

Changes In The Microbiota Of The Birth Canal When Using An Intrauterine Contraceptive During Abdominal Delivery

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Abstract. *In this work, we analyzed the frequency of violations of the vaginal microbiota and the development of infectious and inflammatory complications during post-placental intrauterine contraceptive administration during abdominal delivery. Currently, the incidence of infectious and inflammatory diseases in obstetrics does not tend to decrease. In the structure of infectious and inflammatory diseases, a significant place is occupied by postoperative purulent-septic complications – endometritis, suppuration of wounds on the uterus and anterior abdominal wall after cesarean section. One of the tasks solved in the course of this study was to identify the correlation between the state of the birth canal microbiota and the development of complications when using IUDs during cesarean section.*

Key words. *C-section, IUD, microbiota, complications, LARC, infection, post-placental.*

1. INTRODUCTION

High frequency of abdominal delivery is a distinctive feature of modern obstetrics. Most often, a caesarean section is performed according to the sum of relative indications, often in the interests of the intrauterine patient [5,24]. Currently, the frequency of this operation is steadily increasing. In Uzbekistan, it has more than doubled over the past 10-15 years, and according to the statistical Department of the RSNPMC A and G and the ROC in 2017, it was 18%, reaching up to 35-40% in some institutions.

The problem of contraception after cesarean section is very important, both in medical and social aspects. It was studied that when the interval between operative delivery and subsequent pregnancy is more than 2 years, maternal mortality decreases by 32%, and infant mortality-by 10%. Contraception after cesarean section can reduce the frequency of medical abortions by 90%. The onset of pregnancy within a year after cesarean section is accompanied by a significant increase in the risk of gestational complications: spontaneous abortions, premature birth, placental insufficiency, bleeding, uterine rupture, etc. [3].

Direct post-placental administration of CU T 380 A IUD during cesarean section provides a good opportunity to achieve long-acting reversible contraception (LARC) with minimal discomfort for women. IUDs are one of the most commonly used effective reversible methods of contraception in women of reproductive age worldwide. Post-placental IUD administration is an effective and safe method of contraception. Taking advantage of prenatal care and family planning counseling in the antenatal period in the primary care unit, and in the maternity ward, the introduction of IUD Cu T 380 A immediately after delivery is a good option as a method of contraception. The effectiveness of IUD administration during caesarean section without any additional risk of infection has also been reported in various

studies [19,21]. This is practiced more often after safety is reported and the frequency of expulsions after intraoperative IUD administration decreases. This method offers the obstetrician-gynecologist the opportunity to insert an IUD into the uterus under visual control, thereby eliminating the fear of uterine perforation during the procedure [2,3].

Starting to use an IUD during a caesarean section provides an additional advantage, since it eliminates the six-week postpartum waiting period and an additional visit to a medical facility. However, despite the safety and effectiveness, obstetricians and gynecologists are still hesitant to use IUD si T 380A for women who have undergone operative delivery.

The introduction of an IUD during a caesarean section may be an alternative to sterilization for some couples, especially in women who give birth again and a group of women who refuse to be sterilized for some reason. However, the safety and acceptability of post-placental IUDs during caesarean section has not been widely studied in our country.

At the same time, the frequency of opportunistic vaginal infections has tended to increase in recent years, despite the ever-expanding Arsenal of antimicrobial agents used in clinical practice [21]. This leads to a close interest of researchers in the features of the vaginal normoflora. It is shown that qualitative and quantitative indicators of vaginal microbiocenosis, namely the proportion of lactobacilli in the total bacterial mass, the ratio of groups of microorganisms are not only an objective characteristic of the microbiocenosis itself [15], but can also serve as indicators of disorders caused by various causes [14, 16]. In view of the above, this study is conducted to determine the safety of post-placental administration of CU T 380 A IUD during abdominal delivery.

All of the above determines the need to study the vaginal microbiota when using IUDs in women during cesarean section.

