

Echographic Features of the Range of Variability in the Size of the Uterus and Ovaries in Women of Menopausal Age Using Oral and Injectable Forms of Contraception

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Abstract The article presents the possibilities of complex ultrasound dopplerography in particular the range of variability in the size of the uterus and ovaries in women of menopausal age using oral and injectable contraceptive means. It is established that dopplerography can be used as a method that allows performing echographic differential diagnostics of ovarian formations, as well as various types of uterine pathology. The high frequency of relapses of the disease in menopausal age, a wide range of contraindications and side effects of hormonal drugs make it necessary to evaluate the prognostic factors of endometrial hyperplastic processes and develop a differentiated approach to treatment. Using the ultrasonic Doppler method dopplerography in the examination algorithm for women using oral and injectable contraceptives in menopausal age is a necessary stage of complex echography of the uterus and ovaries to clarify the nature of damage to the uterus and ovaries.

Keywords Endometria, Transvaginal ultrasound, Contraception, Perimenopause, Postmenopausa, Uterine

1. Introduction

Climacteric period is a physiological period of women's life during which involutional processes in the reproductive system dominate against the background of age-related changes in the body. In the climacteric period, premenopause, menopause and postmenopause are distinguished. In women, premenopause usually begins at the age of 45 and lasts for 3 to 7 years until the end of menstruation. The average age at which the last menstruation (menopause) occurs is 50 years. In parallel with the change in the age structure of the female population, there is an increase in the prevalence of endometrial hyperplastic process. During perimenopause, the risk of endometrial malignancy increases significantly and in 30-70% of cases, endometrial cancer is combined with severe extragenital pathology [1,3,4,7,8].

Despite the numerous foreign and domestic studies and publications available there is no consensus in the literature on the results of ultrasound examination for the purpose of timely detection of endometrial hyperplastic changes in women of menopausal age who use oral and injectable forms of contraception.

2. Purpose of Research

The aim of the work is to improve the quality of diagnostics of endometrial hyperplasia in women of menopausal age using oral and injectable forms of contraception by identifying ultrasound-criteria for the most common benign processes using a comprehensive ultrasound study.

3. Materials and Methods

The main group consisted of 80 women using oral and injectable forms of contraception. The comparison group is represented by 35 women of reproductive age without concomitant pathology and not using oral and injectable contraceptives. The second group consisted of 40 women of menopausal age using injectable contraceptives, the third group consisted of 40 women of menopausal age using oral contraceptives. The age of the patients ranged from 39 to 54 years. The research methods used in this work were generally accepted and used specific gynecological manipulations. The examination program included clinical and anamnestic, instrumental diagnostic methods (3D ultrasound) and laboratory (cytological and histological) studies. Ultrasound examination was performed on Mindray DC-8 and SonoScape S40 Exp devices in various modes of ultrasound imaging. Complex ultrasound examination included echography in the gray scale mode, dopplerometry of the uterine and ovarian arteries at different levels of the study, color and energy scanning. Transvaginal access was

used to study the state of uterine and ovarian hemodynamics in women. The Doppler study included: assessment of the degree of vascularization in both study groups, visualization and determination of the course inside the vessels of the uterus and ovaries, qualitative characteristics of the blood flow spectrum, assessment of speed indicators (uterus and ovaries) and the angle of independent indices (resistance index, pulsateness index). Differences between the compared values were recognized as statistically significant at the significance level $p < 0.05$.

