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Features of the Course of the Iii Trimester of Pregnancy in Patients with Mitral Stenosis

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ABSTRACT

Acquired heart defects of rheumatic etiology and pregnancy are one of the most difficult problems of modern obstetrics. The severity of its solution lies in the complex combination of hemodynamic disorders caused by heart disease, circulatory failure, sometimes leading to fetal complications.

The relevance of this problem is due to the fact that despite the available modern methods of early diagnosis and treatment of rheumatic heart disease in pregnant women, the incidence of maternal ante-postnatal fetal death does not tend to decrease over the past 20-30 years [5,6, 8.14]. This problem is one of the important fragments of the priority direction of our health care - the reduction of maternal and child mortality [3,7,10,12].

Heart failure in the mother has a particularly hard effect on the fate of the fetus, while fetal death is three times higher than with compensated heart disease [1,2,4]. In this regard, it seems important to study the features of central, uteroplacental (MP) fetoplacental (AF) hemodynamics, the role of hemodynamic disorders in the mother-placenta-fetus system in mitral heart disease [4,6,9,11,13]

The purpose of the study was to determine the parameters of changes in the central hemodynamics of the mother and the regional blood flow of the fetus in the third trimester of pregnancy in patients with mitral stenosis and to choose the optimal methods of corrective therapy and delivery.

Materials and methods of research. A comprehensive study of the course of pregnancy, childbirth, postpartum outcome for newborns depending on the state of hemodynamics and the mother-placenta-fetus system was carried out in 97 pregnant women with atrioventricular stenosis. When analyzing the form of stenosis, isolated stenosis in -27 combined mitral heart disease with a predominance of stenosis -70 pregnant women. All observed patients were aged 20 to 42 years. The duration of rheumatism in the study of anamnesis revealed that in 23 (23.7%) 1-2 years, from 3-9 years, 40 (41.2%) over 9-16 years in 34 (35%) rheumatism was first diagnosed during real pregnancy in 45 (50.4%).

All pregnant women underwent a general clinical examination. Clinical blood tests urine

biochemical blood tests to determine the activity of the rheumatic process. The content of total protein in serum, protein fractions, sialic acids, C-reactive protein, coagulogram were studied.

The method of studying blood circulation was integral body rheography (IRGT) according to M.I.Tishchenko whose advantages in comparison with other methods are based on a solid physical and mathematical basis tested in a clinical experiment

The study of uteroplacental blood flow (MPC) and fetoplacental blood flow (FPC) was carried out by the method of ultrasonic Doppler with the apparatus <<Aloca>> (Japan). The study was conducted starting from 28-32 weeks of pregnancy, since at an earlier date the reliability of the results is low due to the high and physiological resistance of the placental-fetal bed (Strizhakov A.N., 1989; Medvedev M.B., 1992.) The IPC was evaluated during the study curves of blood flow velocities (BSC) in the arcuate uterine arteries (UA) of the lower uterine segment on both sides and the fetal aorta (AF).

Measurement of blood flow in (MA), (AP) was carried out during periods of apnea of fetal motor rest.

Results of the study: All women in this group underwent a study of central, regional hemodynamics and fetal blood flow upon admission. Considering the spread in terms of pregnancy at admission in Table No. 1, we present the following data.

Table№1. CH indicators of regional MP AF and fetal circulation in pregnant women with mitral stenosis at admission depending on the gestational age.

References	Before treatment	Gestation age		
		29-31 week (n=21)	32-34 week(n=59)	35-36week(n=27)
Volemia				
BCC, ml/kg	71,7+ 3,3	63,7+2,9*	66,9+2,7	64,1+2,8
OCE, ml/kg	26,5+1,1	28,1+1,2	27,5+1,4	25,5+1,4
VCP, ml/kg	45,2+2,2	35,6+1,7*	39,4+1,3	38,6+1,4
Hemodynamics				
UI , ml/m2	54,1+2,4	37,3+2,9*	36,4+1,9*	34,3+2,0*
Heart rate, beats per minute	83,6+3,4	92,4=2,4*	93,9+3,1	94,7+2,7
SI l/min*M2	4,52+0,61	3,44+0,27	3,42+0,3*	3,24+0,28*
WHALE	76,6+1,7	80,7+1,2	80,9+1,4	81,0+0,9*
OPSS, dyn*s*cm-5	1194+63	1426+51	1497+47,0*	1463+54*
LMS ma	1,73+0,03	1,81+0,03	1,86+0,04*	1,78+0,04
IR	0,54+0,06	0,56+0,06	0,57+0,05	0,55+0,05
SDOpa	2,52+0,04	2,89+0,06*	2,96+0,03*	3,10+0,01*
IR	0,74+0,04	0,73+0,02	0,69+0,02	0,68+0,01
DOAS	5,43+0,21	5,74+0,18	5,91+0,20	6,11+0,18
IR	0,8+0,002	0,82+0,002	0,79+0,002	0,74+0,002
PC	0,232	0,192	0,181	0,179

Note: Reliability is given relative to before treatment *-P<0.05.

