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Postoperative Anesthesia Of Elderly And Senile Patients With Total Joint Replacement Of The Lower Extremities

Gaziev Z.T.
Department of Anesthesiology and Intensive Care Uzbekistan, Tashkent

Avakov V.E.
Department of Anesthesiology and Intensive Care Uzbekistan, Tashkent

Shorustamov M.T.
Department of Anesthesiology and Intensive Care Uzbekistan, Tashkent

Bektemirova N.T.
Department of Anesthesiology and Intensive Care Uzbekistan, Tashkent

ABSTRACT

Objective: To evaluate the efficacy and safety of patient-controlled analgesia through prolonged epidural analgesia after joint replacement of the lower extremities.

Material and methods. We analyzed the postoperative period of 213 elderly and senile patients who were operated on for degenerative-dystrophic and traumatic injuries of the joints of the lower extremities. All patients underwent total joint replacement (164 - THA and 49 - TKA). The age of patients is from 65 to 90 years (average age was 78 ± 8 years) with a physical status of ASA 3 and above. All examined patients were divided into 2 groups. 63 patients comprised the main group, which in the postoperative period underwent patient-controlled analgesia (PCA) through prolonged epidural analgesia. The control group consisted of 150 patients, for the anesthesia of which in the postoperative period only standard systemic multimodal analgesia was used

Conclusion. Patient-controlled analgesia is an alternative to traditional analgesic regimens. This method should be one of the main methods after surgical anesthesia for joint replacement of the lower limb in elderly and senile patients.

KEYWORDS

Patient-controlled analgesia, spinal-epidural anesthesia, lower limb endoprosthetics.

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INTRODUCTION

Endoprosthetics of the joints of the lower extremities is accompanied by severe postoperative pain. So, after TKA, 60% of patients indicate severe pain, up to 30% - moderate pain (1,3). Inadequate analgesia can negatively affect the healing process, increasing the incidence of postoperative complications. An inverse relationship between the level of pain and the degree of patient's satisfaction with the operation is also quite obvious (2,5). Despite advances in joint surgery, many issues of postoperative pain relief are still not resolved.

With all the variety of pain relief techniques, there is still no gold standard for the treatment of postoperative pain. Therefore, to minimize pain, it is very important to develop perioperative pain management protocols, especially in geriatric patients with high comorbidity (4,6,10).

There are several options for analgesia following total lower limb arthroplasty, but the main options include regional anesthesia, intravenous CPA, and oral multimodal agents. More recently, a multimodal approach to postoperative analgesia after lower limb arthroplasty has been approved by the Joint Society for the Management of Postoperative Pain (8).

Postoperative pain syndrome in total arthroplasty of the joints of the lower extremity can have a significant impact on the quality of life of patients and the functional outcome of the operation, limiting the early activation of patients, which can lead to an increase in the risk of thromboembolic complications and increase the duration of hospitalization (7,9).

OBJECTIVE

To ensure the efficacy and safety of postoperative pain relief through prolonged epidural analgesia after arthroplasty of the joints of the lower extremities.

MATERIAL AND RESEARCH METHODS.

The postoperative period of 213 patients of geriatric age, who were operated on for degenerative - dystrophic and traumatic injuries of the joints of the lower extremities, was analyzed. All patients were divided into 2 groups by the nature of postoperative pain relief. Group I consisted of 150 patients who received standard systemic multimodal analgesia in the postoperative period. 63 patients of group II made up the compared group, who underwent CPA in the postoperative period using prolonged epidural anesthesia. For prolonged epidural analgesia, we used a three-component mixture (0.5% bupivacaine 2 mg / kg, fentanyl 2 μg / ml) and epinephrine 2 μg / ml) administered at a rate of 4-10 ml / hour. Either bolus administration of drugs using an electronic pump to control, "Accumate - 1100. Electronic PCA", our programmed postoperative pain relief, or a disposable elastomeric pump.

In order to randomize both groups, all patients underwent systemic multimodal analgesia accepted in our clinic, which included a combination of NSAIDs (ketoprofen 100 mg 3 times a day), tramadol (100 mg 1 time a day) and paracetamol (1.0 g 3 times a day). day) during the first day, followed by correction of the frequency and doses of these drugs, depending on the severity of the pain syndrome. Analgo and analgesimetry was performed using VAS, and

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in some cases it was verified by determining the level of cortisol in the blood.

The intensity and severity of pain syndrome before surgery in patients of the compared groups was practically the same.

Table # 1.

Dynamics of the severity of pain at the stages of the study in groups according to VAS

Research stages	**Group 1 (n = 63)**	**Group 2 (n=150)**	**P**
At rest			
Before operation	2,19 ±0,08,9	2,26 ±0,10	>0,05
After 3-5 hours	0,90±0,06	2,89±0,12	<0,05
First day after operation	2,04±0,11	2,91±0,13	<0,05
When flexing the affected joint	28(44,4%)		

In the postoperative period, already after 2 - 6 hours in group II of patients with PCA, the sensation of pain even at rest was 31.1% less pronounced than in group I. Joint movements before surgery were equally painful in both groups within the range of 5.5-7 points. But already by 6 hours of the postoperative period and by the end of the first day in patients of group I, the intensity of pain exceeded that of group II by 318% and 287.9%, respectively.