4. Results of the Study

In progress in this research, 115 women were examined. All women were comparable in age: the average age of patients in the main and control groups was 39.8 ± 1.6 and 54.6 ± 1.6 years, respectively. Among women from the main group, Housewives predominated (more than 30.1%). The proportion of disabled women in the main group was 12.3%. In the comparison group, the majority of women were engaged in active work: 36.3 % of them worked as workers, 39.6% - employees. Only 2 women (2.5%) had a disability due to a combination of somatic diseases. Analysis of a number of inherited diseases did not reveal significant differences in women of the main and control groups. In childhood and adolescence, most women in all groups have experienced acute respiratory viral infections and such infectious diseases. Women in the main group had a higher proportion of endured inflammatory diseases of the uterus appendages compared to women in the comparison group. In addition, women in the main group had a higher incidence of extragenital diseases compared to women in the comparison group. Thus, in the main group compared to the comparison group there was a more unfavorable premorbid background, which certainly influenced the course of the main disease. The majority of women in both groups observed the onset of the first menstruation at the age of 11-13 years. Later onset of the first menstruation occurred in 33.3% of women using oral contraceptives, 46.6% of women using injectable contraceptives and 12% of women in the comparison group. A significant part of the women examined (89%) had chronic inflammatory processes of the internal genitals and cervical diseases, while the proportion of these diseases was significantly higher in the presence of women in the control group. The most favorable outcome of pregnancies occurred in women using oral contraceptives. Severe clinical course of the perimenopausal period (menstrual disorders, pronounced vegetative vascular disorders and the presence of post-hemorrhagic anemia) occurred in a group of women who do not use contraceptives.

Thus, in the observation groups of women who do not use contraceptives, a higher degree of severity of somatic health disorders was noted. Ultrasound examination of the pelvic organs was performed in all patients. In premenopausal women of the main and control groups, blood flow in the uterine and arcuate arteries was recorded in 85% of cases,

and basal-in 60%. In the postmenopausal period, the vascular pattern of the uterus was significantly depleted. The uterine arteries, penetrating into the myometrium, divide, forming the arcuate arteries. The geometry of the uterine and ovarian vessels, their diameter, the presence of pulsation, and the state of the vascular wall were evaluated in ultrasound mode. When using the color Doppler mapping mode, the patency of the uterine and ovarian vessels of the women studied, the speed and nature of blood flow in the vessels of the uterus and ovaries, the resistance index (IR) and the systolic-diastolic ratio (SDO) in the uterine and ovarian arteries were determined. In the spectral Doppler mode, the difference of the Doppler curve, its synchronicity with the act of breathing, and quantitative indicators of blood flow were estimated. The diameter of the vessels varied from 3.7 to 7.1 mm, the average value of the maximum blood flow rate (WT) was 11.9 ± 3.6 cm/s on the right, and 10.7 ± 3.6 cm/s on the left. In the CDC mode, the visualized fragments of myometrial vessels are uniformly filled with color. when using spectral Doppler mode, monophasic blood flow with a peak systolic blood flow rate of 8.87 ± 3.4 cm/s is detected in the arcuate veins of the myometrium. In 48.2% of women in the postmenopausal period lasting more than 3 years, according to our study, the venous bed of the myometrium could not be visualized in the projection of the arcuate vessels, linear hyperechogenic structures were located, probably due to petrification of the vascular walls in women at this age. During dopplerography of blood flow in the uterine vessels in the control group of women, the indicators of blood flow velocity and resistance varied depending not only on the vessel size, but also on the phase of the menstrual cycle. In the control group of women of reproductive age, the echographic size of the ovaries fluctuated significantly, depending on a number of factors: age, reproductive history, menstrual cycle phase, oral and injectable contraceptives, and surgical interventions.

The results of the research diplomatically indicators introvethe results of the study of arterial blood flow conducted by many authors, as well as our data from both groups, showed significant cyclical changes in the rate and index of peripheral resistance. Indicators of the maximum systolic blood flow rate increased slightly during the entire proliferative and early secretory phases and increased during the flowering of the yellow body (up to 35.5 ± 2.1 cm/s), again decreasing during its extinction (15.2 ± 1.1 cm/s). Indicators of the peripheral resistance index in the ovulating ovary in all the study groups did not change during the entire proliferative phase, but they were observed to decrease after ovulation, reaching a minimum by the flowering of the corpus luteum (0.6 ± 0.02), and then increased again by the end of the menstrual cycle (0.8 ± 0.04). Echostructure in the examined women of the control group, the values of IR in the ovulating ovary practically did not change during the follicular phase (0.48 ± 0.02) and reached a minimum (0.41 ± 0.02) by the period of yellow body flowering. In the non-ovarian ovary, IR maintained high values in both the follicular and luteal phases of the menstrual cycle,

