

EFFECT OF INTRAOPERATIVE SEDATION WITH DEXMEDETOMIDINE IN CESAREAN SECTION UNDER SPINAL ANESTHESIA

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Summary. Cognitive dysfunction associated with surgery and anesthesia is one of the most discussed problems in modern anesthesiology. 35 women were examined, including those with full-term pregnancy, uterine scar after Cesarean section, congenital or acquired pathology of the pelvic bones, and absence of neurological symptoms of brain damage, preeclampsia, and myopia. Analysis of the study results revealed that sedation with dexmedetomidine is preferable during Cesarean section under spinal anesthesia.

Keywords: spinal anesthesia, POCD, sedation, dexmedetomidine (Kvanadex), sibazon, Cesarean section.

Аннотация. Одной из наиболее обсуждаемых проблем в современной анестезиологии является когнитивная дисфункция, связанная с оперативным вмешательством и анестезией. Обследовано 35 женщин, среди которых были включены: доношенная беременность, рубец на матке после кесарево сечения, врожденная или приобретенная патология костей таза, отсутствие неврологической симптоматики повреждений головного мозга, преэклампсия, а также миопия. Анализ результатов исследования выявил что при операции кесарево сечения в условиях спинальной анестезии более предпочтительной является седация дексмедетомидином.

Ключевые слова. Спинальная анестезия, ПОКД, седация, дексмедетомидин (Кванадекс), сибазон, кесарево сечении.

Аннотация. Замонавий анестезиологияда энг куп мухокама килинадиганмуоммолардан бири бу жаррохлик ва анестезия билан боглик когнитив дисфункциядир. 35 нафар аёлда тадқиқот утказилди, улар орасида : тулик муддатли хомиладорлик, кесар кесиш операциясидан кейинги бачадон чандиги, тос суягининг тугма ёки ортирилган патологияси, мия шикастланишининг неврологик белгилари йуклиги, преэклампсия ва миопия. Тадқиқот натижалари шуни курсатадики, спинал анестезия фонида кесарча кесиш операцияларида седация сифатида дексмедетомидиндан фойдаланиш афзал.

Калит сузлар: Спинал анестезия, ПОКД, седация, дексмедетомидин, (Кванадекс), сибазон, кесарча кесиш.

Postoperative cognitive dysfunction (POCD) is a cognitive disorder that develops in the early and persists in the late postoperative period, clinically manifested as memory impairment, difficulty in concentration and impairment of other higher cortical functions (thinking, speech, etc.) [2,5].

Cognitive impairment after surgery is a common and undesirable phenomenon, and interest in it is accompanied by an increasing number of scientific papers published recently [1]. In recent years, there has been a definite relationship between the drugs used for anesthesia and POCD, making it possible to reduce the risk of cognitive impairment by optimizing the anesthetic management. In 2011, the European Medicines Agency investigated and approved dexmedetomidine (Kvanadex) as a highly selective alpha-2-adrenoreceptor agonist, which was proposed as a sedative, anxiolytic, and analgesic drug for general, regional anesthesia, and sedation of patients in intensive care units [3]. Despite the large number of studies, there is currently no consensus or clinical protocol for the prevention and treatment of postoperative cognitive disorders.

Purpose of the study: To study the effect of sedation with dexmedetomidine during spinal anesthesia on POCD after Cesarean section.

Materials and methods: This prospective, randomized study was performed at the Multidisciplinary Clinic of SamSMU in the Department of Obstetrics and Regional Perinatal Center (Samarkand). Thirty-five women were examined, including those with premature pregnancy, scar on the uterus after Cesarean section, congenital or acquired pathology of pelvic bones, absence of neurological symptoms of brain damage, preeclampsia, and myopia. Exclusion criteria were massive blood loss ($> 30\%$ of BV), eclampsia, chronic nonspecific and acute lung diseases, cardiovascular diseases, morbid obesity, and patient refusal of SA. All patients were examined by an anesthesiologist before surgery and were ASA class II compliant. All pregnant women provided written informed consent for anesthesia and received standard preoperative preparation: compression bandaging of the lower extremities and pre-infusion of 0.9% sodium chloride solution (500 ml).

