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ТЕНДЕНЦИИ РАЗВИТИЯ БУХГАЛТЕРСКОГО И НАЛОГОВОГО УЧЕТА В ЭКОНОМИКЕ	415
<i>АЙНАБЕКОВА ИНДИРА ТАЙКОНЫРОВНА</i>	
ВЛИЯНИЕ КОРПОРАТИВНОГО МЕНЕДЖМЕНТА НА ДЕЯТЕЛЬНОСТЬ БАНКОВ ВТОРОГО УРОВНЯ В РЕСПУБЛИКЕ КАЗАХСТАН	419
<i>БУКЕЙХАНОВА ТАМАРА КОШКАРБАЕВНА</i>	
<i>ВАСЯКИН РОМАН ЛЕОНИДОВИЧ</i>	
<i>СЛЕПНЁВ СЕРГЕЙ БОРИСОВИЧ</i>	

Physical and Mathematical Sciences

ОҚУШЫЛАРДЫҢ ТАНЫМДЫҚ ОЙЛАУЫН ДАМУДАҒЫ ЛОГИКАЛЫҚ ЕСЕПТЕРДІҢ ОРНЫ	424
<i>МУХАМЕР А.Ж.</i>	
НЕГІЗГІ МЕКТЕПТЕ ГЕОМЕТРИЯ КУРСЫН ВИЗУАЛИЗАЦИЯ ҚҰРАЛДАРЫ КӨМЕГІМЕН ОҚЫТУДЫҢ ТЕОРИЯЛЫҚ НЕГІЗДЕРІ	428
<i>МАҚҰМЫТ ДИДАР</i>	
THEORETICAL FOUNDATIONS OF CONTINUITY IN TEACHING MATHEMATICS.....	439
<i>MADI ALYIA</i>	

Literature

SAYINGS FROM EXAMPLES OF FOLKLORE GENRE CHARACTERISTICS.....	451
<i>VAGIF ALLAHVERDIYEV</i>	
<i>GARANFIL RZAYEVA</i>	
КӨРКЕМ ШЫҒАРМАЛАРДАҒЫ ОНИМДЕРДІ ЗЕРТТЕУ ЖОЛДАРЫ	456
<i>И. С. СУЛТАНИЯЗОВА</i>	
<i>А.К. СИСЕНБАЕВА</i>	

Art History

ҚАЗАҚ ХОР ӨНЕРІНІҢ ҚАЛЫПТСАУЫ МЕН ДАМУ ЖОЛДАРЫ.....	460
<i>НАЗЫМ ПАДСАБЕК</i>	
<i>КАСИМОВА ЗУЛЬФИЯ МАЛИКОВНА</i>	

Geographic Sciences

БІРШОҒЫРДЫҢ ӘЛЕУМЕТІК-ЭКОЛОГИЯЛЫҚ ПРОБЛЕМАЛАРЫ	464
<i>ТЕЛЕУОВ АҚЫЛЖАН НУРХАИРОВИЧ</i>	
<i>ИСЕНГАЛИЕВА ГУЛЯ АМИРЖАНОВНА</i>	
<i>ТОЛЕУОВА ЭЛЬМИРА АДІЛБЕККЫЗЫ</i>	
<i>АМАНЖОЛОВ ТАМЕРЛАН ШЫНБОЛАТОВИЧ</i>	

Geological and Mineralogical Sciences

RESULTS OF THE DIRECT-PROSPECTING METHODS FOR SATELLITE IMAGES FREQUENCY-RESONANCE PROCESSING USING WITHIN AREAS OF WELLS LOCATION ON OFFSHORE AND ONSHORE	470
<i>SERGIY LEVASHOV</i>	
<i>МЫКОЛА ЯКУМЧУК</i>	
<i>IGNAT KORCHAGIN</i>	

