



LONG-TERM CLINICAL AND FUNCTIONAL OUTCOMES OF TRAUMATIC INTRACRANIAL HEMATOMAS AND DETERMINANTS OF PATIENTS' QUALITY OF LIFE

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Abstract.

Background. Traumatic brain injury and associated traumatic intracranial hematomas remain a leading cause of mortality, disability, and social maladaptation among working-age individuals.

Objective. To assess long-term clinical and functional outcomes of traumatic intracranial hematomas and identify factors affecting patients' quality of life.

Materials and Methods. A total of 197 patients with isolated traumatic intracranial hematomas treated surgically or conservatively were analyzed. Clinical-neurological, ophthalmological, otoneurological, neuroimaging (CT, MRI), EEG, and statistical methods were applied. Follow-up duration ranged from 1 to 5 years.

Results. Long-term outcomes were significantly associated with the timing of surgical intervention, severity of hypertension-dislocation syndrome, patient age, duration of loss of consciousness, and presence of acute complications. Hematoma localization in functionally critical brain regions was linked to higher rates of cerebrofocal, epileptic, and psychoorganic syndromes.

Conclusion. Long-term quality of life after traumatic intracranial hematomas depends on multiple clinical and surgical factors, emphasizing the importance of early intervention and prolonged multidisciplinary follow-up.

Key words: traumatic brain injury; intracranial hematoma; long-term outcomes; quality of life; epileptic syndrome; cerebrofocal deficits.

ДОЛГОСРОЧНЫЕ КЛИНИКО-ФУНКЦИОНАЛЬНЫЕ ИСХОДЫ ТРАВМАТИЧЕСКИХ ВНУТРИЧЕРЕПНЫХ ГЕМАТОМ И ФАКТОРЫ, ОПРЕДЕЛЯЮЩИЕ КАЧЕСТВО ЖИЗНИ ПАЦИЕНТОВ

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Аннотация.

Актуальность. Черепно-мозговая травма и связанные с ней травматические внутричерепные гематомы остаются одной из ведущих причин летальности, инвалидизации и социальной дезадаптации пациентов трудоспособного возраста.

Цель исследования. Оценить отдалённые клиничко-функциональные исходы лечения травматических внутричерепных гематом и определить факторы, влияющие на качество жизни пациентов.

Материалы и методы. Проанализированы результаты наблюдения 197 пациентов с изолированными травматическими внутричерепными гематомами, получавших хирургическое и консервативное лечение. Использованы клиничко-неврологические, офтальмологические, отоневрологические, нейровизуализационные (КТ, МРТ), электроэнцефалографические и статистические методы. Сроки наблюдения составили от 1 до 5 лет.

Результаты. Установлена достоверная зависимость отдалённых исходов от сроков хирургического вмешательства, степени гипертензионно-дислокационного синдрома,

возраста пациентов, длительности потери сознания и наличия осложнений в остром периоде ЧМТ. Локализация гематомы в функционально значимых зонах головного мозга ассоциировалась с более выраженными цереброфокальными, эпилептическими и психоорганическими синдромами.

Заключение. Качество жизни пациентов в отдалённом периоде ЧМТ определяется совокупностью клинических и нейрохирургических факторов, что требует комплексного подхода к лечению и длительного динамического наблюдения.

Ключевые слова: черепно-мозговая травма; внутричерепная гематома; отдалённые исходы; качество жизни; эпилептический синдром; цереброфокальный синдром.

TRAVMATIK INTRAKRANIAL GEMATOMALARNING UZOQ MUDDATLI KLINIK-FUNKSIONAL NATIJALARI VA BEMORLAR HAYOT SIFATINI BELGILOVCHI OMILLAR

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Annotatsiya.

Dolzarbli. Bosh miya jarohati va unga bog'liq travmatik intrakranial gematomalar mehnatga layoqatli yoshdagi bemorlar orasida o'lim, nogironlik va ijtimoiy moslashuv buzilishining asosiy sabablaridan biri hisoblanadi.

Maqsad. Travmatik intrakranial gematomalarning uzoq muddatli klinik-funksional natijalarini baholash va bemorlar hayot sifatiga ta'sir qiluvchi omillarni aniqlash.

Material va usullar. Jarrohlik va konservativ davolangan 197 nafar bemorning uzoq muddatli natijalari tahlil qilindi. Klinik-nevrologik, oftalmologik, otonevrologik, KT, MRT, EEG va statistik usullar qo'llanildi. Kuzatuv muddati 1 yildan 5 yilgacha bo'ldi.

