

the localization of the *FBN1* gene mutation identified in this study can also help in planning the dispensary follow-up of children with Marfan syndrome. For example, children with mutations in exons 1-10 should be monitored by an orthopedic traumatologist for foot and thoracic deformities, and children with mutations in exons 21-35 should be monitored for spinal deformities. Earlier observation by an ophthalmologist is recommended for children with mutations in exons 11-20 due to the risk of lens ectopia.

Conclusion. The study of the influence of the type and localization of the *FBN1* gene mutation on the severity and spectrum of clinical manifestations in Marfan syndrome may contribute to a better understanding of the pathogenesis of this disease, the formation of prognosis of its course and planning of dispensary follow-up. In the present study, for the first time in a Russian cohort of children with Marfan syndrome, the influence of the type and localization of the

FBN1 gene mutation on the clinical manifestations of the cardiovascular, ocular, and skeletal systems was proved. Further study of the influence of the patients' genotype on other organ systems in this disease is planned.

Conflict of interest. The authors declare that there are no obvious and potential conflicts of interest related to the publication of this article. Parents of all children participating in the study signed informed consent.

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Z.S. Huseynova

INFLUENCE OF UTERINE FIBROID ON UTERINE BLOOD FLOW, MENSTRUAL FUNCTION AND FEATURES OF REPRODUCTIVE HEALTH DISORDERS IN WOMEN

The study was conducted on women aged 18-45 years old with uterine fibroids and impaired reproductive function. In patients with uterine fibroids, menarche began at an earlier age and cyclic bleeding was more often observed, causing posthemorrhagic anemia. Reproductive function disorders were caused by infertility and miscarriages. Indicators of S/D, RI, PI of the uterine artery in the presence of fibroids were lower than in the group of healthy women. In group I, primary infertility predominated, and in group II, secondary infertility prevailed. Thus, risk factors for reproductive potential in women with uterine fibroids have been studied, early diagnosis has been established, and it has been determined that it is important to choose adequate treatment tactics to achieve the realization of reproductive desires.

Keywords: uterine fibroids, benign diseases of the uterus, reproductive potential disorders, dopplerography of the uterine arteries.

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Introduction. Uterine fibroids are among the most common benign tumors affecting the female reproductive system. The detection rate of uterine fibroids

in women reaches 60% by age 35 and more than 80% by age 50 [13]. The presence of myomatous nodes adversely affects the reproductive function of women and negatively affects the somatic health of patients and their quality of life [1]. In addition, risk factors for the development of uterine fibroids include race and ethnicity, family history, early menarche and late menopause, obesity, stress, hypertension, exposure to environmental

toxins, and vitamin D deficiency [7,9]. Most women with uterine fibroids do not have any special complaints, but a third of patients experience serious symptoms such as uterine bleeding with secondary anemia, pelvic pain, infertility and recurrent miscarriages [8]. Ultrasonography, preferably transvaginal, is the first-line method for diagnosing uterine fibroids [5]. Approximately 60% of patients with uterine fibroids experience clinical mani-

