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COMPARATIVE ANALYSIS OF METHODS OF INTRAOPERATIVE HEMOSTASIS IN TRAUMATIC INTRACRANIAL HEMORRHAGES

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Abstract.

Severe traumatic brain injury is the leading cause of death among people under 45 years of age. For the most part, this is due to a compressive mechanism (mainly intracranial hematoma), leading to edema and swelling of the brain, as a result of acute cerebral insufficiency. The aim of this study was to compare and identify the advantages and disadvantages of various topical hemostatic agents. To do this, we studied the data of 184 patients with intracranial hemorrhages of various depths and localizations. Intraoperative and immediate results of hemostasis and postoperative complications were evaluated, and the advantages and disadvantages of the techniques were identified.

Key words: traumatic brain injury, intracranial hematoma, intraoperative hemostasis, hemostatic collagen sponge, hemostatic powder.

KALLA SUYAGI ICHI TRAVMATIK QON KETISHLARDA INTRAOPERATSION GEMOSTAZ USULLARINI QIYOSIY TAXLILI

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Annotatsiya

Bosh miya og'ir jarohatlari 45 yoshgacha bo'lgan odamlar o'limining asosiy sababidir. Ko'pincha, bu o'tkir miya yetishmovchiligi natijasida miyaning shishishiga olib keladigan bosim mexanizmi (asosan kalla ichi gematoma) bilan bog'liq. Ushbu tadqiqotning maqsadi turli xil gemostatik vositalarning afzalliklari va kamchiliklarini solishtirish va aniqlash edi. Buning uchun biz turli xil chuqurlikdagi va lokalizatsiyadagi kalla ichi gematomalari bo'lgan 184 bemorning ma'lumotlarini o'rgandik. Gemostazning intraoperativ va yaqin natijalari va operatsiyadan keyingi asoratlar baholandi, texnikaning afzalliklari va kamchiliklari aniqlandi.

Kalit so'zlar: travmatik miya shikastlanishi, intrakranial gematoma, intraoperativ gemostaz, gemostatik kollagen shimgich, gemostatik kukun.

СРАВНЕНИТЕЛЬНЫЙ АНАЛИЗ МЕТОДОВ ИНТРАОПЕРАЦИОННОГО ГЕМОСТАЗА ПРИ ТРАВМАТИЧЕСКИХ ВНУТРИЧЕРЕПНЫХ КРОВОИЗЛИЯНИЯХ.

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Аннотация.

Тяжелая черепно-мозговая травма является ведущей причиной смерти среди лиц моложе 45 лет. В большинстве своем это обусловлено компремитирующим механизмом (в основном внутричерепной гематомой), ведущим к отеку и набуханию головного мозга, как следствие острой церебральной недостаточности. Целью данного исследования было сравнение и выявление преимуществ и недостатков различных местных гемостатиков. Для этого нами изучены данные 184 пациентов с внутричерепными кровоизлияниями различной глубины и локализации. Оценены интраоперационные и ближайшие результаты гемостаза и послеоперационные осложнения, а также выявлены преимущества и недостатки методик.

Ключевые слова: черепно-мозговая травма, внутричерепная гематома, интраоперационный гемостаз, гемостатическая коллагеновая губка, гемостатический порошок.

The relevance of research. Surgical removal of intracranial hematomas is one of the main options for treating traumatic brain injury. In modern neurosurgery, one of the unsolved problems is the problem of achieving hemostasis after the main stage of the operation [2, 3]. This is due to the fact that it is undesirable to carry out excessive coagulation, clipping or ligation of vessels in the area of the brain tissue, as well as to use local hemostatic agents that retain their structure for a long time and often provoke the development of a local inflammatory process [1, 4].

The purpose of the study was to conduct a comparative analysis of methods of intraoperative hemostasis based on clinical data.

Material and research methods. The material of the study was the data of 184 patients with traumatic intracranial hemorrhages. The patients were hospitalized immediately after the injury or were admitted through the air

ambulance to the neurosurgery department of the Andijan branch of the Republican Scientific Center for Emergency Medical Care. The age of the studied patients ranged from 18 to 85 years according to the WHO age classification (WHO, 2017). The mean age was 43.8±10.6 years. Among the studied patients, 162 (88%) were men, 22 (12%) were women. The main group (96 patients) consisted of patients who underwent intraoperative hemostasis using Hemoben powder during surgery, patients in the comparison group (88 patients) - a collagen hemostatic sponge.

