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REPRODUKTİV YAŞDA OLAN QADINLARDA ENDOÇERVİKSİN DÖVRİ DƏYİŞİKLİKLƏRİ

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Xülasə. *Məqalədə reproduktiv yaşda olan 78 qadının endoserviksində baş verən dövri dəyişikliklərin transvaginal sonoqrafik müayinəsinin nəticələri təqdim edilmişdir. Qadınların yaşı 19-dan 35-ə qədər olmuşdur.*

Müayinə edilən qadınlardan 4 nəfərin (59,0±5,6%) anamnezində hamiləlik qeydə alınmış (I qrup), 32 nəfərdə (41,0±5,6%) hamiləlik olmamışdır (II qrup).

Gecikmiş proliterativ dövrdə I qrupdakı qadınlarda endoserviksin qalınlığı 6,3±0,7 mm, II qrupdakı qadınlarda isə 9,1±1,2 mm olmuşdur (p<0,05). Menstruasiya dövrünün 9-10-cu günündə I qrupdakı qadınlardan 29 nəfərdə (63,0±7,1) endoserviksin exogenliyi azalmışdır, II qrupda isə belə nəticə qadınlardan 23 nəfərdə (71,9±7,9%) müşahidə edilmişdir. Menstruasiyanın 13-14-cü günündə nisbətən çox hallarda endoserviksin exogenliyinin orta dərəcəli artımı müşahidə edilmişdir – I qrupda 36 qadında (78,3±6,1%), ikinci qrupda 18 qadında (56,3±8,8%) (p<0,05). İzoexogen endoserviks isə mensrtuasiya dövrünün 21-23-cü günlərində nisbətən çox müşahidə edilmişdir – I qrupda 26 (56,5±7,3%), ikinci qrupda 25 (78,1±7,3) qadında (p<0,05).

Açar sözlər*: reproduktiv yaş, endoçerviksin dövri dəyişiklikləri, ultrasonoqrafiya*

Ключевые слова*: репродуктивный возраст, циклические изменения эндоцервикса, ультрасонография*

Key words: *reproductive age, cyclic changes of endocervix, ultrasonography*

THE CYCLIC CHANGES IN THE ENDOCERVIX IN REPRODUCTIVE-AGE WOMEN

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Summary. *The article presents data on transvaginal sonographic assessment of cyclic changes in the endocervix in 78 women of reproductive age (19-35 years) without uterine pathologies. Among the examined women, 46 (59.0±5.6%) had a history of pregnancy (group I), 32 (41.0±5.6%) did not experience pregnancy (group II).*

The thickness of the endocervix in the late proliferative period in women of group I averaged 6.3±0.7 mm, and in group II – 9.1±1.2 mm, indicating a significant (p<0.05) difference between them . A decrease in the echogenicity of the endocervix on days 9-10 of the menstrual cycle was noted in 29 (63.0±7.1%) women in group I, and in 23 (71.9±7.9%) in group II. A moderate increase in the echogenicity of the endocervix was most often recorded on days 13-14 of the cycle - in 36 (78.3±6.1%) and 18 (56.3±8.8%) women (P<0.05), respectively. Isoechogenic endocervix was most often observed on days 21-23 of the cycle - in 26 (56.5±7.3%) and 25 (78.1±7.3%) women (P<0.05), respectively.

As established in the literature, the main methods for examining the vaginal part of the cervix are colposcopy and cytological examination. Colposcopy allows you to identify suspicious neoplastic changes, conduct a targeted biopsy followed by morphological examination, which helps improve the accuracy of diagnosing cervical diseases [1, 2]. The endocervical canal connects the vagina and the uterine cavity. Along the circumference of the cervix, the fornix is a protrusion of the distal part of the vaginal mucosa. The external os of the cervix gives rise to the endocervical canal and ends with the internal os of the cervix. Cervicoscopy does not allow visualization of the endocervix and diagnosis of its pathologies. Cytological examination of the cervical canal does not always give a clear picture of the condition of the endocervix [3].

