

## ASSESSMENT OF POSTOPERATIVE COGNITIVE DYSFUNCTION WHEN USING DEXMEDETOMIDINE IN WOMEN AFTER ABDOMINAL DELIVERY



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### ДЕКСМЕДЕТОМИДИН ФОНИДА ҚОРИН БЎШЛИГИ КЕСАРЧА КЕСИШ ОПЕРАЦИЯСИДАН СЎНГ АЁЛЛАРДА КОГНИТИВ ДИСФУНКЦИЯНИ БАҲОЛАШ

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### ОЦЕНКА ПОСЛЕОПЕРАЦИОННОЙ КОГНИТИВНОЙ ДИСФУНКЦИИ ПРИ ПРИМЕНЕНИИ ДЕКСМЕДЕТОМИДИНА У ЖЕНЩИН ПОСЛЕ АБДОМИНАЛЬНОГО РОДОРАЗРЕШЕНИЯ

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**Резюме.** Жами 35 нафар хомиладор аёл текишилди. Беморларнинг ўртача ёши  $30,8 \pm 6,2$  ёшни ташкил этди. Беморлар 2 гуруҳга ажратилди. 1-асосий гуруҳга 18 нафар хомиладор аёл кирди, улар учун қорин бўшлиғи кесарча кесиш операцияси спинал анестезия фонида утказилди. Медикаментоз седация учун дексмедетомидин  $0,2 - 1$  мкг/кг/соат операция вақтида қўлланилди. 2-назорат гуруҳи 17 та хомиладор аёлни уз ичига олди, седация учун кетаминдан ( $0,5$  мг/кг/соат) фойдаланилди.

**Калит сўзлар:** Операциядан кейинги когнитив дисфункция, дексмедетомидин, кетамин.

**Abstract.** A total of 35 patients were deployed. The mean age of the patients was  $30.8 \pm 6.2$  years. The patients were randomized into 2 groups. The 1st coverage group included 18 pregnant women, the choice of detection of abdominal delivery for which was spinal anesthesia (SA). For medical sedation, dexmedetomidine ( $0.2 - 1$   $\mu\text{g}/\text{kg}/\text{h}$ ) was used intraoperatively. The 2nd control group included 17 pregnant women who were prescribed ketamine ( $0.5$   $\text{mg}/\text{kg}/\text{h}$ ) under spinal anesthesia (SA) for medical observational sedation.

**Key words:** Postoperative cognitive dysfunction, dexmedetomidine, ketamine.

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**Introduction.** The problem of postoperative cognitive dysfunction (POCD) is topical issue in obstetrics due to the psychophysiological condition impairment after abdominal delivery, however the cesarean section frequency is constantly growing in all countries [1,7]. Choosing the optimal methods of anesthesia for cesarean section, which would minimally affect cognitive functions, it is vital to consider effect of anesthesia to the memory and attention of pregnant, as well as their initial cognitive status.

**Aim of study:** To study the effect of drug sedation with dexmedetomidine on spinal anesthesia to the frequency of POCD after cesarean section surgery.

**Materials and methods:** 27 pregnant women aged 19 to 34 years (mean age  $31.2 \pm 3.2$  years) delivered by cesarean section were subjected to the study. The patients were randomized into two groups. The

first-main group included 18 pregnant women whom spinal anesthesia (SA) served as the choice of analgesia for abdominal delivery [3]. Dexmedetomidine ( $0.2 - 1$   $\text{mcg}/\text{kg}/\text{h}$ ) was used intraoperatively for drug sedation [3,7]. The second control group included 13 pregnant women, ketamine ( $0,5$   $\text{mg}/\text{kg}/\text{h}$ ) was used for drug sedation at spinal anesthesia (SA). Every 15 minutes from the start of dexmedetomidine and ketamine infusion, depending on the dynamics of the clinical condition of the patients, the level of sedation on the RASS scale was noted. For spinal anesthesia [4], an isobaric solution of 0.5% bupivacaine 15 mg (HOWARD'S Pakistan) and hyperbaric solution of bupivacaine [4,5] - Longocaine-Heavy 15 mg (Yurya-pharm, Ukraine) were used in both groups. The puncture of the subarachnoid space was performed in a sitting position, in the interval LII –LIV with a 25G needle of the "Pencilpoint" type [6].

**Table 1.** Results of research methods

Groups	I group	II group	I group	II group	
Indicators	Before sedation	Before sedation	After beginning of sedation	After beginning of sedation	Rate
Heart rate per minute	87±14,4	84±16,2	63,7±7,5	87,7±6,5	0,005
BP systolic mm.Hg	141,2±17,97	139,6±14,92	94,98±12,8	132,98±11,8	0,005
BP diastolic mm.Hg	86,7±13	89,3±11	67,6±11,4	83,6±10,4	0,005
SpO <sub>2</sub>	96,87±2,9	95,87±3,4	94,5±2,6	95,5±2,4	0,005

Intraoperative monitoring of life support indicators (noninvasive BP, SBP, HR, SpO<sub>2</sub>) was carried out automatically every 3 minutes with a Mindray heart monitor (IMEC 15 Germany). In the first main group of women, the initial rate of dexmedetomidine was 1.0 mcg/kg/h for 10 minutes, maintaining 0.2-0.6 mcg/kg/h. In patients of the second control group, drug sedation was provided with ketamin in the form of intravenous infusion at the rate of 0,5 mg/kg/h. After the surgery (1st and 5th day) women of both groups, postoperative cognitive dysfunction (POCD) was assessed using the Mini Mental State Examination (MMSE) scale [7]. The obtained data were processed statistically using the Student's criteria.

