

ORIGINAL ARTICLE

A STATISTICAL ANALYSIS OF WOMEN'S REPRODUCTIVE HEALTH CHARACTERISTICS AFTER INEFFECTIVE REATTEMPTS OF USING ART

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The aim: To carry out a statistical analysis of physical and reproductive health characteristics in women after ineffective reattempts of using assisted reproductive technologies and identify significant medical and social factors contributing to the development of chronic endometritis.

Materials and methods: We carried out a statistical analysis involving 177 outpatient medical records: group 1 includes 127 women aged under 45 with two or more ineffective attempts of in vitro fertilization; group 2 comprised 50 healthy women without reproductive disorders. The complete physical exam included past history, clinical and gynecologic examination, lab techniques and medical imaging according to outpatient medical records obtained during the follow-up care in Isida-IVF Medical Center LLC. Chronic endometritis was recognized by means of histologic examination of endometrium, with the samples obtained by an endometrial pipelle biopsy on day 4-9 of the menstrual cycle.

Results: The prevalence of pelvic inflammatory disease in patients of group 1 comprised 47.2%, endometritis – 41.7%; $p1.2 < 0.01$. The prevalence of acute endometritis among patients of group 1 comprised 6.3%; $p1.2 > 0.05$ and was associated with an infection after abortion. In group 1, sexually transmitted infections were reported in 67.7% of patients, $p1.2 > 0.05$, bacterial vaginosis was registered 1.5 times more often – 28.4%; $p1.2 < 0.05$. In group 1, single induced abortion was reported in 15.0%, while 2 times it took place in 15.7% ($p1.2 < 0.05$). Laparoscopies were previously performed in 59.8% of women, laparotomies – in 62.2%, while in 25.4% of women these interventions were re-performed. Unilateral salpingectomy, due to ectopic pregnancy, was performed in 25.4% of women, bilateral – in 12.7%. Fallopian tube removal, due to sactosalpinx, was performed in 25.4% of women, unilateral salpingectomy took place in 3.9% of cases. The most significant risk factors of chronic endometritis in groups studied are acute postabortal endometritis, RR (relative risk) = 1.439, $p = 0.029$ and postoperative peritonitis provoked by the complications of appendectomy, RR = 1.430, $p = 0.084$. We detected none of significant effects of pelvic inflammatory disease on the development of chronic endometritis (RR = 45.132, Confidence interval (CI) (6.151-331.167), $p = 0.001$). The analysis of reproductive failures, as a risk factor of chronic endometritis in women of group 1, showed a significant relative risk: with the past history of premature birth, RR = 1.44, $p = 0.039$, in case of reattempts of induced abortions, RR = 1.5, $p < 0.001$, Spontaneous miscarriage RR = 1.572, $p = 0.001$. A higher relative risk of developing chronic endometritis was observed during pregnancy – RR = 1.597, $p = 0.001$.

Conclusions: Statistical analysis of women's reproductive health after ineffective reattempts of using ART revealed that the high rate of fetal interventions, low rate of alternative and safe abortion methods are registered in these women, as well as the nonavailability of any system of health measures after reproductive failures. A significant increase in miscarriage at early stages takes place, as well as the absence of a tendency for preterm labor to decrease in the rate. Maintaining women's reproductive health is a considerable medical and social issue, whose resolving depends on joint efforts of governmental and public entities, healthcare agencies and the population responsibility for own health. Designing and adopting the program of preconception care and planning for pregnancy in women after ineffective reattempts of using ART, with chronic endometritis as a primary disease, should be the top priority area of a health care system.

KEY WORDS: assisted reproductive technologies, chronic endometritis, fertilization failure, reproductive health, pregnancy

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INTRODUCTION

The matter of pelvic inflammatory disease these days remains a topical medical and social issue. Pelvic inflammatory disease keeps on being one of the leading causes of reproductive disorders. Along with the high prevalence of cervicitis, vaginitis, salpingo-oophoritis, which occurred, the prevalence of chronic endometritis also rose recently. According to various researchers, the occurrence of chronic endometritis averages out at 14 to 25% of cases. Typically, chronic endometritis is recognized in women with common miscarriage and comprises 6087.5% of cases [1-3].

