

Hemostatic Changes in Elderly Patients Using Epidural Analgesia and Combined Unilateral Spinal Anesthesia

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Annotation. Surgical treatment includes rapid activation of the patient, restoration of his ability to stand up, self-care (will), and trophic changes in the skin (bed sores), thromboembolic complications, pulmonary bronchial infection, decompensation of previously compensated organ failure reduces the risk of developing complications. Dystrophic-degenerative diseases also have a negative impact on elderly patients.

Key words: surgical, treatment, dystrophic-degenerative, bed sores, thromboembolic.

Degenerative diseases of the musculoskeletal system are among the leading causes of disability, especially among the elderly, in the world. It is projected that by 2050, the proportion of the population over the age of 60 will be more than 20% of the world's population, and about 15% of them will suffer from osteoarthritis to varying degrees. However, one-third of these patients remain disabled. To date, total endoprosthesis has been recognized as the most effective method of treating severe osteoarthritis, which not only relieves pain syndrome, but also significantly improves quality of life. In cases where conservative measures are ineffective, joint replacement surgery has already become a common treatment for the treatment of severe stages of degenerative joint disease and in the future their number will only increase rapidly.

Thus, according to experts, from 2005 to 2030, the growth of pelvic joint endoprosthesis surgery in the United States could be 174%, while knee joint endoprosthesis surgery could be 673%. [35; 35-41-b].

Any delay in caring for such patients worsens the patient's recovery from the disease [126; 2508-2517-b]. In this regard, the choice of method of analgesia is very important, as such patients will require surgery in almost 100% of cases. The choice of anesthetic care should take into account the unstable hemodynamic status of elderly patients and the quality of postoperative rehabilitation [125; 72-92-b].

The high risk of coronary heart disease in such a group of patients may lead them to a hypotensive state with a high risk of perioperative myocardial ischemia. [134; Pp. 445-452]. There are many scientific studies in the modern literature devoted to the choice of the type of anesthesia in endoprosthesis of the ankle joints in elderly patients, and in general, general and local anesthesia can be used. However, although hemodynamic stability is better during general anesthesia, several published studies still support local anesthesia [126; 2508-2517-b]. However, a decrease in the compensatory mechanisms of the cardiovascular system in elderly patients significantly increases the incidence and recurrence of hypotensive events observed in sympathetic block due to spinal anesthesia.

However, the use of spinal anesthesia can provide satisfactory hemodynamic stability by reducing sympathetic blockade. Various solutions such as continuous spinal anesthesia are proposed for this [3; 137-141, 22-b; 44-50, 30-b; 560-569, 91-b; 404-409-b].

Reliability of research results:

The reliability of the study results is confirmed by modern, widely used clinical, biochemical, instrumental and radiological examination methods.

Scientific novelty of the research.

Systemic and central hemodynamics, hemostasis, autonomic status, sensory and motor block time parameters were studied comprehensively, taking into account cortisol-stress hormone parameters, as well as side effects and complications in elderly patients undergoing surgery using various types of neuroaxial anesthesia.

Research results and their structure.

The desire to optimize neuroaxial anesthesia in elderly patients during endoprosthesis surgery and, first and foremost, to reduce the frequency and apparent manifestations of arterial hypotension induced by the USA led us to use unilateral spinal anesthesia techniques combined with epidural anesthesia and analgesia in the postoperative period.

The aim of our study in this section was to prolong the effect of bupivacaine based on the use of a low-dose hyperbaric (7.5 mg) solution of 0.5% bupivacaine in unilateral SA with opioids (fentanyl 20 mcg), as well as to study perioperative hemodynamics and all other effects intrathecally.

This one-centered, prospective, randomized study conducted by us in the period from 2018 to 2020, at the Department of Anesthesiology and Intensive Care TMA, examined the pelvic number (n = 33) and knee (n = 7) of 40 supervised elderly patients. total endoprosthesis practice of the joints includes research materials conducted in a combined setting of epidural and USA. Restriction criteria: patients under 75 years of age, refusing spinal anesthesia, contraindicated in SA (coagulopathy, hyperthermia > 38.0 C, allergic to local anesthetics and antiaggregate therapy for 5 days).

