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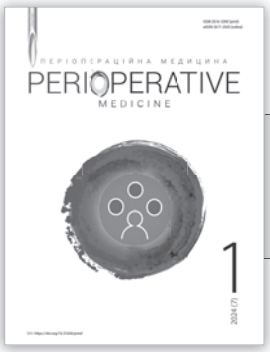

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Improving the Quality of Postoperative Recovery of Elderly and Senile Patients with Circulatory Insufficiency

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A comparison of prolonged epidural analgesia (PEA) with conventional on-demand analgesia in geriatric patients with circulatory insufficiency (CI) who underwent surgery on the lower extremities demonstrated a pronounced opioid-sparing effect in them in the postoperative period. PEA in the postoperative period is indicated mainly in elderly and senile patients with limited cardiovascular system reserves, as epidural anaesthesia significantly reduces the risk of cardiac complications in this patient population.

Keywords: *elderly and senile age, prolonged epidural anesthesia, postoperative analgesia, heart failure.*

Postoperative analgesia of lower extremity surgeries in geriatric patients with heart failure belongs to one of the most difficult and far from fully solved problems of modern anesthesiology.

Naturally, such patient population requires a personalized approach to the choice of the method of postoperative adequate anesthesia, whose main requirement is to ensure the quality and safety, as well as hemodynamic stability. Early mobility and postoperative rehabilitation with minimal pain and discomfort are among the most important and desirable features of modern surgery and anesthesiology.

One of the leading constituents of successful rehabilitation of elderly and senile patients with concomitant diseases of the cardiovascular system and circulatory insufficiency after lower extremity surgeries is adequate anesthesia. The most effective way to control acute postoperative pain is prolonged epidural analgesia [2, 4, 3, 7], which provides not only reliable block of pain afferent input from the surgical site, but also segmental sympathetic block, which significantly contributes to the stabilization of hemodynamics [1, 6, 5, 8]. During PEA in the postoperative period in geriatric patients undergoing the lower extremity surgery corresponds to modern ideas about the mechanisms of spinal nociceptive input block and the principle of multimodal anesthesia. This method is particularly suitable for patients with low levels of cardiovascular reserve, volume depletion, in elderly and senile patients.

Objective

To evaluate the efficacy of postoperative anesthesia outcomes during PEA and conventional analgesia method.1

Material and Methods

We reviewed the postoperative period in 45 patients aged 65 to 90 years (mean age was 78 ± 8 years) with CI (NYHA functional class II–III) due to coronary heart disease, multifocal atherosclerosis, postinfarction cardiosclerosis. Patients underwent surgery to eliminate traumatic lower extremity injuries and their consequences.

Depending on the postoperative anesthesia method, the studied patients were divided into 2 groups. 20 patients made up the main group, who were treated with prolonged epidural analgesia in the postoperative period. For prolonged epidural analgesia, we used a three-component mixture (0.5% bupivacaine (Longocaine) 2 mg/kg; fentanyl 2 μg/mL; adrenaline 2 μg/mL). The control group consisted of 25 patients whose anaesthesia in the postoperative period was based on standard systemic analgesia alone. Medications were administered as requested by the patients.

The level of puncture — epidural catheterization corresponded to L2–L3.

All patients in the control group were treated with standard systemic analgesia, which included a combination of NSAIDs (ketoprofen 100 mg once daily) and paracetamol (1 g thrice daily) during the first day postoperatively with subsequent correction of the frequency and doses of the above medications depending on the severity of pain syndrome, and administration of opiates (morphine 1%, promedol 2% subcutaneously or intramuscularly).

In the preoperative period, all patients were instructed in the use of the 10-point VAS.

Standard monitoring of the vital signs (ECG, BP, HR, RR, SpO2), assessment of daily diuresis was performed within 72 h postoperatively. ECG was also used to examine central hemodynamics, assess the degree of sedation, and record the incidence of complications and side effects. Study phases: preoperatively, 2–3 h after the onset of anesthesia, 24, 48 and 72 h later.

The obtained data were processed by the method of variation statistics using Student's t-test (using Microsoft Excel software).

Results and Discussion

The preoperative intensity and severity of pain syndrome in patients of the compared groups were almost similar.

In the postoperative period already after 2–3 hours in group 1 of patients with PEA the sensation of pain even at rest by 31.1 % was less pronounced than in group I2. HR was 90.4±2.8 — 92.6±2.1 per min, average dynamic arterial pressure (ADAP) was 110.2±3.6–112.3±3.2 mm Hg. All hemodynamic signs of moderate heart failure were noted (Table). Peripheral vascular resistance (PVR) was elevated, urine output corresponded to oliguria, indicating severe spasm of peripheral vessels. In 15 (39.5%) patients, ST interval inversion below the isoline was recorded. All patients had hypokinetic circulation.