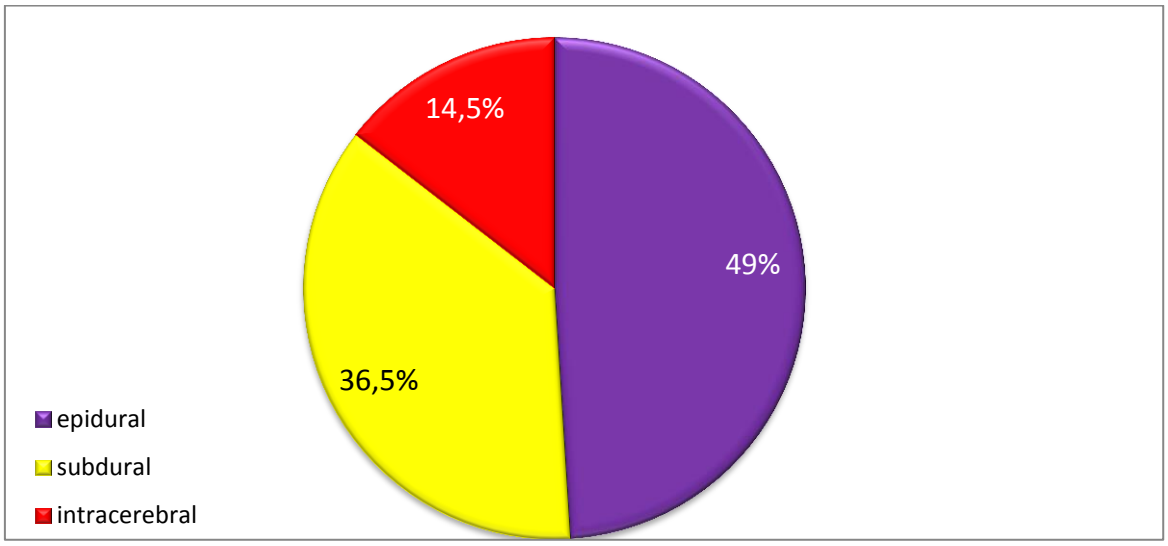

Figure 1. Distribution of patients in the comparison group according to the type of intracranial hematoma.

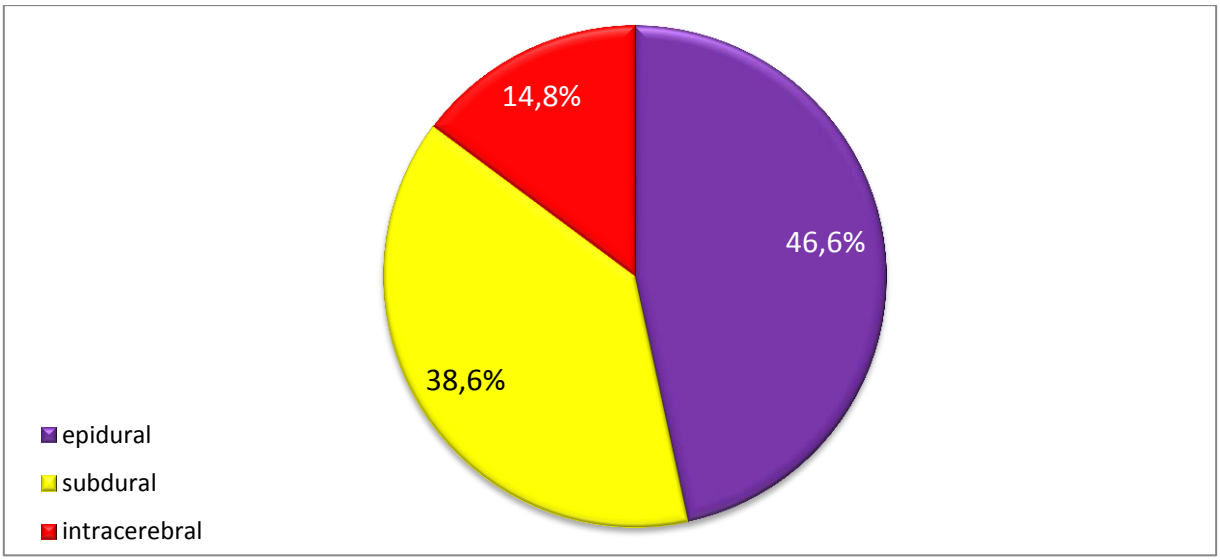

Figure 2. Distribution of patients in the main group according to the type of intracranial hematoma.

All patients underwent surgical removal of intracranial hematoma with intraoperative use of local hemostatics.

Results and its discussion. Bleeding intensity was assessed using the Lewis KM et al. (2017), where 0 points - no bleeding, 1 point - diapedetic hemorrhage, 2 - extensive bleeding.

