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ABSTRACT

of the dissertation for the degree of Doctor of Sciences

EARLY PREDICTION AND PREVENTION OF INFLAMMATORY COMPLICATIONS IN THE POSTPARTUM PERIOD

Specialty: 3215.01 – Obstetrics and gynecology

Field of science: Medicine

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BAKU – 2024

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GENERAL CHARACTERISTICS OF THE STUDY

The relevance of the subject. Maternal morbidity and mortality is not only a current health problem, but also a global socio-economic burden.[1] Inflammatory diseases in the postpartum perıod make up a significant part of this burden. The postpartum period covers the six weeks after birth, during which the frequency of inflammatory diseases is high.[2]

Inflammation cases during postpartum period accounts for 5-7% of all obstetric pathologies.[3] According to the authors, postpartum inflammatory complications are recorded in 6.95% of cases.[4]

A more common inflammatory complication occurs as a result of infected wounds. Preterm opening of amniotic fluid and anemia also cause postpartum inflammation.[5]

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In postpartum surveillance programs, it is noted that endometritis, mastitis, urinary tract infections and episiotomy infections are observed with a higher frequency after discharge from the hospital.[6] Risk factors for postpartum inflammatory complications include pre-existing infections such as diabetes, obesity, long-term use of steroids, smoking, intra-amniotic infection or bacterial vaginosis.[7] The most common microorganism during infectious complications in this period is Staphylococcus aureus. However, infectious complications caused by gram-negative rods, enterococci, group B streptococci and anaerobes are also common.[8] Postpartum sepsis is one of the top five leading causes of maternal mortality worldwide, accounting for 10–15% of postpartum deaths.[9]

The risk of postpartum infection also increases in patients with advanced maternal age, high body mass index, diabetes, hypertension, immunodeficiency, bacterial vaginosis, group B streptococcal positive status, or sexually transmitted infections. The most common infectious complication during postpartum period is endometritis. Thus, the birthing process allows the increased vaginal bacterial flora to spread to the upper reproductive system. Other risk factors include chorioamnionitis, bacterial vaginosis, use of intrauterine fetal monitoring, repeated uterine examinations, and maternal colonization with group A or B streptococci.

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9. Boushra M, Rahman O. Postpartum Infection. 2023 Jul 10. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 32809639.

Chlamydia trachomatis should be suspected in endometritis observed 7 days after birth and later.[10]

Serious infections can also be observed at episiotomy sites. Cut infections are divided into superficial cut (involving skin or subcutaneous tissue) and deep cut (involving muscle or fascia) infections.[11] Endometritis after abdominal childbirth indicates deep organ infection. Other deep postpartum inflammation causes hematomas and pelvic abscesses.[12]

More rarely, necrotizing fasciitis of the surgical site may develop. An important risk factor for the development of necrotizing fasciitis in the postpartum period is diabetes mellitus.[13]

Various diagnostic methods are used in modern clinical practice to detect these complications: cytomorphological examination of the contents of the uterine cavity, detection of endotoxins in blood and lochia (postpartum bleeding) serum, determination of the interferon status of the uterus, hysteroscopic examination of the postpartum uterus, ultrasound diagnostic methods. Based on the above, we can say that the development of highly effective and prognostically significant diagnostic methods that can determine the possibility of the development of inflammatory complications in postpartum women with subinvolution of the uterus and its application to clinical practice is a rather urgent issue.

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12. Kawakita, T. Surgical site infections after cesarean delivery: epidemiology, prevention and treatment / T. Kawakita, H.J. Landy // Maternal Health, Neonatology and Perinatology, - 2017. 3 (12), - p.1-7.

13. Barant, S. Abdominal necrotizing fasciitis after caesarean delivery S. / Barant, D. Radbata, D., Oberweis [et al.] // Revue Medicale de Bruxelles, - 2016. 37 (3), - p. 178-182.

For this purpose, it is possible to use Raman spectroscopy, which creates a comprehensive picture of the processes occurring in the postnatal period. [14]

This method was first proposed by Indian scientists Raman and Krishman. Scientists have experimentally proved that the propagation of light waves gives different peaks in different molecules, and with the help of received spectrograms, it is possible to determine the presence and severity of pathological changes, as well as infectious activators. Recently, the issues regarding application of Raman spectrometry have been widely discussed in the scientific literature.[15]

Timely treatment and preventive measures in patients from a high risk group for the development of inflammatory complications will allow to significantly improve the immediate and long-term consequences of treatment, the quality of life of women of reproductive age and will create positive conditions for their future generative function.

The object and subject of the research. The object of the study was 300 postpartum women during 2017-2019, 250 of whom had inflammatory complications during postpartum period due to various reasons and 50 women went through postpartum period under physiological conditions. The subject of the study was early diagnosis of inflammatory diseases in women during postpartum period.

The purpose of the research. Development of objective prediction criteria and optimization of complex preventive measures based on new diagnostic methods of inflammatory diseases of the postpartum period.

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The duties of the research:

1.Determining the structure and frequency of inflammatory diseases in the postnatal period.

2.The study of various risk factors on the development of inflammatory complications of the postnatal period.

3.The evaluation of gynecological and extragenital pathologies as a risk factor for postpartum complications among examined women.

4.Studying the characteristics of changes in the individual microbiome of the uterus during the physiological course and inflammatory diseases of postnatal period.

5.Determining the diagnostic value of the Raman spectroscopy method for predicting and identifying inflammatory processes in postpartum women.

6.Determining the optimal diagnostic and prognostic criteria of inflammatory complications of postpartum period based on a comprehensive evaluation of the received data.

7.Developing a prognostic algorithm of inflammatory diseases of postpartum period based on optimal examination methods.

8.Application of diagnostic tactics of aggravated and non-aggravated forms of inflammatory diseases of postnatal period to practical health care.

9.The optimization of preventive measures for aggravated and non-aggravated forms of inflammatory diseases in postpartum women.

Research methods.

–The object of the study was 300 postpartum women during 2017-2019, 250 of whom had inflammatory complications during postpartum period due to various reasons and 50 women went through postpartum period under physiological conditions. In the course of the scientific work, clinical and anamnestic, general routine laboratory-instrumental

and obstetric examinations, bacteriological examination, immunological examinations (immune enzyme analysis), determination of the quality of life (SF-36 components), Raman spectroscopy, mathematical and statistical analysis methods were used.

The main provisions of the defense:

1.The assessment of etiopathogenetic mechanisms in inflammatory diseases of postpartum period is of great importance.

2. In some cases, the traditional diagnostic methods of inflammatory diseases of postpartum period do not provide accurate information about the nature of metabolic, morphological, functional and pathophysiological changes in the organs and tissues of the reproductive system.

3. As a result of the achievements in fundamental scientific fields such as laser physics and spectroscopy, new highly informative diagnostic methods based on laser conversion technique and Raman-fluorescence spectroscopy (based on the registration of Raman spectra and beam luminescent lights) have been applied to clinical medicine.

4. Raman spectroscopy allows for a very short period of time to conduct a high-precision examination of the substrates of the body in the form of cells, tissues, biological fluids during the development of pathological processes.

5. The development of diagnostic and prognostic criteria in connection with the division of inflammatory diseases of postpartum period into aggravated and non-aggravated forms in the comparison group allows for targeted treatment and prevention for each group.

Scientific innovation:

- For the first time, new criteria for the division of inflammatory diseases of postnatal period into aggravated and non-aggravated forms have been developed.
- The detection of aggravated and non-aggravated forms of inflammatory diseases of postpartum period with a complex of modern diagnostic methods;
- Based on the results of Raman spectroscopy, the evaluation of informativeness in the diagnosis of aggravated and non-aggravated forms of diseases of postpartum period.

Practical significance of research:

- The conducted complex examination made it possible to determine the main causes of inflammatory diseases of postpartum period and the clinical and laboratory characteristics of the course of the disease.

Criteria have been proposed for dividing the inflammatory diseases of postpartum period into two: aggravated and non-aggravated clinical forms.

- As a result of the conducted research, new prognostic criteria of the disease were developed based on the informativeness of modern diagnostic examinations of inflammatory complications of postpartum period.

-As a result of the application of Raman spectroscopy in the early diagnosis of inflammatory complications of postpartum period and timely preventive measures, the frequency of aggravated forms of inflammatory diseases of the postpartum period has decreased.

The application of research results. The results of the research work were applied to the daily work experience of the Scientific Research Institute of Obstetrics and Gynecology.

The name of the organization where the dissertation work was performed. The research work was carried out on the basis of the Scientific Research Institute of Obstetrics and Gynecology.

Approval of research work. The results of the scientific work were reported and discussed:

- Gynecological Endocrinology. The 17th World Congress (Firenze, Italy, March 2-5, 2016);
- Scientific and practical conference with international participation "Medical simulation - view of the future" (Vinnytsia, February 02, 2018)
-2nd World congress on maternal fetal neonatal medicine (March 31, 2019);
- Materials of the III international conference "Hemostasis, thrombosis and reproduction" (Saint Petersburg, May 13-15, 2019);
-4. International Congress of Pregnancy, Childbirth and Maternity (Bolu, February 20-23, 2020);
- "Global science and innovation - 2021: Central Asia" (Nur-Sultan, October 22-27, 2021);
- Webinar dedicated to the International Day of Doctors and Midwives (Baku, May 5, 2021),
-E-training on "Reproductive health and family planning" (May 3, 2021).
- International III scientific-practical conference dedicated to the 90th anniversary of P. Kintrayan (Tbilisi, 2023)
-Endo Dubai Congress of the European Association of Gynecologists and Endoscopists (Dubai, February 25, 2024)

The results of the research work were discussed at the interdepartmental meeting of the ED 2.06 Dissertation Council of AMU on July 3, 2023 and at the Scientific Seminar of the Dissertation Council of AMU on January 11, 2024.

Publications. 32 scientific works were published on the subject of the dissertation: 19 articles (foreign and native), 8 theses, 3 textbooks and 1 monograph.

The structure and volume of the dissertation. The dissertation consists of 135 computer-printed pages (193.000 characters): introduction (11.005 characters), literature review (64.339 characters), materials and methods chapter (25.693 characters), chapter III (63.123 characters), chapter IV (45.394 characters), chapter V (31.104 characters), chapter VI (23.325 characters), chapter VII (14.042 characters), chapter VII (45.337 characters), conclusion (5.310 characters), practical recommendations (1597 characters), literature list. The list of literature consists of 226 sources: 4 native and 222 foreign sources. 40 tables, 29 figures and 4 pictures are presented in the dissertation.

RESEARCH MATERIALS AND METHODS

The study was conducted based on the analysis of the results of examinations and clinical observations of the women having inflammatory complications due to different reasons during the postnatal period and going through postpartum period under physiological conditions who gave birth naturally at the Scientific-Research Institute of Obstetrics and Gynecology of the Ministry of Health of the Republic of Azerbaijan in 2017-2019. So, in order to solve the objectives of the research, 250 postpartum women between the ages of 17-45 were included in the study based on the inclusion and exclusion criteria of our study among the women who had physiological and abdominal childbirth.

A total of 300 women were involved in the research together with 50 women who went through the postpartum period under physiological conditions.

Emergency cesarean section was performed on 33 women and planned cesarean section was performed on 23 women who had abdominal delivery.

