систем плода його дистрес діагностовано у 90,0 % жінок, при вираженому напруженні регуляторних систем плода – у 27,3 %, тобто результати КІГ плода після 32 тижнів вагітності можуть бути діагностичними маркерами його дистресу. Переважна більшість (76,1 %) дітей від матерів з ПВ в анамнезі після перенесеного внутрішньоутробно дистресу народжуються у стані асфіксії, що обумовлює високу частоту синдромів дизадаптації, найчастішими з яких порушення ЦНС (73,9 %) та дизадаптоз серцево-судинної системи (41,3 %).

Ключові слова: перинатальні втрати, кадіоінтервалографія, адаптація, дистрес плода, новонароджений

Стаття надійшла 19.04.2019 р.

ПЕРИНАТАЛЬНЫЕ ПОСЛЕДСТВИЯ НАРУШЕНИЯ АДАПТАЦИИ ПРИ ОТЯГОЩЕННОМ АКУШЕРСКОМ АНАМНЕЗЕ

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Пережитый стресс на фоне перинатальных потерь (ПП) может негативно влиять на течение последующих беременностей. Проведено исследование вариабельности сердечного ритма (ВСР) плода путем кардиоинтервалографии (КИГ) плода женщин с отягощенным акушерским анамнезом (ПВ в анамнезе) в 32-34 недели беременности. Обследованы 200 беременных с ПП и 100 беременных без ПП в анамнезе. Сравнение результатов кардиотокографии и допплерометрии с данными КИГ плода показало, что при срыве адаптации регуляторных систем плода его дистресс диагностирован у 90,0% женщин, при выраженном напряжении регуляторных систем плода - у 27,3%, то есть результаты КИГ плода после 32 недель беременности могут быть диагностическими маркерами его дистресса. Подавляющее большинство (76,1%) детей от матерей с ПП в анамнезе после перенесенного внутриутробно дистресс рождаются в состоянии асфиксии, обусловливает высокую частоту синдромов дизадаптации, частыми из которых нарушения ЦНС (73,9%) и дизадаптоз сердечно-сосудистой системы (41,3%).

Ключевые слова: перинатальные потери, кадиоинтервалография, адаптация, дистресс плода, новорожденный

Рецензент Похилько В.І.

DOI 10.26724/2079-8334-2020-1-71-49-53
UDC 618.1-089-06-084

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PREVENTION OF PURULENT-SEPTIC COMPLICATIONS DURING LAPAROSCOPIC SURGERIES ON PELVIC ORGANS WITH THE RISK OF VAGINAL MICROBIOTA CONTAMINATION

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The efficacy analysis of the purulent-septic complications prevention at 115 “clean-contaminated” laparoscopic surgeries on the pelvic organs (laparoscopic hysterectomy, conservative myomectomy with the node resection via colpotomy incision) was performed. In the experimental group of patients (n = 60), 0.02% decamethoxin solution was administered intravaginally. The control group (n = 55) received traditional systemic perioperative antibiotic prevention using cephalosporins. It was shown that the early postoperative period dynamics, as well as indicators of systemic inflammatory response and the number of complications did not show significant differences between the studied groups, and in the experimental group there was an increase in the lactobacilli number and 87.3% decrease in the opportunistic pathogens content, which indicated the feasibility of preventive intraoperative topical decamethoxin application.

Key words: laparoscopy, purulent-septic complications, prevention, decamethoxin.

The study is a fragment of the research project “Improving methods of prevention, diagnosis and treatment of diseases of the reproductive system of women using the latest medical and molecular genetic technologies”, state registration No. 0117U007494.

Endoscopic surgery has a clear place in modern surgical gynecology. Due to the minimal invasiveness, high precision and operative endoscopic technique improvement, the incidence of postoperative purulent-septic complications (PSC) in endoscopic gynecological operations does not exceed 3.5% and depends on the complexity, surgery duration, the presence of risk factors, including vaginal microbiota contamination [1].