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In military personnel It was carried out under nilateral spinal-epidural anesthesia Assessment of blood hemostasis parameters and prevention of thromboembolic events during surgery and postoperative periods.

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Abstract

A comparative assessment of the effectiveness and safety of spinal and epidural anesthesia shows a number of disadvantages of epidural anesthesia. Based on the accumulated experience of 24 years, the advantages of spinal anesthesia can be summarized as follows: "No one knows of such a deep and widespread anesthesia with such a small amount of drug, with such low systemic toxicity, and with such effectiveness" [68; 590-597 -b]. While several studies on this issue have shown the qualitative advantages of spinal anesthesia, there are reports of numerous failures of epidural analgesia, manifested by lack of anesthesia, insufficiently widespread anesthesia, unilateral anesthesia, or inadequate blockade of several segments.

Keywords

Spinal and epidural anesthesia, unilateral spinal anesthesia, hemostasis.

These conditions indicate the need for additional analgesia and sedation or a switch to general anesthesia [52; 519-523-p]. Evidence for the better quality of spinal anesthesia compared with epidural anesthesia is the result of this study, which showed that spinal anesthesia shows a significantly lower increase in blood cortisol levels during abdominal surgery [31, 66; 42-64b] and epidural analgesia provides sufficient blockade of the hormonal response to operative stress only when supplemented with spinal anesthesia [66; 42-64 -pages]. There are objective conditions for the occurrence of such problems, determined by the anatomical features of the epidural space. If a patient has repeated epidural blocks, adhesions in the epidural space that formed after the first procedure may serve as a factor impeding the spread of the anesthetic, and this is called "epidural history". This indicates a high incidence of anesthesia failure in patients. [14; pp. 19-23, 32; 33-42, 80; pp. 299-301]. The thickening of the spinal roots in the epidural space innervating the L5-S1 zones can impair the permeability of local anesthetics to the nerve tissue of the root, which is manifested by incomplete blockade and the retention of pain sensitivity in this area [20; pp. 28-33].

4. Some anesthesiologists note greater difficulties in catheterizing the epidural space compared to the subarachnoid space [1; 58-59-p, 2, 164], and this is certainly due to differences in the anatomical structure and depth of the spaces.
5. Significantly high failure rate (insufficient deep anesthesia and/or relaxation).
6. More time-consuming and expensive method: the procedure of epidural catheterization takes more time than spinal puncture.

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7. Serious complications up to cardiac arrest as a result of accidental injection of local anesthetic into the veins of the epidural space (this refers to the bupivacaine drug, which is highly cardiotoxic in these patients).

After total hip arthroplasty, the benefits of early standing and walking are clear. Changing posture and minimal physical activity help redistribute blood flow to the lungs by opening the alveoli, which prevents the development of edema due to immobility. Taking a few steps with crutches can increase blood flow and improve microcirculation in the legs, which is important for preventing the development of deep vein thrombosis [161; pp. 47–53].

Research methods

military personnel during total hip arthroplasty and, first of all, to reduce the frequency and severity of arterial hypotension induced by the USA led us to use the technique of unilateral spinal anesthesia combined with epidural anesthesia and analgesia in the postoperative period .

0.5 in unilateral SA Prolongation of bupivacaine effect based on the use of a low-dose hyperbaric (7.5 mg) solution of 10% bupivacaine with opioids (fentanyl 20 μg) , as well as intrathecal was to study perioperativ hemodynamics and all other effects.

single- center , prospective, randomized study was conducted by us in the Department of Traumatology and Orthopedics of the Central Military Clinical Hospital of the Republic of Uzbekistan (MCCH) from 2021 to 2025 . In the INTERTECHNOMED Gavkhar private clinic, 40 military patients underwent total hip (n = 33) and knee (n = 7) joint replacement surgery using epidural and unilateral USA. Includes research materials conducted in combined conditions. Exclusion criteria: patients under 40 years of age , who refused spinal anesthesia, who had contraindications to CA (coagulopathy, hyperthermia > 38.0 C, allergy to local anesthetics, and who had undergone antiaggregant therapy for 5 days).

Purpose of the study

Developing the prevention of thromboembolic complications in military personnel and creating an algorithm for the prevention of thromboembolic complications among military personnel in the early period after hip and knee arthroplasty.

Research materials and methods

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

A distinctive feature of group II patients: approaching old age, more than 4 (95.0 %) are patients with high comorbidity, 58.1 of these patients % of the physical condition is ASA Class II and that is, the predicted complications and anesthesiological risk were high. Their Kettle index showed the characteristic of the state of normotrophy .

Table 3.12
Demographic characteristics and comorbidity index of this group II patients (n = 40).