Inclusion criteria of the study:

- Postpartum women with clinical signs of postnatal inflammatory complications (an increase in body temperature, an increase in the pulse up to 90 beats per minute, the pathological nature of the lochium, inflammation, separation or partial separation of interstitial sutures);
- acceleration of leukocytosis, ESR, change of leukocyte formula to the left in general blood examination;
- Women with confirmed uterine subinvolution in USG;

Exclusion criteria of the study:

- postpartum women with inflammation due to extragenital diseases (ARD, exacerbation of pyelonephritis) in the postnatal period;
- women with increased body temperature because of lactostasis;
- HIV-infected women.

The quality of life of the women was studied along with clinical-anamnesis, laboratory and instrumental examinations who included in the research. Raman spectroscopy of blood samples of postpartum women was carried out. The mathematical-statistical processing of the obtained results was performed.

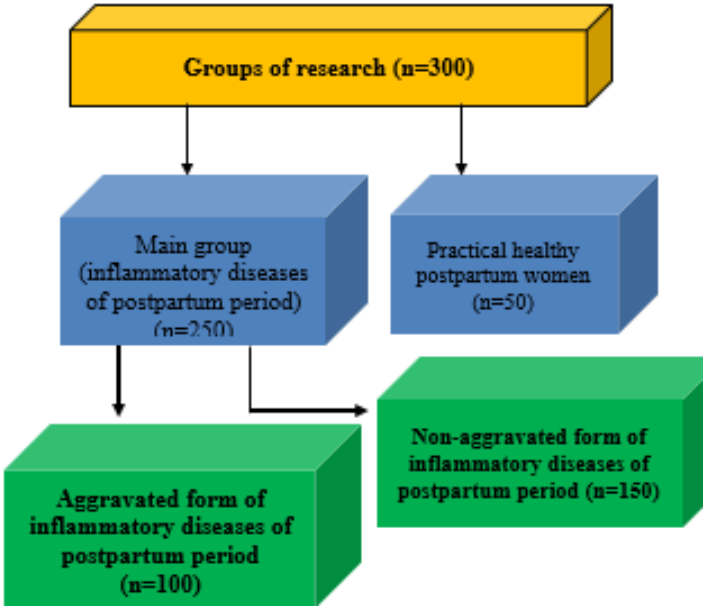


Figure 1. Research design

The blood of practically healthy women and the patients with pathologies involved in the study was analyzed by biochemical methods. All biochemical analyzes were studied in blood serum. Blood samples taken for this purpose were collected in special laboratory test bottles containing "Clot activator" (coagulation process accelerator). The serum samples obtained after rapid centrifugation of 2500 cycles/min for 10 minutes were studied. The concentration of albumin in the blood serum was analyzed by the colorimetric method using the reactive kit of the company "Human" (Germany). The principle of the method is based on the albumin forming a blue complex compound with bromcresol green. 1 ml of bromcresol green solution is poured into each of 2 test bottles (experiment and standard) and 10 μl of blood serum or standard albumin solution

(50 g/l) is added to it and kept for 10 minutes. Then the optical density at a wavelength of 530 nm is determined.

The level of immunoglobulins in the blood serum of healthy individuals and patients involved in the study was determined by using the reactive kit of the company "Vector-Best" (Russian Federation). The principle of the method was the same as that of cytokines and the results were calculated based on the corresponding standard curves. Immunoenzyme tests were performed on the Stat Fax Plus (USA) immunoenzyme analyzer (λ=450 mm, differential filter 650 nm).

The occurrence frequency of conditionally pathogenic microorganisms was studied during the microbiological research. In both groups of women (sick and healthy), the indicators of microorganism colonization in the uterine smear samples taken from them when they came to the hospital were studied (by CFU).

The methods of assessment for the quality of life. To assess the quality of life of the patients in the mentioned groups, SF-36 health status or quality of life criterion was used. The SF-36 criterion can usually demonstrate the status of health economics and quality of life after treatment. It was first proposed by the RAND Corporation. In this criterion, the surveyed persons are questioned according to the physical and psychological components of their quality of life.

The physical components include their physical functioning (PF), sexual functioning (RP), bodily pain (BP) and general health (GH).

The mental components include activities in life (VT), social functioning (SF), sexual functioning (RE) and general mental health (MH).

Here, the patients are asked special questions, which are evaluated with special points. In this survey, their answers are scored, the total is estimated between 0 and 100 points. As the

score increases, it is considered a positive situation, 100 points indicate the absence of any concern. 0 is considered a disability.

Raman spectroscopy was performed on the blood samples we obtained from the participants of both research groups during the Raman spectroscopy examination. The biological materials taken from the participants were sent to the Institute of Physics of the National Academy of Sciences of Azerbaijan, where they were examined by the Raman spectroscopy method. The device used for the examination was Nanofinder 30 (Tokyo Instr.) made in Japan. The obtained results are justified in the form of comparison of phonons in spectrograms.

Raman spectroscopy is mainly used in chemistry to determine the detectable "traces" of various molecules. This spectroscopy is based on inelastic distributions of photons called "Raman distribution". Although near-infrared and near-ultraviolet light from laser-type monochrome light sources are usually used for this purpose, X-rays can also be used [34]. Laser light directed to any system causes up-and-down shifts in the energy of laser photons by interacting with molecular vibrations, phonons and other mobilities in that system. It should be noted that Phonons are the number of common vibrations of atoms in any crystal lattice, which was adopted by Soviet scientist I.E.Tamm in 1932. At this time, the changes in energy can provide the information about vibrational states in the system. Infrared spectroscopy usually provides information analogous to that of monochrome spectroscopy, but can also provide additional information. Any sample is usually illuminated by a laser beam during Raman Spectroscopy. The electromagnetic radiation from the illuminated point is collected in a lens and sent through the monochromator.

Elastically distributed radiation with a wavelength corresponding to the laser line is filtered through special filters and the remaining radiation reaches the detector. Recently, works are done to apply Raman spectroscopy in various fields

of medicine. The results of spectroscopy are also of a complex nature, because the biological materials with a complex composition are often examined in medicine. Therefore, a computer must be added to the system in order to process the results. At this time, any biological sample is illuminated by the rays coming from the laser source, the ray that enters that biological system is emitted with different deviations, not the same as that entered in that system, due to the influence of various elements, cells, etc. in its composition. Later, the radiation waves coming out of the biological samples with changes enter to the wavelength selector, from there to the radiation converter, and finally, the data from the radiation converter enter into the computer database, where various results are processed by a special program.

The obtained numerical data were processed by statistical methods taking into account modern requirements. The average values (M), their standard error (m), the minimum (min) and maximum (max) values of the series, as well as the frequency of occurrence of the quality indicators in the groups were determined for the group indicators.

Parametric method of Student's t-test, the mean difference between the selected indicators for pairwise related variants and the estimation of the difference between parts were used for the initial estimation of the difference between variation series.

Then non-parametric criteria - Wilcoxon (Mann-Whitney) U-criterion was used for the verification and clarification of the results obtained and Pearson's $\chi 2$ - criterion was used for frequency analysis. The correlation analysis was conducted in order to determine the strength of the relationship between the studied indicators [24, p.145].

It should be noted that the statistical processing of the results obtained during the research was carried out with the Statistica 7.0 application computer program.

All obtained results are reflected in tables and diagrams.

RESULTS OF THE RESEARCH AND THEIR DISCUSSION

All examined women were between the ages of 18 and 44. The average age of patients with inflammatory diseases was 25.6±0.4 years. During the comparative analysis of the age characteristics of the two groups, an increasing trend in the incidence of aggravated forms of inflammatory diseases was recorded in the postpartum women under 20 years old: women under 20 years old accounted for 19.5% in the comparison group and 28.9% in the main group ($p<0,05$).

24.9% of all postpartum women: 19.5% in the control group and 30.8% in the main group were not registered in the women's clinic ($p<0.05$). 17.4% of postpartum women: 13.2% of postpartum women in the control group and 22% of postpartum women in the main group had an unwanted pregnancy ($p<0.05$). One of the factors in the development of inflammatory diseases is that pregnant women do not want to perform all the necessary examinations at the women's clinic and to visit the obstetrician-gynecologist regularly.

From the anamnesis, it was determined that 41.1% of the patients had their first pregnancy. Three or more pregnancies in postpartum women in the control group were 35.1% and in the main group - 47.8% ($p<0.05$). Abortions were the risk factor of inflammation in 52% of the postpartum women.

Obstetrics and gynecological anamnesis in the main group: chronic inflammatory diseases of the female genital organs - in 38.7% of postpartum women, purulent-septic complications - 15.3%, sexually transmitted infectious diseases in the anamnesis and during the pregnancy – 40.8%, previous infertility – 4.8%, Caesarean section in the anamnesis – in 7.8%. 9.9% of postpartum women in the control group and 48.4% of postpartum women in the main group had a history of chronic

inflammatory diseases of external genital organs ($p<0.05$). Cervical erosion was diagnosed in 15.5% of the postpartum women in the control group and 24.5% of the postpartum women in the main group. 2.3% of the postpartum women in the control group and 7.6% of the postpartum women in the main group suffered from infertility($p<0.05$).

The women included in the study suffered from extragenital diseases: infectious diseases of the bronchus-pulmonary system - 13.2%; cardiovascular system diseases – 18%; endocrine pathology – 8.1%; autoimmune pathology – 4.5%; ARVI - 12.6%; infectious diseases of the urinary system - 34.2%. The frequency of extragenital diseases in the main group was higher than that of the control group. Thus, 23.6% of the postpartum women in the control group and 45.9% of the postpartum women in the main group suffered from infectious diseases of the urinary system ($p<0.05$). ARVI was present in 9.2% of the postpartum women in the control group and 16.4% of the postpartum women in the main group ($p<0.05$). 12.1% of the postpartum women in the control group and 24.5% of the postpartum women in the main group suffered from cardiovascular system diseases ($p<0.05$). Infectious diseases of the bronchial-pulmonary system were present in 6.3% of the postpartum women in the control group and 18.9% of the postpartum women in the main group ($p<0.05$).

The most serious complications during pregnancy and childbirth among the main group of postpartum women included in the study: chorioamnionitis - in 6.9%, intrauterine infection - in 8.1%, severe delayed preeclampsia - in 26.7%, anemia - in 27% of the postpartum women in the main group. Criminal intervention occurred in 3.9% of postpartum women. In 5.7% of all examined women, delivery was complicated by hypotonic bleeding. Hemorrhagic shock developed in 10.5%, septic shock in 4.8%, DIC syndrome (disseminated intravascular coagulation) in 11.1% of of postpartum women.

49.8% of the postpartum women in the main group were hospitalized in medical institutions during the current pregnancy. Re-hospitalizations during pregnancy were 22.2% of postpartum women. 57.4% of postpartum women entered the maternity hospital urgently. Long-term and repeated hospital stay of pregnant women is a risk factor for nosocomial infection.

In the main group, blood loss of more than 10 ml per 1 kg of body mass during childbirth occurred in 61.3% of the postpartum women and the period without water for more than 6 hours was in 53.2% of the postpartum women.

The main group of patients was brought to the upper level with a delay: in 43.1% of all cases, postpartum women were hospitalized 10 or more days after the onset of the disease.