Purpose of research.

To study the effect of intrauterine contraception Sit380a, administered post-placentally, on the features of the genital microbiota in the postoperative period.

2. METHODS.

In order to study the genitals microbiota in the postoperative period after the introduction of IUD, a prospective study was conducted in the city Maternity hospital No. 2 in the city of Samarkand. The study included 40 women who were delivered by caesarean section and wanted to use the CU T 380 IUD, all of whom met the who standard medical criteria for IUD administration and were willing to follow the study protocol.

The exclusion criteria were: women who did not meet the who medical eligibility criteria for the use of IUDs, as well as patients who did not sign the voluntary informed consent form.

Women were consulted about post-placental IUD administration during prenatal visits and / or after hospitalization. The women were given detailed information about the study, including the advantages and limitations of different methods, and repeated counseling was performed before the caesarean section. Written informed consent was obtained from women who were willing to participate in the study and comply with the study protocol.

Post-placental IUD administration was performed after removal of the placenta and manual revision of the uterine cavity using Kelly forceps, manually, through a uterine incision, with the device placed on the bottom of the uterus. No attempt was made to direct the IUD tendrils into the vagina. Antibiotics were administered according to the Protocol of the maternity hospital for caesarean section. The women were monitored daily for postpartum bleeding, development of inflammatory and painful reactions, and any other complaints during the entire period of hospital stay. Before the patient was discharged, the exchange card indicated the type of IUD, the date of administration, and the validity period. Microbiological

examination of the genitals was performed before cesarean section and before discharge for 5-6 days.

Infection of the pelvic and cervical organs was thought to be present in women with purulent discharge, soreness of the cervix, appendages, or uterus, with or without fever. Patient satisfaction was determined by the patient report. The control group consisted of 36 women who had a caesarean section without using contraception.

Interpretation of the study data was carried out according to the values indicated in table 1.

Table 1: Interpretation of bacteriological research indicators

Indicator	Interpretation
«negatively»	The result is negative, there is no growth of microflora
$\leq 10^2$ CFU Saprophytic microflora	The result is negative, pathogenic microflora is not isolated
$\geq 10^2$ CFU The conditional- pathogenic microflora	The result is positive, recommendations for antibacterial therapy are given

- meager growth - 10^2
- moderate growth - 10^3
- heavy growth $\geq 10^4$

To conduct a culture study of the vaginal discharge, the material for seeding was taken from the cervical canal with a sterile cotton swab, which was placed in a transport medium. The bacteriological study was carried out according to the traditional scheme: sampling of the test material from the cervical canal, seeding on nutrient media, isolation of pure culture and identification of isolated cultures of microorganisms. In order to detect anaerobic microflora, the method of culturing microorganisms using a microanaerostat was used. When opportunistic bacteria were detected, the diagnostic titer was $>10^4$, and for fungi $>10^3$ CFU / ml of the test material. In the laboratory, the material delivered within 1-2 days was examined for the following groups of organisms: aerobes and facultative anaerobes, yeast-like fungi. Seeding was performed on a series of nutrient media for the determination of various groups of microorganisms: blood agar based on brucellosis agar with the addition of vitamin growth factors (for the isolation of anaerobes), mannitol - salt agar (for the isolation of staphylococci), Saburo medium (for the isolation of fungi). Media with blood agar were cultured in a thermostat with a high content of carbon dioxide (5-10%).

Identification of isolated microorganisms was performed using a bacteriological analyzer using computer programs. The number of isolated microorganisms was estimated by the growth density on the sectors of the agar cup.

Results. The majority of women were between 21 and 30 years old (77.89%). Two women (4%) were over 36 years old and only one woman was under 20 years old (table 2).

Table 2: Characteristics of women using IUD CuT 380 a intraoperatively (n =40) and control groups (n =36).