Table 2.

Dynamics of the severity of pain syndrome on the second day in groups.

Research stages	**Group 1 (n=63)**	**Group 2 (n=150)**	**P**
At rest			
8-10 hours	2,36 ±0,12	3,18 ±0,22	<0,05
12-14 hours	1,90±0,09	4,22±0,30	<0,05
20-22 hours	2,11±0,08	3,39±0,18	<0,05
During walking			
Before operation	2,39 ±0,99	5,87 ±0,98	<0,05
After 3-5 hours	1,81±0,07	6,71±0,75	<0,05
First day after operation	1,99±0,08	4,62±0,75	<0,05

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The study on the second day demonstrated a difference in the severity of pain in patients of group II, both at rest and while walking, which affected their activity. If patients of group II during the entire second day practically did not experience pain either at rest or in motion, then all patients of group I continued to experience pain both at rest and when walking within the range of 4-6 points according to the VAS, which required additional anesthesia.

The most important criterion compared in this section is the severity of the pain syndrome; in the absolute majority of cases it was typical for patients of group I, in whom pain on attraction during the first 3 days after surgery at the stages of the study was not lower than 4 points, which affected their lower activation and prolongation of their stay in the ICU by 13.4 ± 3.7 hours. PCA with extended epidural analgesia is consistent with the FT (fast track) and ERAS (Enhanced Recovery After Surgery) concepts, aimed at the earliest possible activation of patients and discharge from the hospital.

Table No. 3

Complications and side effects when using these methods of postoperative pain relief

Side effects, complications	Group 1 (n=63)	Group 2 (n=150)
Severe pain 6 points	0	49(32,6%)
Hypotension (and orthostatic)	12 (19,0%)	3(2%)
Breathing depression 12 per minute	2(3,17%)	9(6%)
Nausea, vomiting	7(11,1%)	15 (10%)
Itching skin	8 (12,6%)	12(8%)
Infectious complications on site	1(1,6%)	6(4%)
Bloating, constipation, urinary retention	0	14(9,3%)

In the group of patients with PCA, episodes of lower than moderate arterial hypotension, including orthostatic hypotension, were more common, which was quickly stopped by the introduction of epinephrine. Complications such as nausea, vomiting, pruritus practically did not prevail in group II, while the frequency of respiratory depression, bradycardia, bowel dysfunction, constipation was higher in the group with multimodal anesthesia.

Table 4. Values of glycemic and cortisol indices in postoperative pain relief

Indications	1st group	2nd group
Cortisol	184,5 ± 4,9 nmol / l	149 ± 43,0 nmol / l
Glucose	4,26 ± 0,4 mmol / l	4,09 ± 0,3 mmol / l

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When analyzing the results of a study of the analgesic effect in the postoperative period with the use of patient-controlled epidural analgesia (PCEA), a clear trend towards a decrease in cortisol and glycemic levels was found, which was not observed in the control group. The decrease in the level of cortisol is due to the interruption of noception in the lesion. there is no activation of the hypothalamic-pituitary-adrenal system (HPAS). The humoral pathway is the direct entry of inflammatory mediators into the blood and activation of the HPAS. The level of glucose in the blood is almost at the same level with a slight fluctuation, which indicates the deactivation of the HPAS.

Table 5

Consumption of anesthetics, opiates, NSAIDs, adjuvant drugs and vasopressors for each patient in the postoperative period in comparable groups

Drugs	Consumption	
	Group 1 (n=63)	Group 2 (n=150)
Bupivacaine 0.5mg	10,1 ±1,3	-
Propofol, mg	-	-
Fentanyl, mcg	78,6±4,9	37,7±2,9
Diazepam, mg	8,3 ±0,5	16,8 ±1,4
Paracetamol, gr	2,0	2,0
Ephedrine, mg	21,3±3,7	-
Adrenaline, mcg	596,3 ±12,7	190,1 ±4,8
Ketoprofen, mg	300,0	300,0
Tramadol mg	100	100
Morphine, mg	-	26,7±3,4
Promedol, mg	-	37,8±7,2

The consumption of drugs, complications and side effects in the groups associated with the technique of postoperative analgesia are shown in the summary tables. Anticipating the events, we note only that in group I (n = 150), the consumption of opioids per patient was 82.7% higher than in the compared group II.

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CONCLUSIONS

1. The use of only systemic, albeit multicomponent, analgesia for postoperative analgesia, especially THA and TKA in geriatric patients with a high risk of developing severe hemodynamic disorders, should be considered ineffective.
2. The combination of local anesthetic with fentanyl and adrenaline, administered epidurally with prolonged epidural analgesia in the postoperative period, best meets modern concepts of the mechanisms of blockade of nociceptive impulses at the spinal level and the principle of multimodality of pain relief.
3. PCA with prolonged epidural analgesia according to this technique in the postoperative period demonstrates a significant (82.7%) opioid-lowering effect relative to the systemic multimodal method of postoperative analgesia.

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