In women of reproductive age, cervical pathologies vary widely and include both benign lesions (eg, cervicitis, hyperplasia, nabothian cysts, cervical polyps, leiomyomas, endometriosis and congenital anomalies) and malignant lesions, particularly cervical carcinoma [4]. In addition, lesions arising in the uterine body may involve secondary cervical involvement, such as endometrial carcinoma and endometrial prolapse. Many of these conditions can be identified and characterized using ultrasound, which is considered the first imaging modality of the female pelvis. However, examination of the cervix during a pelvic ultrasound is often superficial, so cervical disease may be missed or misdiagnosed. Transabdominal cervical ultrasound may not provide sufficient spatial resolution to diagnose cervical disease in many patients, so endovaginal ultrasound is considered the optimal method [5-7].

Unlike the body of the uterus and ovaries, ultrasonography of the cervix is used to a limited extent, in particular, to accurately determine the length of the cervix and the condition of the internal os in pregnant women [8-11].

While ultrasonography is widely used to assess cyclic changes in the endometrium in women with infertility, the structure of the endocervix at different periods of the menstrual cycle is not sufficiently covered in the literature.

The purpose of the study is to evaluate cyclic changes in the endocervix in women of reproductive age, taking into account a history of pregnancy.

Material and methods. The study included 78 women of reproductive age (19–35 years). Among them, 46 (59.0±5.6%) had a history of pregnancy (group I), and 32 (41.0±5.6%) did not experience pregnancy (group II). 27 (34.6±5.4%) women of group I were under the age of 25 years, 19 (24.4±4.8%) were aged 26-35 years. 14 (18.0±4.4%) women of group II were under the age of 25 years, 18 (23.0±4.8%) were aged 26-35 years, respectively (Table 1).

Echography was carried out using an endovaginal sensor in the frequency range of 4-9 MHz on a Philips HD-11 ultrasound device.

The reliability of differences in average values was assessed using a two-sample independent t-test for average values in groups with a non-parametric distribution (Mann-Whitney method) after determining the nature of the distribution. Differences were considered significant at $p < 0.05$.

Table 1. Distribution of examined women by age

Age	Group I	Group II	Total
19-25	27 (34,6±5,4%)	14 (18,0±4,4%)	41 (52,6±5,7%)
26-35	19 (24,4±4,8%)	18 (23,0±4,8%)	37 (47,4±5,7%)
Total	46 (59,0±5,6%)	32 (41,0±5,6%)	78 (100%)

Results and discussion. Visualization of the cervix during transvaginal echography was carried out in the sagittal and axial planes. At the level of the middle third of the cervix, the total thickness of the endocervix was measured on days 5-6, 9-10, 13-14 and 21-23 of the menstrual cycle. In addition, during the same period, the echostructure of the endocervix was assessed (tabl. 2).

As can be seen from the table, during all periods of the menstrual cycle in the group of women (group II) in whom pregnancy did not occur, the thickness of the endocervix was greater than in fertile women (group I). On the 5-6th and 21-23rd days of the menstrual cycle, the difference between the indicators of these groups was negligible. A significant difference between them was revealed on the 9-10th and 13-14th days of the cycle. The thickness of the endocervix on days 9-10 of the cycle in fertile women was 5.4±0.6 mm, in women with infertility - 7.9±0.8 mm (P<0.05). On the 13th-14th days of the menstrual cycle, the thickness of the endocervix was 6.3±0.7 mm and 9.1±0.9 mm (P<0.05), respectively (Fig. 1, 2).

Further analysis of the functional state of the ovaries and endometrium among women who did not have a pregnancy in 13 (40.6±8.7%) cases revealed various types of disorders - luteinization of the neovulatory follicle, luteal phase insufficiency, lack of a ripening follicle.

In all groups on the 8th-10th and 12th-14th days of the cycle, the cervical canal widened, the largest of which was among women who had a history of childbirth. In this regard, the total thickness of the mucosa in the transverse section was determined without taking into account the width of the cervical canal. Therefore, the true total thickness of the leaves was, on average, 3-5 mm less than the anteroposterior size of the endocervix along with the cervical canal, defined as the distance between the side walls on its transverse section (Fig. 3).

In addition to quantitative parameters, we determined such qualitative parameters of endocervix as echogenicity, clarity of contours for the corresponding days of the cycle. Echogenicity of endocervix is assessed as reduced, isoechoic, moderate increased. The frequency of occurrence of these ultrasound symptoms among all groups of women is calculated for the corresponding days of the cycle.

