DOI 10.26724/2079-8334-2021-2-76-18-22
UDC 618.7–002.3–036

F.R. Gadjieva
Azerbaijan Medical University, Baku, Azerbaijan

PREDICTION OF INFECTIOUS AND INFLAMMATORY COMPLICATIONS IN THE POSTPARTUM PERIOD BASED ON THE STUDY OF RISK FACTORS

e-mal: fatma-gadjiyeva@mail.ru

Risk factors for the development of acute inflammatory process in the postpartum period were studied in 100 patients (the main group). The control group consisted of 150 patients with uncomplicated postpartum period. The age of women in labor ranged from 19 to 48 years for the period 2017–2020. Among the infectious risk factors, vaginal microflora contamination and sexually transmitted infections were studied. Among the representatives of anaerobes in the main group of puerperas, the frequency of seeding of Peptostreptococcus, Bacteroides and Peptococcus was particularly high compared to the control group. In the anamnesis, the proportion of chlamydia in the main group was higher – 12.0±3.25 %. Trichomoniasis was diagnosed in 16.0±3.67 % of postpartum women with postpartum complications. In predicting the occurrence of infectious and inflammatory complications in the postpartum period, priority risk factors are: a high level of contamination of the vagina with conditionally pathogenic microflora, sexually transmitted infections, long–term use of contraceptives. The signs established in the course of these studies, associated with the occurrence of pathological changes of inflammatory genesis in the postpartum period, can be used as significant diagnostic and prognostic criteria for the risk of their further development in postpartum women.

Key words: inflammatory complications, risk factors, microbiota, urogenital infection, microorganisms.

Ф.Р. Гаджиєва

ПРОГНОЗУВАННЯ ІНФЕКЦІЙНО-ЗАПАЛЬНИХ УСКЛАДНЕНЬ У ПІСЛЯПОЛОГОВОМУ ПЕРІОДІ НА ОСНОВІ ВИВЧЕННЯ ФАКТОРІВ РИЗИКУ

Було вивчено фактори ризику розвитку гострого запального процесу в післяпологовий період у 100 пацієнток (основна група). Групою контролю служили 150 пацієнток з неускладненим післяпологовим періодом. Вік породіль коливався від 19 до 48 років за період 2017-2020 роки. Серед інфекційних чинників ризику були вивчені забрудненість мікрофлорою піхви і інфекції, що передаються статевим шляхом. Серед представників анаеробів в основній групі породіль особливо високою була частота висівання Peptostreptococcus, Bacteroides і Peptococcus в порівнянні з контрольною групою. В анамнезі у хворих основної групи вище виявилася питома вага хламідіозу – 12.0±3.25 %. Трихомоніаз діагностували у 16.0±3.67 % породіль з післяпологовими ускладненнями. У прогнозуванні виникнення інфекційно-запальних ускладнень в післяпологовому періоді пріоритетними факторами ризику є: високий рівень обсіменіння піхви умовно-патогенною мікрофлорою, перенесені інфекції, що передаються статевим шляхом, тривале застосування контрацептивних засобів. Встановлені в ході даних досліджень ознаки, асоційовані з виникненням патологічних змін запального генезу в післяпологовий період, можуть бути використані в якості значущих діагностичних і прогностичних критеріїв ризику їх подальшого розвитку у породіль.

Ключові слова: запальні ускладнення, фактори ризику, мікробіота, урогенітальна інфекція, мікроорганізми.

The work is a fragment of a doctoral thesis on Medicine "Modern aspects of early prognosis and prevention of infectious and inflammatory complications of the postpartum period"

Postpartum infectious and inflammatory diseases, the causative agents of which are associations of facultative and obligate anaerobic microorganisms, and the frequency of which can vary from 5 % to 90 %, depending on the degree of infectious risk, have a polymicrobial nature and represent an important medical and social problem [1, 2]. Currently, the attention of researchers in many countries is focused on the study of etiopathogenetic mechanisms, the development of optimal therapeutic, preventive and diagnostic criteria, as well as methods of expert evaluation of the effectiveness of the measures taken. In their opinion, mycoplasmosis and chlamydia infection are often important factors of high risk for the occurrence and development of such complications of the postpartum period [8]. Summing up all postpartum infectious–inflammatory and purulent–septic complications in the structure of maternal disability and deaths, we can state their important place in the practice of modern obstetrics and gynecology. One of the most common forms of such complications after childbirth is postpartum endometritis, the most constant symptom, an objective indicator and one of the predisposing factors for the formation of which is the subinvolution of the uterus [6, 10, 12, 14]. An important milestone in reducing the incidence and development of infectious and inflammatory postpartum diseases is the timely identification of high perinatal and postnatal risk groups and the development of optimal methods or tactics for managing pregnancy in women assigned to these groups. At the same time, the most optimal method of managing this contingent of patients is possible with a differentiated approach to each individual case,

