

Dopplerometric Examinations in Women with Uterine Myoma and Liver Pathology in Anamnesis

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The urgency of the problem. Uterine fibroids is the most common benign myometrial tumor, which affects approximately 20% of women over 30-35 years of age [6,7], is diagnosed more often in late reproductive age [9]. Due to the fact that in some cases there is an asymptomatic course, the disease is detected in 5 - 10% during routine examinations or ultrasound examination [1,4,5]. Despite numerous studies, proposals and implementation of new means and methods of treatment of uterine fibroids remains the most common gynecological pathology [8].

The leading role in the development of uterine fibroids belongs to hyperestrogenism due to changes in the metabolism of steroid hormones in the liver.

The dyshormonal nature of the tumor determines the presence of a number of metabolic disorders, functional liver failure. In the formation of hormonal disorders, which are one of the main links in the pathogenesis of uterine fibroids, the liver is directly involved, actively participating in the metabolism of estrogen. Of the numerous metabolic functions of the liver in uterine myoma, enzymatic inactivation and conjugation of steroid hormones with glucuronic and sulfuric acids are most often changed [2,3]. This circumstance is to a certain extent explained by the fact that in patients with uterine myoma, various diseases of the liver and biliary tract are often found, which contribute to the disruption of estrogen metabolism.

Purpose of the study. To study the echodopplerometric parameters of the uterine vessels, the functional state of the liver in women with uterine myoma

Material and research methods.

The study group (group II) included 72 women with uterine fibroids, who underwent echodopplerographic studies in the gynecological department and the women's center of the II clinic of the Tashkent Medical Academy. The control group (group I) - 30 healthy women of the same age as the studied group. Color Doppler mapping (CDM) is an ultrasound technology for imaging blood flow, based on recording the velocities of blood movement, coding them in different colors and superimposing the resulting pattern on a black and white image, which greatly simplifies the detection of blood vessels.

With spectral (pulse-wave) dopplerometry, a characteristic for each vessel blood flow velocity (CSC) curve was obtained in order to digitally assess the phases of systole and diastole. For the correct obtaining of linear blood flow velocities, it is necessary to observe the angle of insonation, which should be less than 60 °, which was used during the study of large vessels. In this regard, used relative indicators (indices), which are angle-independent. The most commonly used in gynecology are resistance index (IR) and pulsation index (PI), systolic-diastolic ratio (SDR). Evaluation of uterine and appendage blood flow was performed using transvaginal echography (TVE). A 6.5 MHz transducer was used. We carried out studies in the uterine, arcuate, ovarian arteries, and also studied the blood flow in the myomatous node.

We also investigated the functional state of the liver in patients with fibroids. Biochemical blood tests were carried out (determination of bilirubin, protein and protein fractions, aspartate - and alanine - aminotransferases). An antipyrine test was carried out according to the usual method (in blood). The intermediate and final products of lipid oxidation, the sorption capacity of erythrocytes (ESE), and the level of medium-molecular peptides were determined. A functional study of the liver was studied in 65 women with uterine fibroids at the age from 30 to 50 years and in 10 healthy women (control group). All patients are divided into 3 groups: the first - 20 with subserous form of the myomatous node, the second -

20 with the submucous location of the node, and the third - 25 with the interstitial form of the myomatous node.

Research results. Our analysis of the medical history of women with uterine fibroids showed that the studied patients have a high percentage of extragenital diseases. Thus, chronic cholecystitis and chronic hepatitis occurred in 19.6% and 17.8% of cases, respectively.

The examined patients had post-hemorrhagic anemia of varying severity. Thus, in 100% of patients with submucous uterine myoma (20 patients), the hemoglobin content was reduced to 80 g / l, the number of erythrocytes to 2.5×10^{12} . In 60% of patients with other forms of tumor location, respectively, these indicators were 102 g / l, 3.3×10^{12} . When comparing the functional parameters of the hepatobiliary system in all groups of patients, no significant differences were found. But compared with the control group, there was an increase in the activity of aspartate aminotransferase (0.65 ± 0.02 and $0.69 \pm 0.5 \mu\text{mol} / \text{L}$) and alanine aminotransferase (0.75 ± 0.07 and $0.85 \pm 0.08 \mu\text{mol} / \text{l}$), which are indicators of enzymes that perform intracellular functions and are activated when the liver cell is damaged by various factors. In terms of total protein and albumin in women of all three studied groups, no differences were found. As evidenced by dysproteinemia in patients of the 1st, 2nd and 3rd groups, the level of α_1 globulins (4.57 ± 0.2 and 4.5 ± 0.15) and α_2 globulins (11.7 ± 0.46 and 9.7 ± 0.63) than in the control group. The pigment-forming system of the liver was reduced, the level of total bilirubin in the 1st group was $14.1 \pm 0.6 \mu\text{mol} / \text{L}$, in the 2nd - $13.2 \pm 0.9 \mu\text{mol} / \text{L}$, in the 3rd - $12.7 \pm 0.8 \mu\text{mol}$, and in healthy people - $16.8 \pm 1.0 \mu\text{mol} / \text{L}$.