Parameters	Post-placental introduction of IUD (n=40)	The control group (n=36)
Average age (years)	25,6±1,7	25,3±1,6
Primeval	4 (10%)	4 (11,1%)
Repeat pregnancies	36 (90%)	32 (88,9%)
Primiparous	6 (15%)	6 (16,7%)
rebirth	34 (85%)	30 (83,3%)

The age of women in both groups varied from 18 to 40 years. The average age in group 1 was 25.6 ± 1.7 years, in the second group 25.3 ± 1.6 years. First-time pregnancies in group 1 were 25% (10 women), in the second group 25.8% (10 women). 6 women had spontaneous miscarriages before the upcoming birth. The remaining women in both groups were re-pregnant and re-giving birth. All the residents were residents of the Samarkand region. The vast majority of them (61.9%) had specialized secondary education, 33.5% had higher education, and 4.6% of women had secondary education (figure 1.)

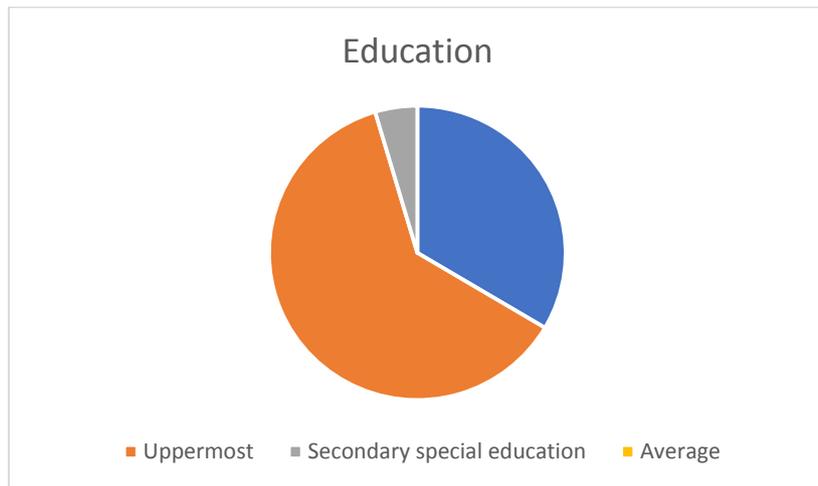


Figure 1. Education of women surveyed

The majority of women (98.7%) who received contraception were married, and there was little variation in the frequency of contraception in the groups. However, 1.3% of women were not married. According to these women, some of them had a regular sexual life with a regular partner (figure 2)

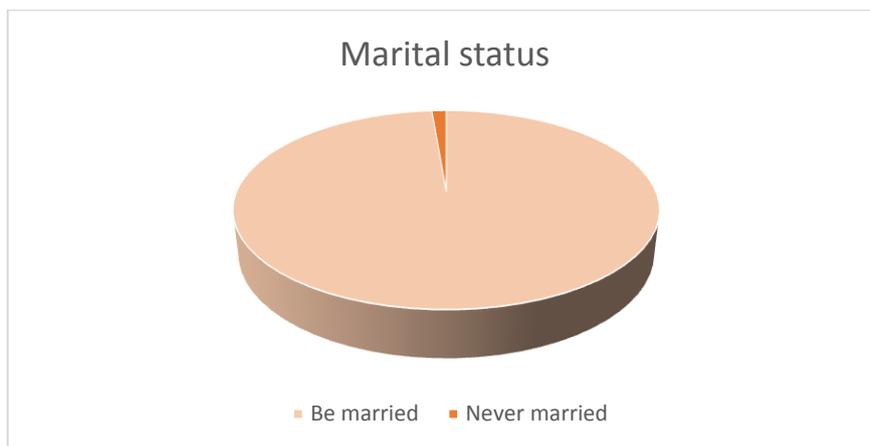


Figure 2. Marital status of patients

Women selected for post-placental intrauterine contraception indicated a history of gynecological diseases at the time of the survey significantly less often ($p < 0.05$) than in the control group (table 3).