The summary data presented in Table 1 quite clearly indicate that in the study group, compared with the control group, at 32-34 weeks there was only a mild tendency to increase BCC, mainly due to plasma volume. At 35-36 weeks of gestation, there was a tendency to decrease in BCC due to both of its components.

As for the CG indicators, already at the gestational age of 29-31 weeks in the pregnant women with mitral stenosis studied by us, the one-time productivity of the heart, increasing relative to the previous gestational age by 7-4%, remained significantly lower than that in the control group of women by almost 31.1 %

The insufficiency of the physiological increase in BCC in patients with mitral stenosis led to a compensatory increase in TPVR (total peripheral vascular resistance) and CIT (integral tonicity coefficient), which in all examined women of this group were statistically higher than the control values. An increase in peripheral vascular resistance affected the uterine fetoplacental and fetal blood flow.

According to our data, the uteroplacental blood flow is subject to the greatest changes, which adversely affects the fetal blood flow, which is especially clearly seen from the placental coefficient, which already at 29-31 weeks was lower than that in the control by 20.8%, and at 32 -34 weeks already by 28.2%, remaining approximately at the same figures in the gestational age of 35-36 weeks.Попытка выявить влияние активности ревматического процесса на изучаемые показатели кровообращения матери и плода, привела к следующим данным, отраженным в нижеследующей таблице №2.

Table №2. Indicators of CG, regional (MG) and fetal circulation in pregnant women with the activity of the rheumatic process and preeclampsia.

References	Control group(n=30)	With the activity of the rheumatic process NK (n=19)	Viceandpreeclampsia(n=16)
Volemia			
BCC, ml/kg	71,7+3,3	65,1+2,7	55,4+1,6
OCE, ml/kg	26,5+1,1	26,2+1,2	25,0+0,8
VCP, ml/kg	45,2+2,2	38,9+1,5	30,4+0,8*
Hemodynamics			
UI , ml/m2	54,1+2,4	36,2+1,9*	33,6+0,6**
Heart rate, beats per minute	83,6+3,4	96,0+2,7*	92,9+1,9*
SI l/min*M2	4,52+0,61	3,47+0,19*	3,09+0,15**
WHALE	76,6+1,7	77,2+1,3	82,7+0,6*
OPSS, dyn*s*cm-5	1194+63	1294+54	1601+47,0
LMS ma	1,73+0,03	1,84+0,03	1,86+0,04*
IR	0,54+0,06	0,6+0,04	0,62+0,02
SDOpa	2,52+0,04	2,84+0,02*	2,94+0,02*
IR	0,74+0,03	0,78+0,03	0,81+0,03
DOAS	5,43+0,21	5,68+0,18	5,89+0,16
IR	0,8+0,002	0,82+0,002**	0,87+0,001**
PC	0,232	0,192	0,185

Note: Reliability is given relative to before treatment *-P<0.05

The analysis of the data given in Table No. 2 showed that the activation of the rheumatic process directly or indirectly affects the indicators of volemia, the blood circulation of the mother and fetus. The absence of a sufficient physiological increase in BCC contributes to the preservation of BCC, in this group of women it is 10.1% (P < 0.05) lower than that in the control. The one-time performance of the heart was reduced by 31.1% (P<0.02). Tachycardia, which averaged 96.0 + 2.7, was 13% higher than that in the control group, but even the indicated tachycardia could not compensate for the cardiac output, which was 13.3% lower than in healthy women.

Relative hypovolemia and a decrease in one-time and minute performance of the heart, most likely, led to the maintenance of peripheral vascular tone, as evidenced by CIT and TPVR, they were higher than the control values by 6.02 and 7.8%, respectively. A moderate increased tone of peripheral vessels directly proportionally affected the uterine and fetoplacental blood flow, the indicators of which were worse by 6.0 and 11.3%, respectively, than in the control.

The addition of preeclampsia without the activity of the rheumatic process in patients with mitral stenosis caused more significant changes in volemia and blood circulation of the mother and fetus than the activity of the rheumatic process. The addition of preeclampsia without the activity of the rheumatic process led to a decrease in BCC by 29.4%, relative to the control group, and was 17.5% lower than the BCC in pregnant women with active rheumatic processes, but without preeclampsia.The decrease in BCC in pregnant women with preeclampsia was entirely due to plasma volume, which turned out to be 48.6% lower than control values and 27.9% lower than plasma volume in pregnant women with mitral stenosis and the activity of the rheumatic process and NK.