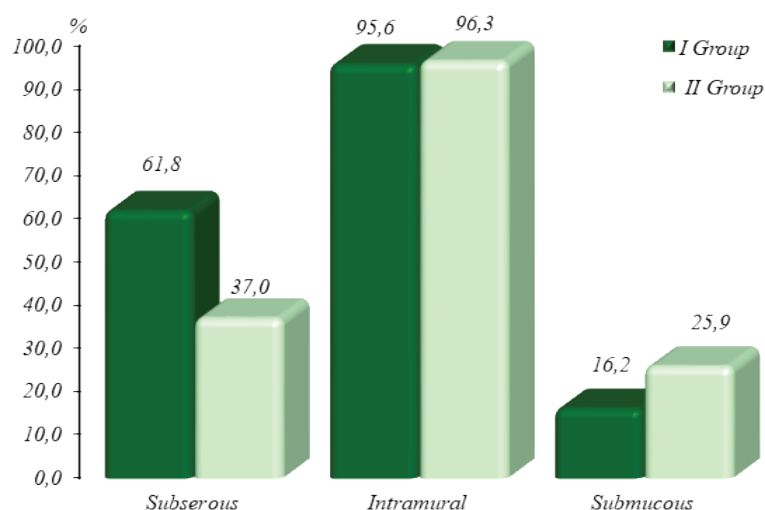
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festations of the disease, which depend on the location and size of the fibroids [1]. Uterine fibroids, depending on their location in the uterus, cause habitual miscarriages and infertility [6]. Infertility, both primary and secondary, is a common occurrence with this disease. According to research, the incidence of uterine fibroids in women of reproductive age is up to 40%, and infertility associated with uterine fibroids occurs in 5–10% of women [12]. Several mechanisms have been proposed to explain the negative impact of uterine fibroids on fertility, including increased uterine motility, neuroendocrine action of the uterine fibroid pseudocapsule, and changes in the expression of genes involved in endometrial receptivity [3]. A growing number of studies highlight the possible negative impact of uterine fibroids on fertility and reproductive outcomes. It is generally accepted that the closer the myoma is to the uterine cavity and the endometrium, the more it can negatively affect fertility, reducing the chances of successful implantation and pregnancy [4]. It is advisable to perform myomectomy before planning pregnancy, and conservative treatment carried out at the stage of preoperative preparation and in the postoperative period is effective and helps to preserve and improve fertility [2].

Purpose: to study the features of reproductive potential disorders in patients with uterine fibroids, to promote the effectiveness of its optimal restoration.

Materials and methods. The study included women with benign diseases of the uterus and reproductive disorders who applied to the Maternity Hospital No. 5 named after Shamama Alaskarova, the Clinical Medical Center and the antenatal clinic of the Maternity Hospital No. 5 to receive medical services in 2017–2022. Uterine fibroids were identified in 96 women out of 200 such patients aged 18–45 years. They were divided into two groups: I – with the presence of isolated uterine fibroids (68 women) and II – with myomatous nodes in association with such benign uterine pathologies as adenomyosis, hyperplasia and endometrial polyps (28 women). The control group included 50 practically healthy women.

In the process of a comprehensive examination, along with clinical and anamnestic methods, instrumental research methods were used. The medical history of each patient was obtained by interview using a structured questionnaire. All women included in the study underwent ultrasound examination (transvaginal) and Doppler ultrasound of the uterine arteries in the first phase of the menstrual



The frequency of different localization of myomatous nodes in patients with impaired reproductive potential

cycle. Using transvaginal ultrasound, the size of the uterus, the number, size and location of myomatous nodes, as well as the resistance index (RI), pulsation index (PI), and systole-diastolic ratio (S/D) in the uterine arteries were assessed.

Quantitative and qualitative data were subjected to statistical processing using the methods of variational (Student-Bonferroni t-test and Mann-Whitney U-test) and discriminant (Pearson Chi-Square test) analyzes in the statistical package SPSS-26. The null hypothesis was rejected at the $P < 0.05$ level.

Results and discussion. In our prospective study, the average age of

patients with uterine fibroids and reproductive dysfunction was 32.1 ± 0.5 and 32.3 ± 0.5 , and in the control group – 31.7 ± 0.7 . The initial diagnosis of uterine fibroids was made using transvaginal ultrasound examination in the first phase of the menstrual cycle. Ultrasound examination determined the location, nature, quantity and size of uterine fibroids and myomatous nodes (Figure).

The average size of various myomatous nodes located in the uterus in group I was $60.4 \pm 2.9 \times 58.7 \pm 2.4$, and in group II was $52.0 \pm 4.4 \times 51.2 \pm 4.0$.

In group I, menarche began on average at 12.9 ± 0.1 years, that is,

Table 1

Characteristics of reproductive disorders and pregnancy complications in women with uterine fibroids

Indicators		group I		group II		P
		n	%	n	%	
Infertility	primary	27	39.7	8	29.6	$P_{I-II}=0.104$
	secondary	14	20.6	11	40.7	
Duration infertility	2 years	3	7.3	0	0.0	$P_{I-II}=0.023^*$
	3-5 years	20	48.8	5	26.3	
	>5 years	18	43.9	14	73.7	
Spontaneous miscarriages	weren't	34	50.0	17	63.0	$P_{I-II}=0.256$
	early	27	39.7	7	25.0	
	late	7	10.3	3	10.7	
Non-developing pregnancy	wasn't	48	70.6	21	77.8	$P_{I-II}=0.481$
	was	20	29.4	6	22.2	
Recurrent miscarriages	weren't	42	61.8	19	70.4	$P_{I-II}=0.432$
	were	26	38.2	8	29.6	
Premature birth	weren't	47	69.1	21	77.8	$P_{I-II}=0.401$
	were	21	30.9	6	22.2	