The examined patients showed an elongation of the half-distribution period (TI / 2) of antipyrine 37-68%, an increase in the apparent volume of distributions by 1.5-2 times compared with the indicators of healthy ones. Thus, an increase in the level of acetylhydroperoxides (AHP) was revealed by 3.4 and 3.92 times compared with the indicators of healthy subjects. Changes in the content of malondialdehyde (MDA) are less pronounced.

The analysis of the results obtained indicates the mutually conditioned content of AGP and SSE, which is one of the mechanisms of the development of endogenous intoxication syndrome in women with uterine myoma. The severity of these changes was significant in patients with posthemorrhagic anemia due to the submucous location of the tumor. Thus, as a result of the dynamic examination of patients with uterine myoma before the operation and before the use of conservative treatment, violations of the antitoxic liver function were revealed depending on the location of the node and the nature of the menstrual dysfunction, which dictates the need for targeted correction of liver function by prescribing hepatoprotectors. Patients with uterine fibroids should be allocated to the risk group for the pathology of the hepatobiliary system. Treatment and observation of these patients should be carried out in conjunction with a gynecologist and therapist.

During ultrasound examination, we established the following echographic signs of uterine fibroids: an increase in the size of the uterus, deformation of the contours of the uterus, a round and ovoid form of pathological formation of the myometrium, a homogeneous structure of the nodes, clear and even contours of the node, as the tumor grows hypo-, iso-, hy- perechogenic areas of various shapes and sizes.

It should be noted that an increase in the size of the uterus occurs not only due to the presence of fibroids, but also due to hypertrophy of the unchanged myometrium. The correct, rounded-oval shape is typical for small nodes. Echogenicity largely depended on the histological structure: the more pronounced the fibrous (connective tissue) component, the higher the echogenicity of the node. Myoma of the uterus can be located on the front, back, side walls and in the fundus of the uterus. The development of the node always begins intermuscularly (interstitially). According to our data, in 62% of cases, the tumor remained interstitial (intramural). With a small size of fibroids, the leading sign is an increase in the anterior-posterior size of the uterus. As it grows, deformation of the outer contour of the uterus begins (a tendency to subserous growth).

In cases of pronounced tumor growth towards the abdominal cavity (subserous, subperitoneal location), the outer contour of the uterus is deformed, which becomes bumpy. The incidence of subserous

nodules was 26%. During transabdominal examination of large tumors, due to increased echogenicity and "layered" structure, sound conductivity decreases, an acoustic shadow is created, which leads to insufficient visualization of areas located distal to the sensor of both the node itself and the myometrium. However, this can be compensated for by the use of transvaginal scanning, in which the distal sections will also be less well defined, but the ultrasound beam passes in the direction from the myometrium to the node and serous membrane of the uterus. Therefore, when combining two approaches (abdominal and vaginal), information on the state of the tumor and myometrium with the endometrium will be more complete.

When fibroids form in the myometrium on the border with the serous membrane, the base of the node is formed, which is rather narrow (the so-called leg). During the ultrasound examination, it seems that there is no general connection with the uterus. A thorough search for the base of the node, even with a transvaginal approach, does not always give a positive result. The use of color Doppler mapping (CDM) facilitates this task, when in most cases it is possible to visualize the vessels passing through the pedicle. Subserous nodes, especially large ones, can lead to persistent pelvic pain syndrome due to stretching and irritation of the peritoneum. In addition, they can disrupt the function of nearby organs (bladder, intestines). Therefore, when large tumors are found, especially those located on the lateral walls of the uterus, it is necessary to examine the kidneys in order to identify violations of urodynamics.

Submucous, submucous location of the node was found in 12.0% of cases. At the same time, the growth of the node towards the uterine cavity was observed. In this case, there is a deformation of the median complex, which is better detected in the secretory phase of the endometrial cycle of increased echogenicity. If the myoma is interstitial with centripetal growth, then part of it remains immersed in the myometrium, and the intraluminal part is covered with the endometrium. This differential diagnosis is necessary to develop further tactics of patient management and determine the method of treatment and surgical access. It should be noted that even a small submucous uterine myoma leads to pronounced clinical manifestations in the form of prolonged heavy menstruation, infertility and miscarriage. This is confirmed by the studies of G.A. Savitsky, A.G. Savitsky. (2000). In our studies, the prevalence of submucous forms of uterine fibroids, accompanied by profuse bleeding and complicated by anemia, prevails. In this connection, the volume of the operation increased until the tumor was removed from the uterus.