Medical Sciences

REPRODUCTIVE RESULTS AFTER HYSTEROSCOPIC METROPLASTY USING A MONOPOLAR RESECTOSCOPE IN WOMEN WITH REPRODUCTIVE DISORDERS	496
<i>GLADCHUK IHOR ZINOVIOVYCH</i>	
<i>ROZHKOVSKA NATALIYA MYKOLAYIVNA</i>	
<i>NOSENKO OLENA MYKOLAYIVNA</i>	
<i>YEVSEYEVA OKSANA ANATOLIYIVNA</i>	
КЛІТИННА ВІДПОВІДЬ НА ГІПОКСІЮ У ВОРСИНЧАТОМУ ХОРІОНІ ПЛАЦЕНТ ВІД ЖІНОК ПІЗЬНОГО РЕПРОДУКТИВНОГО ВІКУ З ВАГІТНІСТЮ, ІНДУКОВАНОЮ В ПРОГРАМАХ ІVФ	502
<i>НОСЕНКО ОЛЕНА МИКОЛАЇВНА</i>	
<i>ХАНЧА ФЕДІР ОЛЕКСАНДРОВИЧ</i>	
EPIDEMIOLOGY OF CERVICAL CANCER AND ONCOGYNECOLOGICAL SCREENING IN KAZAKHSTAN.....	509
<i>ARMAN KHOZHAYEV</i>	
<i>DINA ALISHEVA</i>	
<i>ZULFIYA ALIEVA</i>	
<i>GULAIYM ORAZBEKOVA</i>	
<i>ALMASH TOGUZBAYEVA</i>	
<i>SAULE ESTAEVA</i>	
<i>AZAMAT AKANOV</i>	
<i>SNEZHANA RASPUTNAYA</i>	
<i>MOLDIR MUKHAMEDINA</i>	
<i>AIGERIM TURGALIYEVA</i>	

Political Studies

STRATEGY OF MATHEMATICAL MODELING OF CONFLICTS BASED ON GAME THEORY.....	514
<i>YSKAK ORALBEK</i>	

Medical Sciences

REPRODUCTIVE RESULTS AFTER HYSTEROSCOPIC METROPLASTY USING A MONOPOLAR RESECTOSCOPE IN WOMEN WITH REPRODUCTIVE DISORDERS

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Abstract

The role of different methods of hysteroscopic metroplasty in women with reproductive failure against the background of a septate uterus is not fully determined. **The purpose** of the study was to evaluate the effectiveness of reproductive function restoration after dissection and removal of the uterine membrane using a monopolar resectoscope in women with infertility and miscarriages. **Material and methods.** 65 patients with a septate uterus and reproductive failure were under observation: 34 women underwent hysteroscopic monopolar dissection of the uterine membrane and 31 patients underwent hysteroscopic monopolar resection of the uterine septum. **Results.** Metroplasty technique (dissection or resection) with the use of a monopolar resectoscope in women with a septate uterus did not affect the onset of pregnancy, the number of miscarriages and premature births, but term deliveries and live births were probably 1.69 times more likely to occur when the tissue of the uterine septum was removed compared to similar indicators during its dissection (OR 0.34 [0.12-0.93]), in women with initial miscarriages - 1.96 times, respectively (OR 0.16 [0.03-0.73]). The technique of performing metroplasty (dissection or resection) using a monopolar resectoscope in women with initial infertility in the conducted study did not have a statistically significant difference in terms of the effect on reproductive indicators. **Conclusions.** Removal of the uterine septum using a monopolar resectoscope in women with miscarriages has advantages in restoring reproductive function compared to the dissection technique. The technique of monopolar metroplasty in women with infertility probably does not affect the reproductive results.

Key words: septate uterus, reproductive failure, infertility, miscarriage, monopolar resectoscope, septum dissection, septum removal, reproductive results.

A septate uterus is a common congenital anomaly in women. A complete and incomplete uterine septum is distinguished. Whether the uterine lining increases the risk of reproductive failure is still unknown. On the one hand, several observational studies have reported an association between the uterine septum and obstetric complications, including recurrent spontaneous abortions (both in the first and second trimesters), preterm birth, intrauterine growth retardation, and placental abruption [3, 5, 9, 11]. However, many women with uterine septum do not experience any reproductive difficulties [8].