Note: the statistical significance of the difference between indicators: PI – group with isolated uterine myoma (I) according to Wilcoxon (Mann-Whitney); PII – groups with myoma of the uterus in combination with one of the other benign pathologies of the uterus (II) according to Wilcoxon (Mann-Whitney). * – «0»- the hypothesis is rejected ($p < 0.05$).

Table 2

Indicators of blood flow in the uterine arteries, revealed by dopplerometry

Indicators	groups	N	M	$\pm m$	Me	Q1	Q3	P_k	P_l
S/D - right	control	50	5.76	0.19	5.62	4.94	6.32		
	group I	68	4.26	0.13	4.25	3.47	4.95	<0.001*	
	group II	27	4.69	0.16	4.75	4.18	5.43	<0.001*	0.017*
S/D - left	control	50	6.29	0.20	6.02	5.23	7.24		
	group I	68	4.62	0.11	4.58	4.10	5.13	<0.001*	
	group II	27	4.80	0.13	4.85	4.28	5.11	<0.001*	0.271
RI- right	control	50	0.818	0.007	0.820	0.800	0.840		
	group I	68	0.752	0.007	0.765	0.710	0.800	<0.001*	
	group II	27	0.786	0.007	0.790	0.770	0.820	<0.001*	0.005*
RI- left	control	50	0.834	0.005	0.835	0.810	0.860		
	group I	68	0.773	0.006	0.780	0.755	0.800	<0.001*	
	group II	27	0.785	0.006	0.790	0.770	0.800	<0.001*	0.382
PI- right	control	50	2.17	0.05	2.20	1.89	2.36		
	group I	68	1.69	0.03	1.71	1.64	1.82	<0.001*	
	group II	27	1.76	0.06	1.72	1.68	1.85	<0.001*	<0.001*
PI- left	control	50	2.35	0.06	2.33	1.96	2.68		
	group I	68	1.79	0.02	1.77	0.69	1.92	<0.001*	
	group II	27	1.86	0.06	1.78	1.72	1.83	<0.001*	<0.001*

Note: the statistical significance of the difference according to Wilcoxon (Mann-Whitney) with indicators: P_k – control group (K) according to Wilcoxon (Mann-Whitney); P_l – group with isolated uterine myoma (I) according to Wilcoxon (Mann-Whitney); * – “0” hypothesis is rejected ($p < 0.05$)

earlier than in other groups. In group II, menarche began on average at 13.4 ± 0.1 and in the control group at 13.0 ± 0.1 , the difference between the control with the first and control with the second groups was $p=0.006^*$ and $p=0.030^*$, respectively. On average, the duration of menstruation lasted 8.0 ± 0.3 days in group I, 7.4 ± 0.4 days in group II and 5.7 ± 0.1 days in the control group ($P < 0.001^*$). Among menstrual cycle disorders, menorrhagia prevailed over other disorders in both groups with uterine fibroids and was observed in 51.5% of patients in group I and in 70.4% of patients in group II. Metrorrhagia was observed in 36.8% of patients in group I and in 25.9% of patients in group II, and dysmenorrhea was observed more often in group I (30.9% and 14.8%, respectively). Posthemorrhagic anemia was observed in both groups with uterine fibroids. Thus, first degree anemia was detected in 57.4% of patients in group I, in 44.4% of patients in group II, second degree anemia - in 14.7% of patients in group I, in 11.1% of patients in group II, and third degree anemia - in 2.9% of patients in group I and 11.2% in group II.

As can be seen from the table, in the group with isolated uterine myomas, compared to group II, such obstetric complications leading to impaired reproductive potential prevailed, such as spontaneous abortions, non-developing pregnancy and premature birth, but no

significant difference between the groups was revealed (Table 1). At the same time, 55.9% of women with uterine fibroids did not develop complications during pregnancy and childbirth.

