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THE EFFECTIVENESS OF ADDITIONAL METHODS OF DECOMPRESSION IN PATIENTS WITH SUPRATENTORIAL DISLOCATION OF THE BRAIN

Mitalip Mamytov[1]*, Ruslan Kadyrov[2] and Keneshbek Yrysov[3]
*[1,2,3]*Department of Neurosurgery, Kyrgyz State Medical Academy, Bishkek, Kyrgyz Republic*

Corresponding Author: -

Abstract: -

The aim of the study *is to evaluate the effectiveness of additional methods of external and internal decompression in patients with supratentorial dislocation in focal lesions of the cerebral hemispheres.*

Materials and methods: *A retrospective analysis of 219 cases of supratentorial compression of the brain in patients hospitalized in the Clinic of Neurosurgery of the National Hospital of the Kyrgyz Republic was conducted. In the main group of 143 observations, the assessment of the severity of dislocation syndrome according to our 12-point scale was performed; according to the results of this assessment, after the eradication of the focal lesions, additional methods of external and/or internal decompression were used. The drainage of the lateral ventricles and the one-sided wide infratemporal decompressive craniotomy in severe cases supplemented by the microsurgical resection of the mediobasal parts of the temporal lobe were performed.*

Results: *The analysis of the study showed an increase in unfavorable outcomes with the growth of the severity of DS. Thus, the gross residual effects found in stage I in 17.4% of the patients, in stage II were already found in 43.0%, and in stage IV - 69.4% of the observations. The group with fatal outcomes was even more demonstrative, which showed a clear increase in the number of deaths of patients as the severity of the dislocation progressed. Among patients with DS in stage I, 19.4% died, while in stage III - 32.1 %, and in stage V (the most severe) – 2 of 3 patients died, making up 66.7% of this group. The total number of deaths in both groups was 51 cases (23.2%); at that a significantly smaller percentage of failures of the treatment (p <0.05) was found in patients of the main group making up 20.2%, compared to 29.0% of the control group.*

Conclusion: *the findings of the clinical and instrumental examinations of patients in the postoperative period confirm the high effectiveness of methods of additional external and internal decompression, a high percentage of survival of patients in the main group and a decrease in the number of deaths in the treatment compared to the control group.*

Key words: *dislocation of the brain, decompressive craniotomy, microsurgical resection of the temporal lobe.*

ISSUE URGENCY

Dislocation syndrome in focal lesions of the brain is the displacement of the cerebral hemispheres and / or hemispheres of the cerebellum, leading to compression of the brainstem with subsequent disruption of vital respiratory and circulatory functions [1, 3, 12]. Progressive dislocation syndrome is the leading cause of adverse outcomes in all nosological groups of patients. Postoperative lethality in patients with brain damage accompanied by the development of acute dislocation syndrome is 60-80%, and in the case of failure of surgical treatment it reaches 100% [4, 7, 15, 18].

The displacement of the cerebral hemispheres or hemispheres of the cerebellum in the closed space of the cranial cavity under the influence of the mass effect of intracranial neoplasm, or the increase in the volume of the brain due to its edema, lead to the displacement of cerebrospinal fluid (CSF) from the cisterns of the base of the brain. As the acute dislocation syndrome progresses, the symptoms of the brain stem lesion of the underlying levels are noted and the focal and hemispheric symptoms gradually decrease [1, 3, 7, 11, 17].

Surgical intervention includes removal of the lesion focus, which is the main cause of intracranial hypertension, and a number of surgical procedures aimed at reducing the compression of the brainstem: decompressive trepanation of the skull with edema of the brain, overlapping of external ventricular drainage in acute occlusive hydrocephalus, partial resection of the temporal lobe temporal - tentorial herniation, etc. Delay of the operation worsens the outcome of treatment significantly due to the development of the necessary irreversible ischemic disorders and secondary hemorrhages in the brain stem [8, 12, 13, 16].