The results

The following table shows the demographics of patients who underwent surgery under unilateral spinal anesthesia in combination with epidural analgesia in this group.

Specificity of patients: approaching old age, more than 4 (95.0%) patients with comorbidities, 58.1% of these patients had a physical condition class III according to the ASA classification, ie, the risk of predicted complications and anesthesia. Their Kettle index was specific to the normotrophic condition.

Demographic characteristics of these patients with comorbidity index (n = 40).

Indicators		Values
Age		78,3 ± 2,8
Gender, m/f		14/26
BMI		24,7
Side of the operation, l/r		16/24
Comorbidity index (n %):	4 and less	2 (24,7 %)
	5 and less	25 (60,4 %)
	6 and more	13 (34,9 %)
ASA (n%)	II	15 (41,9 %)
	III	25 (58,1 %)

The most important comorbidities of the cardiovascular system identified in patients during the study were hypertension, myocardial infarction, chronic myocardial infarction, and venous varicose veins of the legs. Other co-morbidities in patients included chronic respiratory failure, osteoporosis, cerebrovascular disorders and pain syndrome, and pneumosclerosis.

Preliminary results of clinical blood tests were almost indistinguishable from those in the previous group.

And on the basis of blood parameters such as Hb, Ht and erythrocyte count in patients in this group, we can talk about hypovolemia as a result of the initial hemoconcentration. As for leukocytes, there is a tendency to inflammatory process, which is confirmed by subnormal values of leukocytes and neutrophils in bone pathology caused by pain syndrome, or systemic inflammatory syndrome as a result of hemoconcentration.

Preoperative and postoperative hematocrit and blood test results (n = 40).

Indicators	Before surgery	After surgery	P
Erythrocytes 10 ¹² /l.	4,57 ± 0,80	3,96 ± 0,12	➤ 0,05
Hemoglobin g/l.	14,9 ± 0,7	13,2 ± 0,6	➤ 0,05
Hematocrit %	46,3 ± 0,5	42,3 ± 0,4	➤ 0,05
Leukocytes 10 ⁹ /l.	6,7 ± 1,0	7,2 ± 1,1	➤ 0,05
Neutrophils 10 ⁹ /l	3,8 ± 0,4	4,2 ± 0,7	➤ 0,05
Лимфоцитлар 10 ⁹ /l	1,52 ± 0,27	1,33 ± 0,19	➤ 0,05

Although the number of lymphocytes did not exceed the level of physiological norms, it was still closer to the minimum numbers and further decreased (12.5% P> 0.05), although not significantly after surgery. But in general, we can testify to the low immune status of these patients. After surgery, the amount of red blood cells returned to the limit of physiological norms. After surgery, the number of leukocytes increased slightly (by 10.7%) (P> 0.05).

Indications for preoperative and postoperative hemostasis in group II patients (n = 40).

Indicators	Before surgery	After surgery	P
Fibrinogen, g/l	4,39 ± 0,21	4,27 ± 0,30	>0,05
Platelets, 10 ⁹ /l	172,9 ± 2,7	159,4 ± 3,2	<0,05
PTT, sec	11,5 ± 1,1	12,6 ± 1,3	>0,05
APTT, sec	29,4 ± 0,7	31,9 ± 1,2	>0,05
Time of bleeding, min	4,06 ± 0,04	5,13 ± 0,07	<0,05

The data presented showed a decrease in blood clotting time (by 20% relative to the minimum values of this indicator in the norm), an increase in fibrinogen, prothrombin time and initial activation of the coagulation system, indicating a decrease in partially activated thromboplastin time. At the end of the operation, almost all the studied parameters approached the norm, except for the platelet count, and by the end of the operation the platelet count decreased by 7.9% (P <0.05), which was associated with blood loss during surgery and the effect of infusion therapy (hemodilution). Cognitive function of all patients was assessed during preoperative examination. In general, the preoperative preparation of patients in this group is in accordance with the protocol described in the "Research Materials and Methods" section of the dissertation and adopted in our clinic. However, preliminary data on the hemostasis obtained forced us to make some corrections. Preoperative hydration was supported by 1.5 to 2 liters of 5% glucose solution and electrolytes. 12–24 hours before surgery, anticoagulant therapy was initiated using 7,500 ME of unfractionated heparin administered subcutaneously twice daily.