The study groups were comparable with respect to baseline variables, including age, weight, ASA physical status (Stage II), gestational age, and extragenital pathology. In addition, there were no significant differences in the perioperative period (sensory level of anesthesia, duration of surgery, intraoperative infusion, and blood loss), with the duration of surgical intervention ranging between 30-40 minutes.

The women were divided into two groups. Sedation with sibazon 5 mg was performed in Group I ($n = 18$). Puncture of the subarachnoid space was performed at the LII-LIV level using Pencil-Point G 25-26 needles in the supine position. A hyperbaric solution of 0.5% bupivacaine with a solution density of 1.026 was injected slowly (within 2 min). The anesthetic dose was calculated on the basis of the recommended dosage. In group II ($n = 17$), starting from the moment of premedication, 0.5 $\mu\text{g}/\text{kg}$ Kvanadex (Yuria Pharm) was administered intravenously

for 15 min; the maintenance dose was 0.5-0.8 $\mu\text{g}/\text{kg}/\text{h}$ throughout the operation until its completion.

Cognitive function was assessed using the Mini Mental State Examination (MMSE) scale, and the depth of sedation was controlled using the RASS scale and maintained at -2 and -3.

Statistical processing was performed using "Data analysis," "Descriptive statistics" using the program package "Microsoft Excel" 2013 with the package of statistical processing applications. The criterion of significance was the value of the error probability index or the probability of accepting an erroneous hypothesis (p) of no more than 5% ($P \leq 0.05$).

Results of the study and their discussion. After fractional injection of sibazon 5 mg (group I) and a 15-minute intravenous loading dose of Kvanadex (group II), a degree of sedation of 2.8 ± 0.12 was observed in group I patients, while in group II - 2.4 ± 1.6 points. At the height of anesthesia before skin incision, RASS parameters in group I increased by 7.4% to moderate, and in group II, it decreased by 8.2% ($P > 0.05$) to a mild degree. After fetal retrieval, the RASS in group I increased by 10.4% ($P > 0.05$) by the end of surgery and decreased by 8.7 ($P > 0.05$) and 70.8% ($P > 0.05$), respectively, 4 h after the end of surgery relative to baseline. In group II, the degree of sedation at all stages of the study according to the RASS remained stable within -2.1 and -1.8 points ($P > 0.05$) (Table 2). The initial cognitive status one day before the operation showed no statistically significant differences between the groups. According to the Mini-Mental State Examination Scale, the median score in Group 1 was 28 points, and in Group 2 - 28.5 points. (Table 1) The frequency of POCD development in the early postoperative period in both groups was 14.3% ($n = 5$), of which 11.4% ($n = 4$) belonged to group I and 2.9% ($n = 1$) to group II. The dynamics of the cognitive status indicators during the postoperative period are shown in Table 1.

Cognitive status	Group I (n = 18)	Group II (n = 17)	P
Mini mental state examination scale, preoperative period, scores	28 [27; 29]	28 [28; 29]	0,001
Mini mental state examination scale on the 1st day, scores	27 [26; 28]	28 [27; 29]	0,05
Mini mental state examination scale on the 5th day, scores	29 [27; 29]	30 [29; 30]	0,001

Table 1. Indicators of cognitive functions in the pre- and postoperative period

As can be seen from Table 1, the cognitive status on all scales used in the study was lower on the 1st day after surgery, and it should be noted that the effect of anesthetic drugs had ended by the time of neuropsychological testing and all women were lucidly conscious.

Table 2. Some indices of basic life support systems during intravenous sedation with sibazon and kvanadex during Cesarean section.