Hysteroscopic metroplasty is indicated for women with repeated miscarriages, as it is believed to significantly improve the reproductive outcome: both the onset of pregnancy (80%-90%) and an increase in fertility (53.7%). However, the role of hysteroscopic metroplasty in the treatment of women with primary infertility is still controversial. Recent studies have shown a significantly lower number of pregnancies in women after hysteroscopic metroplasty (40%-53.1%), and live birth rates were comparable due to a small number of miscarriages after treatment [1, 2, 4, 6, 7, 10, 12]. There are no comparative data on the results of recovery of reproductive function after performing hysteroscopic metroplasty by monopolar dissection and monopolar resection of the septum.

The purpose of the study was to evaluate the effectiveness of reproductive function restoration after dissection and removal of the uterine septum using a monopolar resectoscope in women with infertility and miscarriages.

Material and methods

The study was conducted at the clinical facilities of Odesa National Medical University between 2018 and 2022 after the approval of the project by the bioethical committee of the University. 65 patients of group M with uterine membrane, reproductive failure, monopolar hysteroscopic metroplasty were under observation. Reproductive failure was manifested in the examined women in the form of miscarriages (n=39) and infertility (n=26). The study did not include women with combined factors of infertility. The uterine septum was identified as a factor of infertility in all the studied women. The fallopian tubes of all patients were passable. The men had normal parameters of the spermogram in accordance with the norms approved by the WHO [13].

In group M, 2 groups were distinguished: group MI - 34 women who underwent hysteroscopic monopolar dissection of the uterine membrane; group MII – 31 women who will undergo hysteroscopic monopolar resection of the endometrium.

Hysteroresectoscopy was performed under the control of laparoscopy under general anesthesia. After dilation of the cervix using Hegar dilators to No 10.5 mm, a monopolar hysteroresectoscope (Karl Storz, Tuttlingen, Germany) was inserted into the cervical canal. A continuous flow of fluid was used to stretch the uterus. Dissection and resection was started from the lower edge of the septum with the help of a monopolar electrode and was carried out perpendicular to the axis of the uterus along the midline in the cranial direction. A monopolar knife was used, current indicators did not exceed 80 W for dissection and 30 W for coagulation.

Three months after hysteroresectoscopic metroplasty and if there are indications, it was recommended to plan pregnancy naturally or, if necessary, with the help of IVF. All operated patients were under observation for 2 years. Postoperative management of patients also included the appointment for 3 months of a drug containing 2.0 mg estradiol for 14 days, then 2.0 mg estradiol and dydrogesterone for 14 days during three menstrual cycles; rectal suppositories with 15,000 IU streptokinase and 1,250 IU streptodornase twice a day for 9 days.

Statistical data processing was carried out using the "Microsoft Excel 2020" application program package (Microsoft Corporation, USA). Arithmetic mean (M), error of standard deviation (\pm SE) was evaluated. The probability coefficient p was calculated using the Student's t-test.

Absolute frequency (n) and relative frequency (%) were determined for binomial signs. For intergroup comparisons, Pearson's χ^2 test with degrees of freedom (df) was used. The critical level of significance for testing the null hypothesis was $p < 0.05$. Odds ratio (OR) and 95% confidence interval (CI) were calculated, which were presented as OR [95% CI].

Results and their discussion

The average age of patients in the MI group was 30.12 ± 0.34 years, in the MII group - 30.42 ± 0.23 years ($p > 0.05$).

The studied groups MI and MII did not differ according to anthropometric data: body weight - 58.35 ± 1.67 kg versus 57.65 ± 1.80 kg, height - 1.64 ± 0.01 m versus 1.65 ± 0.01 m, body mass index - 21.84 ± 0.69 kg/m² versus 21.54 ± 0.69 kg/m².

The uterine septum was complete in 8 (23.53%) women of the MI group, incomplete in 26 (76.47%) patients ($p > 0.05$), in 11 (35.48%) and 20 (64.52%) ($p > 0.05$) of the MII group ($p > 0.05$) respectively. Among women with initial infertility in the MI group, the septum was complete in 3 (23.08%) and incomplete in 10 (76.92%) cases ($p > 0.05$), in the MII group - in 4 (30.77%) and 9 (69.23 %) ($p > 0.05$). Among women with early miscarriage in the MI group, the septum was complete in 5 (23.81%) and incomplete in 16 (76.19%) cases, in the MII group - in 7 (38.89%) and 11 (61, 11 %).

