SOME PECULIARITIES OF HEMODYNAMIC INDICES IN PREGNANT WOMEN WITH RHEUMATIC HEART DISEASE DURING CHILDBIRTH

During childbirth some pronounced hemodynamic displacements take place increasing together with the aggravation of uterine contractions, in such a way leading to the increased heart loading. We carried out the comparative investigation of hemodynamic indices in women with rheumatic heart disease depending on their bodies’ posture during labor. The obtained results testify the facts of decreasing of venous blood relapse during every birth pang in women in childbirth with heart valvular disease in supine posture during labor, and that impedes the providing of necessary extension of cardiac output and, correspondingly, adequate blood supply of uterus and oxygenation of foetus.

Keywords: Pregnancy, labor, rheumatic heart disease, anemia, treatment

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Introduction

Cardiovascular diseases in pregnant women have remained an urgent problem in modern obstetrics. Acquired heart valvular disease takes the considerable place among extragenital diseases (Ilyenko et al., 2001; Kravchenko, 2008). The results of multicentre study showed that the frequency of AHVD among pregnant women was 22% (Kuberger, 1992). According to some investigators’ data the frequency of after - effects and mortal outcomes are found in 13% of all pregnancies (Desai et al., 2000).

Maternal mortality in AHVD is regulated in the following way: one third of mortal outcomes corresponds to the pregnancy period and two thirds - to the post-natal period (Tornos, 2006).

Labor and the first hours of the post-natal period are the most crucial ones and they are accompanied by the increase in cardiac output owing to inflax of additional volumes of blood from the uterus into the vascular channel. The present circumstance promotes the increase of ultimate diastolic pressure in the left ventricle and the increase of pressure in the lung artery when, with RHD the threat of lung oedema is probable. In this connection it’s recommended to control the hemodynamic indices during labor and post-natal period (Oakley et al., 2003; Tornos, 2006).

There are some data in literature concerning changes of hemodynamic indices during labor which are determined in many respects by the posture of a woman in childbirth during the labor process (Ilyenko, 2001). Supine posture adversely affects both the mother’s and foetus’s condition (Kravchenko, 2008). More pronounced hemodynamic displacements can be watched during birth pangs, with the sharp decrease of cardiac output and then during birth pangs - a considerable increase, on the contrary. The decrease of placental blood flow at the moment of birth pangs can be accompanied by the foetus's torments of hypoxic nature and the increase of cardiac output can lead to the development of cardiac failure. The expression of hemodynamic changes during labor depends greatly on the woman in childbirth’s posture during delivery.

Taking into consideration the above-stated data the aim of the given investigation was to study hemodynamic indices in pregnant woman with RHD depending on the kind of heart valvular disease and their bodies’ posture during labor.
Materials and methods

Hemodynamic indices were studied in 87 practically healthy women depending on their posture during labor. After a pregnant woman was given the information about some possible body posture during labor a woman in childbirth was conceded a right to choose: labors in lithotomic position (supine posture) were delivered in 37 women, in sitting posture (semisitting, in squatty posture) - in 23, and in standing posture (standing while leaning on the table or the back of the bed) - in 27. The obtained results served as a control during estimation of hemodynamic indices in pregnant women with RHD depending on the body posture during labor and the kind of heart valvular disease. Hemodynamic indices were analyzed in 37 women in childbirth with fetal placental failure depending on their body posture during labor: in 20 in supine posture, in 30 in sitting posture and in 26 in standing posture, and in 100 women in childbirth with mitral stenosis: in 40 in supine posture, in 27 in sitting posture and in 33 in standing posture.

In order to verify the diagnosis the complex investigation of cardiovascular system condition was conducted including clinic estimation (a sick woman’s complaints, objective status), measurement of arterial pressure (AP) using a traditional method, electrocardiography, echocardiography. Calculated methods of estimation of central and peripheral hemodynamics according to standard formulas (stroke output (SO)), cardiac index (CI), cardiac output (CO), general peripheral vascular resistance (GPVR), discharge fraction (DF) were conducted.