When using intrauterine contraceptive device the

prevalence of chronic endometritis is 6-8% and increases threefold, if such contraception is used longer than five years. The prevalence of chronic endometritis in women, who have repeatedly undergone dilation and curettage for the reason of induced abortion or stillbirth, reaches 12.525% of cases [4, 5].

Chronic endometritis is an inflammatory disease, which is characterized by the impairment of endometrial structure and function, as well as predominantly early pregnancy loss: stillbirth, missed miscarriage, infertility, ineffective attempts of in vitro fertilization and embryo transfer, as well as pregnancy and postpartum complications [2, 3].

Table I. Marital status in women examined (abs. n. %)

Parameter	Groups		Statistical significance of differences
	1 n=127	2 n=50	
First marriage	91 (71.6%)	37 (74%)	p>0.05
Second marriage	9 (7.1%)	13 (26%)	p>0.05
Registered marriage	100 (78.7%)	39 (78%)	p>0.05
Common-law marriage	27 (21.3%)	11 (22%)	p>0.05

Note: p<0.05 – statistical significance of differences between groups 1 and 2.

The persistence of infection in endometrium in chronic endometritis, even without prominent disease symptoms, results in the damage to the receptor system in endometrium that may be one of the causes of reproductive disorders in women with intact hormonal ovarian function [4, 6-9].

It is known that risk factors of chronic endometritis are all invasive interventions in the uterine cavity, infection and inflammation as complications after delivery and abortion, intrauterine contraceptive device, vaginitis and cervicitis, cervical stenosis, uterine malformations [10-13]. The primary chronic disease process, involving endometrium in patients having disorders of local immunity [1] with secondary immunodeficiency as a primary disease that occurred due to urogenital infection, cannot be excluded. Despite the adoption of modern technologies for diagnostics and exploration of the brand-new treatment methods, the prevalence of chronic endometritis is not reduced that motivates to explore new approaches to prevention and detection of risk factors.

THE AIM

The aim – to carry out a statistical analysis of physical and reproductive health characteristics in women after ineffective reattempts of using assisted reproductive technologies and identify significant medical and social factors contributing to the development of chronic endometritis.

MATERIALS AND METHODS

We carried out a statistical analysis involving outpatient medical records of 127 women aged under 45 with two or more ineffective attempts of using in vitro fertilization (group 1). Inclusion criteria: women's childbearing age – 25-45 years; uterine factor infertility; regular sex life without using contraception for 1 year and more; male fertility. Exclusion criteria: endocrine, tuboperitoneal and/or combined infertility, exacerbation of a chronic physical disorder, subcompensations and decompensations during the last year.

The comparison group (group 2) comprised 50 healthy women without reproductive disorders. To exclude other causes of reproductive disorders, women with severe physical and allergic disorders were excluded, as well as patients with endocrine factor in reproductive disorder, with systemic diseases, congenital thrombophilia, antiphospholipid

syndrome, pelvic inflammatory disease in particular; patients, who took immunomodulators less than 6 months ago. The complete physical exam included past history, clinical and gynecologic examination, lab techniques and medical imaging according to outpatient medical records obtained during the follow-up care in Isida-IVF Medical Center LLC. Chronic endometritis was recognized by means of histologic examination of endometrium, with the samples obtained by an endometrial pipelle biopsy on day 4-9 of the menstrual cycle. The techniques for mathematical statistics represented in STATISTICA 6.1 Statsoft Inc were applied in the study, the statistical significance of differences was assessed by the relative risk (RR) value using the following formula: $RR = A \times D / B \times C$, where A means the number of patients from the group with chronic endometritis who also represent the feature studied; C – do not have the same characteristic value; B – the number of patients in the control group, who have the feature studied; D – do not have the same feature. To prove that the differences observed between AD and BC are not accidental, the χ^2 criterion was used in the table and for one degree of freedom.

RESULTS

When estimating the age, the mean age of those examined was found to be significantly (p<0.05) higher in group 1 and comprised 35.17 ± 0.42 , in group 2 this value was 28.30 ± 0.71 years. Group 1 numbered 72 (56.7%) of women of early reproductive age among the patients with ineffective attempts of using ART, 55 (43.3%) of those examined were of late reproductive age. This values came to 47 (94.0%) and 3 (6.0%), respectively, in group 2.

