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Comparison 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.

Keywords Traumatic brain injury, Intracranial hematoma, Intraoperative hemostasis, Hemostatic collagen sponge, Hemostatic powder

1. Introduction

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

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

2. Material and Research Methods

The study material included data from 184 patients with traumatic intracranial hemorrhage. The patients were hospitalized immediately after the injury or were admitted via air ambulance to the neurosurgery department of the Andijan branch of the Republican Scientific Center for Emergency Medical Care. The age of the study patients ranged from 18 to 85 years, according to the WHO age classification (WHO, 2017). The average age was 43.8±10.6 years. Among those studied 162 (88%) patients were men, 22 (12%) were women. The main group (96 patients) consisted of patients who, during surgery, underwent intraoperative hemostasis using Hemoben powder; patients in the comparison group (88 patients) received a collagen hemostatic sponge.

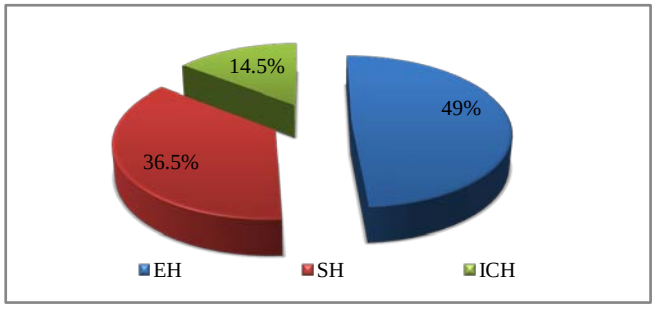

Figure 1. Distribution of patients in the comparison group by type of intracranial hematoma

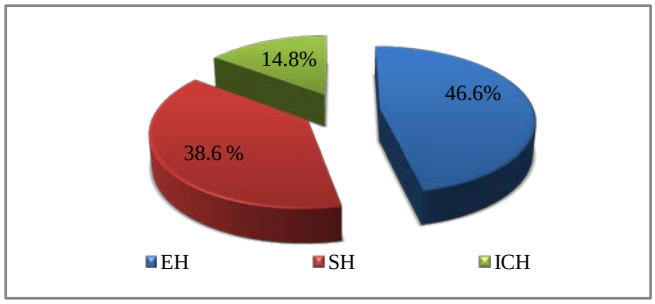

Figure 2. Distribution of patients in the main group by type of intracranial hematoma

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

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3. Results and Its Discussion

The intensity of bleeding was assessed using the Lewis KM et al. (2017), where 0 points – no bleeding, 1 point – diapedetic hemorrhage, 2 – extensive bleeding.

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

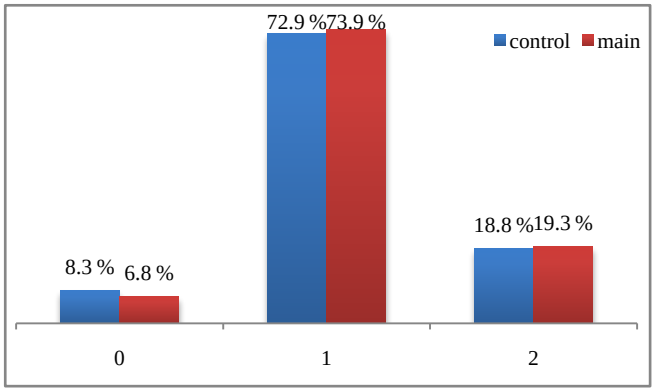

Figure 3. Assessment of bleeding intensity according to the Lewis KM et scale al. (2017) after completing the main stage of the operation

To achieve complete hemostasis in patients in the comparison group, an average of 1.5±0.7 stages were required, and in the main group this figure decreased to 1.2±0.4.