Table 3: Structure of patients' chronic gynecological diseases

Diseases	1 group I / o VMK	Monitoring group (n=35)

	(n=40)			
	Abs. Number	%	Abs. Number	%
Inflammatory diseases of the genitals	-	-	3	8,6
Diseases of the cervix	-	-	2	5,7
Menstrual irregularity	2	5	3	8,6
Hyperplastic processes of the endometrium	1	2,5	2	5,7
infertility			1	
Induced abortion	6	15	11	31,4
Spontaneous abortion	2	5	2	5,7
Inflammatory diseases of the genitals	-	-	3	8,6

11 (27.5%) women from the group of patients selected for intrauterine contraception had previously had gynecological diseases. In the anamnesis, these women mostly had menstrual disorders - 5% of cases. The selection of women for intrauterine contraception was carried out in the absence of chronic inflammatory diseases of the sexual sphere and the absence of an infectious process according to bacterioscopic examination of the discharge from the cervical canal, urethra, vagina and PCR for the presence of sexually transmitted infections. Although there were few gynecological diseases in these patients, 6 (15%) women had a history of artificial abortions, and 2 (5%) women had spontaneous miscarriages.

The health index of the examined women for somatic diseases was relatively satisfactory. The most common diseases of the visual organs were -10% in women with post-placental IUD administration and 8.3% in women in the control group. The most common indications for cesarean section were the failure of the scar and the scar itself (24.2%), somatic pathology (9.4%), and the pelvic position of the fetus (8.7%) (figure 3). Thus, the clinical characteristics of the observed women in both groups indicate the homogeneity of the contingent.