The tendency to later pregnancy planning is registered in patients of group 2. Women of late reproductive age postponed childbearing with an eye on career growth and had a high standard of living. Woman's marital status is a crucial social factor that determines childbearing. The high frequency of marriages registered first-ever was reported in all groups (Table I).

In group I, irrespective of reproductive loss (ectopic pregnancy and missed miscarriage) and infertility, marriages did not break up, while spouses applied for a pre-pregnancy checkup and selection of the method of pregnancy planning. The frequency of unregistered marriages in groups studied did not have any statistically significant differences and came at 27 (21.3%) in group 1, 101 (22.0%) cases in group 2.

Table II. Menstrual cycle characteristics in women examined (M ± m)

Parameters	Groups		Statistical significance of differences
	1 n=127	2 n=50	
Mean age of menarche	13.3±0.1	13.1±0.1	p>0.05
Average duration of menses	5.4±0.1	4.8±0.1	p>0.05
Average duration of the period	29.3±0.2	28.2±0.1	p>0.05

Note: p<0.05 – statistical significance of differences between groups 1 and 2.

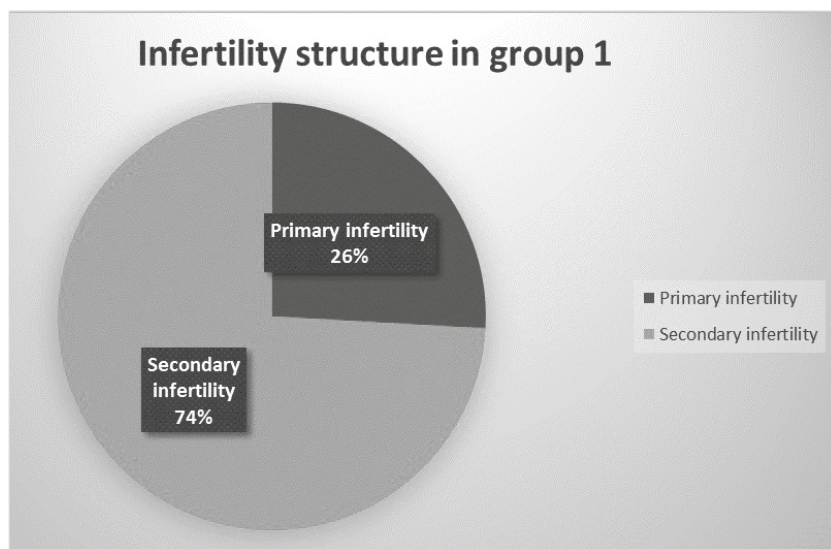


Fig 1. Infertility structure in women of group 1.

When studying women’s reproductive health in target groups, we assessed menstrual cycle characteristics, the age of sexual onset, parity. The analysis of menstrual cycle characteristics indicated the age variation at menarche ranging from 11 to 16, depending on the groups it averaged out at 13.3 ± 0.1 and 13.1 ± 0.1 years, respectively (Table II).

Early menarche (11-12 years) was more likely to be registered in patients of group 1 in 27.5% of cases in contrast to 20.0% in group 2 (p<0.05). We did not obtain any statistically significant differences (p>0.05) among patients of groups studied according to the duration of a period and menstrual cycle. The age of menarche corresponds to patients’ normal sexual development, while the duration of a period and menstrual cycle complied with characteristics of a normal menstrual cycle. Gonadotropin and steroid evaluation combined with an ultrasound-based monitoring of preovulatory follicle growth indicated the biphasic ovulatory type menstrual cycle in all women from groups studied. Sexual behavior of modern women is characterized by early sexual onset, multiple sex partners. The age of the first pregnancy is 17-18 years, the age of the first childbirth is 25-28 years, over the whole reproductive period woman delivers one-two children. Women and families, willing to have children, reduce in number. Statistically significant differences in the age of sexual onset between patients of group 1 – 17.8 ± 0.2 years and group 2, where this value comprised 18.9 ± 0.3 years (p<0.05) were obtained in the study (Table III). Every third patient of group 1 (30.7%) had two and more sex partners, 20% of women in control

group had 2 sex partners that did not make any statistically significant differences.