After performing the main stage of the operation in patients in the comparison group, this indicator was 0 points (no bleeding) only in 8.3% of patients, in the main group 6.8%.

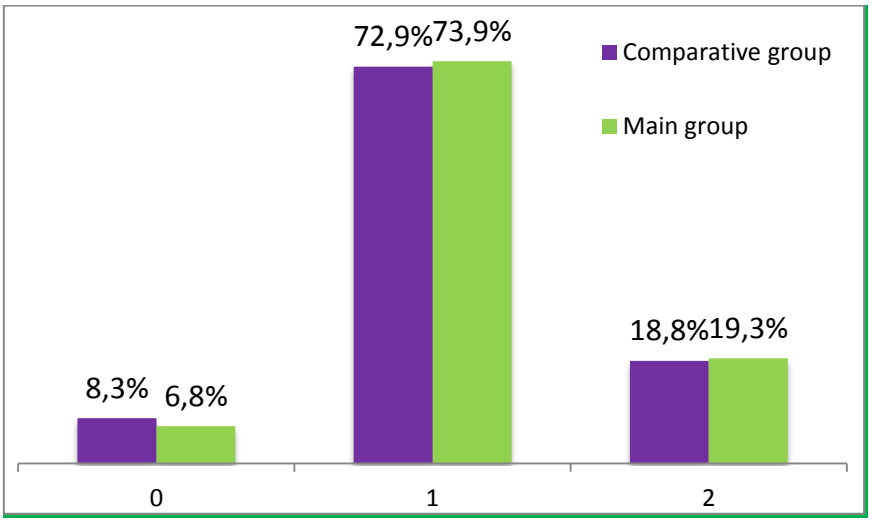

Figure 3. Estimation of bleeding intensity according to Lewis K.M. et al. (2017) after the main stage of the operation

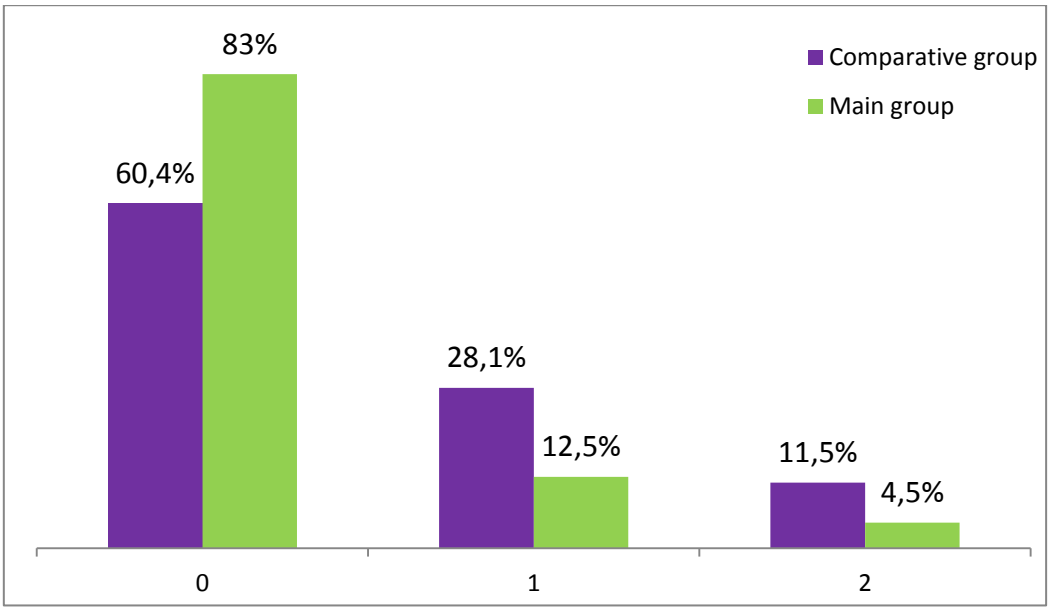

Figure 4. Assessment of bleeding intensity after the first stage of local hemostasis

To achieve complete hemostasis in patients in the comparison group, on average, it took 1.5±0.7 stages, and in the main group this figure decreased to 1.2±0.4.

The assessment of bleeding intensity after the first stage of local hemostasis is shown in the following diagram.

As can be seen from the diagram, complete hemostasis (0 points on the scale) was achieved in 73 patients (83%) in the main group, while in the comparison group this figure was 60.4% on the intraoperative bleeding severity scale. Diapedetic bleeding (1 point on a scale) after the first stage of local hemostasis in patients in the main group was 12.5% (in 11 patients) and in the comparison group it was 28.1% (in 27 patients).