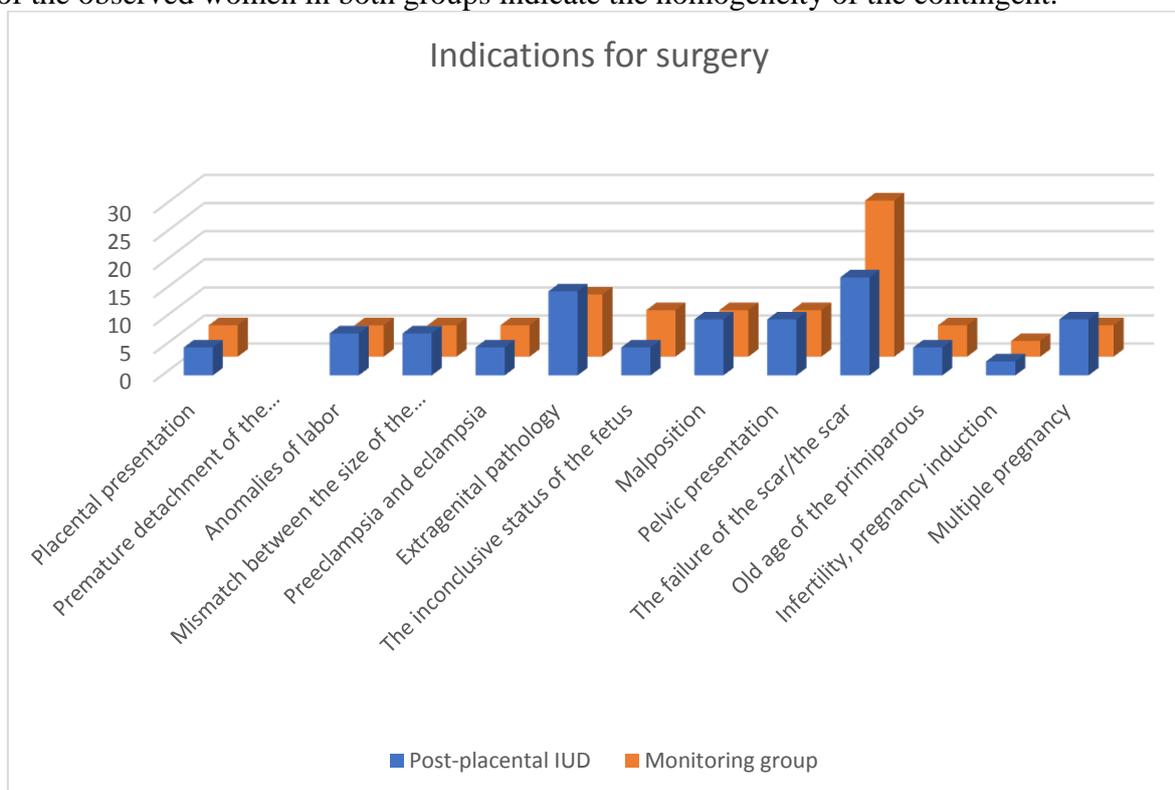


Figure 3. The most frequent indications for cesarean section.

Analysis of the primary detection of infectious and inflammatory diseases of the genitals against the background of the use of IUDs in women during cesarean section showed that there were cases of vulvo-vaginal candidiasis, bacterial vaginosis, without inflammatory pathology of the pelvic organs.

Table 4 shows the cumulative results of the bacteriological study of *Lactobacillus* spp. in women of the main group and control group before and after cesarean section.

Table 4. Results of a bacteriological study of examined women in the perioperative period (*Lactobacillus* spp. in the credits $>10^7$):

1-main group (with post-placental introduction of IUDs);

2-control group

	Concentration of the microorganism	Before surgery (%)	After operation (%)
1 group	$<10^7$	22,6	31,7
	$\geq 10^7$	77,4	68,3
2 group	$<10^7$	23,2	32,6
	$\geq 10^7$	76,8	67,4

According to the data presented in table 4, there is a significant decrease in *Lactobacillus* spp. in the postoperative period, almost the same frequency was observed in both groups ($p < 0.05$). A bacteriological study of the material from the cervical canal revealed a polymicrobial landscape in almost all patients. Most often, associations of microorganisms were represented by various combinations of conditionally pathogenic microorganisms.

Data on the frequency of detection of various microorganisms and their concentration in the bacteriological study are presented in table 5.

Table 5. Results of a bacteriological study of the examined women (in titers $>10^3$)

Вид возбудителя	Концентрация	1 группа		2 группа	
		До операции	После операции	До операции	После операции
Staphylococcus spp.	$\leq 10^4$	1 (2,5%)	1 (2,5%)	1 (2,9%)	1 (2,9%)
	$> 10^4$	-	-	-	-
Streptococcus spp.	$\leq 10^4$	-	-	1 (2,9%)	1 (2,9%)
	$> 10^4$	-	-	-	-
Ent. Faecalis	$\leq 10^4$	-	1(2,5%)	1(2,9%)	2 (5,8%)
	$> 10^4$	-	1 (2,5%)	-	1 (2,9%)
Enterobacteriaceae spp.	$\leq 10^4$	-	-	-	-
	$> 10^4$	-	1(2,5%)	-	2 (5,8%)
E.coli	$\leq 10^4$	-	-	-	-
	$> 10^4$	-	1(2,5%)	-	1 (2,9%)
C. albicans	$\leq 10^4$	-	-	2 (5,8%)	1 (2,9%)
	$> 10^4$	1(2,5%)	2 (5%)	-	2 (5,8%)
Klebsiella spp.	$\leq 10^4$	-	1(2,5%)	-	1 (2,9%)
	$> 10^4$	-	-	-	-

Citrobacter spp.	$\leq 10^4$	-	-	1 (2,9%)	-
	$> 10^4$	-	-	-	-
Proteus mirabilis	$\leq 10^4$	1 (2,5%)	1(2,5%)	-	-
	$> 10^4$	-	-	1(2,9%)	1(2,9%)
Pseudomonas aeruginosa	$\leq 10^4$	-	-	-	1(2,9%)
	$> 10^4$	-	-	-	-
G.vaginalis	$\leq 10^4$	-	-	-	-
	$> 10^4$	2 (5%)	3 (7,5%)	2 (5,8%)	3 (8,7%)

From the data presented in table 5, it can be seen that *G. vaginalis* was detected most often before the operation (5% and 5.7%, respectively). After applying IUD on day 5-6, *G. vaginalis* was seeded in the main group in 7.5% of women, and in the control group in 8.6% ($p < 0.05$).