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

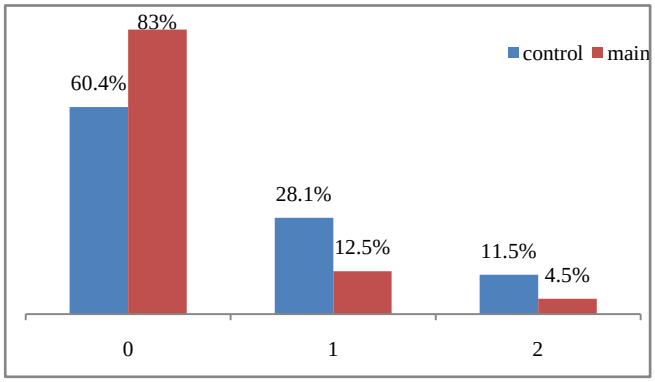

Figure 4. Assessment of bleeding intensity after the first stage of local hemostasis

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 scale of severity of intraoperative bleeding. Diapedetic bleeding (1 point on the scale) after the first stage of local hemostasis in patients in the main group was observed in 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%) 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 there were no such patients in the main group.

As we can see from this diagram (Fig. 5), the duration of the hemostasis stage was 8.1 ± 4.9 minutes in patients in the comparison group, while in the main group this figure was 4.9 ± 1.2 minutes, thereby the total surgical time intervention decreased from 94.2± 35.5 minutes in the comparison group to 83.3 ± 32.2 minutes in the main group.

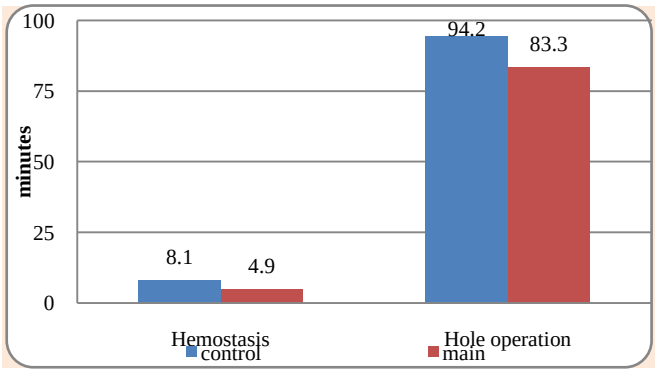

Figure 5. Duration of the hemostasis stage and the entire operation (min: M±δ)

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, of which the hematoma volume in the comparison group was 63.6 ± 19.2 ml and in the main group 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 already at the main stage in the comparison group was 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.

4. Conclusions

The use of the domestic drug Chemoben during operations on patients with traumatic intracranial hemorrhages, already at the first application according to the proposed method on the wound surface of 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.) from 60.4% to 83.0% ($\chi^2 = 11.395$; 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 the use of additional means for hemostasis (electrocoagulation, hemostatic sponge, temporary compression with a gauze pad with hot saline solution) from 39.6 to 17.0% ($\chi^2 = 15.717$; 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 reduce the volume of blood loss at the hemostasis stage from 70.2±16.6 to 54.4±15.1 ml (t =6, 77; p <0.05).

REFERENCES

[1] Del Verme J., Conti C., Guida F., Use of gelatin hemostatic matrices in patients with intraparenchymal hemorrhage and drug-induced coagulopathy. J Neurosurg Sci. 2019; 63: 737-742 https://doi.org/10.23736/S0390-5616.16.03362-2.

[2] Garza, N.; Toussi, A.; Wilson, M.; Shahlaie, K.; Martin, R. The Increasing Age of TBI Patients at a Single Level 1 Trauma Center and the Discordance Between GCS and CT Rotterdam Scores in the Elderly. Front. Neurol. 2020, 11, 112.

[3] Isakov, B. M., Mamadaliev, A. B., Khakimov, M. N., & Isakov, K. B. (2022). On the issue of surgical methods for the treatment of dislocation syndrome in supratentorial brain tumors. International journal of social science & interdisciplinary research ISSN: 2277-3630 Impact factor: 7.429,11 (04), 14-16.

[4] Nicoletti GF, Umana GE, Graziano F., Florio A., Scalia G. Repair of a spinal pseudomeningocele in a delayed postsurgical cerebrospinal fluid leak using titanium U-clips: technical note. Interdiscip Neurosurg Adv Tech Case Manag. 2020; 21: 100742 https://doi.org/10.1016/j.inat.2020.100742.

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