The total duration of achieving intraoperative hemostasis was less than 5 minutes in the main group in 64 (72.2%) patients and in the comparison group in 51 patients (53.1%). In 23 (26.1%) patients in the main group and in 31 patients (32.3%) in the comparison group, the duration of hemostasis was from 5 to 10 minutes, and in 10 (10.4%) patients in the comparison group, the duration of hemostasis took 10-15 minutes, and in the main group only in one patient (1.1%). In 4 patients (4.2%) in the comparison group, this stage took more than 15 minutes, while in the main group there were no such patients.

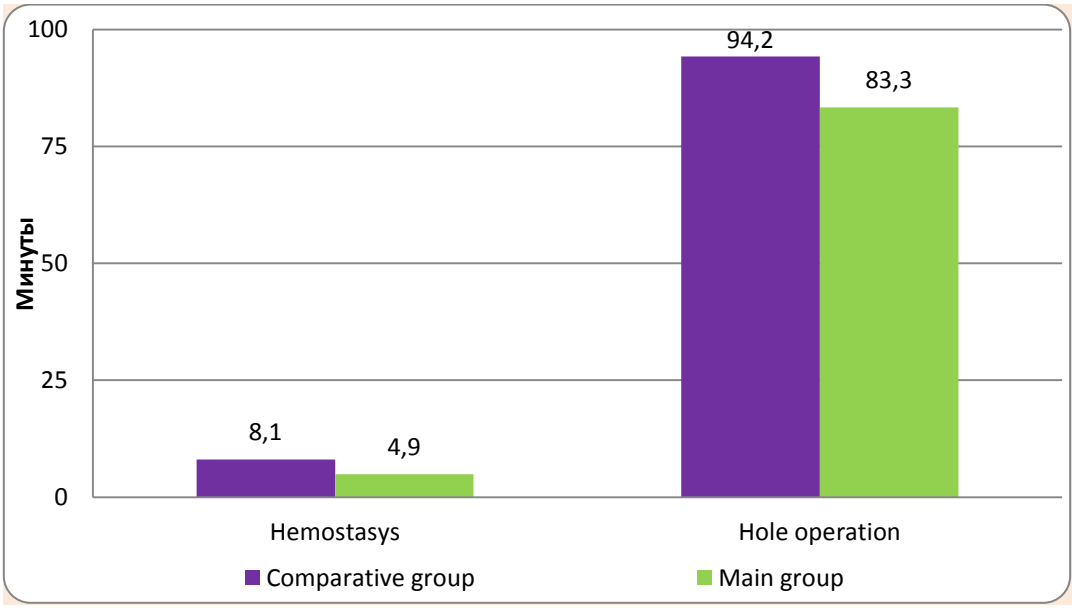

Figure 5. Duration of the hemostasis stage and the whole operation (min: M±δ)

As we can see from this diagram (Fig. 5), the duration of the hemostasis stage was 8.1±4.9 minutes in patients of the comparison group, while in the main group this indicator was 4.9±1.2 minutes, thus the total time of the

operative intervention decreased from 94.2±35.5 minutes in the comparison group to 83.3±32.2 minutes in the main group.

The total volume of intraoperative blood loss in the comparison group was 397.9±43.1 ml, while in the main group it was 376.3±39.5 ml; group - 62.8 ml ± 20.8. At the stage of access to the hematoma, the volume of blood loss in the comparison group was 264.2±29.9 ml, in the main group - 259.1±25.1 ml, blood loss indicators already at the main stage in the comparison group amounted to 70.2±16.6 ml, while in the main group this figure was 54.4±15.1 ml, thereby achieving less blood loss at all stages.

Conclusions. The use of the domestic drug Hemoben in operations in patients with traumatic intracranial hemorrhages, already at the first application according to the proposed method to the wound surface of the brain tissue, made it possible to significantly reduce the intensity of parenchymal bleeding with an increase in the frequency of achieving one-stage absolute hemostasis (0 points on the Lewis KM et al. scale) with 60.4% to 83.0% ($\chi2=11.395$; df=2; p=0.004).

Also, the new method made it possible to reduce the number of hemostatic stages from 1.5±0.7 to 1.2±0.4 (t=3.74; p<0.05), reduce the need for additional hemostasis agents (electrocoagulation, hemostatic sponge, temporary compression with a gauze pad with hot saline) from 39.6 to 17.0% ($\chi2=15.717$; df=3; p=0.002), duration of the entire hemostasis stage from 8.1±4.9 to 4.9 ±1.9 minutes (t=5.83; p<0.05) and to reduce the volume of blood loss at the stage of hemostasis from 70.2±16.6 to 54.4±15.1 ml (t=6.77; p <0.05).

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