Patients with aggravated forms of inflammatory diseases of the postpartum period were transplanted in time, which is confirmed by Spearman's correlation coefficient ($r = -0,94$, $p<0,05$).

Critical patients (25.8%) and very critical patients (27%) of the main group were delivered to the hospital many times faster than patients in the same condition of the control group (12.1% and 8.6%, respectively) ($p<0.05$). When arriving at the hospital, 35.2% of patients in the main group were on mechanical ventilation of the lungs ($p<0.05$).

The patients in sufficient condition and moderate severity were admitted to the gynecology department (69% of postpartum women with aggravated form, 34.6% of postpartum women with non-aggravated form). 29.9% of postpartum women with aggravated form and 64.8% of postpartum women with non-aggravated form were hospitalized in the intensive care unit.

While only 38.5% of the postpartum women with non-aggravated form admitted to the intensive care unit were hospitalized in the first 6 days after birth, 71.8% of the patients with the aggravated form ($p<0.05$) were hospitalized.

We have developed and implemented optimized postpartum examination and treatment tactics for the examination and treatment of the postpartum women with aggravated forms of inflammatory diseases.

The following bacteriological examinations were carried out on postpartum women admitted with aggravated forms: biopsy from the cervical canal and uterus, examination blood and urine, biopsy from the abdominal cavity during surgery. This reasearch was carried out during all manipulations: pleural cavity puncture, bronchoscopy, surgical treatment of purulent postoperative wounds on the anterior abdominal wall, episiotomy and interstitial sutures after other manipulations. During the bacteriological examination of biopsies from the cervical canal and uterus, microbial associations of aerobic and anaerobic infection were found in most cases and monoinfections in less cases.

As a result of our research, the swabs obtained from the patients were sent to the microbiological laboratory operating at the institution where the research was conducted, and it was recorded that the type of E.coli prevailed along with other representatives of microorganism in 10 samples as a result of the microbiological analysis of the uterine swabs (n=50) obtained from the patients who made up the control group without inflammatory complications during pregnancy. For the control group appropriate samples accounted for 20 of the total samples we obtained. During the microbiological analysis of the uterine swabs in the main group, it was recorded that E. coli prevailed in 22 of them, and these samples cover 22.0% of the total samples for the group (p=0.835). The predominance of Enterobacter species was recorded in 7 of the relevant materials obtained from the main group of patients with postpartum inflammatory complications and these samples represent 7.0% of the total samples (n=100). During the study of the relevant biological materials obtained from the healthy postpartum

women involved in the control group, the predominance of enterobacter species was recorded in 4 of them, or 8.0% of them. In this case, the statistical relationship between the groups was determined at p=0.925.

we have witnessed the dominance of Proteus species along with several other species in 8 of the suitable biological materials obtained from the main group. These samples represent 8.0% of the total biological samples we collected from the patients in the main group. Among the biological materials we obtained from the research objects that underwent a period of healthy postpartum period after birth, which we included in the control group, we observed that individual species of the Proteus were in a dominant position in 4 of them, and these samples covered 8.0% of the samples in the control group and can be said that it was same with an analogous indicator in the main group. (p=1,000).

During the microbiological analysis of the vaginal swabs obtained from the healthy postpartum patients (n=50) of the control group, it was recorded that the Klebsiella species were in a dominant position together with some other species in only 3 of them, and these samples accounted for 6.0% of the total samples in the corresponding group. Nevertheless, species of the Klebsiella genus dominated in 31 samples from vaginal swab samples taken from the patients who had postpartum period accompanied by an inflammatory complication in the main group and this case accounted for 31.0% for the group. The statistical relationship between the groups was p=0.001, that is, the difference was statistically significant.

During the microbiological analysis, the dominance of species of the genus Enterococcus was reflected in 20 of the biological materials obtained from the patients with postpartum inflammatory complications who were included in the main group, and these samples made up 20.0% of the total samples. Enterococcus species were found in 3 of the vaginal swabs

obtained from the control group, or 6.0% of them, and the statistical relationship between the groups was p=0.029. In 59.0% of the vaginal swab samples obtained from the main group, S.epidermicus species was found to be dominant. As a result of the study of similar biological materials taken from the women in the control group who did not have any inflammatory complications after childbirth, it was reflected that S. epidermicus was in one of the dominant positions in 20 samples and these samples made up 40.0±6.93% of the control group (p =0.037).

Microbiological examinations of uterine swabs were carried out in research groups. Proteus species were detected in 8 women in the main group. These samples made up 8.0% of the total biological samples we collected from the patients in the main group. The genus Proteus was identified in 4 materials of the control group (8.0±3.84%), the difference was statistically significant (p=1.000). Klebsiella species were detected in 31 women (31.0%) in the main group and in 3 women (6.0%) in the control group. The statistical relationship between groups was p=0.001.

S. aureus was found in 3 patients (6.0%) in the control group, and prevailed in 18 patients (18.0%) in the main group (p=0.049).

Species of the genus Streptococcus were recorded in 4 materials in the main group (4.0%), in 5 materials (10.0%) in the control group (p=0.161).

Acinetobacter genus was recorded in 12 women (12.0%) in the main group and in 2 women (4.0%) in the control group (p=0.143).

Bacteriodes species were found in 29 samples in the main group (29.0±4.54%), in 6 women (12.0%) in the control group (p=0.024). Peptococcus species were identified in 6 biological materials (12.0±) in the control group and 27 materials (27.0%) in the control group (p=0.039).

In order to compare, analyze and justify the results of the research in the control group, during the microbiological analysis of the uterine swab samples obtained from the patients who did not have postpartum inflammatory complications, it was recorded that in 2 of them (4.0%) species of the genus Propionibacterium were in dominant positions. At this time, as a result of the microbiological examination of the uterine swab samples from the main group, it was observed that the species of the mentioned genus prevailed in 9 of them (9.0%). Thus the statistical relationship between the groups was calculated as p=0.338.

From the results of the microbiological examination, it is known that the number and average index of women infected with all pathogens in the main group was relatively higher than in the control group.

Results of blood laboratory examination. During our study, the following laboratory indicators were recorded: leukocytosis with changes in neutrophils was recorded in 38.4%, leukopenia in 10.5%, elevated ESR in 89.5% (in this case its average value was 38 mm/s), anemia in 90.7%, liver protein production disorders: hypoproteinemia in 39.3%, hypoalbuminemia in 45.9%, disorders of electrolyte exchange in 24.6% of patients, coagulopathy with the development of DIC syndrome was observed in 18.2% of the postpartum women. More proteinuria (42%), leukocyturia (35.1%), hematuria and cylinduria (18%) were detected in the general analysis of urine. In 16.2% of postpartum women an increase in blood urea concentration and in 21.3% an increase of creatinine was recorded.

In the main group, 10 postpartum women were diagnosed with necrosis of the cervix after supravaginal amputation of the uterus, which was 3%; 15.9% of postpartum women were diagnosed with unstoppable stitches in the uterus after caesarean section; Parametrium hematomas were found in 8.1%;

prevesical hematomas were found in 12.3% of postpartum women; retroperitoneal hematoma was found in 0.9% of postpartum women; hematoma of the anterior abdominal wall was found in 6.91% of postpartum women; 2 postpartum women were brought with incomplete perforation of the uterus after itching of the uterine cavity (0.6%); in 9.9% of postpartum women, during cesarean section, the transition of the lower segment incisions to vascular bundles was confirmed intraoperatively based on ultrasound examination data; pelvioperitonitis was found in 10.8% of postpartum women; peritonitis was found in 6.3%; purulent omentitis was found in 1.8% of postpartum women; 1.5% of postpartum women were diagnosed with pelvic abscesses; inter-intestinal abscesses were found in 2 postpartum women (0.6%); a foreign body was found in the abdominal cavity in 4 postpartum women (1.2%); the eventration of the anterior abdominal wall was found in 0.9% of postpartum; the suppuration of stitches on the anterior abdominal was found in 7.81% of postpartum women; purulent tubo-ovarian abscesses were found 3.3% of postpartum women; iatrogenic bladder injury was found in 3 postpartum women (0.9%); iatrogenic ureteral injury was found in 2 postpartum women (0.6%); vesicouterine fistula - found in 2 postpartum women (0.6%). During the comparison of the two groups, the postpartum women in the main group (20.1%) were diagnosed with non-stop uterine sutures twice more than those of the control group (12.1%) - $p<0.05$.

In the main group: peritonitis was found in 6.3%, sepsis - in 12.6%, septic shock - in 5.7% of postpartum women, which once again emphasizes the relevance of the problem of purulent-septic diseases after childbirth. Sepsis developed in 8.1% of pospartum women with non-aggravated form and in 17.6% of pospartum women with aggravated form, i.e. twice more ($p<0.05$). Peritonitis was found in 5.2% of postpartum women

with non-aggravated form and in 7.6% of postpartum women with aggravated form.

Polyorgan failure was diagnosed in 21.3% of the main group. This complication was diagnosed more often in postpartum women with aggravated form - 30.8% ($p<0.05$) than women with non- aggravated form - 12.6% after childbirth.

Urgent surgical treatment was performed on the patients who were diagnosed with complicated forms of purulent-septic postpartum diseases with signs of spread of the process, danger of perforation of the purulent process, and intra-abdominal bleeding. Urgent surgical treatment was performed in 22.8% of cases among postpartum women with aggravated form, and only in 13.9% of cases with non- aggravated form.

Patients' length of hospital stay decreased and disease outcomes were improved (Table 1).

Table 1

Length of hospital stay in the women with aggravated and non- aggravated forms of inflammatory diseases of the postpartum period

Length of stay	Aggravated form		Non-aggravated form		P
	n =100		n=150		
	ABS	%	ABS	%	
Up to 11 bed/days	9	9	38	25,16	p<0,05
11-14 bed/days	10	10	40	26,42	p<0,05
15-18 bed/days	24	24	26	17,61	p>0,05
19-21 bed/days	29	29	26	16,98	p<0,05
More than 21 bed/days	28	28	20	13,84	p<0,05

While evaluating the effectiveness of the developed treatment tactics, it was found that the length of stay in the hospital decreased and the results of the disease improved.

During the research carried out for the purpose of studying non-specific and specific cellular and humoral immune factors such as T-lymphocytes, IL-6 and various immunoglobulins, the

amount of T-lymphocytes in the blood samples taken from postpartum women with inflammatory complications, which formed the main group, was found to be $0,55x10^9$/l in minimal case, $1,24x10^9$/l in the maximum case. Thus, the average indicator for the group was determined as 0.85±0.02x109/l.

During the examination of the blood samples taken from the objects of the control group of postpartum women who did not have inflammatory complications after childbirth, the average quantity of the appropriate cell population was calculated as $1,45±0,06 x10^9$/l. The corresponding indicator of the sample with the maximum T-lymphocyte amount was $2,08x10^9$/l, and that of the sample with the minimum T-lymphocyte amount was $0,80x10^9$/l in the relevant reasearch group. The statistical relationship between the indicators we obtained for the relevant parameter was P=0.001.

The average amount of IL-6 was 10362.1±626.0 ng/g in the blood samples (n=50) taken from the control group consisting of postpartum women without inflammatory complications who were involved in the process of the comparison, analysis and justification of quantitative indicators of interleukin-6, one of the indicators of humoral immunity in the blood samples analysed on the research groups. At this time, among the biological samples, the analogous indicator of the sample with the minimum amount of IL-6 was 2948 ng/g, and that of the sample with the maximum amount was 16633 ng/g.