Natijalar. Davolash natijalari jarrohlik aralashuvining vaqti, gipertenziya-dislyokatsiya sindromi darajasi, bemor yoshi, hushdan ketish davomiyligi va o'tkir davrdagi asoratlar bilan bevosita bog'liq ekanligi aniqlandi. Funksional ahamiyatli miya sohalarida joylashgan gematomalar og'ir nevrologik sindromlar bilan kechdi.

Xulosa. Travmatik intrakranial gematomalardan keyingi hayot sifati klinik va jarrohlik omillar majmuasi bilan belgilanadi hamda uzoq muddatli kompleks kuzatuvni talab etadi.

Kalit so'zlar: bosh miya jarohati; intrakranial gematoma; uzoq muddatli natijalar; hayot sifati; epileptik sindrom; serebrofokal buzilishlar

Relevance. The complexity of pathogenesis, high mortality, variety of clinical manifestations of traumatic brain injury in the acute and late periods, an increase in injuries every year, and high disability among young people determine the medical and social significance of this problem. Traumatic brain injury (TBI) is currently a pressing medical and social problem. The main task of medicine at present is not only to save the life of a patient with severe TBI, but also to preserve his or her ability to work and social adaptation. The solution to this problem is impossible without a reliable assessment of the functional disorders developing in the brain as a result of injury. For further study of the TBI problem, there is a need to evaluate not only the immediate but also the long-term results of treatment, taking into account the severity of the condition of victims in the acute period of TBI, the timing and extent of surgical intervention, as well as the age of the victims, the presence of somatic pathology [1-12].

Material and methods of study. We present data from 197 observations of isolated traumatic intracranial hematomas after surgical and conservative treatment. The following research methods were used: neurological, ophthalmological, otolaryngological, CT, MRI, EEG, clinical-follow-up and statistical analysis. The observation period for patients ranged from 1 year to 5 years after the injury and surgery, the average follow-up was 7.0 ± 3.0 years, the age of patients was from 20 to 75 years, the average age was 43.0 ± 4.0 years. There were 167 men and 30 women. Among the 197 patients observed by us, epidural hematomas were removed in 40 patients, subdural

hematomas in 107, intracerebral hematomas in 20; Epidural hematomas were present in 16 cases, a combination of subdural and intracerebral hematoma - in 12 cases, the presence of epidural and intracerebral hematoma - in 1 case, intraventricular hematoma was detected in 1 case. Small-volume hematomas - 20-50 cm³ - were in 12%, 50-100 cm³ - in 54%, more than 100 cm³ - in 25% of cases. In 47% of cases, there was grade I hypertension-dislocation syndrome (HDS), in 40% - grade II, in 14% of cases - grade III. More than 60% of patients with acute hematomas were operated on within 24 hours of admission to hospital. Surgical intervention for subacute hematomas in 74% of cases was performed within the first 5 days, in 26% - within 2 weeks. In the group of patients with chronic hematomas, clinical manifestations of traumatic disease occurred within 2 months of the injury in 85% of cases.

Study results. Our analysis of the impact of surgical timing on injury outcome showed that the earlier the surgery was performed and the less severe the dislocation symptoms (grade 1 GDS), the less noticeable the changes in the late period, certainly in the absence of complications in the acute period. Complications, Added to the underlying pathological process, these complications often worsened the long-term treatment outcomes. All acute complications were divided into 3 groups: 1) vascular complications (post-traumatic cerebral circulatory disorders) were observed in 13 cases; 2) intracranial purulent-inflammatory complications - in 15 cases; 3) extracranial purulent-inflammatory complications - in 6 cases. The presence of post-traumatic cerebral circulatory disorders in the acute period worsened the treatment outcome and was detected in 69% of victims. Extracranial and intracranial purulent-inflammatory disorders led to severe impairments according to the Glasgow Outcome Scale (GOS) in the long-term period and were observed in 50% of cases. Moreover, all patients in this group with severe impairments had varying degrees of dislocation syndrome severity in the acute period of TBI. The results according to the Glasgow Outcome Scale in the long-term period, taking into account the dependence on the presence of complications in the acute period in the group of patients with good recovery and moderate impairments, differed statistically significantly ($p < 0.05$).