Indicators	Value
Age , years	49.1 ± 2.9
Sex, A / E	4/36

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TVI , kg/m²		24.7
The side where the operation was performed , O' / Ch		16/24
Comorbidity index (n %) :	Up to 3	2 (24.7%)
	Up to 4	25 (60.4%)
	5 and above	13 (34.9%)
ASA class (n%)	I	15 (41.9 %)
	II	25 (58 , 1 %)

The most important cardiovascular comorbidities identified in the patients during the study were hypertension, chronic myocardial insufficiency , and varicose veins of the legs . Among other comorbidities in the patients, chronic pain syndrome was also noted
initial indicators of clinical blood tests did not differ from those of the previous group.
And in this group of patients, blood parameters such as Hb, Ht, and erythrocyte count Based on these indicators, we can speak of hypovolemia as a result of initial hemoconcentration. As for leukocytes, a tendency to the inflammatory process is observed, which is confirmed by subnormal values of leukocytes and neutrophils in bone pathology, which occurs in pain syndrome or systemic inflammatory syndrome as a result of hemoconcentration.

Table 3.13

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

Indicators	Before the operation	After the operation	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
Lymphocytes 10^{9}/l	1.52 ± 0.27	1.33 ± 0.19	0.05

Although the number of lymphocytes did not go beyond the level of physiological norms, it was still close to the minimum numbers and after surgery, it decreased even more, although not significantly (12.5 % P > 0.05). However, in general, we can testify to the low immune status of these patients. After the operation, the number of red blood cells returned to the physiological norm. After the operation, the number of leukocytes slightly increased (10.7 % ha) P>0.05).

Table 3.14

Preoperative and postoperative hemostasis parameters of military personnel of group II (n = 40).

Indicators	Before the operation	After the operation	P
Fibrinogen, g/l	4.39 ± 0.21	4.27 ± 0.30	>0.05

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Platelets , 10^9/l	172.9 ± 2.7	159.4 ± 3.2	<0.05
Prothrombin time, sec	11.5 ± 1.1	12.6 ± 1.3	>0.05
Partially activated thromboplastin time (AChTV), sec	29.4 ± 0.7	31.9 ± 1.2	>0.05
Blood transfusion time , min	4.06 ± 0.04	5.13 ± 0.07	<0.05

In general, Preoperative preparation of patients in this group corresponds to the protocol adopted in our clinic, described in the "Research materials and methods" chapter of the thesis. However, the obtained preliminary data of hemostasis forced us to make some corrections. Preoperative hydration 1.5 - 2 liters 5 % glucose solution and electrolytes. Anticoagulant therapy was initiated with 7500 IU of unfractionated heparin administered subcutaneously twice daily 12-24 hours before surgery .
who were receiving oral anticoagulant therapy prior to hospitalization were prescribed 5 mg of intravenous vitamin K followed by three doses of heparin to correct activated partial thromboplastin time (APTT).
In the operating room, 15 minutes before the spinal puncture, patients in the previous group received 0.5 mg of bupivacaine. Considering that arterial hypotension was observed within 30-15 minutes after intrathecal administration of 7.5 mg of a % solution , all patients in this group were previously administered 5 ml/kg as infusion therapy during the CA procedure. Hydroxy starch 130/0, 4 and 5 mg of ephedrine drug and 0.8-1.0 mg/kg of prednisolone were sent slowly intravenously.
Operation, including ECG recording, pulse oximetry, non- invasive measurements of blood pressure It was done every 3 minutes for 30 minutes, then every 5 minutes.
Sedation in order not to affect the cognitive function of patients during the operation The technique of performing unilateral USA in combination with epidural puncture and catheterization is described in detail in Chapter II of the dissertation.
Again, total hip and knee arthroplasty We believe it is necessary to reiterate that for long and traumatic operations, such as those performed in the past, a low dose of hyperbaric bupivacaine, 7.5 mg, was administered intrathecally. Therefore, 20 μg of fentanyl was administered intrathecally to prolong the effect of bupivacaine. The local anesthetic infusion with fentanyl was administered slowly over a period of 60–120 seconds without CSF aspiration to avoid air bubbles and turbulence that could lead to bilateral SA . was conducted [42; 245-248-b].

Discussion

The presented data is a reduction in blood clotting time (compared to the minimum values of this indicator in the norm by 20 by %), increased fibrinogen values, prothrombin time and partially activated thromboplastin time indicated initial activation of the blood coagulation system. At the end of the operation, almost all the studied indicators approached the norm, with the exception of the platelet count, which by the end of the operation, the platelet count was 7.9 % (P <0.05), which is due to blood loss during surgery and the effect of infusion therapy (hemodilution) was related to. The cognitive function of all patients was evaluated during the preoperative examination.

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Conclusions.

1. Preoperative hydration 1.5 - 2 liters 5 % glucose solution and electrolytes. Anticoagulant therapy was initiated with 7500 IU of unfractionated heparin administered subcutaneously twice daily 12-24 hours before surgery.
2. Who were receiving oral anticoagulant therapy prior to hospitalization were prescribed 5 mg of intravenous vitamin K followed by three doses of heparin to correct activated partial thromboplastin time (APTT) .

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