The average amount of IL-6 in the blood samples obtained from the main group of patients aggravated by logiometry during postpartum period was determined to be 24263.5±480.2 ng/l. Among the corresponding samples, its amount was 32216 ng/g in the blood with the maximum amount of IL-6, and its amount was 15640 ng/g in the blood with the minimum amount of IL-6. At this time, the statistical relationship between the main and control groups was defined as P=0.001.

During the research phase while determining the levels of IgA in the blood samples on the groups, the average level of the corresponding immunoglobulin in the blood samples we received from the patients with non-aggravated inflammatory complications in the control group was 0.09±0.006 g/l. In the control group, the corresponding index of the patient with the minimum IgA level was 0.02 g/l, and that of the patient with the maximum level was 0.16 g/l. Nevertheless, the average level of IgA in the blood samples obtained from the main group of patients with inflammatory complications in postpartum period was 0.14±0.005 g/l slightly higher than that of the control group. At this time, blood samples taken from the main group showed a corresponding indicator of 0.06 g/l in the case of the minimal IgA amount and 0.24 g/l in the case of the maximum amount. Thus, the statistical relationship of the average indicators obtained from groups was calculated as P=0.01.

In the research stage while determining the IgG levels in the analogous biological materials on patient groups, the minimum IgG level was determined 0.55 g/l and the maximum IgG level was 1. 34 g/l in the postpartum women with non-aggravated inflammatory complications in the control group. So the average indicator for the group was 0.93±0.022 g/l. During the biochemical analysis of the blood samples we obtained from the group of postpartum patients who had given birth and did not suffer from inflammatory complications during postpartum period, the corresponding indicator of the sample with the minimum IgG level was 0.24 g/l, and the maximum was 0.55 g/l. In this case, the average IgG level of the control group was determined to be 0.41±0.011 g/l, the statistical relationship of the indicators obtained from the groups was P=0.01.

During the research phase while determining the amount of sIgA in the blood samples taken from the groups, the average amount of the immunoglobulin fraction was determined to be 0.15±0.006 g/l in the analogous biological materials of the

patients who had inflammatory complications after the birth process in the main group. The minimum sIgA level for the main group was 0.06 g/l, and the maximum was 0.25 g/l. The average indicator of sIgA in the blood samples obtained from the patients in the control group was determined to be 0.45±0.012 g/l. The analogous average indicator of the blood sample with minimal sIgA was 0.45±0.012 g/l. Among the corresponding samples, the minimum sIgA level indicator was 0.30, and the maximum sIgA level was 0.62 g/l, the difference was statistically significant (p=0.001).

During the research phase, when the quantitative indicators of lysozyme enzyme were calculated in the blood samples taken from the main and control groups, the average amount of lysozyme in the biological materials obtained from the patients with postpartum period accompanied by inflammatory complications in he main group, was calculated to be 0.62±0.023 g/l, while this indicator was found to be slightly higher, i.e. 2.11±0.050 g/l in the patients with non-aggravated postpartum inflammatory complications, in the control group.

It should be noted that in the blood samples we took from the main group, the corresponding indicator was 0.21 g/l in the case with the minimum amount of lysozyme and 0.99 g/l in the case with the maximum amount of lysozyme.

In this regard, in the blood samples obtained from the control group, its amount in the biological material with the maximum amount of lysozyme was 2.68 g/l, and in the biological material with the minimum amount of lysozyme its amount was found 1.46 g/l. Thus, the statistical relationship p=0.001 was calculated between the average limit indicators of lysozyme in the groups.

During the research phase where the percentage share of the subpopulations of lymphocytes with different receptors within the total number of lymphocytes was determined in blood samples, the average number of lymphocytes with the CD^{3+}

receptor in the relevant biological materials (n=100) obtained from the patients with inflammatory complications during the postpartum period was 60,8±0,32% of the total lymphocytes. Among the blood samples, the percentage of lymphocytes belonging to the CD^{3+} subpopulation was determined to be 55.0% in the material with the minimum amount, and 66.9% in the material with the maximum amount. During the analysis of the blood samples obtained from the patients who did not experience inflammatory complications during postpartum period, the number of lymphocytes belonging to the relevant subpopulation was slightly higher 62.6±0.60% than the average limit of total lymphocytes. On the corresponding group, the appropriate index of the sample with the minimum CD^{3+} lymphocyte amount was 56.0%, and that of the sample with the maximum amunt was 70.1%. The statistical relationship of the obtained values for the groups was P=0.0035.

In the research phase where the percentage share of lymphocytes belonging to the CD^{4+} subpopulation within the total number of lymphocytes was determined, the average indicator of the percentage ratio of the number of lymphocytes with the mentioned receptors to the total lymphocytes on the cell surface was identified 41.8±0. 47% in the biological material taken fromthe control group consisting of the patients who did not have any inflammatory complications after birth.

In the blood samples we took from the patients in the main group consisting postpartum women with inflammatory complications, its percentage share was 26.5% in the material with the minimum CD^{4+} cell amount and 38.4% in the material with the maximum CD^{4+} cell amount was. The corresponding average indicator for the total samples was calculated as 31.9±0.34%. The statistical relationship between the averages obtained from the main and control groups was p=0.0001. During the study, as a result of determining the percentage share indicators of the lymphocyte subpopulation with CD^{8+} receptor

within the total number of lymphocytes in the groups, the average limit of the mentioned lymphocyte subpopulation was identified 25.7±0,19% in the blood samples taken the from patients who did not have inflammatory complications during postpartum period in the control group. It was recorded that blood sample with minimum level contained 22.8% and blood sample with maximum level contained 27.7% lymphocytes with CD^{8+} receptor. Nevertheless, during the analysis of blood samples of the women in the main group after childbirth, the women with the highest matching receptor lymphocyte were 32.4%, the lowest one was 23.5%, so the average limit was calculated as 28.1±0.28%. The statistical relationship between the indicators of the percentage share of the number of cells with the average CD^{8+} receptor of the obtained biological materials was determined p=0.0001.

In the research stage, where we determined the percentage share of the number of lymphocytes with CD^{16+} receptors among the total lymphocytes, the average indicator of the percentage share of the number of lymphocytes with CD^{16+} receptors among the total lymphocytes in the biological materials in the main group was determined to be 14.6±0.23%.

Its percentage share in the sample with the minimum corresponding subpopulation number was 10.8%, and in the case of the maximum, it was 18.5%. In the blood samples taken from the women in the control group, the percentage share of the lymphocyte subpopulation with the CD^{16+} receptor within the total lymphocyte number was determined as 16.7±0.18% on average for the group.

In the biological material with the minimum number of CD^{16+} lymphocyte subpopulation, its percentage share was 15.0%, and in the material with the maximum number, it was 19.3%. The statistical relationship between the number of CD^{16+} lymphocytes in both study groups was P=0.0001.

Results of a quality of life study. The results of our survey on the Hospital Anxiety and Depression Scale (HADS) were analyzed across study groups. As a result of our survey on the Hospital Anxiety and Depression Scale (HADS), it was determined that 42% of the research subjects did not have panic attacks on the depression section of the corresponding scale in the main group (5.40±0.17 points). 38% of the control women had an anxiety attack of the appropriate scale (5.05±0.29 points).

A subclinical form of anxiety state was observed in 43% (9.02±0.11 points) in the main group and 46% (8.70±0.13 points) in the control group. The difference between the groups was not statistically significant ($p=0.0679$, $p<0.05$).

During the analogous scale survey, 16% of patients (13.88±0.48 points) in the control group and 15% (12.60±0.31 points) in the main group had a clinical manifestation of anxiety. The statistical relationship between the average scores of the groups was insignificant ($p=0.2129$, $p<0.05$).

76% of patients in the main group (5.11±0.17 points) and 62% (4.68±0.31 points) in the control group were diagnosed with depression (within the normal range). The difference between the groups was statistically insignificant ($p=0.2129$, $p<0.05$). While clinical form of depression was determined in 4% of the main group and in none of the women of the control group at all.

As a result of our survey on the Hospital Anxiety and Depression Scale (HADS), it was determined that 42% of research subjects did not have panic attacks on the depression section of the corresponding scale in the main group of patients with postpartum period accompanied by inflammatory complications. At this time, the average score for the depression section of the scale for the respective group was calculated as 5.40±0.17, which corresponds to the range of the scale considered as "norm" (0-7 points), 10 (38%) of the women in the control group had the corresponding the average score on the

anxiety section of the scale which was determined to be 5.05±0.29 and considered as "normal" interval (0-7 points). The statistical relationship of the obtained indicators for groups was p=0.2757.

As a result of our survey of the Hospital Anxiety and Depression Scale (HADS) among the patients in the main group, it was determined that 43% of the patients had a subclinical form of anxiety. Thus, the average score of the appropriate scale obtained from the patients for the relevant research group was 9.02±0.11, which corresponds to the "subclinical" interval of the scale (8-10 points). Subclinical state of anxiety was found in 46% of study subjects among healthy postpartum women in the control group. The average indicator of the scale-questionnaire for the relevant research group was calculated as 8.70±0.13 points, which is within the "subclinical" interval (8-10 points). The statistical relationship p=0.0679 was determined between the scores we obtained in terms of subclinical manifestations on the section indicating anxiety attacks or state of the Hospital Anxiety and Depression Scale (HADS).

During the similar scale survey we conducted in the control group of postpartum women, it was concluded that anxiety was in a state of clinical manifestation in 16% of patients. This conclusion was made due to the fact that the index of the scale for the group was 13.88±0.48 points, which corresponds to the interval of "clinical" manifestation (points above 11). In the main group of postpartum women with inflammatory complications, the alarm state in the main clinical manifestation was recorded in 15% of the patients, the average value of the scale for the group was 12.60±0.31 points, and this is included to "clinical" manifestation interval (11 points and above). The statistical relationship between average scores for the groups obtained with the scale-questionnaire was determined p=0.2129. In general, the statistical relationship of our results on the section of the Hospital Anxiety and Depression Scale

(HADS) containing anxiety attacks was calculated as $\chi 2=0.22$ and $p=0.895$.

In addition to the survey on the anxiety state section of the Hospital Anxiety and Depression Scale (HADS), a survey on its depression section was conducted. In the main group of patients who had postpartum period accompanied by inflammatory complications after childbirth, it was recorded that 76% of patients had depression within the normal range. In these patients, the indicator of the depression section of the corresponding scale was 5.11±0.17 points, which is included in the range of the scale that is considered as the "norm" shown above. Among the patients whose depression is within the normal range, the lowest score of the scale was 2 points, and the highest score was 7 points.

As a result of the study, it was revealed that the depression section of the corresponding scale was normal among 62% of the postpartum women in the control group. In these patients, the average score of the appropriate scale was 4.68±0.31 points, which is included in the interval considered as "norm". The statistical relationship between the mean scores of the Hospital Anxiety and Depression Scale (HADS) for the depression section was calculated as $P=0.2129$.