The women examined by us had a high percentage of infectious and inflammatory diseases (within 21.0 - 50.8%), against the background of anemia and diseases of the gastrointestinal tract. Consequently, uterine fibroids developed in women with a reduced immunological response of the body.

To diagnose tumor growth, we measured its volume over time every two weeks. The diagnostic criteria for the "rapid growth" of the myomatous node is an increase in its volume by 10 cm³ or more, with repeated echography in a month.

The combination of abdominal and vaginal ultrasound examination, according to our data, contributed to an increase in the accuracy of diagnosis of uterine fibroids to 98.8%.

According to our data, the echographic diagnostic signs of uterine fibroids are:

- 1.increase in the size of the uterus
- 2.deformation of the contours of the uterus
- 3.Rounded and ovoid pathological formations (nodes) of the myometrium
- 4.homogeneous knot structure
5. clear and even contours of the knot
6. as the tumor grows, hypo-, iso-, hyperechoic areas of various shapes and sizes are determined.

Echographic diagnostic signs of complications of uterine fibroids are:

1. With the "rapid growth" of fibroids (proliferating):
 - a) pronounced heterogeneity of the node due to alternating areas of reduced echogenicity and hyperechoicity of the zones;
 - b) pronounced deformation of the outer contour;

c) an increase in the volume of the myomatous node by 10 cm³ or more, with repeated echography in a month.

2. With "node edema":

a) hypoechoic formation;

b) symptom of "increased reflection" from the back wall of the node

c) in dynamics, a significant increase in the size of the node due to edema;

3. In case of malnutrition of the node and necrosis:

a) anechoic cavities of various shapes and sizes;

b) complete cystic fibroid degeneration;

c) thickening of the peripheral zone of the tumor;

d) pronounced heterogeneity of the node: hyperechoic areas in which anechoic cavities occur.

The study of the blood flow velocity in the control group (30 healthy women) showed that there was no significant difference in the uterine, arcuate and ovarian arteries on the right and left. So, the IR in the uterine arteries on both sides was 0.83 ± 0.06 and 0.84 ± 0.04 , in the arcuate arteries - 0.82 ± 0.01 and 0.82 ± 0.01 , in the ovarian arteries - 0.80 ± 0.06 and 0.81 ± 0.07 , respectively. PI indices also did not differ significantly in the studied vessels on the right and on the left.

Consequently, the rate of blood flow in the uterus in healthy women, both on the right and on the left, is the same.

Comparison of the indices of vascular resistance indices in women with uterine fibroids (group II, subgroup I) with healthy women (control group) also showed that there was no significant difference in blood flow velocity. Thus, IR in women with uterine myoma without complications was equal to the right and left in the uterine arteries 0.82 ± 0.01 and 0.80 ± 0.01 , arcuate arteries 0.82 ± 0.03 , ovarian arteries 0.81 ± 0.08 and 0.80 ± 0.08 , i.e. there were no significant differences from the control group.

PI indices of the examined vessels in women with uterine fibroids without complications also did not differ significantly in comparison with the control group.

Thus, the blood flow velocity in the studied vessels in women with uterine fibroids without complications was the same as in healthy women of reproductive age.

According to the results of our research, depending on the leading complication, the study group was divided into subgroups: with "hyperpolymenorrhea" (n = 18) - subgroup II, with "rapid growth" (n = 12) - subgroup III, with "node edema" (n = 5) - IV subgroup.

Comparison of SDO indices of the examined vessels in women with complications of uterine fibroids with subgroup I (uterine fibroids without complications) established a significant decrease in uterine vessels. So, with "hyperpolymenorrhea" this indicator was on the right 3.27 ± 0.13 (p < 0.01) in the uterine arteries; 2.39 ± 0.05 (p < 0.001) arcuate arteries; 3.14 ± 0.81 - ovarian intratumoral blood flow, which is not detected in women of subgroup I (SDO = 1.75 ± 0.31).

With "fast growth" (III subgroup), the SDO was on the right 2.20 ± 0.04 (p < 0.01) in the uterine arteries, 2.07 ± 0.10 in the arcuate arteries, With "rapid growth", the SDO in the uterine arteries 1 study was equal to 3.4 ± 0.1 on the right, 3.7 ± 0.2 on the left. In the second study, a month later it was equal to 2.2 ± 0.01 on the right, 2.4 ± 0.1 on the left, i.e. significantly decreased (p < 0.05) compared to the first study.

IR in the uterine arteries was 0.7 ± 0.01 on the right, 0.7 ± 0.02 on the left. In the second study, it was equal to 0.6 ± 0.009 on the right, 0.6 ± 0.01 on the left, i.e. this indicator significantly decreased (p < 0.05) compared to the first study. And in the rest of the vessels, there were no significant changes in the studied parameters. Consequently, with "rapid growth", blood flow increases sharply only in the uterine arteries.

