



# **ANESTHESIOLOGICAL PROTECTION OF NEWBORNS DURING CESAREAN SECTION IN WOMEN WITH SEVERE MITRAL STENOSIS**

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## **Abstract:**

The results of study of 38 preterm infants (19 patients in each group) have been presented. The aim of the research was a comparative assessment of the condition of newborns extracted by CS from mothers with clearly marked mitral stenosis (MS) against the background of the use of the traditional variant of GMA with ALV (artificial lung ventilation) and balanced combined general anesthesia based on EB with reduced concentrations of local anesthetics. It was found that MCA with ALV against the background of epidural block has a less marked negative effect on newborns in comparison with GMA with ALV makes it possible to preserve the adaptive capacity of the child to a greater extent during the period of early adaptation to extrauterine conditions, despite the extremely unfavorable initial background (prematurity; DBC, significant decrease in maternal coronary reserves due to clearly marked MS (1.9-1, 1 cm<sup>2</sup>).

**Keywords:** condition, of newborns caesarean section severe mitral stenosis general anesthesia.

**INTRODUCTION.** The problem of delivery of pregnant women with mitral heart disease, surgical delivery with minimal risk predictors for mother and child remains relevant to date. The generally accepted "gold standard" of anaesthesiological aid in caesarean section (CS) is central neuroaxial blockade (CNB), theoretically - spinal and epidural anaesthesia, any variant of spinal-epidural blockade in relation to obstetric tactics is absolutely safe. [2, 3, 10]. At the same time, CNBs are unacceptable in patients with circulatory insufficiency (CI) and low coronary reserves, due to the real possibility of haemodynamic instability of both mother and newborn, especially in pregnant women with "pronounced" atrioventricular stenosis (1, 9-1.1cm<sup>2</sup>), the maximum acceptable term of delivery for which, due to progressive heart failure, is considered to be 32-34 weeks [6, 8,], and the optimal method of anaesthesia is one of the variants of general multicomponent anaesthesia (GMA) with ventilation [9]. An acceptable method is combined anaesthesia (CA) based on epidural blockade (EB) with reduced concentrations of local anaesthetics, which allows to minimize the consumption of narcotic drugs and muscle relaxants, and, consequently, to significantly reduce their depressive effect on the state of newborns.

**PURPOSE OF THE STUDY:** Comparative assessment of the condition of newborns delivered by CS in mothers with severe MS against the background of using the traditional variant of OMA and combined anaesthesia based on EB with reduced concentrations of local anaesthetics.

**MATERIAL AND METHODS OF RESEARCH.** For comparative analysis of the early adaptation period, we analysed 38 developmental histories of newborns delivered by CS from mothers with severe MS (1.9-1.1 cm<sup>2</sup>). Depending on the variant of anaesthesia we used, all newborns were divided into 2 groups. The 1st group included 19 children extracted under combined anaesthesia (CA) on the background of epidural blockade with reduced concentrations of local anesthetics, and the 2nd group included the same number of children extracted under OMA with IVL. We also analysed 38 anaesthesia charts and delivery histories, which were completed by CS operation in the maternity complex of the multidisciplinary clinic of Samarkand Medical University. (Samarkand city),

Both groups of mothers were identical in terms of gestational age (33-35 weeks), the nature of surgical intervention, the degree of MS severity (1.9-1.1 cm<sup>2</sup>),



the physical status of women in labour, the frequency and severity of extragenital diseases, and the initial level of uteroplacental-fetal blood flow. The condition of premature infants at birth was assessed using the Apgar scale at the 1st and 5th minutes of life [12], the NACS scale [3] and the V.A. Bushtyrev scale at 1 hour and 24 hours after birth [3]. The course of early postnatal adaptation of newborns was assessed by mathematical analysis of heart rhythm using cardiointervalography, while the stress index (SI) was calculated at 5 min and 24 h after birth [1,11], the concentration of total cortisol (TC) was determined in umbilical cord blood using immunochemiluminescent assay (ICLA) (MAGLUMI-600 Shibe CoL-TD China analyser) at 5 min after birth. The efficiency of independent breathing was judged by oxygen saturation - SpO<sub>2</sub> (Triton-Russia monitor), 2 and 24 hours after birth. Statistical processing of the results was carried out by the method of variation statistics with the determination of Student's criterion of reliability of differences using the Microsoft Excel programme.

