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# Improvements After Surgical Anesthesia in Elderly and Old Age Patients in the Intervention of the Hip Joint

**Begmatov Zhurabek  
Akmatovich**

Anesthesiologist-resuscitator

Samarkand branch of the Republican Specialized Scientific and  
Practical Medical Center of Traumatology and Orthopedics

**Goyibov Salim Saidullaevich**

Assistant of the Department of Anesthesiology and Intensive Care  
Samarkand State Medical University

## ABSTRACT

Postoperative analgesia based on regional blockade of the lumbar plexus (0.1% solutions of naropine or marcaine) and the planned administration of NSAIDs (diclofenac, ketonal or xefocam) is a more effective method of analgesia after surgery in trauma patients of elderly and senile age.

The use of low-concentration solutions of local anesthetics (0.1% naropin solution and 0.1% marcaine solution) makes it possible to obtain a complete sensory and minimal motor block, which contributes to the early activation of elderly and senile patients.

### Keywords:

elderly and old age patients, Promedol, on demand

The problem of prevention and treatment of postoperative pain syndrome in trauma patients of elderly and senile age is a very urgent and difficult task. [7, 8]. A feature of elderly patients is a burdened premorbid background. They are characterized by: sclerotic changes, decreased coronary and cerebral blood flow, hypovolemia, the reduced compensatory capacity of the heart and blood vessels, and increased sensitivity to opioids and hypnotics [9, 11].

The technique of anesthesia after surgery, as well as the technique of anesthesia, must take into account these features and meet the requirements of efficiency and maximum safety for the patient. Despite the use of various modern methods of anesthesia, the number of postoperative complications in the elderly remains high and reaches 60%, and mortality during the first year after the fracture ranges from 14 to 36%. [5].

The main areas of treatment after surgical pain have been identified for a long time,

however, the adequacy of postoperative analgesia is far from ideal and, according to subjective assessments of patients, does not exceed 50% [3, 5, 10]. Many studies have proven the low effectiveness of analgesia with narcotic analgesics "on demand" [1, 2, 6]. As a rule, monoanalgesia with opiates is either insufficient or dangerous due to its complications in the form of CNS depression and respiration. According to A. M. Ovechkin, in 87% of cases after surgery, the pain intensity is moderate and high, and 17% of patients noted that the pain intensity exceeded the expected [4]. Important advantages of regional anesthesia over traditional methods of anesthesia are a decrease in the severity of postoperative pain syndrome, a decrease in the neurohumoral response to surgical trauma, a decrease in intra- and postoperative blood loss, an improvement in microcirculation in the operated limb, and a decrease in the number of pulmonary complications.

**Purpose of the study:** to develop a method of pain relief in elderly and senile patients after hip surgery and the use of non-steroidal anti-inflammatory drugs and to give its clinical and physiological justification.

**Materials and methods.** The study included 56 patients (35 women and 21 men) of elderly and senile age from 62 to 85 years, with the risk of anesthesia III-IV ASA, who underwent elective operations of unipolar hip arthroplasty and osteosynthesis of the femur. Age composition, distribution of patients by weight and height, blood loss, type and duration of surgery were comparable in all groups. Concomitant pathology of the cardiovascular system had 97% of the subjects: arterial hypertension - 91.2%; coronary heart disease - 68.1%; dyscirculatory encephalopathy - 32% of patients. All patients were divided into 2 groups depending on the method of postoperative analgesia: main and control. In the main group (n=30), combined anesthesia was used based on a combination of peripheral neural blockade of the lumbar plexus by inguinal access with solutions of long-acting local anesthetics of low concentration (0.1%) and "basic" NSAID analgesia. In the control group (n=26), standard anesthesia was performed with the narcotic analgesic "Promedol" "on demand" - 20 mg 2-3 times a day. Patients of the main group were divided by simple randomization into 4 subgroups depending on the chosen non-steroidal drug and local anesthetic for neural blockade: diclofenac-naropine (n=18); xefocam-naropin (n=6); ketonal-naropine (n=17); ketonal-marcaïne (n=15).

We have developed the following algorithm for postoperative anesthesia. The introduction of NSAIDs was carried out in all patients in a planned manner intramuscularly 2-3 times on the first day after surgery. The first injection - almost immediately after the patient's admission to the ICU, then after 6-8 hours. 4-5 hours after SMA, after the restoration of sensation in the legs, a single peripheral neural blockade of the lumbar plexus was performed using inguinal access with a 0.1% solution of naropin or marcaïne. In case of insufficient anesthesia or positional discomfort, a narcotic analgesic (Promedol) was additionally administered. Considering the shortcomings of

inguinal access blockade, we proposed to perform a 3-in-1 blockade in the postoperative period after preliminary anesthesia of the obturator nerve according to the standard technique using an electrical stimulator and injecting 20 ml of 0.1% solution of marcaïne or naropin. Then, a 3-in-1 blockade was performed, directing the needle cranially at an angle of 45° under the inguinal ligament, and 40 ml of the same solution of LA was injected.