Patients receiving oral anticoagulant therapy prior to hospitalization were instructed to switch to intravenous administration of 5 mg of vitamin K and subsequent triple administration of heparin to correct partially activated thromboplastin time.

In the operating room, 15 min before spinal puncture, arterial hypotension was detected 30–15 min after 7.5 mg intrathecal administration of 0.5% bupivacaine solution in the previous group of patients, and 5 ml / 5 ml / s as a pre-infusion therapy for all patients in this group during SA. Hydroxyethyl starch 130 / 0.4 and 5 mg of ephedrine and 0.8 - 1.0 mg / kg of prednisolone were slowly infused intravenously.

During the operation, standard monitoring, including ECG recording, pulse oximetry, noninvasive measurements of blood pressure were performed every 3 minutes for 30 minutes, and then every 5 minutes.

Sedation was ruled out during the operation to avoid affecting patients' cognitive function. The technique of performing USA with puncture and catheterization of the epidural space is described in detail in Chapter II of the dissertation.

Nevertheless, we consider it necessary to repeat that low-dose hyperbaric bupivacaine was administered intrathecally at a low dose of 7.5 mg for long and traumatic operations such as pelvic and knee joint total endoprosthesis operations. Therefore, 20 mcg of fentanyl was administered intrathecally to

prolong the effect of bupivacaine. A local anesthetic infusion with fentanyl was administered slowly without liquor aspiration (60–120 s) to prevent air bubbles and turbulence that could lead to bilateral SA [42; 245-248-b].

The patients were kept in a supine position for 20 minutes. 10-15 minutes after SA, the level of sensory blockage and the intensity of motor blockade were assessed from both sides.

During the operation, all patients received an air-oxygen mixture through a mask (O_2 - 3-4 l / min). During surgery, in addition to the 130/0.4 loading dose of HES, additional infusion of crystalloids and HES corresponding to the amount of surgical blood loss was performed in patients. In cases where the estimated and estimated blood loss was > 500 ml, it was concluded that there was a need for erythrocyte mass transfusion.

In 23 patients in this group, a subclavian vein was catheterized due to insecurity of peripheral venous access and possible complications and the need to measure central venous pressure.

Conclusion.

1. The peculiarity of patients in this group is that they are elderly (58.1%), patients with a high percentage of complications with a comorbidity index greater than 4 are predicted.
2. Preoperative hydration was provided with 1.5 - 2 liters of crystalloid and colloidal solutions (HES 130/04 - 5 ml / kg) vasopressors, hormones, and slowly infused intravenously before and after the USA. Monitoring of systemic and central hemodynamic parameters was performed in this group for 20 min after 3 min and then every 5 min.
3. The technique of performing USA in conjunction with epidural cavity catheters is described in detail in Chapter II of the dissertation. However, we consider it necessary to reiterate that low-dose 7.5 mg of hyperbaric bupivacaine was administered intrathecally to this group of patients. Therefore, taking into account the duration of total endoprosthesis of the knee and pelvic joints and the degree of morbidity, 20 mcg of fentanyl was administered intrathecally during the operation in order to prolong the effect of bupivacaine.
4. The patient's lateral position was maintained for 20 min. An epidural catheter was used for intraoperative use of fentanyl when anesthesia was insufficient and for the purpose of anesthesia according to the patient-administered method of anesthesia.
5. The stages of surgery and the subsequent postoperative period showed significant stability of the average values of systemic and central hemodynamics.
6. With catheterization of the epidural space, similar results in the USA showed relative stability here as well. In the first 6 minutes after intrathecal administration of a local anesthetic and fentanyl, the short-term maximum decrease in blood pressure to 9.2% was rapidly reversed. At 6 minutes, the maximum decrease in systolic blood pressure, diastolic blood pressure, and OCD was 9.2%, 9.5%, and 9.3%, respectively. In no case in this group did we experience more than 20% episodes of arterial hypotension.

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