Indicator	Group	On admission	After entering the operating room.	During the period of dominant effect of spinal anesthesia.	After the skin incision.	After extracting the fetus.	End of operation	The day after surgery.	On the day of discharge
HR, beats per min.	I	92,3±7,2	98,3±2,1	93,1±2,6	88,4±0,8*	88,2±2,8	76,1±2,8**	72,1±2,8	74,1±1,8***
	II	90,8±3,1	88,4±6,4	86,7±3,1	82,7±1,2*	80,6±1,6	72,3±1,6**	73,3±1,6	72,3±1,6
BP systolic mm Hg.	I	136,35±6,4	138,4±8,5	104,8±3,7*	107,4±3,6	112,7±0,4**	112,7±0,4	112,7±0,4	100,4±1,4***
	II	135,7±5,3	127,7±1,7	112,4±0,8*	111,6±6,8	118,4±9,3**	118,4±9,3	118,4±9,3	97,4±5,3
BP diastolic mm Hg.	I	92,3±4	77,3±6,2	67,4±4,2*	60,4±9,3	59,2±3,3	55,2±3,3**	67,2±3,3	62,2±3,3***
	II	91,7±2,4	71,8±0,4	64,8±3,3*	67,2±8,1	70,4±8,1	62,4±8,1**	72,4±8,1	66,4±8,1
SpO ₂	I	97,4±1,4	98,1±0,3*	95,7±0,9**	96,5±6,3	97,3±2,4	97,3±2,4	97,3±2,4	98,3±0,4***
	II	98,2±3,3	96,6±2,7*	98,4±1,6**	97,8±1,1	98,7±0,7	98,7±0,7	98,7±0,7	97,7±0,7
SI, l/min×m ²	I	2,46±0,035	2,30±0,025	2,32±0,047*	2,41±0,04*	2,50±0,06	2,64±0,6	2,40±0,06	2,38±0,06***
	II	2,41±0,031	2,27±0,04	2,31±0,062*	2,47±0,016**	2,41±0,03	2,31±0,03	2,61±0,03	2,25±0,03
TPR, dyn×s×cm ⁻⁵	I	1879,2±40,5	1823,5±21,1	1743±18,1*	1651±0,05	1750±0,17**	1720±0,17	1720±0,47	1630±0,6
	II	1881,5±31	1878,2±19,7	1741±30,5*	1667±20,2	1763±9,3**	1753±9,3	1703±8,3	1603±0,3
RASS scale (scores)	I		0±0,0	0±0,0	0±0,0	-	-	0±0,0**	0±0,0
	II		1,5±0,14	-2,2±0,7	-2,7±0,4*	-2,4±1,6	-2,2±0,5	0±0,0**	0±0,0

Note: * reliability of differences to the outcome; ** to the previous stage; *** between groups (P < 0.05)

Hemodynamic parameters, blood oxygen saturation during the operation, and parameters of laboratory and instrumental studies after the operation were within acceptable values. The observed decrease in HR and BP in the mother is associated with the activation of central postsynaptic adrenoreceptors -2 by dexmedetomidine, which leads to a decrease in sympathetic activity with a subsequent decrease in BP and HR. The initial state of hemodynamics in the studied patients was characterized as hypertensive-hypodynamic dissociation, systolo-diastolic dysfunction was present in the structure of hemodynamic changes, low SI - in group I and II, respectively, 2.46±0.035 and 2.41±0.031/min×m², high TPR 1879.2±40.5 and 1881.5±31 dyn×s×cm⁻⁵. Minute cardiac output and TPR at the stages of anesthesia in both groups corresponded to the clinical and physiological picture of spinal anesthesia without sharp changes even during the most traumatic stage of surgical intervention. The SI changes were more pronounced in group I than in group II at the height of anesthesia and at the end of the operation. Thus,

they were significantly lower by 3.2% and 2.8%, respectively. A comparative evaluation of the effect of dexmedetomidine and sibazon on the level of consciousness (RASS) showed that sedation induced by dexmedetomidine is characterized by easier awakening of patients, which provides more effective interaction and communication with the medical staff. The simultaneous analgesic properties of dexmedetomidine, especially in the sense of potentiating the effects of opioids and the absence of respiratory suppression, seem to be useful, especially when administered before fetal extraction or during premedication.

Analysis of the study results revealed a statistically significant difference in the level of cognitive function between the groups on postoperative 1st and 5th days after surgery. Thus, on the 1st and 5th days after surgery in the group using dexmedetomidine, the indicators of cognitive status were significantly higher than those in the group using sibazon, which indicated a minimal negative effect of spinal anesthesia with dexmedetomidine sedation on cognitive potential in women in labor.

Conclusion: Sedation with dexmedetomidine is preferable for Cesarean section surgery under spinal anesthesia. Its use leads to a decrease in the frequency of POCD in the early postoperative period, a decrease in the intensity of pain syndrome, and a favorable effect on recovery and activation after surgery.

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