### Results and discussion:

A comparative analysis of the obtained results showed that the initial parameters of peripheral hemodynamics in all subgroups of the main group were statistically significantly higher, which indicates emotional preoperative stress. In all groups of patients, the initial indicators of central hemodynamics (MOS and CI) were 30-35% lower than normal values, which is associated with reduced left ventricular function in elderly and senile patients and severe concomitant cardiovascular pathology. Statistical analysis showed that in the groups "diclofenac-naropine", "ketonal-naropine" and "ketonal-marcaïne" hemodynamic parameters were stable at all stages of the study, both peripheral and central. A statistically significant decrease in CI, MOS and TPVR at stage I in all groups of patients is associated with a sympathetic block, which highly correlates with peripheral hemodynamic parameters (BPs, BPd, Adm, HR). In the xefocam-naropine subgroup, changes in peripheral hemodynamics differed from other subgroups of the main group, since at stage II of the study there was a statistically significant increase in blood pressure, blood pressure, heart rate, blood pressure, which is associated with an insufficient level of analgesia against the background of the planned administration of xefocam during these operations. However, the average values of peripheral hemodynamics were normal, and their fluctuations amounted to 15-20%, which is within the physiological norm. In the control group, the increase in blood pressure and blood pressure was 25-35% of the initial values, which indicates unstable hemodynamics and inadequate pain relief. Indicators of heart rate and TPVR at II, III and IV stages of the study in the control group are also significantly higher than in the main group. We found that changes in the CO<sub>2</sub> content at the end of

exhalation were significant only in the control group. There was a trend towards an increase in the content of CO<sub>2</sub> at the end of exhalation at stages III–VI ( $p=0.01$ ), however, the concentration of CO<sub>2</sub> was on average at the upper limit of the norm (at stage V it reached  $4.23\pm 0.31\%$ ). These changes were caused at stage II by hyperventilation accompanying pain, and at stages IV and V by a decrease in minute respiratory volume due to hypoventilation and the depressing effect of promedol on the respiratory center. We noted that in the main group there were no significant fluctuations in arterial oxygen saturation ( $p=0.01$ ). In the control group, "desaturation" (SpO<sub>2</sub> - 89–90%) was in 36.7% of patients, and a decrease in saturation below 94% was registered in 66.7% of patients. The study of postoperative pain syndrome on the first day after surgery showed that in the control group the intensity of pain was statistically significantly higher, with frequent returns, in contrast to the main group. The reason for this is that fixed doses of promedol were administered to patients, often injections were made with long interruptions, that is, when a "breakthrough" of pain had already occurred. Despite the difference in NSAIDs (diclofenac, ketonal or xefocam), as well as in the local anesthetics used (naropin or marcaine) for peripheral blockade, the intensity of pain in all subgroups of the main group was minimal and did not exceed 1 point on the VAS on average. A statistically significant decrease in the intensity of the pain syndrome was noted when diclofenac was used as an NSAID, in combination with a neural blockade of the lumbar plexus with naropin. In addition, the later appearance and resumption of pain in the diclofenac-naropin group is explained by a more pronounced anti-inflammatory activity of the drug. It should be noted that there were no statistically significant differences in the intensity of pain syndrome, self-assessment of the quality of postoperative analgesia, daily need for narcotic analgesics between the groups "ketonal-naropin" and "ketonal-marcaine", despite the fact that peripheral blockade using 0.1% solution of naropin develops faster on average by 12 minutes, and also lasts longer by 2.5 hours. A comparative analysis of the effectiveness of postoperative pain relief methods in elderly patients showed that the daily need for narcotic

analgesics significantly prevails only in the control group and amounts to 75.5 mg/day, which is 5–10 times higher than the need for drugs in any of the subgroups of the main group. In a significant percentage of cases, patients of the main group (from 29% in the xefocam-naropin group to 77% in the diclofenac-naropin group) did not require the administration of a narcotic analgesic. The rest of the patients were administered promedol due to the development of positional discomfort or moderate pain syndrome. The study of the effects of MA showed that low-concentration, namely, 0.1% solutions of naropin and marcaine are able to develop a nerve blockade of sufficient severity, which successfully relieves pain after traumatological operations on the hip joint and thigh. The complete disappearance of skin sensitivity on the anterior, medial and lateral surfaces of the thigh was accompanied by a slight motor blockade (1 point on the Bromage scale) and limitation of flexion and extension, as well as abduction and adduction in the knee joint of the operated leg in the groups with naropin and marcaine without statistically significant differences. We have shown that the sensory block after a single injection of local anesthetic perineurally persists in the case of naropin, on average for  $15.5\pm 1.2$  hours, and  $12\pm 0.8$  in the marcaine group, that is, the entire early postoperative period. If necessary, the next day, you can also repeat the neural block against the background of the "basic" administration of NSAIDs. In addition, it is known that naropin has less neuro- and cardiotoxicity than marcaine, which is especially important in elderly and senile patients.

**Conclusions.** Postoperative analgesia based on regional blockade of the lumbar plexus (0.1% solutions of naropin or marcaine) and the planned administration of NSAIDs (diclofenac, ketonal or xefocam) is a more effective method of analgesia after surgery in trauma patients of elderly and senile age.

The use of low concentration solutions of local anesthetics (0.1% naropin solution and 0.1% marcaine solution) makes it possible to obtain a complete sensory and minimal motor block, which contributes to the early activation of elderly and senile patients.

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