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Summary of Evaluation and Surgical Treatment of Hemorrhagic Stroke

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ABSTRACT

Stroke is one of the leading causes of death. Every 7th patient with stroke is of a hemorrhagic nature, from which the mortality rate is 35-40%, and disability is 75%, and 10% disabled are bedridden. The disease has social impact, as it is common among working-age population. In the past three decades, neurosurgeons conducted an active search for and introduction of new methods of treatment of primary intracerebral hematomas. That is, patients with extravasations have the most pronounced neurological deficit and require prompt action to eliminate it. Thus, the admission of patients to specialized neurosurgical department, the proper selection of patients for surgery, the use in surgery minimally invasive methods and usage of modern technologies postoperative mortality does not exceed 25%, and the time from diagnosis to the possibility of a complete rehabilitation therapy is 1.5-2 weeks.

Keywords: hemorrhagic stroke, spontaneous intracerebral hematomas, surgical treatment, brain.

INTRODUCTION

In the structure of total mortality, acute cerebrovascular accidents (CVA) in industrially developed countries currently occupy the second place [1,8]. Moreover, the ratio of ischemic and hemorrhagic stroke (GI) in the structure of ACVA is approximately 80–85% versus 15–20% [3,7,9,11]. Thus, the incidence of hemorrhagic stroke is 12-15 cases per 100,000 population [12]. Currently, GI means a wide range of diseases of non-traumatic genesis, which are accompanied by hemorrhage into the medulla, under its membranes or into the ventricular system. Depending on the etiological factor, GI is divided into primary and secondary. Primary GI occurs against the background of hypertension, it is most common and accounts for 70–90% of all cases of non-traumatic cerebral hemorrhages [10,13,15]. The causes of secondary GI are: rupture of arteriovenous malformation or aneurysm, brain tumors, coagulo- and vasculopathy, drug use, chronic alcoholism, septic conditions, uncontrolled use of anticoagulants [3,14]. Despite the constant development and introduction of new methods of diagnosis and treatment, acute (the first three days after the onset of the disease) mortality in HI remains unacceptably high and amounts to 38–74% [17]. Monthly mortality in case of GI is 44–52% (for comparison with ischemic stroke - 10–15%). Disability with HI reaches 70–80% [3, 11]. The number of surgeries performed for GI in different centers ranges from complete rejection of surgeries to 20% of activity, but every year it is steadily increasing, which, apparently, is due to unsatisfactory results of

conservative treatment [11, 14]. These results are most likely explained by the fact that the therapeutic treatment of GI is symptomatic rather than etiopathogenetic. Modern symptomatic treatment is aimed at normalizing cardiovascular and respiratory activity, the homeostasis system, combating the growth of cerebral edema, but not eliminating the effect of the pathological focus. The main goal of surgical treatment is the total removal of the intracerebral hematoma with minimal damage to the medulla [13]. This allows you to eliminate the toxic effect of biologically active substances that are formed as a result of the breakdown of blood cells and damaged brain tissue - proteolytic enzymes, serotonin, endothelin, histamine, norepinephrine, etc., which leads to a decrease in intracranial pressure, inhibits the progression of edema and, consequently , dislocation of the brain and ischemia of the medulla [10]. Operative treatment will be considered justified if it leads to a decrease in mortality and improves functional outcomes in comparison with the results of conservative treatment. It is believed that in order to obtain the best results of surgical treatment, surgery should be used only in 10% of patients with HI [14].

Open (microsurgical) method - a method of removal that includes craniotomy, encephalotomy and direct removal of intracerebral hematomas. The open method is currently used in the treatment of subcortical and lateral hemorrhages, as well as hemorrhages in the cerebellar hemisphere [10]. Surgical intervention is performed taking into account the location and size of the hematoma, as well as functionally significant areas of the cerebral cortex [10]. The technique of execution consists of successive stages: trepanation of the skull bones and opening the dura mater, then puncture of the intracerebral hematoma through the cerebral cortex with a trial aspiration of its liquid part is performed. After obtaining clots or lysed blood, encephalotomy 1.5–2 cm long is performed, then the medulla is moved apart with spatulas along the puncture needle bar-channel to the hematoma cavity. Under the control of magnifying optics, the remaining clots and the liquid part of the hematoma are removed, and hemostasis is also performed by electrocoagulation, hydrogen peroxide, and a hemostatic sponge [10, 15]. A modification of this method is access to intracerebral hemorrhage through the Sylvian fissure (for mixed and medial hemorrhages up to 80 cm3), which makes it possible to reduce mortality rates by 15.8% in comparison with conservative treatment [11]. For hemorrhages of deep localization, a transcallosal approach is also used [10], which allows to obtain a decrease in mortality by 11–15% compared with conservative treatment [14]. The disadvantage of this access is the possible formation of foci of "venous" strokes in the postoperative period and the development of "transient transcallosalmutism" [12]. To perform transcallosal and transylvian approaches, compared to projection encephalotomy, it takes much more time and requires mastering microsurgical techniques; therefore, such surgical interventions have not become widespread [14].