Table 2. Ultrasonographic parameters of endocervix in different periods of the menstrual cycle

Echographic parameters of endocervix	Menstrual cycle days	I group n=46	II group n=32
The total thickness of the endocervix (Te), mm	5-6- th	4,9±0,5	5,3±0,6
	9-10-th	5,4±0,6	7,9±0,8
	13-14-th	6,3±0,7	9,1±1,2 P<0,05
	21-23-th	4,8±0,5	5,7±0,6
Hypoechoic endocervix, n%	5-6- th	15 (32,6±6,9%)	13 (40,6±8,7%)
	9-10-th	29 (63,0±7,1%)	23 (71,9±7,9%)
	13-14-th	4 (8,7±4,1%)	1 (3,1±3,1%)
	21-23-th	8 (17,4±5,6%)	2 (6,3±4,3%)
Izo-echoic endocervix, n%	5-6- th	21 (45,7±7,3%)	18 (56,3±8,8%)
	9-10-th	11 (23,9±6,3%) P<0,05	2 (6,3±4,3%)
	13-14-th	8 (17,4±5,6%)	5 (15,6±6,4%)
	21-23-th	26 (56,5±7,3%)	25 (78,1±7,3%) P<0,05
Moderate echogenicity of endocervix**, n%**	5-6- th	10 (21,7±6,1%) P<0,05	2 (6,3±4,3%)
	9-10-th	7 (15,2±5,3%)	6 (18,8±6,9%)
	13-14-th	36 (78,3±6,1%) P<0,05	18 (56,3±8,8%)
	21-23-th	9 (19,6±5,9%)	4 (12,5±5,8%)

As can be seen from Table 2, the best visualization of the endocervix was carried out on the 9-10th and 13-14th days of the menstrual cycle. At the same time, on the 9-10th day, a decrease in echogenicity was recorded significantly more often, and on the 13-14th day of the cycle, a moderately increased echogenicity was recorded. Among fertile women, the frequency of decreased echogenicity of the endocervix on days 9-10 of the cycle was 63.0±7.1%, in women without a history of pregnancy - 71.9±7.9%. The same indicators on days 5-6 of the cycle were 32.6±6.9% and 40.6±8.7%, respectively. Was found a significant difference ($p<0.001$) in the frequency of occurrence of reduced echogenicity of the endocervix in both groups between the 9-10th and 13-14th days of the menstrual cycle (Fig. 4).

Fig. 1. Echogram of a 21-year-old woman with impossibility of pregnancy. On the 13th day of the menstrual cycle, the thickness of the endocervix is 1.03 cm.

Fig. 2. Echogram of a 26-year-old woman with impossibility of pregnancy. On the 14th day of the menstrual cycle, the thickness of the endocervix is 1.09 cm.

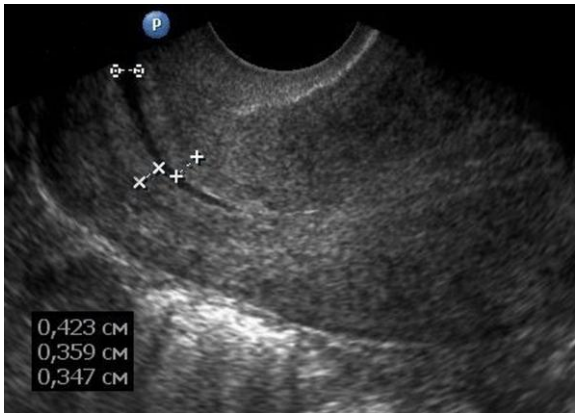

Fig. 3. Longitudinal view of the body and cervix on the 14th day of the menstrual cycle. The thickness of the leaves is 0,359 cm and 0,347 mm, the maximum width of the cervical canal is 0,423 mm.