#### The results of the study and their discussion.

35 patients in total were examined. The average age of patients was 30.8±6.2 years, there were no significant differences with group N-2. Evaluation of the effectiveness of dexmedetomidine. The main purpose of dexmedetomidine infusion was to achieve the necessary level of sedation from 0 to 3 points by the RASS scale. In the whole group, the vast majority (88%) of patients managed to achieve the target level of sedation depth. The average maintenance dose of dexmedetomidine was 0.93 mcg/kg/h, for ketamine – 0,5 mg/kg/h (Table 1).

Occurrence of POCD was 81% in 2<sup>nd</sup> group patients, however in the 1<sup>st</sup> group only 23%. The effect of dexmedetomidine was significant and was expressed in 28.3% reduction in duration of POCD comparing to ketamine ( $p < 0.05$ ). In the dexmedetomidine group, 3.6% of patients developed bradycardia, which required titration of the dose or suspension of the infusion of the drug, or administration of atropine (1 case). After discontinuation of dexmedetomidine infusion, there were no rebound or tachycardia phenomena. In some cases (2 patients), after discontinuation of dexmedetomidine infusion, excitement, headache, nausea were recorded[4,5]. Arterial hypotension and tachycardia were observed in 25.7% of patients in group 2, which required a decrease in the rate of ketamine infusion. In general, low and average rates of sedative administration prevailed in both study groups, so blood oxygen saturation with SpO<sub>2</sub> did not decrease, we did not notice any cases of significant changes in blood pressure, systolic BP and

heart rate. The initial cognitive status a day before surgery had no statistically significant differences between the groups. As can be seen on the MMSE median scale was 28 points in the 1<sup>st</sup> group, 28.5 points in the 2<sup>nd</sup>. A statistically significant difference in the level of cognitive functions between the groups on the 1<sup>st</sup> and 5<sup>th</sup> days after surgery was revealed[7]. The cognitive status on the MMC scale was lower on the 1<sup>st</sup> day after the operation, while it should be noted that the effect of drugs for anesthesia had ended by the time of neuropsychological testing and all women had clear conscious. Also, at the time of assessment of the cognitive status of women, there was no pronounced postoperative pain. When comparing the data of day 1<sup>st</sup> to day 5<sup>th</sup> in group 1 on the MMSE scale, the score of cognitive status was higher than the preoperative level, which indicates an improvement in higher mental functions. In the 2<sup>nd</sup> group, on the 5<sup>th</sup> day, cognitive indicators improved compared to those on the 1<sup>st</sup> day after surgery and returned to the preoperative level. In the dexmedetomidine group, cognitive status indicators were statistically significantly higher than in the ketamine group, which indicates a minimal negative effect of spinal anesthesia with dexmedetomidine sedation on cognitive potential in patients after abdominal delivery.

**Conclusions:** During obstetric operations under regional anesthesia, sedation with dexmedetomidine, is the best, rather than ketamine. The strategy of drug sedation with dexmedetomidine in women during cesarean section operations will reduce the number of complications for both fetus and mother, being a highly effective drug with a light and medium level of sedation for the prevention of postoperative cognitive dysfunction (POCD), it is also associated with a lower incidence of hypoxemia and arterial hypotension during surgery.

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**ОЦЕНКА ПОСЛЕОПЕРАЦИОННОЙ  
КОГНИТИВНОЙ ДИСФУНКЦИИ ПРИ  
ПРИМЕНЕНИИ ДЕКСМЕДЕТОМИДИНА У  
ЖЕНЩИН ПОСЛЕ АБДОМИНАЛЬНОГО  
РОДРАЗРЕШЕНИЯ**

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**Резюме.** *Всего было обследовано 35 пациентов. Средний возраст пациентов равнялся в 30,8±6,2 года. Пациентки были рандомизированы на 2 группы. В 1-ю основную группу были включены 18 беременных, выбором обезболивания абдоминального родоразрешения для которых послужила спинальная анестезия (СА). Для медикаментозной седации интраоперационно использовали дексмедетомидин (0,2-1 мкг/кг/ч). Во 2-ю контрольную группу вошли 17 беременных женщин, для медикаментозной седации использовались кетамин (0,5 мг/кг/ч) на фоне спинальной анестезии (СА)[1].*

**Ключевые слова.** *Послеоперационная когнитивная дисфункция, дексмедетомидин, кетамин.*