During the survey on the section of depression of the relevant scale, it was found that 20% of the patients in the main group suffered from subclinical depression. In these patients, the average indicator of the scale was 9.10±0.12 points, the indicator of the research object with the lowest indicator was 8 points, and the highest one was 10 points. Despite this, 38% of patients with a healthy postpartum period are in a state of subclinical depression, which is reflected in the indicators of the HADS scale. At this time, the average indicators on the scale of these patients in the state of subclinical depression were 8.68±0.17 points. Among the patients with subclinical depression in the control group, the minimum scale indicator was 8 points and the

maximum was 10 points. A statistical relationship P=0.0552 was determined between the average scale indicators obtained from the patients in the state of subclinical depression.

During the study, we first conducted a survey on the physical component of the SF-36 health and quality of life criterion. As a result, during the calculations on the state of PF physical functions of the physical component of the SF-36 quality of life criterion, the indicator of the PF parameter in the main group was determined to be 63.3±0.80 on average for the group (n=100). At this time, the minimum PF parameter indicator among patients in the group was 40.0 and the maximum indicator was 80.0. As a result of the questioning of the physical component of the corresponding criteria in the control group of patients (n=50) where no complications were registered, the average indicator for the group was higher than the main group, 82.3±0.86. At this time, among patients in the control group, the indicator of the research object with the minimum PF indicator was 70 and the maximum was 95. It was noted that the statistical relationship between the average indicators obtained from the groups is p=0.0001. At the stage of evaluating the sexual functioning (RP) based on the SF-36 health questionnaire, among women who experienced complications during the postpartum period, the average limit of the sexual functioning criterion (RP) indicator of the physical component of the corresponding scale was determined to be 34.3±1.36. Among patients, the minimum indicator of the corresponding parameter was 0 and the maximum indicator was 75. Nevertheless, in the control group consisting of postpartum women who did not have inflammatory complications after childbirth, the average result of the corresponding quality of life questionnaire was calculated as 67.5±2.50, while minimum index among patients was 50, and the maximum index was 100. The statistical relationship P=0.0001 was calculated between the

average indicators of the sexual function criterion of the physical component of the SF-36 health index for the study groups.

At the stage of our survey of "bodily pain" (BP) criterion of the physical component of SF-36 health condition in the patients, the average index of the relevant criterion was 81.9±0.71 in the control group consisting of postpartum women who did not have any form of inflammatory complications after childbirth, while in the main group consisting of the women with postpartum period accompanied by inflammatory complications, this indicator was identified slightly lower 73.2±0.93. It should be noted that among patients in the control group, the minimum index of the sexual functioning criterion of the physical component of the SF-36 health status index was 77.5, and the maximum index was 87.5, while the minimum index was 55 and the maximum index was 100 in the main group. The statistical relationship between our averages on the corresponding quality of life questionnaire for the control and main groups was P=0.0001.

Although the mean index of the corresponding criterion was 69.2±0.71 in the main group of healthy women at the stage of determining the indicators according to the "general health condition" (GH) criterion of the physical component of the SF-36 quality of life questionnaire index in the study groups, this indicator was calculated slightly lower 78.2±1.14 in the control women. During the study, among patients in the main group, the minimum indicator of the general health condition, which is the end criterion of the physical component of the SF-36 quality of life scale, was 60 and the maximum indicator was 85, while in the control group, these indicators were determined as 60 and 95, respectively (p=0.0001). In the stage where indicators are determined by the "social functionality" (SF) criterion of the mental component of the quality of life questionnaire, the corresponding mean index of the patients in the main group with inflammatory complications in the postpartum period was

72.4±0.93, while in the control group this index was determined slightly higher 82.3±1.56 (p=0.0001).

The analysis of the indicators of individual patients on the "social functionality" (SF) criterion of the mental component of the SF-36 quality of life questionnaire for the main group shows that the minimum indicator is 62.5 and the maximum indicator is 100. In the control group, the minimum and maximum indicators were the same as the main group: 62.5 and 100.

According to the "sexual emotionality" (RE) criterion of the psychological component of the SF-36 quality of life survey, the appropriate criterion indicator was determined on average at 71.3±2.86 among control group women. The minimum indicator of the mentioned criterion was 33.3 and the maximum indicator was 100 for the control group. In the main group with inflammatory complications during postpartum period, the average indicator of the "sexual emotionality" (RE) criterion of the corresponding quality of life index of the research subjects was calculated as 64.7±3.03, which was slightly lower than the analogous indicator of the control group. It should be noted that the minimum and maximum indicators of the relevant criteria for the main group were the same as the control group. The difference between the groups was not statistically significant (p-0.1615).

At the stage when we performed calculations on the general mental health criterion (MH) of the mental component of the quality of life SF-36 index in the study groups, the average index of the relevant criterion in the main group of postpartum women was 69.6±0.64, while this indicator was calculated slightly higher 77.8±1.03 in the control group consisting of postpartum women who did not have the inflammatory complication. It was determined that the minimum indicator of the criterion among patients was 60 and the maximum indicator was 92 during the calculations carried out with the appropriate criterion for the main group. In the control group, these

indicators were 63 and 96, respectively. The difference between groups was statistically significant (p=0.0001).

As a result of our survey on the anxiety (HAM-A) component of the Hamilton scale, in the main group of patients with inflammatory complications in the postpartum period, the average indicator of the corresponding component was determined to be 21.6±0.51 points, while its minimum indicator among the patients was 10 points and the maximum indicator was 32 points. Nevertheless, as a result of the analogous survey we conducted in the control group of patients without inflammatory complications after childbirth, the average indicator for the group was slightly lower than the main group, which was 15.3±0.79 points. In the control group, the maximum index of Hamilton scale anxiety (HAM-A) component was 27 points and the minimum index was 5 points. On the anxiety component of the Hamilton scale (HAM-A) the statistical indicators $p<0.0001$ and $t=6.99$ were determined among the indicators received from the groups.

As a result of our group survey on the anxiety component of the appropriate scale (HAM-A), we determined that 7.0±2.55% of postpartum women with inflammatory complications had a mild level of anxiety in the main group (n=100). Nevertheless, in the control group of postpartum women who did not show inflammatory complications after childbirth, patients in the state of mild anxiety covered 26.0±6.20% of the group.

As a result of the study, 37.0±4.83% of 100 postpartum women with inflammatory complications were recorded to be in a moderate state of anxiety during the survey of the anxiety component of the Hamilton scale (HAM-A), but in the control group consisting women with healthy postpartum period, this indicator was higher at 52.0±7.07%.

When analyzing the results of the survey on the HAM-A component of the scale during the study, it was recorded that

48.0±5.00% of the research subjects in the main group had symptomatic anxiety, while in the control group this indicator was only 8.0±3.84%. During the survey of on the anxiety (HAM-A) component of the Hamilton scale, although the control group consisting of patients without postpartum inflammatory complications did not have a full manifestation of anxiety, in the main group of patients with postpartum inflammatory complications, the full manifestation of anxiety is justified in 8.0±2.71%. Statistical relationship of the indicators we obtained on the parameters of "absence of anxiety", "mild anxiety", "moderate anxiety", "symptomatic anxiety" and "full manifestation of anxiety" in the patient groups of the anxiety component (HAM-A) of the scale were calculated as $\chi 2=44.19$ and $p<0.0001$.

During the survey phase of the depression (HAM-D) component of the scale, the average indicator of the corresponding component for the group was determined as 15.9±0.35 points in the main group of women who had postpartum period accompanied by inflammatory complications after childbirth. Among the subjects of the study, 9 points were recorded for the depression component of the mentioned scale and 22 points for the maximum. According to the results of a similar survey we conducted in patients with healthy postpartum period (n=50), their average score was slightly lower than the similar score of the main group, which was 12.6±0.55 points. Among the patients in the control group, the lowest score was 5 points, and the highest score was 20 points. Statistical indicators $t=5.20$ and $p<0.0001$ were identified between the mean values obtained during the survey phase of the Hamilton Rating Scale for Depression (HAM-D) component in patient groups.

According to the results of survey on the depression (HAM-D) component of the scale in the main group, there were no research subjects who did not have depression, but in the control group consisting of healthy postpartum women, this

condition was recorded in 12.0±4.60% of the research subjects. As a result of the survey on the depression component of the appropriate scale (HAM-D), it was concluded that 24.0±4.27% of women with inflammatory complications in the main group had mild depression. Nevertheless, this indicator was high 46.0±7.05%, among patients in the control group who had a healthy postpartum period. Based on the results of the survey with the depression (HAM-D) component of Hamilton Rating Scale, during the stage of determining the research subjects in the state of moderate depression, in the main group of postpartum women with complications after childbirth, the indicator was identified as 45.0±4.97% of the total research subjects. Nevertheless, it was substantiated by the survey that 36.0±6.79% of postpartum women in the healthy control group suffered from mild depression, which is significantly lower than that of the main group. According to our conclusion based on the survey carried out in the research groups on the depression (HAM-D) component of the scale, 31.0±4.62% of patients in the main group with postpartum inflammatory complications had severe depression. It was recorded that only 6.0±3.36% of postpartum women who did not have inflammatory complications in the control group suffered from severe depression. According to the results of our survey on the depression (HAMD) component of the appropriate scale, neither in the control group of postpartum women who did not have postnatal inflammation, nor in the main group that had postpartum inflammatory complications, there were no research subjects with very severe depression among the research subjects. It should be noted that the statistical relationship indicators on the parameters of "no depression", "mild depression", "moderate depression", "severe depression" and "very severe depression" were defined as $\chi 2=26.98$ and $p<0.0001$ in the patient groups according to the depression (HAM-D) component of Hamilton Rating Scale.

As a result of our survey on the Hospital Anxiety and Depression Scale (HADS) among patients in the main group of women with inflammatory complications of the postpartum period, it was determined that 43% of patients had a subclinical form of anxiety. during the period of our survey on the (BP) criterion, in the control group consisting of women who did not have any form of inflammatory complication after childbirth, the average indicator for the corresponding criterion was 81.9±0.71, while in the main group consisting of women with postpartum period accompanied by inflammatory complications after childbirth, this the indicator was determined slightly lower at 73.2±0.93. At the stage of the study where the indicators were determined by the "social functionality" (SF) criterion of the mental component of the SF-36 quality of life questionnaire by groups, while the corresponding indicators of the patients in the main group were calculated to be 72.4±0.93 on average, this indicator is slightly higher 82.3±1.56 in the patients of the control group consisting of th women who had a healthy postpartum period without any complications after childbirth. As a result of the study, based on the results of our survey on the anxiety (HAM-A) component of the Hamilton scale, although there were no subjects among the women in the main group, in the control group, no anxiety disorder was recorded in 14.0±4.91% patients who did not have inflammatory complications in postpartum period.

According to the Edinburgh Postnatal Depression Scale (EPDS), which was performed 6 weeks after the operation of the patients who had a planned Caesarean section, the average index for the group was 3.78±0.19 points, which was significantly lower than the first average we obtained for the corresponding group.

As a result of our study to determine the degree of manifestation of postpartum depression according to the Edinburgh Postnatal Depression Scale (EPDS) in the "planned"

and "immediate" groups after the operation, in the group of 23 patients who underwent a planned operation it turned out to be an average of 6.96±0.28 points as a result of the survey we carried out according to the corresponding scale on the morning of the operation. The minimum indicator of the relevant scale was found to be 5 points and the maximum indicator was 10 points among the patients.