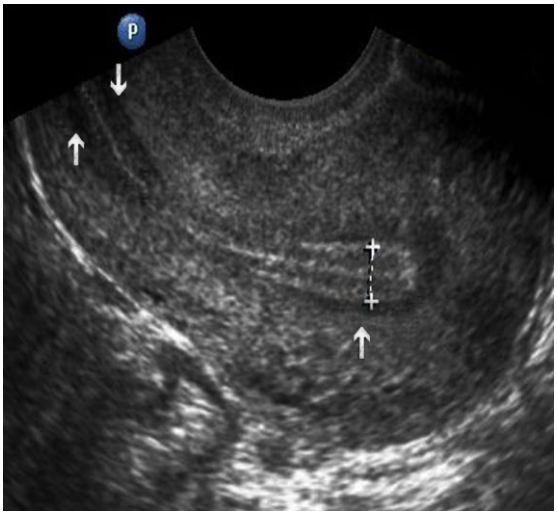

Fig. 4. Longitudinal view of the body and cervix on the 9th day of the menstrual cycle. A homogeneous hypoechoic endocervix is visualized (left arrows).

For days 21-23 of the cycle, the isoechoic structure of the endocervix is most characteristic; in fertile women it was recorded in 56.5±7.3%, and in women with infertility in 78.±7.3% of cases ($p<0,05$), respectively (Fig. 5).

Fig. 5. Longitudinal view of the body and cervix on the 23rd day of the menstrual cycle. Isoechoic endocervix is determined (arrows).

Discussion

Transvaginal echography is the leading imaging method for assessing the structure of the endometrium in women with infertility, inflammatory diseases of the cervix, and in the early stages of endometriosis due to its informativeness and low cost [12-15].

The studi by Shahzad, H. et al. (2022) showed that among women of reproductive age, the frequency of infertility caused by hormonal imbalance in the age group of 20-25 years is significantly higher than 40-45 years and in approximately 68% of them it is primary [16]. In our studies, among women with an increase in the thickness of the endocervix in 40.6%, various manifestations of hormonal imbalance were identified, in particular luteinization of a non-ovulating follicle, insufficiency of the luteal phase of the menstrual cycle and polycystic ovaries.

Cyclical changes in endocervix in healthy women have been studied in a few works. In works devoted to chronic cervicitis development of hypertrophy of cervix is shown, without taking into account the state of endocervix [17-19].

Determination of the thickness and echogenicity of the endocervix at different periods of the menstrual cycle made it possible to identify a group of women of reproductive age with hormonal imbalance. We recorded the greatest thickness of the endocervix on the 13-14th days of the menstrual cycle among women who did not become pregnant.

Conclusions:

1. In women of reproductive age, the greatest thickness of the endocervix is observed in the late proliferative phase, precisely on the 13-14th days of the menstrual cycle. This figure among women with hormonal imbalance is significantly higher than among fertile women.
2. Hypoechoic endocervix is most often observed on days 9-10, isoechoic - on days 21-23 of the menstrual cycle.

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ЦИКЛИЧЕСКИЕ ИЗМЕНЕНИЯ В ЭНДОЦЕРВИКСЕ У ЖЕНЩИН РЕПРОДУКТИВНОГО ВОЗРАСТА

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Резюме. В статье представлены данные о трансвагинальной сонографической оценке циклических изменений в эндоцервиксе у 78 женщин репродуктивного возраста (19-35 лет) без патологий матки. Среди обследованных женщин у 46 (59,0±5,6%) в анамнезе были беременности (I группа), у 32 (41,0±5,6%) – беременность не наступала (II группа).

Толщина эндоцервикса в позднем пролиферативном периоде у женщин I группы в среднем составила 6,3±0,7 мм, а во II группе – 9,1±1,2 мм, что показывает на достоверное ($p<0,05$) различие между ними. Снижение эхогенности эндоцервикса на 9-10-е дни менструального цикла отмечено у 29 (63,0±7,1%) женщин I группы, у 23 (71,9±7,9%) – II группы. Умеренное повышение эхогенности эндоцервикса наиболее часто регистрировалась на 13-14-й дни цикла – у 36 (78,3±6,1%) и у 18 (56,3±8,8%) женщин ($P<0,05$), соответственно. Изоэхогенный эндоцервикс наиболее часто отмечался на 21-23-й дни цикла – у 26 (56,5±7,3%) и у 25 (78,1±7,3%) женщин ($P<0,05$), соответственно.

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