Staphylococcus spp. in both groups of women before cesarean section was found in 2.5% and 2.9%, respectively ($p < 0.05$). After intraoperative IUD administration and in women without contraception, after abdominal delivery, this pathogen was encountered with the same frequency as before operative delivery (2.5% and 2.9%, respectively) ($p < 0.05$).

Streptococcus spp. it was not detected in women of the main group both before surgery and after IUD administration on day 5-6, and in the control group it was found in 2.9% ($\leq 10^4$).

According to the table, there is an increase in opportunistic microflora *Ent. Faecalis*, *Enterobacteriaceae* spp. and *E. Coli* in postoperative crops in both groups with almost the same frequency in concentrations $> 10^4$.

In General, the bacteriological study in the perioperative period revealed the following species composition of microorganisms: *Staphylococcus* spp., *Ent. Faecalis*, *Enterobacteriaceae* spp., *C. albicans*, *G. vaginalis*.

The most frequently detected facultative gram-positive cocci were *Staphylococcus* spp. in concentration $= 10^4$, both before and after the operation. *C. albicans* were often isolated from gram-negative obligate anaerobes.

According to the data of the bacteriological study presented in table 3, there is a clear increase in opportunistic flora in crops in the postoperative period: *G. vaginalis* in (7.5%) in the group with post-placental IUD administration, in 8.7% in the control group.

No patients were found to have *N. gonorrhoeae*, *TR. vaginalis*, or *CH. trachomatis*.

3. DISCUSSION.

Infectious and inflammatory diseases of the pelvic organs in women is a complex and insufficiently studied problem with serious, resulting medical, social and economic consequences around the world. In post-cesarean delivery women, an additional factor is surgical trauma, which leads to a more significant decrease in immunological reactivity and its slower recovery than after delivery through the natural birth canal.

Based on the above, it can be argued that purulent - septic diseases are currently a serious medical and social problem. The incidence remains at a high level due to many factors, the main of which are low socio-economic status, somatic diseases, features of the current pregnancy, operative delivery, features of the operation, and features of the postpartum period. Fearing these complications, doctors do not always use post-placental IUD administration, which is consistent with the opinion of V. A. Strukova [25].

Postpartum infection is not always symptomatic, it is polyethological in nature and the program of preparation for planned caesarean section allows the doctor to expand and deepen

the diagnosis and, taking it into account, conduct etiotropic active prevention of postpartum infection of the birth canal. Given the possibility of developing erased forms of postpartum purulent-septic diseases, it is necessary to conduct a comprehensive assessment of the severity of the state of puerperas based on clinical data (body temperature, respiration, hemodynamics, urination, etc.) and the results of laboratory tests. That is why this contingent of women requires more careful attention.

In this regard, to fully assess the possible development of postpartum purulent-septic complications in the postoperative period, active dynamic monitoring of patients in the main and control groups was carried out.

This study was conducted in the conditions of maternity hospital No. 2 in the city of Samarkand and included laboratory and instrumental research methods. The laboratory study included (in addition to the generally accepted ones) a bacteriological study of the microbial landscape of the genitals, since the effect of post-placental IUD administration on the state of the genitals' microbiota was not studied. These unsolved problems were the impetus for this scientific research, which requires further study and detailed step-by-step development.

The clinical characteristics of pregnant and puerperal women in the control group and the study group showed that they did not differ significantly ($p > 0.05$) in such criteria as age, gynecological history, frequency of extragenital pathology, frequency of pregnancy complications, average blood loss during surgery, etc., which allowed us to correctly compare them to identify differences in other parameters.