**RESULTS AND THEIR DISCUSSION.** As shown in the table, all neonates at birth had a birth weight of less than 2000 g, which corresponded to the gestational age at delivery and the criteria for prematurity. The Apgar score at the first minute in group 1 neonates was  $5.9 \pm 0.4$  points and in group 2  $5.4 \pm 0.1$  points. At 5 minutes after birth, the arithmetic mean Apgar scores in both groups significantly increased, being  $7.2 \pm 0.2$  points and  $6.7 \pm 2$  points, respectively. A significantly higher score in the group of children extracted in the conditions of CA with ventilator is noteworthy (Table). When analysing the results of neuropsychological adaptation of newborns according to the NACS scale 2 hours after birth, the best results were registered in the 1st group of children born under CA conditions based on epidural blockade, whose average score was  $30.2 \pm 0.3$ , while in the 2nd group of newborns only  $28.6 \pm 0.2$  points, which had a statistically significant difference. After 24 hours, the absolute arithmetic mean values in points relative to the previous stage of the study in both study groups increased significantly. No significant intergroup differences were registered.

**Some indicators characterising the condition of newborns in the early adaptation period (M±m)**

Indicators studied	Method of anaesthesia	
	OCA with ventilator	OMA with ventilator
Gestational age, weeks	$33,2 \pm 0,4$	$33,4 \pm 0,6$
Birth weight, grams	$1905,6 \pm 30,6$	$1894,8 \pm 32,8$
Apgar score (points)		
1 minute	$5,9 \pm 0,1 *$ $7,2 \pm 0,2 *$	$5,4 \pm 0,1 *$ $6,7 \pm 0,2 * \Delta$
After 5 minutes	$30,20 \pm 0,3 *$ $35,7 \pm 0,5 \Delta$	$28,6 \pm 0,2 *$ $35,4 \pm 0,3 \Delta$
NACS score (points)	$1432,6 \pm 50,4 *$ $730,8 \pm 22,8 \Delta$	$1935,6 \pm 80,4 *$ $796,8 \pm 20,2 \Delta$
2 hours after birth	$591,8 \pm 35,6 *$	$338,6 \pm 22,4 *$
	$92,9 \pm 0,1 *$ $96,3 \pm 0,2 \Delta$	$91,2 \pm 0,1 *$ $96,4 \pm 0,3 \Delta$

*Note: Δ-statistically significant differences (p<0.05) relative to the previous stage of the study; \*-intergroup statistically significant differences*

As can be seen from the table: IN at the 5th minute after birth significantly exceeded the upper limits of the "stress norm", being  $1432.6 \pm 50.4$  усл.4 units in group 1 and  $1935.6 \pm 80.4$  units in group 2, thus reflecting the extreme degree of stress of the

sympathetic section of the ANS and the heart rate regulatory systems, significantly less pronounced in neonates delivered under EB-based CA. In 24 hours after birth, the IN in both groups under study significantly decreased, amounting to  $731.8 \pm 22.8$



units in group 1 and  $796.8 \pm 20.2$  units in group 2, respectively, indicating that the heart rhythm regulatory systems and sympathoadrenal mechanisms of its regulation were still quite severely impaired. The concentration of SC in cord blood at the 5th minute after birth in group 1 infants was significantly higher ( $591.8 \pm 35.6$  nmol/l) compared to group 2 infants ( $338.6 \pm 22.4$  nmol/l), which indicates a more preserved and more active physiological response of the hypothalamic-pituitary-adrenal system to the birth process in newborns delivered under conditions with EB-based CA. The lower concentration of SC in the group of babies extracted under conditions of OMA with IVL (group 2) indicates the inhibition of the functional state of the hypothalamic-pituitary-adrenal system, which is a consequence of the stress response of the mother's organism to general anaesthesia and drug load. At 2 hours after birth, the SpO<sub>2</sub> in group 1 neonates was  $92.9 \pm 0.05\%$ , and in group 2  $91.2 \pm 0.1\%$ , which characterises a pronounced depression of respiratory function, which had to be corrected by oxygen therapy. In 24 hours after birth, in the process of post-syndromic intensive therapeutic measures, SpO<sub>2</sub> in both groups significantly increased to  $96.3 \pm 0.2\%$  and  $96.4 \pm 0.3\%$ , respectively. Clinical and functional studies of newborns delivered to women of the 1st and 2nd groups with severe MS at gestational age of 32-34 weeks allowed to establish that OCSA has a less pronounced negative effect on children in comparison with OMA, despite the extremely unfavourable initial background (prematurity, maternal CH and pronounced IUGR).

In summary, we can conclude that CA compares favourably with OMA both in terms of the quality of antinociceptive protection from surgical aggression and minimal impact on the basic life support systems. It should be noted that ventilatory support in this category of patients, providing adequate gas exchange, to a large extent levels out the initial disorders of external respiratory function due to the negative impact of pregnancy-related CH against the background of severe MI.

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**CONCLUSIONS:** In summary, we can conclude that CA compares favourably with OMA both in terms of the quality of antinociceptive protection from surgical aggression and minimal impact on the basic life support systems. It should be noted that ventilatory support in this category of patients, providing adequate gas exchange, to a large extent levels out the initial disorders of external respiratory function due to the negative impact of pregnancy-related CH against the background of severe MI.

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