An absolute contraindication to surgical treatment is deep depression of consciousness (less than 7 points on the Glasgow coma scale), relative - age over 70-75 years, coagulopathy and other severe concomitant diseases (cardiovascular, renal-hepatic failure, diabetes mellitus in the stage of decompensation) ... The factors causing an unfavorable outcome in stroke surgery are the maximum diameter of the hematoma - more than 5 cm or the volume of more than 80 cm^3, accompanied by the development of coma, the presence of massive ventricular hemorrhage (more than 20 cm^3), transverse dislocation of the brain more than 8 mm, and the recurrent nature of the hemorrhage. GI surgeries can be divided into 2 groups: life-saving and functional. In the first case, the intervention is aimed at eliminating lesions of the vital structures of the brain (trunk), in the second - functionally important pathways, for example, the inner capsule. [2,17] Open operations (craniotomy, encephalotomy) are indicated in 3 cases: with subcortical hematomas, with cerebellar hematomas and with putamenal hemorrhages, in which the deterioration develops

rapidly - immediate decompression is required. In patients with subcortical and cerebellar hematomas, surgery is performed only after performing cerebral angiography and excluding vascular malformation.

Open surgery in them, as a rule, is not accompanied by significant surgical damage to the brain and does not lead to an aggravation of the neurological deficit, and in addition, it allows a full revision of the hematoma cavity and removal of possible angiographically negative malformation. In a previously compensated patient with a putamenal hematoma with a rapidly growing dislocation of the trunk, open surgery is considered as a stage of resuscitation and is aimed at saving life. In all other cases, the risk of death or gross neurological deficit after such an open intervention is the same as in conservative therapy [6, 7, 11, 12, 14]. Improvement of technologies in neurosurgery has made it possible to carry out operations that are less traumatic. These include operations involving puncture of a hematoma through a small trepanation hole and removing it at the same time using various aspirators or a neuroendoscope. In the latter case, after puncture and aspiration of the liquid part, a drainage is left in the hematoma, through which a fibrinolytic is injected for a certain time and lysed blood is removed. Such operations are now widespread. The use of a neuroendoscope allows the removal of a hematoma through a small opening, but under visual control [1, 2, 3, 10, 17].

Thus, during hospitalization of patients in specialized neurosurgical departments, the correct selection of patients for surgery, the use of minimally invasive interventions and modern technologies in stroke surgery, the postoperative mortality does not exceed, and the time from diagnosis to the possibility of full rehabilitation therapy decreases [1, 2, 3, 4, 5, 17].

Purpose of the study. Based on the study of the results of operations for hemorrhagic stroke, to optimize the indications for surgical treatment.

Materials and methods. At the Republican Specialized Scientific and Practical Center for Neurosurgery, 135 patients were treated for hemorrhagic stroke. Mixed hematomas dominated - 38 (28.1%), lateral - 26 (19.2%), lobar - 20 (14.8%) and medial - 21 (15.5%) hematomas complicated by breakthrough into the ventricular system 30 (22 , 2%) cases. The average volume of hematoma was 56.5–4.5 cm^3. Lateral dislocation of more than 5 mm was detected in 73.3% of patients. The analysis of the relationship between the severity of hemorrhage, the method of surgical treatment and the outcome of the disease was carried out.

Results. For a long time in the field of treatment of cerebral hemorrhages, a certain stagnation was observed, which in recent years was replaced by the rapid development of various methods of treating hemorrhages, mainly neurosurgical. Decompressive craniotomy was performed in 97 (71.8) cases. External decompression made it possible to effectively reduce intracranial pressure, which contributed to a significant decrease in mortality in the surgical group during the first week after surgery. Patients who underwent decompressive craniotomy were characterized by the greatest severity of the disease. Thus, the maximum size of the hematoma was 7.0 ± 0.2 cm, the volume of the hematoma was 74.6 ± 5.0 cm^3, the displacement of the midline structures was 9.6 ± 0.7 mm. These factors have left an imprint on the outcome of treatment of patients and the quality of life of survivors. In surviving patients, severe and deep disability was 27%, moderate - 8%, mild 14.3% of cases. Puncture-aspiration removal of hematomas was used in 11 cases. It should be noted that most of the operations performed on the first day were performed on the basis of the increasing hypertensive-dislocation syndrome. This allows us to recommend a delayed surgical intervention after stabilization, provided that there are no indications for emergency surgery due to the growing dislocation syndrome. Despite the significant lethality, surgical intervention, in general, provided a tendency to improve the results of treatment of patients in comparison with

the prognosis of the outcome of conservative treatment.

Conclusion. New approaches to the treatment of intracerebral hemorrhage will undoubtedly increase not only patient survival, but also improve their quality of life. However, a key role in the present and in the future should be played by rational prevention of hemorrhagic stroke, aimed primarily at correcting high blood pressure. Its effectiveness is very high: according to a number of international studies, the likelihood of developing cerebral hemorrhages, as well as mortality from them, can be reduced by almost half.

Thus, at present, the surgeon has a significant number of modern methods of surgical treatment of hemorrhagic strokes in his arsenal. Most of them are quite effective, contributing to a decrease in mortality, a decrease in disability and an improvement in treatment results compared to conservative treatment, since they are pathogenetic. The application of a specific technique depends on the type and size of intracerebral hemorrhage, the patient's condition, the presence of occlusive hydrocephalus, dislocation syndrome, blood breakthrough into the ventricular system, microsurgical skills of the surgeon and his technical equipment. Such a differentiated approach makes it possible to use the known advantages of these techniques and level their disadvantages. Surgical techniques for treating GI require further study and development. It is necessary to conduct an evidence-based comparison of their effectiveness in comparison with conservative treatment.

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