An analysis of the influence of age on the outcome of TBI revealed that good recovery according to the GOS outcome scale was noted in more than half of the observations in groups of patients under 60 years of age. An increase in the number of patients with moderate impairments was found in the group over 60 years of age. It is well known that the older the age, the higher the number of patients with somatic pathology. In the acute period of TBI, somatic pathology significantly aggravated the clinical picture and worsened the prognosis of outcomes. This is largely due to the fact that during injury, the compensatory capabilities of the body are disrupted and somatic pathology is aggravated, sometimes taking on a progressive course. Concomitant somatic pathology was detected in 69 (35%) of those observed in the late period, with hypertension in 44 (64%) observations, diabetes mellitus in 13 (9%) victims, and other diseases (polyarthritis, bronchial asthma, chronic hepatitis) in 16 (23%) analyzed. When analyzing the influence of the duration of loss of consciousness in the acute period on the outcome of TBI, it was found that the longer the loss of consciousness, the worse the outcome of TBI. Good recovery was achieved in 60% of cases in the group of patients with loss of consciousness in the acute period of up to 30 minutes, as well as in the group of patients without loss of consciousness. Moderate disorders were noted in the group of patients with a duration of loss of consciousness of more than half an hour. Severe disorders according to GOS were found in patients with a duration of loss of consciousness of more than 1 hour (63%). In our observations, hematomas were equally common on both the right (93 patients - 48%) and left (93 - 48%). Good recovery and moderate disorders in the late period according to GOS prevailed in the group of patients with right-sided hematoma localization (47%); along with this, severe disorders were more common in cases of hematoma location in the dominant hemisphere (36%). Statistical analysis of the obtained data revealed a direct dependence of TBI outcomes ($p < 0.05$) on the side of the hematoma location. In patients with acute hematomas ($n=146$) located in the left hemisphere, the most common syndromes were cerebrofocal (97 observations, 67%), epileptic (34-24%), and psychoorganic (21-15%). Subacute hematomas ($n=21$) were predominantly located on the left (76%), the main clinical syndrome in the late period was either isolated cerebrofocal or its combination with other syndromes (61%). Most often, in chronic hematomas