As can be seen from the table. 1, the reproductive history of women in the groups had no statistically significant differences (Table 1).

Table 1 – Reproductive anamnesis of women in the studied groups

Indicator	Group MI, n=34	Group MII, n=31
Infertility, n (%)	13 (38.24)	13 (41,94)
Primary infertility, n (%)	7 (53.85)	6 (46,15)
Secondary infertility, n (%)	6 (46.15)	7 (53,85)
Mean duration of infertility, M \pm SE, years	6.62 \pm 0.41	6,31 \pm 0,43
Presence of pregnancies, n (%)	27 (79.41)	25 (80,65)
Average number of pregnancies, M \pm SE	1.94 \pm 0.23	1,71 \pm 0,21
Availability of artificial abortions, n (%)	4 (11.76)	4 (12,90)
Average number of induced abortions, M \pm SE	0.26 \pm 0.11	0,13 \pm 0,06
The presence of miscarriages, n (%)	26 (76.47)	25 (80,65)
The average number of miscarriages, M \pm SE	1.59 \pm 0.18	1,52 \pm 0,17
Presence of childbirth, n (%)	3 (9.09)	1 (3,23)
The presence of ectopic pregnancies, n (%)	2 (5.88)	2 (6,45)
Note. No statistically significant differences were found between the indicators of MI and MII groups ($p > 0.05$).		

When evaluating the results of hysteroscopic metroplasty, it was found that the average duration of surgery in the MI group compared to the MII group was 1.19 times shorter ($p < 0.01$), intraoperative blood loss – 1.14 times ($p < 0.01$) (Table 2).

Table 2 – Results of hysteroscopic metroplasty in the studied groups

Indicator	Group MI, n=34	Group MII, n=31
Operation time, M±SE, min.	29.92±1.48 ^{mII}	35.72±0.81 ^{mI}
Intraoperative blood loss, M±SE, ml	20.94±1.04 ^{mII}	23.85±0.69 ^{mI}
Subfebrile after surgery, n (%)	4 (11.76)	4 (12.90)
Postoperative pain, n (%)	2 (5.88)	4 (12.90)
Intrauterine synechiae, n (%)	3 (9.09)	1 (3.23)
Residual membrane over 1 cm, n (%)	3 (8.82)	1 (3.23)
Intraoperative bleeding, n (%)	1 (2.94)	0 (0.00)

Note. ^{mI, mII} - a statistically significant difference with the indicators of groups MI, MII (p<0.05).

The frequency of postoperative complications in the MI and MII groups had no significant differences: low fever after surgery was registered in 11.76% and 12.90% of patients, postoperative pain – in 5.88% and 12.90%, intrauterine synechiae – in 9.09% and in 3.23%; residual membrane over 1 cm – in 8.82% and in 3.32%. Metroplasty was complicated by bleeding in only 1 (2.94%) woman of the MI group.

The analysis of recovery of reproductive function within 2 years after the operation showed that pregnancy occurred in 79.41% of women in the MI group, in 83.87% in the MII group (p>0.05); the specific weight of miscarriages was 23.53% and 12.90%, respectively (p>0.05); childbirth - 58.88% and 70.97% (p>0.05); premature births – 17.65% and 6.45% (p>0.05); term deliveries – 38.24% and 64.52% (p<0.04) (Table 3).

Table 3 – Indicators of restoration of reproductive function in the studied groups depending on the hysteroscopic metroplasty technique used within 2 years after the operation, n (%)

Indicator	Group MI, n=34	Group MII, n=31	OR [95% CI]	P=
Onset of pregnancy	27 (79.41)	26 (83.87)	0.74 [0.21-2.64]	0.64
Natural onset of pregnancy	22/34 (64.71)	22/31 (70.97)	0.75 [0.26-2.14]	0.59
Pregnancy in IVF cycles	5/12 (41.67)	4/9 (44.44)	0.89 [0.16-5.11]	0.90
Miscarriages	8/34 (23.53)	4/31 (12.90)	2.08 [0.56-7.74]	0.28
Childbirth	19/34 (58.88)	22/31 (70.97)	0.52 [0.19-1.45]	0.21
Premature birth	6/34 (17.65)	2/31 (6.45)	2.74 [0.51-14.57]	0.24
Term delivery	13/34 (38.24)	20/31 (64.52)	0.34 [0.12-0.93]	0.04

An analysis of recovery of reproductive function was carried out depending on the type of reproductive disorders prior to surgical intervention.