In cases of "node edema" (subgroup IV), the LMS values significantly decreased in the uterine arteries on the right - 2.48 ± 0.13 (p < 0.001), on the left - 2.60 ± 0.01 (p < 0.01), ovarian arteries on the right - 3.54 ± 0.06 (p < 0.001), on the left - 3.54 ± 0.06 (p < 0.05).

The IR indices of the examined vessels in women with complications of uterine fibroids were equal: with "hyperpolymenorrhea" (II subgroup) in the uterine arteries 0.68 ± 0.01 on the right, 0.66 ± 0.01 on the left; arcuate arteries 0.58 ± 0.08 on the right, 0.60 ± 0.05 on the left; ovarian arteries - 0.48 ± 0.12 on the right, 0.50 ± 0.12 on the left.

With "rapid growth" (III subgroup) IR in the uterine arteries was $0.58 + 0.09$ on the right, $0.59 + 0.01$ on the left; in the arcuate arteries $0.52 + 0.01$ ($p < 0.05$) on the right, $0.55 + 0.09$ on the left; in the ovarian arteries $0.78 + 0.09$ on the right, $0.80 + 0.01$ on the left.

In cases of "node edema" (subgroup IV) IR in the uterine arteries was equal to $0.58 + 0.02$ on the right, $0.60 + 0.02$ on the left; in the arcuate arteries $0.73 + 0.19$; in the ovarian arteries $0.74 + 0.01$ ($p < 0.05$) on the right, $0.76 + 0.02$ on the left.

The carbon-dependent PI index of the examined vessels in women with complications of uterine fibroids was: with "hyperpolymenoria" (II subgroup) in the uterine arteries $1.02 + 0.02$ ($p < 0.01$) on the right, $0.97 + 0.02$ on the left; in the arcuate arteries $0.82 + 0.01$ on the right, $0.84 + 0.01$ on the left; in the ovarian arteries $0.80 + 0.20$ on the right, $0.82 + 0.20$ on the left. Intratumoral blood flow was determined and PI was $0.62 + 0.11$.

In subgroup III (with "fast growth"), this indicator was equal in the uterine arteries $0.80 + 0.01$ ($p < 0.01$) on the right, $0.82 + 0.02$ on the left; in the arcuate arteries $0.72 + 0.02$ on the right, $0.78 + 0.02$ ($p < 0.01$) on the left; in the ovarian arteries $1.27 + 0.04$ on the right, $1.36 + 0.04$ on the left. Intratumoral blood flow was determined and the PI was $0.71 + 0.01$.

In women with uterine fibroids complicated by "node edema" (subgroup IV), PI in the uterine arteries was $0.82 + 0.04$ on the right, $0.88 + 0.08$ on the left; in the arcuate arteries - $0.72 + 0.02$, in the ovarian arteries - $1.08 + 0.02$ on the right, $1.18 + 0.04$ on the left. A significant decrease in this indicator was noted in the arcuate arteries on the left ($p < 0.001$), in the ovarian arteries on the right ($P < 0.01$). Intratumoral blood flow was determined and PI in this subgroup was $0.62 + 0.02$.

Thus, the CDC and Doppler studies have shown that with the complication of uterine fibroids "hyperpolymenorrhea", there is an increase in blood flow in the uterine and arcuate arteries by an average of 30% or more, and in the ovarian arteries, the blood velocity remains without significant changes. With "rapid growth", the blood flow rate in the uterine and arcuate arteries increases by an average of 50% or more in comparison with uterine myoma without complications.

In the case of "node edema", an increase in blood flow in the arcuate arteries increases by an average of 40%, and in the uterine arteries - by an average of 25%. In the ovarian arteries, no significant change in blood flow was established.

Thus, the diagnostic criteria for complications of uterine fibroids with CDC and Doppler are:

1. The smaller the node, the less often the vessels are determined in it.
2. Minimal vascularization is noted in simple myoma, more pronounced - in proliferative.
3. Avascularization of cystic cavities.
4. With "hyperpolymenorrhea" and "rapid growth" increased blood flow in the uterine and arcuate arteries by 30-50%.
5. With "node edema" - increased blood flow in the arcuate arteries by an average of 40%, in the uterine arteries - by an average of 25%.
6. With CDC, pronounced vascularization of the node and intratumoral blood flow are determined.

According to our research, a comprehensive ultrasound scan (abdominal and transvaginal echography, color Doppler mapping and Doppler analysis) improved the accuracy of diagnosing uterine fibroids and its complications with a reproducibility of 96%, sensitivity of 99%, and specificity of 88%. Thus, the blood flow rate, PI and RI in the uterine arteries depend on the degree of the proliferative process of the myomatous node, which also makes it possible to predict the intensity of tumor growth and further management tactics for these women [10].

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