(n=30), cerebrofocal syndrome (24%) developed when the hematoma was located on the left, and epileptic syndrome (10%) was isolated or in combination with other syndromes with right-sided localization of hematomas. In the late period, the following clinical syndromes predominated in the group of observations with acute hematomas: asthenic - in 65% of observations; vegetative-vascular - in 56%; cerebrofocal - in 48%; epileptic - in 26%; hypertensive-hydrocephalic - in 3%. It is important to emphasize that practical recovery was achieved in 24% of observations. In the remote period, in patients from the subacute hematoma group, the frequency of asthenic syndrome was 58% of cases; cerebrofocal - 54%; vegetative-vascular - 18%; epileptic - 12%; hypertensive-hydrocephalic - 12%; practical recovery was achieved in 37% of cases. In the group with chronic hematomas, the following syndromes were noted in patients in the remote period: cerebrofocal - in 14%; epileptic - in 14%; vegetative-vascular - in 32%; practical recovery was observed in 33% of cases. In the late period, the patients underwent a comprehensive clinical and instrumental examination, which revealed the following syndromes: cerebrofocal syndrome in 80 patients, epileptic syndrome - in 39, hypertensive-hydrocephalic syndrome - in 23, trepanned skull syndrome - in 3, extrapyramidal syndrome - in 2, psychoorganic syndrome - in 36, vegetative-vascular syndrome - in 25 and asthenic syndrome in 61 patients. In 30 patients, recovery was noted with good restoration of impaired functions. It should be noted that in some observations a combination of several syndromes was noted, they are classified under the maladaptive syndrome. Among victims with acute hematomas in the late period, cerebrofocal syndrome turned out to be maladaptive in 52 (78%) observations and manifested itself as concomitant - in 14 cases (22%). In the subacute hematoma group, cerebrofocal syndrome remained maladaptive in 9 (43%) cases, while in the chronic hematoma group, cerebrofocal syndrome led to maladaptation in 7 (23%) cases. Late-term cerebrofocal syndrome was detected in 70 patients who were in the severe decompensation stage during the acute period. Analysis of long-term surgical treatment outcomes for traumatic intracranial hematomas demonstrates that the incidence and severity of cerebrofocal syndrome are higher in patients operated on for acute subdural hematomas. The pattern of adaptation to everyday life with cerebrofocal syndrome was as follows: good in 52% of cases, satisfactory in 46%, and unsatisfactory in 2%. Long-term follow-up of patients with cerebrofocal syndrome in the late period allows us to conclude that the severity of focal symptoms decreases over time. In some patients, personality changes, followed by the development of psychoorganic syndrome, dominate the clinical picture. Epileptic syndrome was observed in 39 patients, of which 17 had subdural hematomas in the acute period, 10 had epidural hematomas, 8 had intracerebral hematomas, and 4 had epidural hematomas. Victims were admitted primarily in the stage of moderate decompensation (45%), with epileptic syndrome at discharge accounting for 11%. The onset of epileptic seizures ranged from several months to two years after TBI. Seizures were generalized in 23 cases, and partial in 16. In the group of patients with acute hematomas, in the late period, the epileptic syndrome was maladaptive in 15 patients, concomitant - in 18; in the group with subacute hematomas, the epileptic syndrome led to maladaptation in 1 case and was concomitant in 1 patient. In the group of patients with chronic hematomas, the epileptic syndrome was maladaptive in 2 cases and concomitant in 2. Prevention and treatment of the epileptic syndrome was carried out in all patients who suffered severe TBI, starting from the acute period. The results of the study allow us to state that the development of epileptic seizures is most likely to occur within 2 years after the injury (88% of observations). Subsequently, the risk of epilepsy after TBI progressively decreases. The course of partial seizures was benign. In patients whose clinical picture is predominantly represented by epileptic syndrome, good adaptation to everyday life was observed in 65% of cases, satisfactory in 33%, and unsatisfactory in 2%. Full adaptation to work was noted in 62% of cases, while 61% of those examined with partial seizures, including 5 patients with disability group II, returned to work in full, decreased adaptation was detected in 7%, and 59% of victims are unemployed. Hypertensive-hydrocephalic syndrome in the late period was detected in 23 victims. Subdural hematoma was diagnosed in 15 cases, epidural hematoma was diagnosed in 4 cases, and intracerebral hematomas were removed in 4 cases. In acute hematomas, hypertensive-hydrocephalic syndrome was maladaptive in 12 cases and concomitant in 6. In the subacute hematoma group, this syndrome was maladaptive in 1 case and concomitant in 1. In the chronic hematoma group,