The age of the first pregnancy in patients of group 1 (excluding women with primary infertility) was 22.5 ± 0.4 years in such a case, the age of the first delivery was 22.8 ± 0.7 years that indicates the high frequency of delivery resulting from the first pregnancy and the prevalence of secondary infertility. In primary infertility the mean age of sexual onset was 17.3 ± 0.6 years. All women of group 1 complained about reproductive dysfunction. Primary infertility came to 33 (25.9%), secondary – 94 (74.1%) in the structure of reproductive disorders in patients of group 1. Data on the structure of reproductive disorders in women after ineffective attempts of using ART are illustrated in Fig. 1.

The majority of patients from group 1, or 69 (54.4%), applied for a treatment after 5 and more years of infertility. Seventy-eight (61.4%) women applied for the 3rd try of in vitro fertilization, 40 (31.5%) -for the 4th and 9 (7.1%) – for the 5th, and at the same time all patients with primary infertility had failures at trying in vitro fertilization.

Over the last years an increase in the prevalence of reproductive system diseases in women of various ages has become exponential. The structure analysis of gynecological morbidity (Table IV) indicated the high rate of benign diseases and pelvic inflammatory disease.

Typically, patients of group 1 numbered 60 (47.2%) complained about the past history of salpingo-oophoritis, 53 (41.7%) – endometritis, the incidence of acute endometritis among patients of group 1 comprised 8 (6.3%) and

Table III. Features of sexual behavior (M ± m)

Parameter	Groups		Statistical significance of differences
	1 n=127	2 n=50	
Mean age of sexual onset	17.8±0.2	18.9±0.3	p<0.05
Mean age of the first pregnancy	22.5±0.4	25.4±0.6	p<0.05
Mean age at first birth	22.8±0.7	26.2±0.5	p<0.05
Average number of pregnancies per 1 patient	2.4±0.2	1.2±0.1	p<0.05

Note: p<0.05 – statistical significance of differences between groups 1 and 2.

Table IV. Gynecological morbidity in women examined (abs. n. %)

Parameter	Groups		Statistical significance of differences
	1 n=127	2 n=50	
Benign cervical disorders	72 (56.7%)	18 (36%)	p<0.05
Benign ovarian tumors	14 (11%)	2 (4%)	p<0.05
Salpingo-oophoritis	60 (47.2%)	(0%)	p<0.001
Endometritis	53 (41.7%)	(0%)	p<0.001
Endometrial hyperplasia	10 (7.9%)	(0%)	p<0.05
Infertility (I)	33 (25.9%)	(0%)	
Infertility (II)	94 (74.1%)	(0%)	-
BV	36 (28.4%)	9 (18%)	p<0.05
STIs	86 (67.7%)	8 (16%)	p<0.05

Note: p<0.05, p<0.001 – statistical significance of differences between groups 1 and 2.

Table V. The assessment of risk factors of chronic endometritis in pelvic inflammatory disease (abs. n., %, CI, φ)

Parameter	Group 1 n=127		Group 2 n=50		p*	OP (CI 95%)	Strength of the association (φ)
	abs.	%	abs.	%			
Acute postabortal endometritis	8 (6.3%)		(0%)		0.029	1.439 (1.330-1.557)	0.130 p=0.029
Salpingo-oophoritis	43 (33.9%)		(0%)		0.001	45.132 (6.151- 31.167)	0.358 p=0.001
Postoperative peritonitis	4 (3.2%)		(0%)		0.084	1.430 (1.324-1.545)	0.103 p=0.08)

Note: p*– statistical significance of differences between groups 1 and 2.

was associated with postabortal infection. Benign cervical disorders prevailed over pelvic inflammatory disease except for the value in the control group. Predominance of their frequency was reported in patients of group 1 – 72 (56.7%), which is significantly more often (p<0.01) comparing to group 2 – 18 (36.0%). All patients of group 1 took medication (curative treatment with subsequent recovery of normal vaginal flora) and different techniques of radical cervical surgery. Radical techniques for treating cervical ectropion after delivery were used in 8 (16.0%) women of group 2 and they had normal structure and function of cervix till the moment of their inclusion in the study. The occurrence of functional ovarian cysts and ovarian tumors did not make any statistically significant differences in groups, but prevailed slightly in patients of group 1 – 14

(11.0%), which is three times more frequent as compared to group 2 – 2 (4.0%) (p<0.05).