which will allow to a certain extent to reduce the level of further serious problems with the general state of the body and mortality. Thus, the high frequency of occurrence does not reduce the interest in the problem of the studied pathology [5, 7, 13]. From this point of view, it is very important from a diagnostic and prognostic point of view to thoroughly study the risk factors for inflammatory diseases, in particular, the microbial landscape of the uterine cavity, which leads to the implementation of the infectious process among women in childbirth.

The purpose of the study was to increase the effectiveness of early diagnosis of postpartum complications based on the assessment of prenatal and puerperal risk based on the quantitative assessment of risk factors.

Material and methods. In the study of risk factors for the development of acute inflammatory process, their registration was carried out in the postpartum period in 100 patients undergoing inpatient treatment at the Scientific Research Institute of Obstetrics and Gynecology in Baku for the period 2017–2020. The specified contingent of maternity patients made up the main group. The control group consisted of 150 patients with uncomplicated postpartum period who were treated in the same medical institution at the same time. The age of the women in labor ranged from 19 to 48 years. The main risk factors from the point of view of studying the frequency of their occurrence were: sexual risk factors (age, the beginning of sexual activity, the use of contraception, the presence of abortions and childbirth in the anamnesis); social factors, where it is important to note education, employment, study; behavioral risk factors (regular visits to the doctor and the exact execution of appointments, including personal hygiene measures); obstetric and gynecological factors, which include invasive surgical methods, pregnancy complications and the presence of gynecological and extragenital diseases, as well as risk factors that increase the likelihood of infection and the development of infectious complications in the postpartum period. In patients of both experimental groups, subjective symptoms were registered; vaginal examination; blood analysis; determination of systemic and local humoral immunity. Among the infectious risk factors, the contamination of the vaginal microflora was studied with an assessment of quantitative and qualitative indicators of Escherichia coli, Proteus, Klebsiella, Enterococcus, Staphylococcus spp., Streptococcus spp., Bacteroides Peptostreptococcus and sexually transmitted infections.

The contents of the uterine cavity were obtained with a two–light catheter, which excluded contamination of the samples with the microflora of the vagina and cervical canal. The calculation of prognostic criteria and the development of prognostic tables, as a variant of an algorithmic technique or an algorithm for mathematical and statistical analysis of informative diagnostic symptoms of the analysis, is considered very important from the point of view of the diagnostic significance of the studied risk factors, both in case of their presence and in case of their absence, and from the point of view of identifying the most informative diagnostic indicators of the acute inflammatory process in the postpartum period.

Quantitative features were subjected to statistical processing by calculating the arithmetic mean (M) and its error (SE). The statistical significance of the obtained differences between the values was determined by calculating the Student's t–test. The significance level $p<0.05$ was used as the minimum acceptable value.

Results of the study and their discussion. According to the main parameters, the examined patients of the main and control groups did not differ significantly. Thus, in the statistical analysis of age–related indicators that also contribute to the development of inflammatory complications among the observed cohort of patients, it was found that in the main group, as well as in the control group, patients aged 30–34 years strongly predominate – 32.0±4.66 % and 36.7±3.93 %, respectively ($p>0.05$) (table 1).

Table 1

Age distribution of postpartum women in a retrospective analysis

Age (years)	Main group, n=100		Control group,n=150		P
	abs.	%	abs.	%	
Up to 20 years	2	2.0±1.40	2	1.3±0.94	0.681
From 20 to 24	7	7.0±2.55	14	9.3±2.38	0.515
From 25 to 29	30	30.0±4.58	43	28.7±3.69	0.820
From 30 to 34	32	32.0±4.66	55	36.7±3.93	0.448
35 or more	29	29.0±4.54	36	24.0±3.49	0.377

Note: No significant differences were found between the groups ($p>0.05$)