In the group of 33 people we had to perform caesarean section under urgent conditions, its average indicator was identified 6.58±0.16 points as a result of the survey we conducted according to the appropriate scale on the morning of the operation. The minimum indicator of the relevant scale was found to be 5 points and the maximum indicator was 9 points among the patients. The statistical relationship between the indicators of the degree of manifestation of postpartum depression according to the average Edinburgh Postnatal Depression Scale (EPDS) we obtained for the study groups where we performed planned and emergency surgery on the morning of the cesarean section was calculated as $p=0.2204$. According to the Edinburgh Postnatal Depression Scale (EPDS), which we performed 6 weeks after the operation of the group in which we performed a planned cesarean section, the average index for the group was 3.78±0.19 points, which means that it was significantly lower than the first average we obtained on the morning of the caesarean section for the corresponding group. At the end of the 6th week after the operation, the minimum indicator of the appropriate scale among patients was 2 points, and the maximum indicator was 5 points. The statistical relationship between the average values obtained on the morning of the operation and 6 weeks later in the research group where we performed planned cesarean section was determined as $p<0.0001$.

Characterization of Raman spectroscopy. The results of optical radiation of blood serum from the women included in the

study were collected and spectral radiation was recorded. Laser irradiation and delivery of white light to the examination point was accomplished through a light transmitter with a disposable sterile protective cover. Using the capabilities of blood serum Raman spectroscopy, we determined its effectiveness by differentiating women with inflammatory complications during postpartum period. Optical spectral responses are recorded when the light transmitter is moved towards the bioptate. Also, spectra were registered in the comparison group. The graphical and digital registrations were analyzed in a complex hardware program.

On average, in the range of 500-600-1800-2000 cm^{-1}, there are numerous lines that are individual for each component and organic compounds of blood. It is possible to determine the quantitative indicators of both the biological compounds themselves and the examined blood serum sample in the above-mentioned range in the spectrogram for the presence or absence of this inflammation. The highest frequency of 15810781 cm^{-1}, the lowest frequency of 1686621 cm^{-1}, the highest intensity of 59550003 mw /cm^2 and the lowest intensity index of 123 mw/cm^2 were recorded in the blood serum of the mentioned woman (Graph 7.1.1).

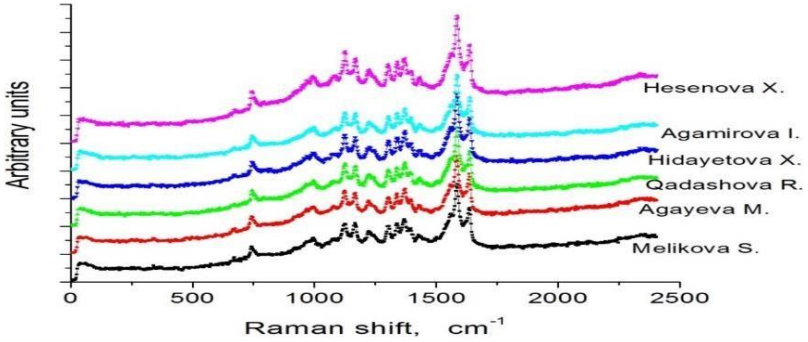


Figure 2. Raman characteristics of inflammatory diseases that develop during postpartum period

Thus, it is possible to make an opinion about the presence of inflammatory processes on the basis of different indicators of the amplitude of normal peaks during inflammatory diseases developed in postpartum period with different forms and degrees of complication. So, on the basis of the development of inflammation, additional peaks appear at certain wavelengths during the examination of blood serum in postpartum women, which provide information about the degree of severity of inflammatory processes, its chemical composition, and the quantitative composition of lipids, proteins and carbohydrates at a certain concentration. Indicators such as Raman peak, wavelength amplitudes, widths and quantities are very informative. Based on them, the peaks, their shape, convexity and smoothness of the spectral curves are recorded.

Analyzing the data obtained during Raman spectroscopy of the blood serum of 300 postpartum women included in the study, it was found that there were differences between the frequency and intensity of the highest peaks. In the control group, that is, practically healthy women, these frequency and intensity indicators were lower. The results obtained in the main group were diffirent. We also organized relative groups of women with high, medium and low frequencies based on the obtained indicators. It was found that there were women with a higher frequency of peaks, medium and low frequency.

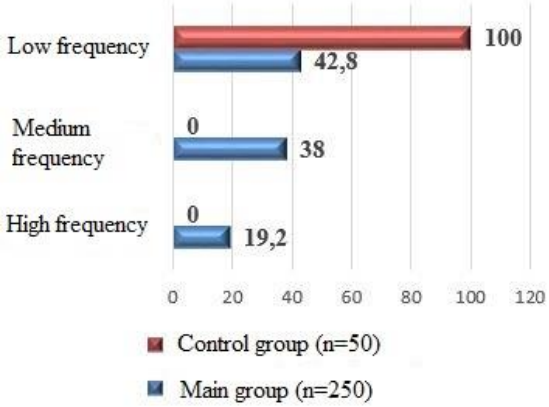
Figure 3

Quantification of frequency and intensity of Raman spectrogram of postpartum women included in the study

Postpartum women	High frequency		Medium frequency		Low frequency	
	Number	%	Number	%	Number	%
Main group (n=250)	48	19,2	95	38	107	42,8

Control group (n=50)	-	-	-	-	50	100

The frequency and intensity limits of wave peaks on Raman spectroscopy were high in 48 (19.2%) women included in the study, in 95 (38%) women it was medium and in 107 (42.8%) women it was average. Lower frequency and intensity indicators were also found in the control group. However, the control group's limit was lower than the indicators of the women with low limit in the main group.



Graph 1. Comparative frequency and intensity indicators of Raman spectrogram of postpartum women included in the study

As can be seen from Graph 1, among the women involved in the study, the number of women with low frequency was 4.8% more than women with medium frequency and 23.6% more than women with high frequency. In the control group, a low frequency was recorded in all women. As can be seen, the number of women with higher frequency was less, it was 19.2%

in total and 107 women had a lower frequency indicator of blood serum spectrogram. From the obtained results, it was found that the frequency and intensity indicators were low in 50 women included in the control group.

We also determined the average indicators of the frequency and intensity of the highest peaks in postpartum women included in the study. The obtained results are reflected in table 4.

Table 4

Mean frequency (M±SD) of Raman spectrogram in postpartum women included in the study groups

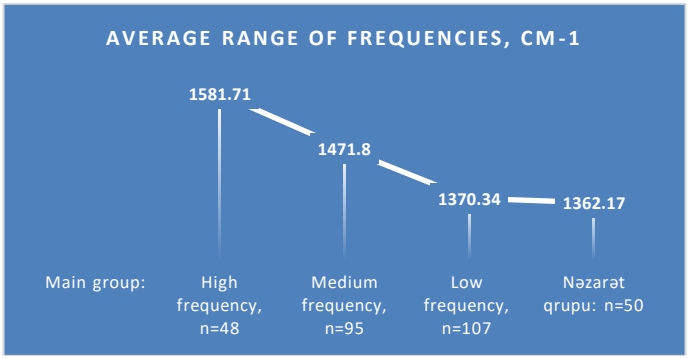
Postpartum women (n=300)	Mean frequency, cm^{-1}	P
Main group:		
48 postpartum women	1581.7124±2.404	p<0.001
95 postpartum women	1471.8071±23.36	p<0.001
107 postpartum women	1370.342±22.77	p<0.001
Control group: 50 postpartum women	1362.1774±37.280	p=0.27093

In the female group (n=48) with a higher spectrogram frequency (1581.7124±2.404 cm-1), the intragroup differences were moderate statistically significant (p<0.001). The difference between the groups of women with moderate spectrogram frequency (1471.8071±23.36 cm-1) and the women (n=95) with lower spectrogram frequency was statistically significant (p<0.001). The difference between women (n=107) with lower spectrogram frequency (1370.342±22.77 cm-1) and control group indicators (1362.1774±37.280 cm-1) (n=50) was statistically insignificant (p=0.27093, p<0.05).

As can be seen, there were no differences between the 107 women in the main group with a low spectrogram frequency and the women in the control group, which indicates that they did not have an inflammatory process.

As can be seen from Graph 2, the average frequency indicator in the group of high-frequency women was 109.91 cm^{-1} higher than the average indicator of medium frequency women and 211.37 cm^{-1} higher than the average indicator of low frequency women. In the control group, this index was 219.54 cm^{-1} less than the average index of women with high frequency wave peaks.

Thus, as can be seen from the graphs and pictures, there were general similarities in the spectrograms of the blood samples of postpartum women who showed inflammatory complications during postnatal period.



Graph 2. Distribution of average frequencies of Raman spectroscopy wave peaks in study groups

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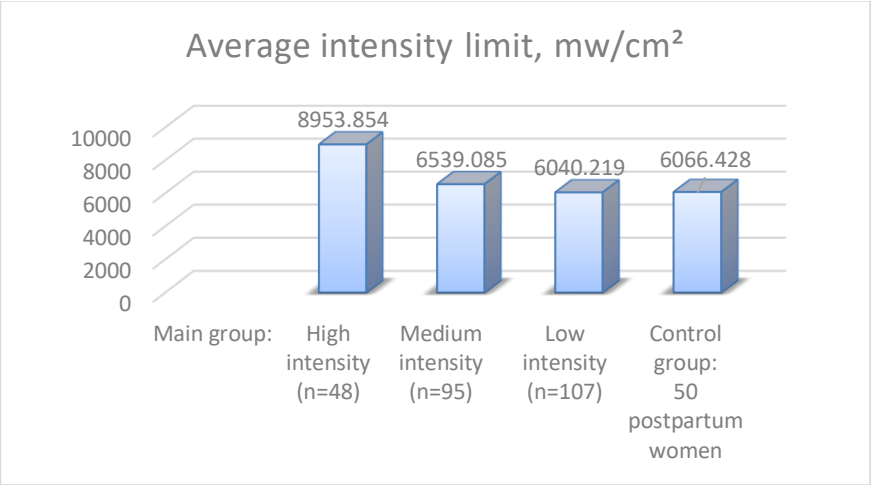
Mean frequency (M±SD) of Raman spectrogram in postpartum women included in the study groups (M±SD)

Postpartum women (n=300)	Average intensity limit, mw/cm2	P
Main group:		
48 postpartum women	8953.8543±9018.7595	p<0.001

95 postpartum women	6539.0854±776.550	p<0.001
107 postpartum women	6040.219±930.2501	p<0.001
Control group: 50 postpartum women	6066.4287±1029.0914	P=0.44828

Statistical calculations show that the difference between the group of women with high spectrogram intensity (n=48) and women with moderate intensity (n=95) was statistically significant (p<0.001) (Table 4). There were statistically significant differences between women (n=95) with moderate intensity and the women (n=107) low intensity. The difference between the women (n=107) low intensity and control group (n=50) was statistically insignificant (p=0.44828, p<0.05).



Graph 3. Distribution of average intensities of wave peaks on Raman spectroscopy in study groups

As can be seen from Graph 3, the indicator of high intensity of wave peaks according to Raman spectroscopy was

2014,774 mW/cm^2 more than the average intensity indicator and 2513,644 mW/cm^2 than the low intensity indicator.