In order to assess risk factors of chronic endometritis in patients of group 1, multiple factor analysis with subsequent determination of relative risk and the strength of the association was carried out. The most significant risk factors of chronic endometritis in groups studied were acute postabortal endometritis, RR = 1.439, p = 0.029 and postoperative peritonitis, resulting from complications of appendectomy- RR = 1.430, p = 0.084. At the same time, we did not detect any significant effect of salpingo-oophoritis on chronic endometritis progression- RR = 45.132, CI (6.151-331.167), p = 0.001 (Table V).

The occurrence of sexually transmitted infections (STIs), dysbiosis, lower genital tract infectious diseases made the

Table VI. Assessment of risk factors of chronic endometritis depending on an infectious agent (abs. n., %, CI, φ)

Parameter	Group 1 n=127		Group 2 n=50		P*	OP (CI 95%)	Strength of the association (φ)
	abs.	%	abs.	%			
Chlamydia infection	19 (15%)		3 (6%)		0.046	2.646 (0.987-7.093)	0.130 p = 0.029
Ureaplasma urealyticum infection	29 (22.8%)		2 (4%)		0.001	5.734 (1.991-6.515)	0.358 p = 0.001
Mycoplasma genitalium (Mgen) infection	20 (15.7%)		4 (8%)		0.824	1.085 (0.527-2.234)	0.103 p = 0.08

Note: p* – statistical significance of differences between groups 1 and 2.

Table VII. Assessment of risk factors of chronic endometritis that are associated with reproductive history (abs. n., %, CI, φ)

Parameter	Group 1 n=127		Group 2 n=50		P*	OP (CI 95%)	Strength of the association (φ)
	abs.	%	abs.	%			
Normal labor	43 (33.9%)		6 (12%)		0.089	1.735 (0.962-3.130)	0.110 (p=0.065)
Preterm labor	9 (7.1%)		0 (0%)		0.039	1.44 (1.33-1.56)	0.141 (p=0.017)
Induced abortion	47 (37.0%)		0 (0%)		0.01	0.990 (0.591-1.659)	0.450 (p=0.001)
Medical abortion	0 (0.0%)		2(4.0%)		0.001	-	-
First abortion	19 (15.0%)		2(4.0%)		0,163	1.841 (0.773-4.388)	0.083 (p=0.163)
Repeated abortion	20 (15.7%)		0 (0%)		0.001	1.503 (1.376-1.642)	0.242 (p=0.001)
Miscarriage	29 (22.8%)		0 (0%)		0.001	1.572 (1.425-1.735)	0.316 (p=0.001)
Missed miscarriage	37 (29.1%)		0 (0%)		0.001	1.597 (1.443-1.768)	0.338 (p=0.001)

Note: p – statistical significance of differences

past history distinctive in all patients of group 1. In group 1 STIs were registered in 86 (67.7%), BV – 36 (28.4%) (p1.2<0.05), which was fairly more often as opposed to women of group 2: STIs – 8 (16.0%), BV – 9 (18.0%) cases.

We assessed the effect on CE; typically detected in vaginal bacteria biotope (Table VI).

Parameters of confidence intervals and the strength of the association let us suppose that there is no effect of these bacteria on chronic endometritis that proves the numerous researchers' opinion about the overestimation of infectious agents' contribution to pathogenesis of chronic inflammation of endometrium.

The study of reproductive history of women in target groups revealed the high parity of pregnancies among patients in group 1 with secondary infertility. The average number of pregnancies per 1 patient in group 1 came to 1.6 ± 0.02, in group 2 – 0.3 ± 0.01 (p1.2 <0.001). We did not get any statistically significant differences in the number of deliveries in women of group 1, and the relative risk of

the effect on chronic endometritis turned out to be low, RR = 1.735, (CI = 0.962-3.130), p = 0.089.

