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SECTION 22.
MEDICAL SCIENCES AND PUBLIC HEALTH

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THE ROLE OF EARLY COMBINED USE OF TRANSEXAMIC ACID AND ETAMSYLATE IN REDUCTION OF BLOOD LOSS FROM THE PLEURAL CAVITY IN THORACIC TRAUMA

Background. Chest injuries occur in polytrauma in approximately 60% of cases, with hemothorax most often resulting from chest trauma. The estimated incidence of trauma-related hemothorax in the United States approaches 300,000 cases per year [1]. In severe cases of chest trauma, blood loss into the pleural cavity can reach 1500 ml. Moreover, subsequently the rate of this blood loss can reach 250-200 ml per hour [1-3]. Drainage of the pleural cavity, inflation and straightening of the lungs help reduce the rate of blood loss. However, the desired effect does not always occur [1, 2, 4]. To stop bleeding, transfusions of fresh frozen plasma and intravenous tranexamic acid are most often used [1, 4, 5]. Tranexamic acid had used not only intravenously. There are reports of successful administration of tranexamic acid into the pleural cavity to stop bleeding [5, 6]. Etamsylate is another drug that helps stop bleeding. Ethamsylate (2,5-dihydroxy-benzene-sulfonate diethylammonium salt) is a synthetic hemostatic drug indicated in cases of capillary bleeding. Ethamsylate acts on the first step of hemostasis by improving platelet adhesiveness and restoring capillary resistance. Recent studies showed that ethamsylate promotes P-selectin-dependent, platelet adhesive mechanisms. Experts often use this drug in gynecological patients [7]. We believe that this drug can be to use successfully in patients with polytrauma, including those with thoracic trauma. We already have positive experience with the successful use of etamsylate in patients with polytrauma, without complications from the administration of the drug. We have reports of successful combined use of tranexamic acid and etamsylate in pediatric surgery to control bleeding [8]. We set the goal of our comparatively study the effectiveness of the use of tranexamic acid and the combination of tranexamic acid with etamsylate in patients with thoracic trauma and the presence of hemopneumothorax.

Materials & methods. We included in the study 40 patients with thoracic trauma who required drainage of the pleural cavity due to the increase in hemopneumothorax. All patients in our study were men. We provided surgical intervention with intravenous anesthesia using ketamine (100-200 mg), diazepam (10 mg) and morphine (10 mg). Additionally, for pain relief we used metamizole sodium at a dose of 1000 mg. Patients received premedication with atropine sulfate (0.2-0.3 mg) and metoclopramide (10 mg). For fluid resuscitation and hemodynamic stability support we used Ringer's solution infusions. For arterial hypotension, when the systolic blood pressure in patients decreased to 80 mm Hg, we used dexamethasone at a dose of 12-20 mg.

We prescribed tranexamic acid to all patients immediately and administered it at a dose of 1000 mg by rapid drip in 200 ml of normal saline. In 20 patients, in addition to all these measures, we used intravenous etamsylate at a dose of 1000 mg. We also administered tranexamic acid to all our patients after surgery, increasing the dose to 1000 mg over the next 6 hours. For those who received etamsylate during surgery, we additionally administered it over the next 24 hours at a dose of 1000-2000 mg [9]. The volumes of fluid load in patients who received only tranexamic acid and in patients who received tranexamic acid and etamsylate during surgery and during the day were comparable. We assessed the effectiveness of hemostatic therapy by comparing the volume of fluid loss through the drainage of the pleural cavity, as well as based on monitoring changes in hemoglobin and hematocrit in patients with thoracic trauma. We also determined the level of fibrinogen A in all patients after surgery.

Results. Upon admission to the operating room, the hemoglobin concentration in the blood of patients with thoracic trauma who received only tranexamic acid was 14.14±0.72 g/dl. Upon admission to the operating room, the hemoglobin concentration in the blood of patients with thoracic trauma who received combined treatment with tranexamic acid and ethamsylate was 14.07±0.71 g/dl ($p>0.05$). After 24 hours, the hemoglobin concentration in patients who received tranexamic acid decreased to 11.74±0.72 g/dl. At this time, the hemoglobin concentration in the blood of patients who received tranexamic acid with etamsylate reached 12.47±0.71 g/dl ($p=0.0025$). Fluid losses from pleural cavity drainage in patients who received only tranexamic acid were 213.5±29.4 ml. With the combined use of tranexamic acid and etamsylate, losses in the drainage of the pleural cavity were significantly lower and amounted to 166.5±25.4 ml ($p<0.001$). The concentration of fibrinogen A in patients of both groups did not exceed 0.4 g/dl and was in the range of 0.16-0.4 g/dl. We did not find any significant differences.

Conclusion. The combined use of tranexamic acid and etamsylate showed greater effectiveness of hemostatic therapy in patients with thoracic trauma and the presence of hemopneumothorax. This therapy had no side effects in any of the patients. We consider the combined use of tranexamic acid and etamsylate to be promising to reduce blood loss in surgery and intensive care.

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