In women with initial infertility, pregnancy occurred in 69.54% of women in the MI group and 69.23% in the MII group (p>0.05) within 2 years after the operation; the specific weight of miscarriages was 25.00% and 22.22%, respectively (p>0.05); childbirth - 75.00% and 77.78%

($p > 0.05$); premature births – 12.50% and 11.00% ($p > 0.05$); term deliveries – 62.50% and 66.67% ($p > 0.05$) (Table 4).

Table 4 – Indicators of restoration of reproductive function among women with initial infertility depending on the hysteroscopic metroplasty technique used within 2 years after the operation, n (%)

Indicator	Group MI, n=34	Group MII, n=31	OR [95% CI]	P=
Onset of pregnancy	8/13 (61.54)	9/13 (69.23)	0.71 [0.14-3.61]	0.68
Miscarriages	2/8 (25.00)	2/9 (22.22)	1.17 [0.12-10.99]	0.89
Childbirth	6/8 (75.00)	7/9 (77.78)	0.86 [0.09-8.07]	0.89
Premature birth	1/8 (12.50)	1/9 (11.11)	1.14 [0.06-21.87]	0.93
Term delivery	5/8 (62.50)	6/9 (66.67)	0.56 [0.06-4.76]	0.59

Analysis of recovery of reproductive function within 2 years after surgical intervention in women with initial miscarriage showed that 90.48% of women in the MI group became pregnant, 94.44% in the MII group ($p > 0.05$); the specific weight of miscarriages was 31.58% and 11.76%, respectively ($p > 0.05$); childbirth- 68.42% and 88.24% ($p > 0.05$); premature births – 26.32% and 5.88% ($p > 0.05$); term deliveries – 42.11% and 82.35% ($p < 0.02$) (Table 5).

Table 5 – Indicators of restoration of reproductive function in women with initial miscarriage depending on the hysteroresectoscopic metroplasty technique used within 2 years after the operation, n (%)

Indicator	Group MI, n=34	Group MII, n=31	OR [95% CI]	P=
Onset of pregnancy	19/21 (90.48)	17/18 (94.44)	0.56 [0.05-6.73]	0.65
Miscarriages	6/19 (31.58)	2/17 (11.76)	3.46 [0.59-20.21]	0.17
Childbirth	13/19 (68.42)	15/17 (88.24)	0.29 [0.05-1.69]	0.17
Premature birth	5/19 (26.32)	1/17 (5.88)	5.71 [0.59-54.96]	0.13
Term delivery	8/19 (42.11)	14/17 (82.35)	0.16 [0.03-0.73]	0.02

In the conducted study, for the first time, the influence of the metroplasty technique (dissection or resection) using a monopolar resectoscope was evaluated in women with initial infertility and miscarriages against the background of a septate uterus. Metroplasty led to improved reproductive outcomes in the group with initial miscarriages. The weakness of the conducted study was the small sample of examined women, therefore, it is necessary to conduct large RCTs clarifying the impact of metroplasty on fertility, especially in the cohort of infertile women.

Conclusion

The method of metroplasty (dissection or resection) using a monopolar resectoscope in women with a septate uterus does not affect the onset of pregnancy, the number of miscarriages and premature births, but term deliveries and live births are probably 1.69 times more likely to

occur when the tissue of the uterine membrane is removed compared to similar indicators during its dissection (OR 0.34 [0.12-0.93]), in women with initial miscarriage- 1.96 times (OR 0.16 [0.03-0.73]). The technique of metroplasty (dissection or resection) using a monopolar resectoscope in women with primary infertility does not have a statistically significant effect on reproductive performance, which may be due to the small sample size in the study.

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