We analyzed the structure of perinatal loss in the past history of women from group I with the history of secondary infertility. In group 1, miscarriage/stillbirth, intrapartum, early neonatal and infant deaths occurred in normal timely birth and comprised 3.2%, 1.1%, 2.1% and 2.1%, respectively. In two cases, miscarriage/stillbirth was recognized as a manifestation of placental insufficiency in case of full-term pregnancy in women, who have previously got abortions. Cases of early neonatal death resulted from intrauterine hypoxia and birth asphyxia. Mortality among infants was due to the effects of birth injuries: one newborn died because of Hypoxic-Ischemic Encephalopathy, one because of sepsis as a complication. Two cases of perinatal death due to congenital malformations took place in group 2.

The analysis of reproductive history associated with invasive interventions in the uterine cavity in the cohort is as

Table VIII. Structure of surgical procedures among women examined (abs. n., %)

Parameter	Groups		Statistical significance of differences
	1 n=127	2 n=50	
Laparoscopy	76 (59.8%)	2 (4%)	p<0.001
Laparotomy	79 (62.2%)	1 (2%)	p<0.001
Salpingectomy	66 (52%)	(0%)	p<0,001
Salpingo-oophorectomy	5 (3.9%)	(0%)	p<0.05
Ovarian surgery	14 (11%)	1 (2%)	p>0.05
Appendectomy	15 (11.8%)	2 (4%)	p<0.05
Peritonitis	5 (3.9%)	(0%)	p<0.05
Cholecystectomy	6 (4.7%)	(0%)	p<0.05
Uterine myomectomy	8 (6.3%)	(0%)	p<0.05

Note: p<0.05, p<0.001 – statistical significance of differences between groups 1 and 2.

Table IX. Assessment of risk factors of chronic endometritis in case pelvic surgery (abs. n., %, CI, φ)

Parameter	Group 1 n=127		Group 2 n=50		P*	OP (CI 95%)	Strength of the association (φ)
	abs.	%	abs.	%			
Salpingectomy	33 (26.0%)		0 (0%)		0.001	1.532 (1.397-1.680)	0.276 (p=0.001)
Salpingectomy due to ectopic pregnancy	22 (17.3%)		0 (0%)		0,001	1.500 (0.962-3.130)	0.110 (p=0.065)
Salpingectomy due to sactosalpinx	11 (8.7%)		0 (0%)		0.005	1.503 (1.374-1.638)	0.238 (p=0.001)

Note: p – statistical significance of differences

follows: the number of induced abortions in women of group 1 turned out to be as follows: single induced abortion was reported in 19 (15%), 2 times it took place in 20 (15.7%), numerous abortions – 10 (7.8%) (p1.2<0.05), miscarriage – 29 cases (22.8%) and missed miscarriage – 37 cases (29.1%).

We comprehensively characterized risk factors of chronic endometritis and reproductive failures by means of statistically significant differences, OR and the strength of the association (Table VII). When studying sexual behavior and early pregnancy failure in target groups we identified risk factors that provoke CE. While identifying risk factors of chronic endometritis we obtained the following results: past history of premature birth, RR = 1.44, p<0.039. The most significant risks were reported in repeated abortions-RR = 1.503, p<0.001; miscarriage – RR = 1.572, p<0.001. Higher relative risk of chronic endometritis was observed in missed miscarriage – RR = 1.597, p<0.001.

Data on the number of surgical procedures in women with different variants of reproductive loss are represented in Table VIII. The frequency of pelvic and abdominal surgery appeared to be reliably higher in group, at the same time laparoscopy was performed in 76 (59.8%), laparotomy – in 79 (62.2%) and in every fifth woman 27.9% of surgical procedures were reperformed, the average number of surgical procedures per 1 patient was 1.2 ± 0.06.

The frequency of surgical procedures is 6 times lower in control group, laparotomy prevailed, the average number of surgical procedures per 1 patient was 0.2 ± 0.01.

It is worth mentioning that the frequency of fallopian tube procedures was higher in group 1. Unilateral salpingectomy for the reason of ectopic pregnancy was performed in every fifth patient – 25.4%, bilateral – in every tenth woman (12.7%). Salpingectomy for the reason of sactosalpinx was performed in every fifth woman – 25.4%, unilateral salpingectomy took place in 3.9% of patients. The frequency of ovarian laparoscopic surgery (cystic degeneration was an indication for ovarian wedge resection) came up to 11.0%, 2.0% had resection due to a ruptured corpus luteum cyst in control group. It is noteworthy that laparotomy and laparoscopy were used equally in all groups that indicated the insufficient use of endoscopic technologies when providing gynecological urgent care (Table IX).