During a long period of time in the domestic and foreign neurosurgical schools, the degree of sufficient decompression of brain structures was determined by the presence (appearance) of brain pulsation [2, 6, 14]. To do this, even some criteria for visual assessment of the brain condition in the operating wound were determined: “the presence of brain pulsations”, “sluggish pulsation”, “absence of brain pulsation”, “bloating of the brain”. Undoubtedly, these criteria have a certain prognostic value, but in most cases, not being an indicator of the removal of temporal-tentorial or foramenal dislocation. Thus, Puras Iu.V. and Talypov A.E. in their works conducted on the basis of the SRI ambulance of N.V. Sklifosovsky clearly demonstrated the persistence of the infringement of the parahypocampal gyrus in the incision of the cerebellar outgrowth in a significant proportion of patients even after total removal of the substrate of compression of the brain and the appearance of a sufficiently distinct “cerebral pulsation”.

In view of the foregoing, in our work, based on pre-operative indicators of brain stem condition evaluation, according to the scale developed by us, additional methods of external and internal decompression were used, regardless of the intraoperative state of the brain.

Goal of the study is to evaluate the effectiveness of external and internal decompression methods in patients with supratentorial brain dislocation in focal lesions of the cerebral hemispheres.

Materials and methods

The study is based on an analysis of 219 cases of supratentorial compression of the brain in patients who were hospitalized in the Clinic of Neurosurgery of the National Hospital of the Kyrgyz Republic. According to the nosological representation, the patients were distributed as follows: 106 cases were neurooncological patients with a wide variety of histological forms, the second large group (65 patients) represented spontaneous intracranial hemorrhages, traumatic brain lesions, which included shell and intracerebral hematomas, were found in 25 observations, parasitic (Echinococcal) cysts of the brain in 8 patients, abscesses of the brain, mainly of an otogenic genesis, accounted for 12 cases in the observed group.

The main group of the study included 143 cases, the degree of dislocation syndrome was estimated according to the 12-point scale of severity evaluation of the brain stem lesion developed by us with the use of additional methods of external and internal decompression in cases of surgical treatment. A comparison group represented by 76 observations identical to the main group for nosological presentation and severity at the time of admission, was evaluated and treated according to the classical pattern with the directivity vector solely to remove the substrate of compression.

Out of outside decompression methods, external drainage of the lateral ventricles and wide decompression skull treating (DST), with TMO plastic was used at the patients of the main group. Combining the use of DST with selective microsurgical resection of the medio-partal regions of the temporal lobe, formed a group of patients with additional internal decompression.

On the graph of Figure 1, the ratio of patients in the comparison groups is displayed, depending on the treatment tactics used. Thus, conservative treatment was performed in the main group in 18 patients, in the comparison group in 14 cases, which amounted to 12.6% and 18.5%, respectively. In the main mass (2/3 of observations), the group of conservative treatment consisted of patients with I stage of the dislocation syndrome, who had a clear positive dynamic with a regression of the symptoms of the stem dislocation against intensive therapy, mainly in patients with spontaneous (much less often traumatic) intracranial hematomas. At the time of admission, 9 patients were in extremely severe, agonizing state, with signs of damage to the caudal sections of the stem, when the operative intervention was not possible due to the extreme instability of the vital functions. In the main observation group, in 50 patients (35.0%) with an evaluation of the degree of severity of the brain stem lesion with a score above 7, no additional methods of decompression of the brainstem were used, as the degree of dislocation of the hypocampal gyrus or amygdala of the cerebellum corresponded to the stage of protrusion or wedging according to the classification of Blinkov and Smirnov (1967). In 52.4% of the patients in the main group (75 cases) with a score of the severity of the brain stem lesion, the score was 7 points or lower, which morphologically corresponded to the infringement of the medio-partal areas in Bish gap and, accordingly, required additional methods of decompression of the cerebral stem.