Results and discussion

The analysis of character of the hemodynamic indices during labor, as a whole, in practically healthy women showed some gradual increase of CO with its maximum at the beginning of birth pangs with average figure as 7.6±0.7 l/min. Together with increasing of CO the rise of SO with average figure as up to 95.5±2.2 ml was stated which was accompanied with the increased cardiac rate (CR) up to 90.4±2.0 strokes a minute AP and GPVR were stated to increase on the average up to 997.8 ± 22.5 din°e°cm°5 during labor.

It’s known that at the moment of birth pangs 300 - 500 ml of blood is pushed out of the placental channel resulting in increasing of cardiac output and AP (Tornos, 2006). Parallel with the analysis of the hemodynamic indices in a group of women in childbirth with the physiological course of pregnancy and labor we made an attempt to analyse differentially parameters during birth pangs, at interval during birth pangs depending on the posture of the woman in childbirth during labor.

The results of the analysis showed that in lithotomic position the average figures of CO during birth pangs were 6.6±0.23 l/min and in a sitting posture - 7.4±0.32 l/min.

According to the investigators’ opinion the vertical position and freedom of movements provide all comfort conditions for a woman in child birth and exert positive influence on uterine activity and blood supply in uterus placental system (Ilyenko, 2001; Kravchenko, 2008).

According to data of Ilienko et al. (2001) the vertical position during labor promotes the abatement of pang and acceleration of cervical dilatation, decreasing the duration of the first period of labor. The active behavior of the woman in childbirth is the most acceptable during the first period of labor that is her wish to choose the most comfortable position. In this case it is obligatory to take into consideration the character of sensation of pain depending on the position and health condition of the woman in childbirth.

The results of the investigation showed that the duration of labor of the women in the first childbirth was an average of 8 hours 49 min±33 min, while using vertical position during labor, as opposed to 11 hours 25 min±1 h 15 min in lithotomic position. According to some authors’ opinion during labor in vertical position the pressure of fetal bladder and the presenting part of foetus onto the receptor device of lower uterine
segment during uterine activity result in effective opening of womb mouth which is accompanied by the shortening of delivery duration.

The increase of CR irrespectively of the body position was stated in women in childbirth with FPF at the same time in sitting posture CR was an average 86.7±3.7 as opposed to 90.4±5.0 strokes a minute in lithotomic position. At the moment of birth pangs in women in childbirth with insufficiency of mitral valve there was the decrease of CO, compensatory growth of CR and essential decrease of cardiac output up to 5.6±0.25 l/min was registered in supine posture as opposed to 7.2±0.33 l/min in vertical position. It is important to state that in supine posture CO doesn’t have time to recover during birth pang interval.

In a lithotic position the decrease of CO, CI, SO and DF during birth pangs in women in childbirth with IMV was stated.

A considerable increase of CR, AP, GPVR and decrease of SO and CO was registered in women in childbirth with MS in a lithotomic position. A lot of investigators think that squeezing of vena cava by a pregnant uterus is the main reason of cardiac output decrease (Kuberger, 1992). According to some investigated data cardiac output was 17% less in supine posture, in vertical position the increase of CO was registered accompanied by the palpitation of systoles (Kravchenko, 2008).

**Conclusion**

Thus, the pronounced hemodynamic indices take place during labor. Sharp fluctuations in CO indices during labor increasing while aggravating of uterine contractions, increasing of SO and making CR more frequent indicate the gradual increasing of heart loading. Hemodynamic parameters depend on the position of the pregnant woman’s body in labor. In the lithotomy position there is a decrease of 20% CO and a compensatory increase in heart rate, which does not have time to return to its original level. In the standing position CO is reduced by 5%, and sharp fluctuations in hemodynamic parameters are not marked. Venous blood relapse is reduced during every birth pang in women in childbirth with RHD in supine posture and this makes it difficult to ensure the necessary increase of cardiac output, and, accordingly, adequate blood supply of uterus and oxygenation of foetus.

**References**