Thus, statistical analysis of women's reproductive health after ineffective reattempts of using ART revealed that the high rate of fetal interventions, low rate of alternative and safe abortion methods are registered, as well as the nonavailability of any system of health measures after reproductive failures. A significant increase in miscarriage at early stages takes place, as well as the absence of a tendency for preterm labor to decrease in the rate.

DISCUSSION

To implement the objectives of our study, we assessed women's reproductive health in target groups, analyzed risk factors of reproductive failures and chronic endometritis during the preconception period (stage 1 of the study). Based on the analysis of risk factors for reproductive failures and chronic endometritis during the preconception period (stage 1 of the study) it was identified that the risk of reproductive failures is determined by:

- 1) Nonavailability of a well-defined system for pregnancy planning and low coverage of the female cohort with modern contraception methods that contribute to high prevalence of benign ovarian tumors and ectopic pregnancy, observed in patients of group 1. Ectopic pregnancy prevailed in group 1: it was reported once in 35 patients (27.5%), twice – in 17 (13.4%), 3 times – in 2 (1.6% ($p_{1.2} < 0.001$)).
- 2) The high occurrence of salpingo-oophoritis in patients of group 1 – 47.2%, endometritis – 41.7% ($p_{1.2} < 0.01$). The frequency of acute endometritis among patients of group 1 comprised 8 (6.3% ($p_{1.2} > 0.05$)) and resulted from postabortal infection.
- 3) The occurrence of Sexually transmitted infections, dysbiosis and lower genital tract infectious diseases, in group 1 STIs were registered in 67.7%, $p_{1.2} > 0.05$, the frequency of BV was 1.5 times higher – 28.4%, $p_{1.2} < 0.05$.
- 4) The high occurrence of induced abortions, miscarriage, missed miscarriage is a manifestation that burdens reproductive history, was registered in women of group 1: single induced abortion was reported in 15.0%, 2 times it took place in 15.7% ($p_{1.2} < 0.05$). The number of abortions per woman on average was the largest in group I ($p < 0.05$).
- 5) The high frequency of all pelvic and abdominal surgery techniques, as well as gynecologic surgery was reported in women of group 1. Laparoscopies were previously performed in 59.8%, laparotomies – in 62.2%, at the same time in every fifth woman (25.4%) surgical procedures were reperformed. Unilateral salpingectomy, due to ectopic pregnancy, was performed in every fifth woman – 25.4%, bilateral in every tenth – 12.7%. Fallopian tube removal, due to sactosalpinx, was performed in every fifth woman – 25.4%, unilateral salpingectomy took place in 3.9% of patients.
- 6) The multiple factor analysis showed that the most significant risk factors of chronic endometritis in target groups are acute postabortal endometritis, $RR = 1.439$, $p = 0.029$ and postoperative peritonitis, provoked by the complications of appendectomy – $RR = 1.430$, $p = 0.084$.
- 7) The analysis of reproductive failures, as a risk factor of chronic endometritis in women of group 1 revealed the significant relative risk: with the past history of premature birth, $RR = 1.5$, $p < 0.001$, spontaneous miscarriage, $RR = 1.572$, $p = 0.001$. A higher relative risk of chronic endometritis was observed in missed miscarriage – $RR = 1,597$, $p = 0,001$.

Designing and adopting the program of preconception care and planning for pregnancy in women after ineffec-

tive reattempts of using ART, with chronic endometritis as a primary disease, should be the top priority area of a health care system.

CONCLUSIONS

Statistical analysis of women's reproductive health after ineffective reattempts of using ART revealed that the high rate of fetal interventions, low rate of alternative and safe abortion methods are registered in these women, as well as the nonavailability of any system of health measures after reproductive failures. A significant increase in miscarriage at early stages takes place, as well as the absence of a tendency for preterm labor to decrease in the rate.

Maintaining women's reproductive health is a considerable medical and social issue, whose resolving depends on joint efforts of governmental and public entities, healthcare agencies and the population responsibility for own health. Designing and adopting the program of preconception care and planning for pregnancy in women after ineffective reattempts of using ART, with chronic endometritis as a primary disease, should be the top priority area of a health care system.

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