In the same groups, the proportion of persons aged 25–29 years ($p>0.05$) and in the age group of 35 and more years ($p>0.05$) is higher. In the control group, the percentage of women in labor aged 20–24

years is statistically unreliable higher than in the main group. According to the results of the conducted clinical studies and questionnaires, the risk factor for the development of various forms of obstetric and gynecological complications of an inflammatory nature in the postpartum period is considered to be the long–term use of existing and often used methods of contraception (table 2). Thus, in the observed maternity patients of the main group, such methods of preventing unwanted pregnancy as the use of intrauterine contraception and barrier contraceptives are most often used, compared with the control group, 24.0±4.27 % and 29.0±4.54 %, respectively, in the main group, against 7.3±2.13 % and 12.0±2.65 % of the values for the same indicators, but already in the control group.

Table 2

Use of contraception by patients of the main and control groups (P±mp, %)

Method of contraception	Main group, n=100		Control group, n=150		P
	abs.	%	abs.	%	
intrauterine contraception	24	24.0±4.27	11	7.3±2.13	0.001*
chemical contraception	6	6.0±2.37	8	5.3±1.83	0.822
barrier contraceptives	29	29.0±4.54	18	12.0±2.65	0.001*
oral contraceptives	7	7.0±2.55	15	10.0±2.45	0.412

Note: * – Significant differences between groups ($p<0.05$) (according to the exact Fischer test)

Determination of the numerical values of prognostic coefficients for the purpose of diagnosing the degree of pathogenicity of the next risk factor associated with the use of certain methods of contraception, and statistical analysis of all data obtained for the main and control groups of maternity patients, showed that the most significant impact on the probability of occurrence and development of postoperative complications is the long – term use of intrauterine contraception and barrier contraceptives – 24.0±4.27 % and 29.0±4.54 %, respectively. Bacteriological studies of the quantitative and qualitative composition of the microbiocenosis of the pelvic organs in patients with postpartum complications and in the control group of practically healthy individuals revealed significant differences in some types of conditionally pathogenic and pathogenic microflora (table 3).

Table 3

Microflora of the uterine cavity in acute endometritis and in the control (P±mp, %)

Composition of the vaginal microflora	Main group n=100		Control group, n=150		P
	abs.	%	abs.	%	
Escherichia coli	22	22.0±4.14	29	19.3±3.22	0.608
Enterobacter	7	7.0±2.55	13	8.7±2.30	0.634
Proteus	8	8.0±2.71	11	7.3±2.13	0.845
Klebsiella	31	31.0±4.62	8	5.3±1.83	0.001*
Enterococcus	20	20.0±4.00	10	6.7±2.04	0.001*
Staphylococcus epidermicus	59	59.0±4.92	60	40.0±4.00	0.003*
Staphylococcus aureus	18	18.0±3.84	9	6.0±1.94	0.003*
Streptococcus spp.	4	4.0±1.96	15	10.0±2.45	0.079
Corynebacterium spp.	4	4.0±1.96	14	9.3±2.38	0.110
Acinetobacter	12	12.0±3.25	6	4.0±1.60	0.017*
Bacteroides spp.	29	29.0±4.54	17	11.3±2.59	0.001*
Peptococcus spp.	27	27.0±4.44	20	13.3±2.78	0.007*
Peptostreptococcus spp.	39	39.0±4.88	7	4.7±1.72	0.001*
Clostridium	8	8.0±2.71	19	12.7±2.72	0.244
Propionibacterium	9	9.0±2.86	6	4.0±1.60	0.103

Note: * – Significant differences between groups ($p<0.05$) (according to the exact Fischer test)

Thus, the higher seeding rate of Klebsiella in comparison with the control group allowed us to consider it one of the main risk factors and one of the leading causative agents of infectious and inflammatory complications of the postpartum period ($p<0.001$). In both experimental groups, Staphylococcus epidermicus and Enterococcus were significantly more common among representatives of aerobic microflora ($p=0.003$). It should be noted that both in the main group and in the control group, Escherichia coli was also most often isolated – 22.0±4.14 % and 19.3±3.22 %, respectively ($p>0.05$).