fluctuating slightly from 0.52 ± 0.02 to 0.47 ± 0.02 . In postmenopausal women, ovarian blood circulation was characterized by extremely low perfusion volume, low rate (maximum systolic rate less than 6 cm/s), and high resistance ($IR - 0.68 \pm 0.05$). In postmenopause, the uterus was reduced in size in all women, mainly in the control group, which corresponded to the norm (the thickness of the endometrium corresponded from 1 mm to 0.5 mm, depending on the use of contraceptives). During dopplerography in menopausal age, intraendometrial blood flow was characterized with a low rate (< 4.5 cm/s) and a high resistance index ($IR 0.6-0.7$). In women using oral contraceptives, the size of the right and left ovaries did not decrease and were almost the same in all the study groups: length 2.5 ± 9 mm, thickness 1.3 ± 5 mm, width 1.5 ± 6 mm, volume 7.1 ± 1.4 . In the third group of women using injectable contraceptives, the ovaries are significantly reduced, while the size of the right and left ovaries in our study were almost the same in all the study groups: length 2.0 ± 5 mm, thickness 9 ± 1.2 cm, width 1.2 ± 1.5 cm, volume 4.1 ± 1.4 . In women after 5 years of postmenopause of the main and control groups, intraovarian blood flow was not visualized even when using energy dopplerography. Doppler parameters of intraovarian blood flow in postmenopause were characterized by a low rate (< 5.6 cm / s) and a high resistance index ($IR 0.6-0.7$). According to Baldwin M.K. et al., color dopplerography of the myomatous node determines mainly peripheral vascularization, which allows to define its contour more clearly [2,6]. Our research showed that low values of IR in the Central parts of the nodes were registered for degenerative changes in the uterine fibroids. In case of necrosis, there were no color spots in the myomatous node during color Doppler mapping. In a number of cases of severe eating disorders in the node, we found a marked increase in IR in the peripheral vessels in all study groups. Teshaev Sh.J. et al. Found more pronounced vascularization and relatively low values of IR during premenopause compared to similar indicators in postmenopausal women ($P < 0.05$), in large myomatous nodes compared to indicators in small myomatous nodes ($P < 0.0001$), as well as in submucous and subserous nodes compared to those in interstitial ($P < 0.05$) [8]. Grigore et al. The possibility of Doppler differentiation of the nodal form of internal endometriosis and uterine fibroids is stated [5,9]. In our study, in 35% of women in the control group with internal endometriosis in the affected area, the vessels were located randomly, while dopplerography of myomatous nodes in 58% of cases visualized peripheral or external feeding vessels in women using oral contraceptives. Our research showed that Doppler parameters of adenomyosis were characterized by higher resistance (in 80% $PI > 1.17$) compared to its parameters in myoma (in 84% $PI < 1.18$). Pathological transformation of the endometrium in the form of endometrial hyperplasia and endometrial polyps was detected in the vast majority of women with extragenital pathologies in the control group – about 45,4% of cases, in the comparison group-only 11,0%. Hypoplastic structure of

the endometrium occurred only in the main group of women using injectable contraceptives. Hypoplasia of the uterine mucosa was observed in 1,2% of women in the control group. The normal structure of the endometrium is considered in the phase of secretion or proliferation, marked only in women in the control group. It should be noted that the morphological structure of endometrial polyps in all patients was dominated by glandular (41,1%) and mixed polyps (19,9%). According to the results of our research, the coincidence of ultrasound interpretation of endometrial polyps and histological material was noted in 98,6% of observations.

5. Conclusions

1. Ultrasound Doppler evaluation of blood flow in endometrial vessels in women using oral and injectable contraceptives had a greater diagnostic value in the early proliferative phase of the menstrual cycle.
2. In the main group of women using injectable contraceptives of menopausal age, the qualitative and quantitative characteristics of blood flow in various vessels of the uterus and ovaries differed depending on the phase of the menstrual cycle in healthy women and the nature of damage to the uterus and ovaries in the examined women using oral contraceptives.
3. Blood Flow with low peripheral resistance was characteristic a sign of vascularization disorders in women with uterine and ovarian lesions women using injectable contraceptives compared to the control group.
4. In Such a way that the use of the method of ultrasonic plography in the examination algorithm for women using oral and injectable contraceptives at menopausal age is a necessary stage of complex echography of the uterus and ovaries to clarify the nature of damage to the uterus and ovaries.

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