In 2–3 h after the onset of anesthesia under the maximum effect of postoperative analgesia, the studied hemodynamic parameters improved: there was a significant decrease in HR, a decrease in ADAP and PVR, a trend towards an increase in single and minute cardiac output. These changes were significantly more evident in group 1 patients. When PEA was used, patients by this time point had a 19.6% and 20.7% decrease in ADAP and PVR, respectively, and an 8.5% decrease in HR. Using the conventional postoperative anesthesia, ADAP and PVR decreased only by 7.7 and 10.9%, and HR decreased only by 4.4%. At the same time, in Group 1, ST interval inversion below isoline was maintained only in 4 patients, and in 7 patients in Group 2, which indicates a more effective recovery of perfusion in the problematic organs, in particular myocardium, under moderate preganglionic blockade caused by PEA.

The most important criterion compared in this section is the severity of pain syndrome, it was characteristic in absolute majority of cases for group 2 patients, whose pain at the first 3 days postoperatively at study phases was not lower than 4 points, which affected their lower activation and prolongation of their stay in ICU by 19.4±3.1 hours. Prolonged epidural analgesia is well in line with the concepts of FT (fast track) and ERAS (Enhanced Recovery After Surgery) aimed at the earliest possible activation and discharge from hospital.

Thus, in group 2 patients moderate hypertension, increased PVR, oliguria persisted, indicating persisting spasm of peripheral vessels and associated organ disorders. In group 1 patients influenced by moderate segmental sympathetic block, spasm of peripheral vessels and related organ disorders practically resolved during this period, as evidenced by the decrease in PVR to 1970.6±50.4 dyne.s.cm^5, increase in hourly diuresis to 46.3±1.9 mL/h, decrease in the number of patients with ST interval inversion below isolation to 2.

After 48 and 72 h from the time of PEA use, hemodynamic stability occurred in group 1 patients. The studied hemodynamic parameters approached the initial preoperative values. Adequate urine output was restored. Only 1 patient maintained ST interval inversion below isolation. During the same period, the functional state of the cardiovascular system in group 2 patients recovered significantly slower, spasm of peripheral vessels and related organ disorders were partially persisted.

Note. The numerator contains data from group 1 patients and the denominator contains data from group 2 patients. P < 0.05: a = compared with baseline; b = compared with the previous stage; c = compared with group 1.

The comparative data we obtained give us reason to doubt the efficacy of standard analgesia. The use of only systemic standard analgesia for postoperative anesthesia, in geriatric patients with a high risk of severe hemodynamic disorders, can be considered ineffective.

There were no fatalities related to postoperative anesthesia methods.

Conclusion

Thus, PEA provides effective postoperative anesthesia in geriatric patients with circulatory insufficiency. The combination of local anesthetic with minimal doses of morphine administered epidurally during prolonged epidural analgesia in the postoperative period best meets modern ideas about the mechanisms of spinal nociceptive input block and the principle of multimodal anesthesia.

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Table 1. Parameters of the functional state of the cardiovascular system in elderly and senile patients in the postoperative period.

Parameter	Study phase				
	I	II	III	IV	V
HR, per min	90.4±2.8	82.8±1.4 av	83.6±1.2 a	78.6±1.3 ac	78.8±1.9 a
	92.6±2.1	88.6±1.9 c	86.8±1.3 a	82.4±2.4 a	80.3±2.1 a
ADAP, mmHg	112.3±3.6	90.3±2.1 ac	86.2±2.6 ac	86.4±2.1 ac	86.4±2.2 a
	110.2±3.2	101.8±2.5 ac	98.4±1.9 ac	93.1±1.8 abc	90.8±2.4 a
CI, L/v2^min	1.97±0.08	2.06±0.1	2.12±0.12	2.07±0.09	2.12±0.11
	1.91±0.06	1.99±0.09	2.01±0.11	1.96±0.1	2.01±0.12
PVR, dyne*s*cm5	2682.3±71.3	2128.3±40.8 ac	1970.6±50.4 abc	2022.9±48.3 ac	1955.4±42.3 ac
	2796.2±80.3	2493.5±65.4 ac	2315.3±60.3 ac	2311.4±52.4 ac	2196.4±42.4 ac
Urine output, mL/h	20.1±2.3		46.3±1.9 ac	52.3±2.2 abc	53.9±2.1 ac
	20.6±3.2		32.1±2.5 ac	41.4±3.4 abc	46.8±1.6 ac
ST interval depression, number of observations	8	4	2	1	1
	7	7	6	3	2

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Поліпшення якості післяопераційної реабілітації хворих похилого і старечого віку з недостатністю кровообігу

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Резюме. Порівняння *пролонгованої епідуральної аналгезії (ПЕА) з традиційною аналгезією на вимогу у геріатричних хворих з недостатністю кровообігу (НК), що перенесли операції на нижніх кінцівках, продемонструвало виражений опіоїдозберігаючий ефект у них у післяопераційному періоді. ПЕА у післяопераційному періоді показана переважно у хворих похилого та старечого віку з обмеженими резервами серцево-судинної системи, оскільки епідуральна анестезія суттєво знижує ризик кардіальних ускладнень у даної категорії пацієнтів.*

Ключові слова: *літній та старечий вік, пролонгована епідуральна анестезія, післяопераційне знеболювання, серцева недостатність.*