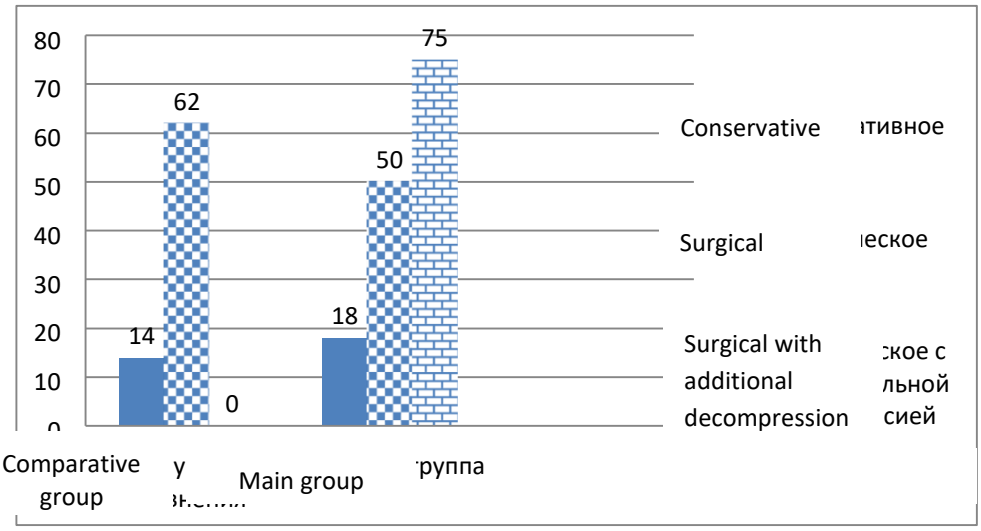

Fig. No. 1. Distribution of patients according to treatment options

Results and discussion

A comprehensive evaluation of the results of treatment is based on the classification of the outcomes of therapeutic tactics proposed by us in all the study groups.

Six subgroups of outcomes include:

- full recovery with regress of all the symptoms of the disease,
- recovery with the preservation of certain symptoms of the disease,
- minor residual effects of the disease,
- moderate residual effects of the disease,
- gross residual effects of the disease,
- death.

This classification is based on the postoperative course of the disease outcomes and the nearest catamnesis in conjunction with the assessment of the functional state of the results of treatment according to the Karnovsky scale.

As you can see from Table 1.0, the percentage of favorable outcomes in both comparison groups is fairly comparable and not high, due to the initially severe, often decompensated condition of patients in the entire observation group. Moderate residual events characterizing the presence of neurologic deposition and a 60-40% score according to Kanovsky were diagnosed in the main group in 25.1% of cases, which is almost 10% more frequent than in the comparison group. The data of the unfavorable results of treatment are indicative, where, as can be seen from the table, the coarse residual events of the disease with the patient's invalidisation revealed in one third of patients in both groups (31.0%) were more frequent in the comparison group (34.2%) than in the main group , where these effects were found in 30.0% of patients. The total number of deaths in both groups was 51 cases, (23.2%), while a significantly lower percentage of adverse outcomes ($p < 0.05$) was found in the patients of the main group, amounting to 20.2%, in relation to 29.0% of the comparison group.

Table 1.0: Patient distribution after treatment result

Result	Group 1 (n=76)		Group 2 (n=143)		Total (n=219)	
	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)
Complete recovery with regress of all symptoms	2	2.6	5	3.5	7	3.2
Recovery with the preservation of symptoms of the disease	6	7.9	9	6.3	15	6.8
Minor residual effects	8	10.5	22	15.3	30	13.7
Moderate residual effects	12	15.8	36	25.1	48	22.0
Gross residual effects	26	34.2	42	30.0	68	31.0
Death	22	29.0	29	20.2	51	23.2

Note: the differences are true (at $p < 0.05$) compared with the corresponding index in group 1