A similar statistical picture revealed that some other representatives of Gram-positive aerobes isolated for prognostic purposes were also often found in the control – Corynebacterium. Among the representatives of anaerobes in the main group of puerperas, the frequency of seeding of Peptostreptococcus was particularly high. Significantly often, microbiological examination of vaginal biopsies against the background of detected pathological changes revealed Bacteroides and Peptococcus with a representative difference in comparison with the control group ($p<0.05$). Other identified anaerobes, in particular Clostridium, did not have a significant difference with a pronounced predominance in the control group and a lower seeding rate in the main group ($p=0.244$). Further preliminary analysis of the informative content of the species composition of the vaginal microflora revealed significant differences in some species. Therefore, according to the data obtained, the maximum information content corresponded to Peptostreptococcus, Klebsiella, Bacteroides, that is, their information content is significant.

In order to determine the etiological significance of various bacteria in the development of postpartum infectious and inflammatory complications, in addition to the frequency of their occurrence, their quantitative indicator was determined, namely, the level of contamination of the uterine cavity with various types of pathogenic microorganisms. The difference in the frequency of some sexually transmitted infections in the main group and in the control group is significantly higher in patients with postpartum complications (table 4).

Table 4

Frequency of sexually transmitted infections

Sexually transmitted infections	Patients with acute endometritis,n=100		Control group, n=150		P
	abs.	%	abs.	%	
Trichomoniasis	16	16.0±3.67	5	3.3±1.47	0.001*
Chlamydia	12	12.0±3.25	4	2.7±1.32	0.003*
Candidiasis	6	6.0±2.37	21	14.0±2.83	0.060*
Mycoplasmosis	3	3.0±1.71	2	1.3±0.94	0.356

Note: * – Significant differences between groups ($p<0.05$) (according to the exact Fischer test)

According to the data obtained, the specific weight of chlamydia was significantly higher in the anamnesis in patients of the main group, compared with the control group – 12.0±3.25 % and 2.7±1.32 % ($p=0.003$). The above also related to the frequency of trichomoniasis, which was diagnosed according to anamnestic data in 16.0±3.67 % of women in labor with postpartum complications ($p=0.001$). Thus, among sexually transmitted infectious diseases, trichomoniasis and chlamydia can influence the occurrence and development of pathological disorders of inflammatory genesis.

In predicting the occurrence of infectious and inflammatory complications in the postpartum period, priority informative risk factors are: the presence of complications of childbirth, a high level of contamination of the vagina with conditionally pathogenic microflora, sexually transmitted infections, some gynecological and general somatic diseases, long-term use of contraceptives. Predicting the pathology under study by specific risk factors provides an unmistakable distribution of patients according to the degree of risk of developing the pathology under study. Attention was drawn to the predominance in the percentage of first–time pregnancies in the main group, which belongs to the group of high risk of postpartum complications in comparison with the control group. At the same time, if statistically reliable results were recorded for the above factor, then the frequency of occurrence of re–pregnant and multi–pregnant women was almost the same in both groups, but at the same time, statistically insignificant and unrepresentative data were recorded. As a means of contraception, the majority of women in both the main and control groups used the barrier method. On average, intrauterine contraception was used with the same frequency in women of both groups for the purpose of contraception. In the course of the study, we revealed a high level of diagnosis in the anamnesis of some types of pregnancy complications in the examined patients: toxicosis; the threat of termination of pregnancy; and gestosis. The most pronounced and diagnostically significant complications during pregnancy in the examined women in the main group were gestosis and the threat of termination of pregnancy. When analyzing the data on the frequency of urogenital infections, their high level was found in almost every third maternity hospital with postpartum complications, which is consistent with the data of the literature of recent years on infectious and inflammatory morbidity that develops in the postpartum period [3]. When analyzing the results of a microbiological study of the separated vagina, the dominance of conditionally pathogenic flora in women of the main group was revealed. Representatives of the cocci flora were more often seeded in women of the main group compared to those of the control group, and the detected differences were statistically

significant ($p<0.05$). The differences between the observation groups in the frequency of seeding of Escherichia coli and Enterobacter were also less significant, which were more often found in practically healthy women in the control group. This fact is consistent with the results of clinical and laboratory studies of foreign authors [4, 9, 11]. Based on the statistical analysis of the obtained data, it is important to emphasize that the main etiological cause of postpartum infectious and inflammatory complications was conditionally pathogenic microflora. Thus, the results of this study showed that the development of complications of early puerperia in women can be influenced, first of all, by the tactics of labor management, taking into account the general state of the body of women at various stages of pregnancy and intranatal pathological disorders.