hypertensive-hydrocephalic syndrome was maladaptive in 1 case and concomitant in 1. Three patients were examined in the acute clinical subcompensation stage, 10 patients in the moderate decompensation stage, and 1 patient in the severe decompensation stage. According to our observations, cerebrospinal fluid circulation disorders, manifested by excessive cerebrospinal fluid accumulation, occurred at different stages of TBI. Impaired cerebrospinal fluid circulation in these patients inevitably leads to worsening neurological deficit and the course of hypertensive-dislocation syndrome. CSF circulation disorders in patients with traumatic brain injury (TBI) can be caused by impaired cerebrospinal fluid resorption, cerebrospinal fluid pathway occlusion, and cerebrospinal fluid hypersecretion. When choosing a treatment strategy, it is important to distinguish between high-, normal-, and low-pressure hydrocephalus. In our observations, only three patients required surgical treatment (due to congestive changes in the optic discs and severe hypertensive symptoms); they received high- and medium-pressure shunts. The remaining patients received conservative therapy. Against this background, stable remission was achieved in 43% of cases and remission with rare exacerbations also in 43% of the examined patients. In the late period, with hypertensive-hydrocephalic syndrome, everyday adaptation of patients was good in 61% of cases, satisfactory in 30%, and unsatisfactory in 9%. Trepanned skull syndrome was detected in 3 cases, after removal of the epidural hematoma - in 1 case, after removal of the subdural hematoma - in 2. During the acute period, there were 2 patients in the moderate decompensation stage, while 1 patient was observed in the severe decompensation stage. In the late period, cranial defect plastic surgery was not performed in 1 patient due to the fact that the EEG revealed a stable focus of pathological activity with increased seizure readiness and noticeable involvement of the brain stem formations in the pathological process. In addition to the neurological examination, the patients were examined by an otoneurologist in 98 cases, an ophthalmologist in 112 cases, and a psychiatrist in 43 cases. The following instrumental examination methods were performed in the late period: EEG - in 125 (63%) cases, CT of the brain - in 70 (35%) cases, MRI of the brain - in 97 (49%) cases. The performed analysis of clinical and instrumental comparisons in the late period after removal of traumatic intracranial hematomas did not establish a direct relationship between the type and severity of clinical syndromes of intracranial changes in the brain and its membranes. EEG examination in combination with clinical data in the late period of TBI allows us to dynamically objectify the degree of restoration and compensation of brain functions and diagnose the appearance of seizure readiness, thereby judging the development of epileptic syndrome much earlier than clinical manifestations. Conclusion. We have established a direct correlation between patients' long-term quality of life and the location of the hematoma, as well as the severity of focal cerebrovascular accidents, epileptic seizures, hypertensive-hydrocephalic syndromes, and psychoorganic syndromes. When the hematoma is localized in a functionally insignificant area of the brain, better quality of life indicators are observed in these patients. Social adaptation is achieved in 82% of cases, and work adaptation is achieved in 43%. Based on this study, it can be concluded that long-term treatment outcomes for traumatic hematomas depend on the severity of the acute phase, age, and the degree of hypertensive-dislocation syndrome. In the late period, cranial defect plastic surgery was not performed in 1 patient due to the fact that the EEG revealed a persistent focus of pathological activity with increased seizure readiness and noticeable involvement of the brainstem formations in the pathological process. In addition to the neurological examination, the patients were examined by an otoneurologist in 98 cases, an ophthalmologist in 112 cases, and a psychiatrist in 43 cases. The following instrumental examination methods were performed in the late period: EEG - in 125 (63%) cases, CT of the brain - in 70 (35%) cases, MRI of the brain - in 97 (49%) cases. The performed analysis of clinical and instrumental comparisons in the late period after removal of traumatic intracranial hematomas did not establish a direct relationship between the type and severity of clinical syndromes of intracranial changes in the brain and its membranes. An EEG study, in combination with clinical data in the late period of TBI, allows us to dynamically assess the degree of restoration and compensation of brain functions and diagnose the onset of seizure readiness, thereby assessing the development of an epileptic syndrome significantly earlier than clinical manifestations. Conclusion. We have established a direct correlation between patients' quality of life in the late period and the location of the hematoma, as well as the severity of

cerebrofocal, epileptic, hypertensive-hydrocephalic, and psychoorganic syndromes. When the hematoma is localized in a functionally "insignificant" area of the brain, better quality of life indicators are observed in such patients: social adaptation is achieved in 82% of cases, and work adaptation in 43%. Based on the conducted study, it can be concluded that the long-term results of traumatic hematoma treatment depend on the severity of the acute period, age, and the degree of hypertensive-dislocation syndrome. In the late period, cranial defect plastic surgery was not performed in 1 patient due to the fact that the EEG revealed a persistent focus of pathological activity with increased seizure readiness and noticeable involvement of the brainstem formations in the pathological process. In addition to the neurological examination, the patients were examined by an otoneurologist in 98 cases, an ophthalmologist in 112 cases, and a psychiatrist in 43 cases. The following instrumental examination methods were performed in the late period: EEG - in 125 (63%) cases, CT of the brain - in 70 (35%) cases, MRI of the brain - in 97 (49%) cases. The performed analysis of clinical and instrumental comparisons in the late period after removal of traumatic intracranial hematomas did not establish a direct relationship between the type and severity of clinical syndromes of intrascopic changes in the brain and its membranes. An EEG study, in combination with clinical data in the late period of TBI, allows us to dynamically assess the degree of restoration and compensation of brain functions and diagnose the onset of seizure readiness, thereby assessing the development of an epileptic syndrome significantly earlier than clinical manifestations.

Conclusion. We have established a direct correlation between patients' quality of life in the late period and the location of the hematoma, as well as the severity of cerebrofocal, epileptic, hypertensive-hydrocephalic, and psychoorganic syndromes. When the hematoma is localized in a functionally "insignificant" area of the brain, better quality of life indicators are observed in such patients: social adaptation is achieved in 82% of cases, and work adaptation in 43%. Based on the conducted study, it can be concluded that the long-term results of traumatic hematoma treatment depend on the severity of the acute period, age, and the degree of hypertensive-dislocation syndrome. An EEG study, in combination with clinical data in the late period of TBI, allows us to dynamically assess the degree of restoration and compensation of brain functions and diagnose the onset of seizure readiness, thereby assessing the development of an epileptic syndrome significantly earlier than clinical manifestations.

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