In our observations, the features of the increase in clinical signs of dislocation in the dynamics were noted, where 26.0% of cases noted the dislocation process increase from the date of admission to the hospital and to the outcome of treatment (discharge or death). The numerical and percentage relationship between the growth of a dislocation from the date of receipt and the discharge or death of patients on the basis of the classification of Kondakov E.N. used by (2008) were as

follows: Stage I DS - 103 (47.0%), Stage II Stage DS - 72 (32.9%), Stage III DS - 28 (12.8%), Stage IV DS - 13 (5 , 9%), V stage DS-3 (1.3%) patients.
Further calculation was carried out taking into account the increase in dislocation for reliable evaluation of the results of treatment and the outcome of severe craniocerebral trauma (Table 2).

Table 2.0 Results depending on the stage of dislocation

Results	I stage (n=103)		II stage (n=72)		III stage (n=28)		IV stage (n=13)		V stage (n=3)		Total (n=219)	
Complete recovery with regress of all symptoms	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)
Recovery with the preservation of symptoms of the disease	3	2.9	1	1.3	3	10.7	0	0	0	0	7	3.2
Minor residual effects	13	12.6	2	2.7	0	0	0	0	0	0	15	6.8
Moderate residual effects	23	22.3	3	4.1	4	14.2	0	0	0	0	30	13.7
Gross residual effects	26	25.2	17	23.6	3	10.7	2	15.3	0	0	48	22.0
Death	18	17.4	31	43.0	9	32.1	9	69.2	1	33.3	68	31.0
Complete recovery with regress of all symptoms	20	19.4	18	25	9	32.1	2	15.3	2	66.7	51	23.2

As a result of evaluating the treatment of patients with a supratentorial dislocation, the outcomes, depending on the stage of the DS, were as follows:

Complete recovery and recovery with the preservation of some symptoms of the disease, identified in isolated cases of I-III stages of the disease, are not identified in the IV and V stages of dislocation processes at all.
Minor and moderate residual events were detected in 22.3% and 25.2%, respectively, in patients with stage I of DS, in 4.1% and in 23.6% of patients in stage II of DS, 14.2% and 10.7% in stage III, and no slight residual events in stages IV and V were found, at the same time, moderate residual events in patients with stage IV were 15.3%, and in stage V were not detected at all.
The increase in cases with an unfavorable outcome is indicative as the severity of the DS increases. Thus, gross residual effects found in stage I in 17.4% of patients, at stage II already occur in 43.0%, and in stage IV already - in 69.4% of cases. In the group of patients with lethal outcome, a significant dynamic of the increase in the number of dead patients is also clearly observed as the severity of the dislocation progresses. In patients with stage, I of DS - 19.4% died, while in Stage III it was 32.1%, and in the most severe stage V, 2 out of three patients died, amounting to 66.7% of this group.

Conclusion:
Thus, in patients with a supratentorial dislocation of the brain, the most significant effect on the outcome of the course of the disease is a cumulative sign, like the stage of DS. This is due to the fact that the clinical gradations of DS are based on a set of prognostically significant criteria: the severity of oppression of consciousness, stem reflexes and disruption of vital functions.
In the analysis of survival in the main group, who underwent DST in combination with the resection of the medobasal sections of the temporal lobe and the usual DST, it was noted that the proportion of survivors at any time was significantly higher in the group of patients who performed DST in combination with temporal lobe resection. The study presents the first experience in the territory of the Kyrgyz Republic of the application of DST in combination with selective microsurgical resection of the lower medial sections of the temporal lobe - middle and lower temporal convolutions, the hippocampus and parigypocampal gyrus in the surgical treatment of temporo-tentorial wedge in patients with focal lesions of the cerebral hemispheres.
The obtained data of clinical and instrumental examination of patients in the postoperative period confirm the high efficiency of this method of internal decompression of the brain, there was a faster recovery of wakefulness after surgery than in patients with DST without resection of the temporal lobe, a high survival rate of patients and a decrease in the number of deaths by one and a half times.

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