The main group of the microbial spectrum consisted of obligate anaerobic pathogens in low concentrations that do not cause the development of postoperative endometritis.

Among the identified obligate anaerobic pathogens, it is necessary to distinguish: *Gardnerella vaginalis*. Many authors (Prilepskaya V. N., 2014) [24] consider them highly specific markers responsible for the development of recurrent vaginal dysbiosis.

Abdominal delivery, especially repeated delivery, preparation for its implementation, the very technology of the operation and prevention of its infectious complications, especially in the postpartum period, require the doctor to be highly responsible when preparing for its implementation and taking into account the degree of infection risk. This also applies to abdominal delivery performed in urgent cases (up to 70,0 %).

The most important thing is to take into account the safety of the operation for the mother and fetus in the presence of a high infectious risk of endometritis.

Thus, we would recommend not to weaken attention to maternity hospitals and to provide clinical and laboratory monitoring of the course of the postoperative period (clinical observation, ultrasound scanning of the uterus, bacteriological examination), which is consistent with the data of Eastman A. J. et al. [7]. If abnormal flora is detected, appropriate treatment is recommended. When detecting its ascending infection and a subcompensated form of chronic placental insufficiency, inform the neonatologist and obstetrician-gynecologist to develop appropriate tactics for managing the maternity hospital after discharge.

4. CONCLUSIONS.

Our research shows that the biocenosis of the genitals of women preparing for abdominal delivery before CS surgery is characterized by a predominance of lactobacilli $10^7 - 10^8$ CFU / ml. In the postoperative period as a whole, the concentration of lactobacilli $\geq 10^7$ significantly decreased from 77.4% to 68.3% in the main group ($p < 0.05$) and from 76.8% to 67.4% in the control group ($p < 0.05$).

The dominant flora of the genitals when using IUDs during abdominal delivery is an Association of opportunistic microorganisms, but this is most likely due to cesarean section.

A quantitative study of the genitals microflora revealed that women who underwent cesarean section using contraception and without contraception have a tendency to increase the total number of bacteria from 10^4 - 10^5 CFU / ml to 10^6 CFU / ml or the appearance of microorganisms that were not encountered before cesarean section-a significant increase in the concentration of E. coli (from 2.5% to 2.9%).

Thus, after abdominal delivery, women with IUD and without contraception do not change the microbial landscape of the vaginal microflora after surgery. In General, in the postoperative period, there was a decrease in the concentration of lactobacilli and an increase in the representation of opportunistic microflora. These changes in the normal representation of the microflora depend on surgical intervention and to some extent on the reduction of the body's defenses. Features of micropesage of the genitals in women in the postoperative period with IUD and without contraception may be associated with the immunological features of the body of women in the postpartum period.

In post-cesarean delivery women, an additional factor is surgical trauma, which leads to a more significant decrease in immunological reactivity and its slower recovery than after delivery through the natural birth canal.

Of course, planned caesarean section has significant advantages over urgent one, taking into account the circumstances known to the surgeon, even if there are no risk factors for infection. Clinical and laboratory monitoring of the course of the postoperative period provided clear evidence of its physiological course, regardless of the presence or absence of IUD.

It should be noted that in our study there were no cases of complications in the form of uterine perforation and common inflammatory diseases (endometritis, peritonitis).

We found no evidence that intrauterine contraceptives altered the composition of the vaginal microbiota. Therefore, it is unlikely that the use of intrauterine contraception post-placental changes the composition of the vaginal microbiota so that the susceptibility to infection will change.

5. CONCLUSIONS:

1. The effectiveness of contraception, short duration and low severity of adverse reactions allow the use of IUDs in women after abdominal delivery post-placental.
2. Although the vaginal microbiota may be very dynamic, no pathological changes associated with the use of intrauterine contraception were detected in the postoperative period.

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