Conclusion

Some clinical and anamnestic signs established in the course of these studies, associated with the occurrence of pathological changes of inflammatory genesis in the postpartum period, can be used as additional and very significant diagnostic and prognostic criteria for the risk of their further development in women in childbirth.

References

1. Avramenko, NV. Vospalitelnyye zabolevaniya organov malogo taza u zhenshchin, kak vedushchiy faktor formirovaniya trubno–peritonealnogo besplodiya. Zaporozhskiy med. zhurnal. 2014; 4(85): 63 – 66. [in Russian]

2. Bochkov VV, Plekhanov AN, Tsydenova TSB. Khronicheskiy nespetsificheskiy endometrit: epidemiologiya, etiologiya, patogenez, faktory riska, diagnostika. Vestnik Buryatskogo gosudarstvennogo universiteta. Meditsina i farmatsiya. 2015; 2:30–38 [in Russian]

3. Zagrtdinova RM, Bogolyubskaya AL, Dimakova YV. Optimizatsiya lecheniya urogenitalnoy mikoplazmennoy infektsii u zhenshchin. Akusherstvo i ginekologiya. 2015; 9: 103–107. [in Russian]

4. Muravyeva VV, Priputnevich TV, Yakushevskaya OV i dr. Rol uslovno–patogennykh mikroorganizmov v etiologii khronicheskogo endometrita u zhenshchin reproduktivnogo vozrasta. Klinicheskaya mikrobiologiya i antimikrobnaya khimioterapiya. 2015; 17(4):318–327. [in Russian]

5. Pestrikova TYu, Yurasov IV, Yurasova YeA. Posledstviya neadekvatnoy taktiki provedeniya terapii antibiotikami u patsiyentok s vospalitelnymi zabolevaniyami organov malogo taza. Vestnik obshchestvennogo zdorovya i zdravookhraneniya Dalnego Vostoka Rossii. 2015: 2–12. [in Russian]

6. Plyasunova MP, SV Khlybova. Khronicheskiy endometrit kak odna iz aktualnykh problem v sovremennoy ginekologii. Vyatskiy meditsinskiy vestnik. 2013; 1:44–53 [in Russian]

7. Bartolome JA, Khalloub P, de la Sota RL, Drillich M, Melendez PG. Strategies for the treatment of dairy cows at high risk for postpartum metritis and for the treatment of clinical endometritis in Argentina JA BartolomeTrop Anim Health Prod.2014; 6(1):79–85.

8. Casari E, Ferrario A, Morenghi E, Montanelli A. Gardnerella, Trichomonas vaginalis, Candida, Chlamydia trachomatis, Mycoplasma hominis and Ureaplasmaure alyticum in the genital discharge of symptomatic fertile and asymptomatic infertile women . New Microbiol. 2010; 33(1):69–76.

9. Chen C, Song X, Wei W, Zhong H, Dai J, Zhou L, Li F, et al. The microbiota continuum along the female reproductive tract and its relation to uterinerelated diseases . Nat Commun. 2017; 8(1): 875. DOI: 10.1038/s41467–017–00901–0.

10. Cicinelli E, Matleo M, Tinelli R, Lepero A, Alfonso R, Indraccolo U, et al. Prevalence of chronic endometritis in repeated in plained implantation failure and the IVF success rate after antibiotic therapy.Hum. Reprod. 2015;30, 2:323 – 330

11. Cicinelli E, Matteo M, Tinelli R, Pinto V, Marinaccio M, Indraccolo U, et al. Chronic endometritis due to common bacteria is prevalent in women with recurrent miscarriage as confirmed by improved pregnancy outcome after antibiotic treatment . Reprod Sci. 2014; 21(5): 640–647

12. Kasius JC, Fatemi HM, Bourgain C, Sie–Go D, Eijkemans R, Fauser BC Devroey P, et al. The impact of chronic endometritis on reproductive outcome. Fertil & Steril. 2014; 96 (6):145 – 146.

13. McQueen DV, Perfetto CO, Hazard FK, Lathi RB. Pregnancy outcomes in women with chronic endometritis and recurrent pregnancy loss. Fertil. Steril. 2015;104 (4):927–931

14. Viana GA, Cela V, Ruggiero M, Pluchino N. Endometritis in infertile couples: the role of hysteroscopy and bacterial endotoxin GA Viana JBRA Assisted Reproduction. 2015; 19 (1): 21– 23.

Стаття надійшла 21.05.2020 р.