To clarify the role of blood supply to the uterus in patients with uterine fibroids, spectral dopplerometry was performed in the uterine arteries. Basically, they compared indicators such as resistance index (RI), pulsation index (PI), and systolic-diastolic ratio (S/D). Table 2 shows the results of spectral dopplerometry of the uterine arteries, which may be related to the identified disorders of the reproductive potential.

There was no significant difference in age between groups in our study. In most patients with uterine fibroids, menarche began at an early age, and menstrual irregularities in the form of menometrorrhagia were observed, causing posthemorrhagic anemia. According to the studies conducted previously [5] and our study, menstrual dysfunction was mostly observed as menorrhagia. Although most uterine fibroids are asymptomatic, their location and size can affect pregnancy and childbirth [15]. Submucosal, intramural and subserosal fibroids have different effects on fertility and are mainly associated with submucosal lesions leading to implantation defects [14]. Failure to realize reproductive desire was more often observed in wom-

en with intramural myomatous nodes that deform the uterine cavity and submucosal uterine fibroids. During our study, in patients with uterine fibroids, primary infertility prevailed in group I, secondary infertility prevailed in group II, and the duration of infertility was 3-5 years in group I, and more than 5 years in group II. This difference between the results of the duration of infertility is associated with the deeper influence of combined pathology on reproductive dysfunction in group II. It should be emphasized that uterine fibroids affect not only fertility, but also pregnancy outcomes [12]. Thus, in our study, pregnancy complications were more common in patients with uterine fibroids, such as early and recurrent miscarriages, as well as premature birth. When Doppler monitoring of blood flow in the uterine arteries was performed in patients with uterine fibroids and reproductive disorders, a significant change in Doppler parameters was observed compared to healthy women. According to a previous study, increasing uterine volume increases blood flow and decreases Doppler readings due to decreased vascular resistance [11]. These data correspond to the results of our study, where in both groups with uterine fibroids and reproductive dysfunction, Dopplerographic indicators of the uterine arteries - IR, PI and S/D - were lower than in healthy patients. Thus, the effect of uterine fibroids

on the blood supply to the uterus is characterized by a change in the established Doppler parameters.

Conclusions:

- in women with uterine fibroids, menarche began at an early age, and menorrhagic disturbances of menstrual function were more often observed, causing posthemorrhagic anemia;
- the clinical course of the disease in women with uterine fibroids depends not on the patient's age, but on the number, size and location of myomatous nodes;
- in patients with isolated uterine fibroids, primary infertility prevailed;
- secondary infertility and duration of infertility prevailed in patients in whom fibroids were found along with other benign diseases of the uterus;
- in patients with uterine fibroids, early, recurrent miscarriages and premature births were more common;
- with Doppler ultrasound of the uterine artery, IR, PI and S/D indicators in women with uterine fibroids were lower than in healthy patients;

In the end, we can conclude that timely assessment of clinical symptoms and early diagnosis in women with uterine fibroids can become the basis for pathogenetically based treatment, which can lead to improving women's lives, restoring

menstrual function and achieving reproductive desire.

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CHARACTERISTICS OF METABOLIC INDICATORS OF BODY STUDENTS DOING BOXING

The assessment of metabolic parameters in students engaged in boxing at the training stage was carried out. According to the results of the study, normal functional parameters of the body, BMI, and satisfactory AP were established. According to biochemical parameters, the group of athletes showed an excess of the range of normal values of CK, HDL, a decrease in LDL and the de Ritis coefficient (CDR), in the beginner group – an increase in CDR and a decrease in VLDL. Significant differences between the groups were found in the values of TG, VLDL ($p < 0.005$), HDL glucose and KA ($p < 0.05$). Conclusion. The athletes showed metabolic indicators indicating formed adaptive and metabolic changes to training loads in comparison with the beginner group.

Keywords: students, athletes, beginners, metabolic, biochemical parameters, boxing

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Introduction. Each meal supplies our metabolic pathways with new metabolites, but nothing changes the rate of metabolic reactions as much as intense exercise [18]. The three

main pathways of metabolism – energy metabolism, anabolism, and catabolism – are profoundly altered in response to exercise [20]. Studies of biochemical parameters in blood serum and functional