Differences recorded in the intensity of the spectrum peaks of combined light emission indicate significant differences in the metabolic profile of women with inflammatory complications during postpartum period. From the conducted research, it is known that there has been a change in the metabolic profile depending on the presence or absence of inflammatory complications.

Comparative analysis of the results of blood Raman spectroscopy with the level of leukocytes and C-reactive protein in the blood in postpartum women. To determine the informativeness of Raman spectroscopy, we also comparatively analyzed the average values of C-reactive protein and leukocytes in women. As already mentioned, we divided the patients into conventional groups according to high (n=48), medium (n=95) and low (n=107) frequencies and intensities based on the average indicators obtained in the Raman spectroscopy of postpartum women. We calculated the statistical accuracy by determining the average indicators of C-reactive protein and leukocytes for those conditional groups.

CRP is one of the 30 acute-phase proteins. It manifests itself in response to the introduction of a foreign agent or during the development of an autoimmune reaction. The permeability of the vascular wall increases, its adhesive properties change, lymphocytes, macrophages and platelets are activated in response to an increase in the level of CRP in the blood. Thus, reflecting the degree of inflammation, CRP is one of the main acute phase proteins in the body and is rightfully considered the main marker of inflammation.

Studies have shown that CRP is not only an indicator of inflammation or infection, but also an important regulator of inflammatory processes. It can increase up to 1000 times in areas of inflammation and infection.

However, it should be taken into account that CRP reflects two sides of the inflammatory process, depending on the level in the blood. At very high concentrations (acute phase range > 10 mg/l), CRP is the indicative of an acute inflammatory process caused by infection. CRP in the highly sensitive range (usually <10 mg/l) reflects the activity of low-grade chronic inflammation associated with the development of atherosclerosis.

Taking these into account, we determined CRP which is considered an actual indicator of the inflammatory process in postpartum women.

In addition, it is known that the amount of leukocyte cells and their differentials (for example, neutrophils, lymphocytes, monocytes, eosinophils and basophils) are established markers of systemic inflammation.

Leukocyte accumulation plays an important role in protective and pathological immune responses in many diseases. The increase in the amount of leukocytes in the blood circulation involves several processes, such as rolling and sticking to the endothelial cells lining the inner walls of blood vessels, migrating through the inner walls of blood vessels to surrounding tissues, and migrating to other tissues.

Leukocytes participate in the regulation of systemic inflammatory response syndrome, fever, and leukopoiesis due to the formation of far-reaching cytokines.

Based on the results of Raman spectroscopy, we determined the average index of CRP and leukocytes in groups of patients, which we call high, medium and low frequency, as well as in the control group.

Table 5

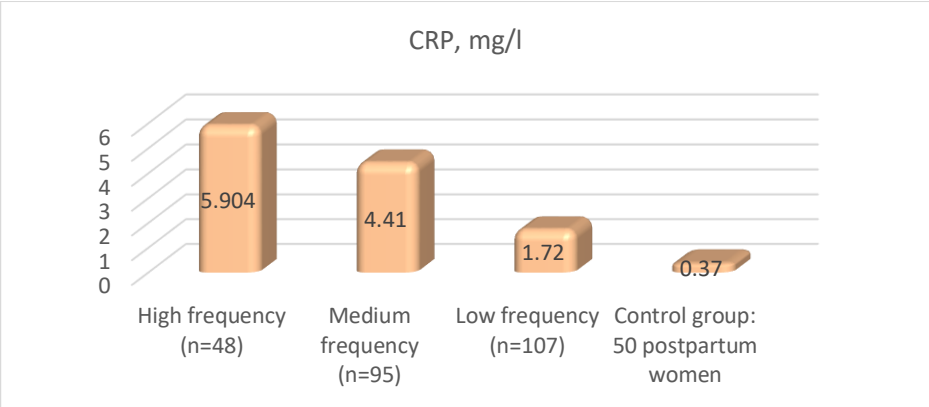
Mean CRP level and leukocyte amount in the women divided into conventional groups according to the results of Raman spectroscopy

Postpartum women (n=300)	CRP, mg/l	Leukocytes $x10^3$ /l
Main group:		
High intensity (n=48)	5,904±0,76	17,891±0,99
Medium intensity (n=95)	4,41±0,903	14,541±0,935
Low intensity (n=107)	1,72±0,66	11,344±0,87
Control group: 50 postpartum women	0,37±0,123	7,46±1,521

As can be seen from Table 5, the average limit of CRP indicator (5.904±0.76 mg/l) was also high in postpartum women with high frequency and intensity of wave peaks according to Raman spectroscopy. The mean limit of the CRP indicator was higher in the group of conventional women with a higher wave peak (n=48) than in the group of conventional women (n=95) with an average frequency and intensity of the wave peak (4.41±0.903 mg/l) ($p<0.001$). The mean limit of CRP indicator was also statistically high ($p<0.001$) in the group of conventional women with a more moderate wave peak (n=48) than in the group of conventional women with lower wave peak frequency and intensity (n=95). Although the average limit of CRP indicator (1.72±0.66 ml) was lower in the women with low frequency and intensity of wave peaks according to Raman spectroscopy, this indicator was statistically significantly higher than in the control group (0.37±0.123 mg/l) ($p<0.001$).

According to Raman spectroscopy, the average level of leukocytes in the blood (17,891±0.99 x103 /l) in postpartum women with high frequency and intensity of wave peaks (n=48) was significantly higher than in postpartum women with average wave peaks (n=95) ($p<0.001$). According to Raman

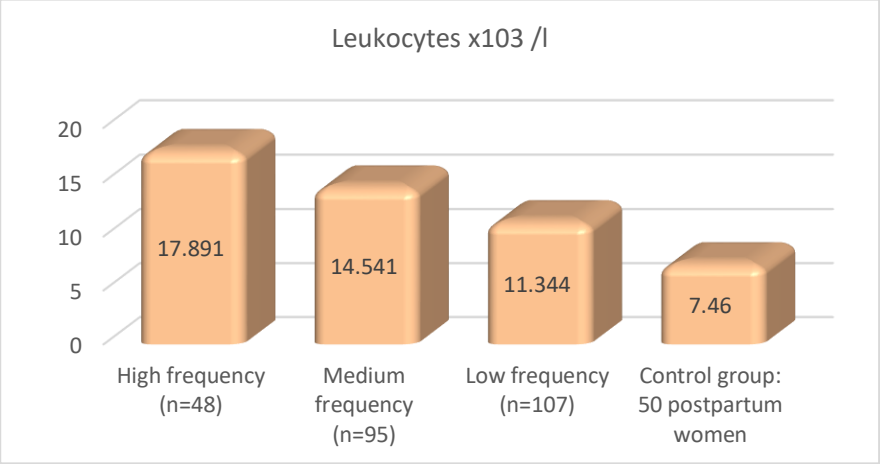
spectroscopy, the amount of leukocytes in the blood of women with average frequency and intensity of wave peaks (14,541±0,935 x103/l) was higher than that of women with low frequency and intensity of peaks (p<0.001). Although the average leukocyte index (11,344±0,87 x103 /l) was lower in the women (n=107) with low frequency and intensity of wave peaks on Raman spectroscopy, itnwas higher than the average level of leukocytes in the control group (7,46±1,521 x103 /l). Statistically significant difference between those groups was determined.



Graph 4. The average limit indicator of CRP in postpartum women divided into conventional groups according to the frequency and intensity of Raman spectroscopy wave peaks in the study groups

As can be seen from Graph 4, according to Raman spectroscopy the average limit of CRP in the women with high frequency and intensity of wave peaks was 1.494 mg/l higher than in the group of the women with medium frequency. The average limit of CRP in the women with medium frequency and intensity of wave peaks was 2.69 mg/l higher than in the group

of the women with low frequency and intensity. The average limit of CRP in the women with low frequency and intensity of wave peaks was 1.35 mg/l higher than control group of postpartum women. Thus, it can be concluded from the obtained indicators that the level of CRP was also high in postpartum women whose wave peaks on Raman spectroscopy showed very high frequency and intensity. So, the high level of CRP is considered as a predictor of the inflammatory process in the body. In other words, high wave peaks indicate that there is already an inflammatory process in the body. Also, based on the high frequency and intensity of the wave peaks, it is possible to suggest the severity of the inflammatory process.



Graph 5. The average limit of leukocytes in the blood of postpartum women divided into conventional groups according to the frequency and intensity of Raman spectroscopy wave peaks in the study groups

As can be seen from graph 5, the average limit of leukocytes in the women with high frequency and intensity of wave peaks according to Raman spectroscopy was 3.35x103 /l

higher than the group of women with medium frequency and intensity, and in the group of the women with medium frequency and intensity it was 3,197x103 /l higher than the group of women with low frequency and intensity. Moreover, the average limit of leukocytes was 3,884 x103 /l higher in the group of the women with low frequency and intensity than control group. It can be concluded from the obtained indicators that the quantity of leukocytes was also high in postpartum women whose wave peaks on Raman spectroscopy showed very high frequency and intensity.

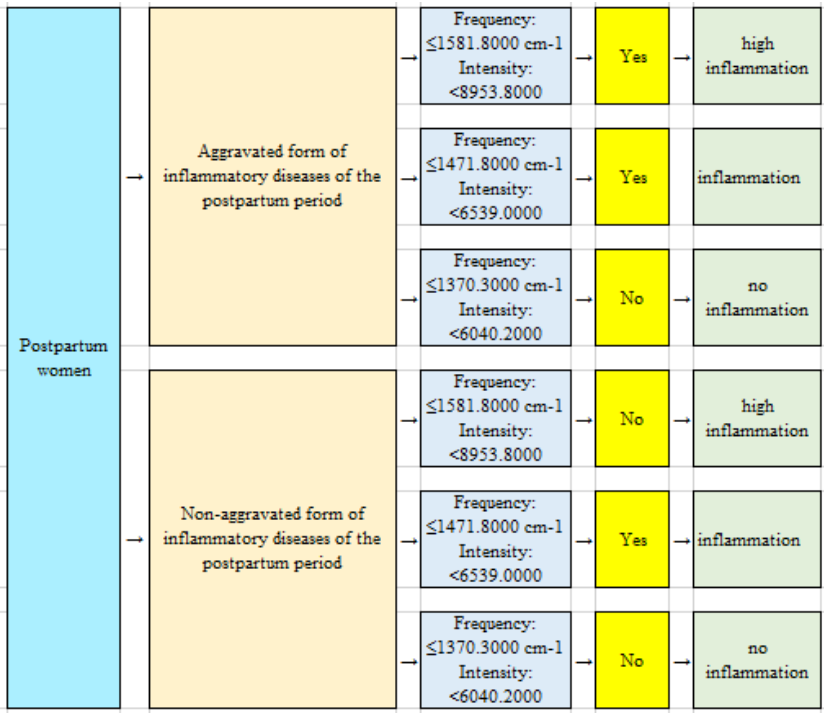


Figure 3. Characterization of the main measurement units (frequency and intensity) of aggravated and non-aggravated

forms of inflammatory diseases of the postpartum period based on Raman spectroscopy

We considered it appropriate to start the treatment in the first hour after birth and prescribe it for a longer period, making the selection of the drugs reflected in these two protocols individually.