As expected, pregnant women with preeclampsia had the highest values of CIT and TPVR, which were 7.9% and 34.1%, respectively, in the control group and 7.1% and 23.7%, respectively, higher than those in the group of women. with activity of the rheumatic process, but without preeclampsia. All of the above had a negative effect on the blood circulation of the fetus, in connection with which the blood circulation in the spiral arteries of the uterus was 7.5% worse than in the control values and 1.1% less than in the group with the activity of the rheumatic process. The blood flow in the umbilical artery in pregnant women with preeclampsia was 16.6% lower than normal and 4.2% lower than in pregnant women with active rheumatic process and moderate preeclampsia. Their blood flow in the fetal aorta decreased by 8.4% relative to the control values and by 4.2% it was lower than the aortic blood flow of the fetus with the activity of the rheumatic process. The placental coefficient in pregnant women with preeclampsia was 20.8% lower than that in the control and 3.7% lower than the placental blood flow in women with rheumatic process activity.

The above analysis convincingly indicates that both the activation of the rheumatic process and the addition of preeclampsia in patients with mitral stenosis have, first of all, a negative effect on the hemodynamics of the mother and indirectly on the blood circulation of the fetus.In a comparative aspect, preeclampsia led to significant changes in the indicators of volemia, maternal and fetal circulation, rather than the activity of the rheumatic process.

The most alarming in terms of the prognosis of gestation for the mother and fetus were 19 pregnant women with the activity of the rheumatic process, NK and layering of moderate forms of preeclampsia. According to the parameters of CG and regional (MP, AF) and fetal blood flow, their issue was resolved in favor of emergency termination of pregnancy. Of the 19 women in this group, 10 were delivered by caesarean section, which accounted for 52.6%, the remaining 9 women managed to deliver by induced labor

It should be noted that the soft birth canal responded well to preparation when using anaprilin in tablets of 20 mg 2 times a day, intracervical administration of prostaglandins, since hypoxia of all organs and tissues, including the cervix, contributed to this.

19 women gave birth to 12 newborns weighing 2800.0 + 75.0 g with an Apgar score of 5-6 points and 7 newborns weighing 1800.0 + 100.0 g with a score of 4-5 points. 7 newborns were transferred to the second stage of nursing.

Of the remaining 77 women at 28-29 weeks of gestation, 15 women at 30-32 weeks remained - 53 patients and at 35-36 weeks - 9 women who underwent differential corrective therapy for hypovolemia with low SI values (<25.4 ml m2) SI (<2.4l. Min. m2) and with high rates of OPSS

(>1400.0] dyn. s cm -5), KIT (>80). With satisfactory CVP values, infusion therapy with volemic drugs and antispasmodics was performed.

With a progressive increase in CVP (>120. mm of water column), infusion therapy was canceled, preference was given to cardiotonic drugs and hormones.With high values of CIT (>80) and TPVR (>2000 dyn.s.cm2) without manifestations of hypovolemia, pregnant women needed to include peripheral vasodilators in the complex therapy. The criterion for the effectiveness of therapy was a moderate decrease in TPVR and CIT without a decrease in SI, SI and an improvement in the placental coefficient.

The study of the parameters of maternal CG and fetal circulation in 2 women out of 15 with a period of 28-29 weeks indicated a progressive approach to critical numbers, despite the ongoing corrective cardiac therapy. We associated a sharp deterioration in the condition with a high degree of stenosis of the mitral orifice III-IV degree according to Bakulev. A.N. –Damir. E.N. Due to the high risk of developing a clinical form of pulmonary edema, 2 pregnant women at 28-29 weeks of age underwent urgent abdominal delivery. Deeply premature newborns with a severe form of malnutrition weighing 800.0 + 100.0 g, 37-38 cm tall, who died on the 1st day after delivery, were extracted. 13 women carried pregnancy up to 35-36 weeks.

Of the 53 women in this group who had a gestational age of 30-32 weeks, 7, according to maternal CG, regional (MP, AF) and fetal blood flow, showed a tendency to a critical decrease in these indicators, which we associated with the growing discrepancy between BCC, OPSS, CIT and the degree of narrowing of the mitral orifice (III-IV), in connection with which 2 women were taken for operative delivery; in 5, induced labor was achieved. 7 newborns were born weighing 2700.0+ 100.0 g with an Apgar score of 6-7 points. All of these newborns were transferred to the second stage of nursing.

Of the 97 pregnant women who reached the third trimester of pregnancy, it was possible to prolong pregnancy to 36-38 weeks due to monitoring of clinical, laboratory hemodynamic parameters and timely corrective therapy in 68 (70.1%).

Conclusions: Thus, monitoring of indicators of central, systemic hemodynamics in pregnant women with maternal mitral stenosis allows timely detection of subclinical maternal and fetal circulatory disorders, promptly assesses the effectiveness of corrective therapy, and chooses the optimal term and method of delivery.

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