Thus, it is known from our research that identifying early prognostic markers of inflammatory complications of postpartum period and determining them with Raman spectroscopy, timely detection of postpartum women who fall into risk groups allows the initiation of preventive measures and the stabilization of the situation in a short period of time.

RESULTS

1. 73 patients (30%) were included to the main group in 2017, 91 patients (37%) in 2018 and 86 (35%) in 2019 in USG carried out on research years. Heterogeneous myometrium was present in 38,1% of the main group and 2,1% of the control group. After childbirth, 98 (98.1%) women had thickening of the endometrium in the main group, while there were no such women in the control group. After childbirth, in the main group 97 (97,1%) women and in the control group 1 (2,1%) woman had excessive growth of the uterus. The difference between the groups was statistically significant ($p<0,005$) [5,30].

2. Menstrual cycle risk factors were studied: 19,5% in the control group and 30,8% in the main group were not registered at the women's clinic ($p<0,05$). From the anamnesis, it was determined that 41,1% of the patients had their first pregnancy. Three or more pregnancies in the control group were 35,1%, and in the main group – 47,8% ($p<0,05$). 23,6% of patients in the control group and 45,9% of patients in the main group suffered from infectious diseases of the urinary system ($p<0,05$). CVD

was present in 9,2% of patients in the control group and in 16,4% of patients in the main group ($p<0,05$). 12,1% of control group patients and 24,5% of main group patients suffered from cardiovascular system diseases ($p<0,05$). Infectious diseases of the bronchial-pulmonary system were present in 6,3% of patients in the control group and in 18,9% of patients in the main group ($p<0,05$) [18,23,27,28].

3. The main group had obstetric and gynecological anamnesis: chronic inflammatory diseases of the female genital organs, purulent-septic complications, sexually transmitted infectious diseases in the anamnesis and during this pregnancy, previous infertility, cesarean section in the anamnesis ($p<0,005$). Among the main group of women, the most serious complications during pregnancy and childbirth were: chorioamnionitis – in 6,9%, intrauterine infection – in 8,1%, severe delayed preeclampsia – in 26,7%, anemia – in 27% . In 15,6% of cases, the fetus was lost intra- and antenatally. In 5,7% of all examined women, delivery was complicated by hypotonic bleeding. Hemorrhagic shock developed in 10,5% of patients, septic shock in 4,8%, DDL syndrome (disseminated intravascular coagulation) in 11,1% of patients. In the main group, salpingophoritis was detected in 30% and colpitis in 21% during pregnancy, myoma in 3% before pregnancy, menstrual irregularities in 16%, cervical ectropion in 16% and ovarian cyst in 5%. The difference between the groups was calculated for salpingoophoritis as $p=0,002$, uterine myoma as $p=0,752$, menstrual disorders as $p=0,628$, cervical ectropion as $p=0,210$, ovarian cyst as $p=1,000$. Ophthalmological pathologies were detected in 19% ($p=0,408$), ENT-organ diseases in 20% ($p=0,628$), endocrine disorders in 16%, cardiovascular pathologies in 30% ($p=0,851$), urinary system diseases in 24% ($p=0,840$) and gastrointestinal diseases 6% ($p=0,507$) in the main group [13,20,30].

4. During the characterization of the infection of the uterine cavity and endometrium, Mycoplasma Hominis was (titre>104) 38.0±4.85% and Ureaplasma urealyticum (titre>104) was 73,0±4,44% in the main group, respectively, in the control group, they were 2,0±1,98% and 6,0±3,36%. These two microorganisms were the majority among the causative agents of inflammatory complications found in the main group ($p<0.05$) [3,7,11,12].

5. There was no statistically significant difference in hemoglobin level between the groups. The number of leukocytes in the main group was statistically significantly higher than the control group ($p=0,001$). There were no differences between the groups in the amount of monocytes ($p=0,304$). The mean platelet count was statistically significantly lower in the main group than the control group ($p=0,001$). In the main group, the mean ESR indicator was statistically significantly higher than the control group ($p=0,001$) [9,14].

6. In the main group on Raman spectroscopy, the average frequency of the spectrogram was significantly different from the average frequency ($p<0,001$). The spectrogram frequency in the mean of the medium frequency was statistically significant from the mean of the low frequency ($p<0,001$). Spectrogram low frequency did not statistically significantly differ from control group women's frequency ($p=0,27093$, $p<0,05$). The difference between the group of women with high spectrogram intensity ($n=48$) and women with moderate intensity ($n=95$) was statistically significant ($p<0,001$). There were statistically significant differences between medium intensity and low intensity women. The difference between the low intensity and the control group was not statistically significant ($p=0,44828$, $p<0,05$). Frequency and intensity parameters of the spectrogram were statistically significantly higher both in the women with inflammation and in the women with high risk of inflammation [2,4,6,8].

7. According to Raman spectroscopy, the average limit of the CRP index was also high in the women with high frequency and intensity of wave peaks. The mean limit of the CRP indicator was high in the group of women with high frequency and intensity of the wave peak ($p<0.001$). The mean limit of CRP indicator was also statistically high ($p<0.001$). Although CRP was lower in postpartum women with low frequency and intensity of peaks, this indicator was statistically significantly higher than the control group ($p<0.001$). Leukocytes were significantly higher in the women with high frequency and intensity ($p<0,001$). The amount of leukocytes in women with medium frequency and intensity was higher than that of low frequency and intensity ($p<0,001$). Although the average index of leukocytes was low in the women with low frequency and intensity, it was higher than the average level of leukocytes in the control group (7,46±1,521 x103 /l). Statistically significant difference between those groups was identified. The level of CRP was also higher in the women with high frequency and intensity. High wave peaks indicate that there is already an inflammatory process in the body [32].

8. For the first time, a new convenient and optimal prediction method, which is an alternative to laboratory-microbiological examinations, has been developed for the purpose of early prediction of inflammation for the women with postpartum inflammatory complications. Based on the conducted studies including the frequency and intensity parameters of Raman spectroscopy, a comparative analysis was made with CRP and leukocyte threshold, which are laboratory parameters of inflammation. Based on the analysis, it is appropriate to use the indicators obtained by Raman spectroscopy of blood samples of postpartum women as early prognostic criteria of inflammation [10,15,19].

9. Based on the prognostic algorithm, the development of diagnostic and prognostic criteria in connection with the division

of inflammatory diseases of postpartum period into aggravated and non-aggravated forms makes it possible to carry out targeted treatment and prevention for each group [1,21,29].

PRACTICAL RECOMMENDATIONS

1. The informativeness of Raman spectroscopy in the study of various biological materials in gynecology creates basis for its wide application in practice for this purpose.

2. The prediction of the studied pathology on aggravated and non-aggravated forms of specific inflammatory diseases, such as a high level of infection with conditionally-pathogenic uterine microbiota, exposure to sexually transmitted inflammatory infections, the presence of somatic diseases, the long-term use of contraceptives, allows the distribution of patients with accuracy on the developing risk of that pathology.

3.In postpartum period, by performing a Raman spectroscopy examination of non-aggravated and aggravated forms of inflammatory diseases, the severity of inflammation is determined according to the frequency and intensity parameters of the wave peaks: high frequency: $\leq$1581.8000 cm^{-1}, Intensity: <8953.8000 (high inflammation); Frequency: $\leq$1471.8000 cm^{-1}, Intensity: <6539.0000 (inflammation); Frequency: >1370.3000 cm^{-1}, Intensity: >6040.2000 (no inflammation).

4. Targeted treatment and prevention is recommended for each group due to the division of inflammatory diseases of the postpartum period into non-aggravated and aggravated forms.

5.The following criteria for non-aggravated and aggravated forms of inflammatory diseases in postpartum women are recommended.

Table 6

Criteria for the distribution of inflammatory diseases of the postpartum period according to aggravated and non-aggravated forms

Non-aggravated form	Aggravated form
Subfebrile, which is eliminated on the ground of antibacterial therapy with an increase in temperature up to 38°C - 1 point	Long period of fever with recovery of hyperthermia after the end of antibacterial therapy - 2 points
There is no intestinal paresis or easy elimination of intestinal paresis after caesarean section on the ground of peristaltic stimulation therapy - 1 point	The presence of transient intestinal paresis, lack of effect from the use of intensive or repeated courses of treatment of intestinal paresis - 2 points
The cervix was formed during vaginal examination - 1 point	Absence of a tendency to the formation of the cervix - 2 points
Involution of the uterus is slowed down - 1 point	Continuous subinvolution of the uterus - 2 points
Hysteroscopy - slight dilatation of the uterine cavity, fibrinous tissue, soft endometrium, cloudy wash water - 1 point	Hysteroscopy - significant expansion of the uterine cavity, pale endometrium, purulent discharge, scarring, gas bubbles at the suture site, "notch" at the suture, necrotic tissue - 2 points
USG - growth and expansion of the uterine cavity up to 0.5-1.0 cm, absence of deformation in the scar area or deformation up to 0.5 cm, the presence of linear exopositive structures 0.2-0.3 cm thick in the walls of the uterus, local changes in the structure of the myometrium in the form of areas of reduced echogenicity in the area of sutures not larger than 1.5x1.5 cm, absence of infiltration or hematoma in the suture area of the uterus or anterior abdominal wall suture during clinical examination and USG data - 1 point	USG - enlargement of the uterine cavity ≥1 cm, deformation of the suture ≥0.5 cm, presence of exopositive structures in the cavity ≥0.4 cm, reduction of echogenicity in the suture area ≥2.5x1.5 cm. The presence of a hematoma or infiltrate in the posterior space area (in the region of the uterine suture) or in the suture on the anterior abdominal wall - 2 points
Improvement of laboratory indicators (anemia is eliminated, leukocytosis decreased, insignificant hypoproteinemia, no electrolyte disturbances) - 1 point	Lack of positive diagnosis or deterioration of laboratory parameters - 2 points

Note: Up to 7 points is the non-aggravated form of inflammatory disease, more than 7 points is the aggravated form of inflammatory disease.

LIST OF THE SCIENTIFIC WORKS PUBLISHED ON THE TOPIC OF THE DISSERTATION

1. Ф.Р. Гаджиева Ультразвуковая диагностика послеродового эндометрита // – Баку: Биомедицина, – 2017. №3, – s.80-86

2. Ф.Р. Гаджиева Рамановская спектроскопия в медицинской практике (обзор литературы) // Müasir ginekologiya, perinatologiyanın müasir məsələləri, 2017, N4, s.34-42

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Şərti ixtisarların siyahısı

BP	–	Bodily Pain
CD	–	cluster of differentiation
EPDS	–	Edinburgh Postnatal Depression Scale
HADs	–	Hospital Anxiety and Depression Scale
HAM-A	–	Hamilton Rating Scale for Anxiety
HAM-D	–	Hamilton Rating Scale for Depression
GH	–	General Health
IL-10	–	Interleukin -10
IL-12	–	Interleukin - 12
IL-5	–	Interleukin - 5
PF	–	Physical component
RP	–	Sexual component
SF -	–	Social functionality
SF-36	–	Short Form
VT	–	Activity in life

The defense of the dissertation will be held on «25» June 2024 at «14⁰⁰» at the meeting of the Dissertation council ED 2.06.

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Electronic versions of dissertation and its abstract are available on the official website of the Azerbaijan Medical University (amu.edu.az).

The abstract was sent to the required addresses on «23» May 2024.