



MAIN PREDICTORS OF TRAUMATIC RECURRENT INTRACRANIAL HEMATOMAS

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Abstract

Were analyzed the treatment outcomes of 28 patients with recurrent intracranial hematomas. Was carried out during the study, the main predictors and terms of formation of recurrent hematomas were determined and the assessment of treatment outcomes. Recurrent intracranial hematomas are among the complications of the early postoperative period, since their development is accompanied by high lethality, deterioration of functional results of treatment and an increase in the duration of hospital stay of patients.

Keywords: Traumatic brain injury, intracranial hematomas, surgical treatment of hematoma, recurrence of hematoma.

Introduction

Traumatic brain injury (TBI) remains one of the main causes of mortality and disability in the population and occupies leading positions among the factors of lethal outcome in young individuals [1,2,3,4]. Among the most serious early complications after surgical treatment are postoperative recurrent intracranial hematomas [5,6,7,8]. According to the data of various authors, the frequency of recurrence after removal of traumatic intracranial hematomas varies widely from 3.6% to 40.0% [9].

Analysis of the modern scientific literature shows that the main attention of researchers is focused on the study of recurrences of chronic subdural and non-



traumatic intracerebral hematomas [10,11]. At the same time, the problem of repeated formation of acute traumatic intracranial hematomas remains insufficiently studied and covered [12,13]. The relevance of the problem of recurrent intracranial hematomas is обусловлена its significant medical and social significance [14,15]. The development of this complication leads to worsening of treatment outcomes, an increase in the level of patient disability, prolongation of hospitalization duration, as well as extension of the periods of temporary disability [16].

Aim of the study

To study the main causes of the formation of recurrent traumatic intracranial hematomas, the timing of their occurrence, outcomes, and the results of treatment of patients with recurrent hematomas.

Materials and methods

An analysis of 28 patients with recurrent traumatic intracranial hematomas treated at the Fergana Branch of the Republican Research Center of Emergency Medical Care was carried out. A total of 28 patients with recurrences of traumatic intracranial hematomas were identified, which constituted 100% of the observed group. All patients were men aged from 29 to 70 years, while the mean age was 47.7 years. The overall recurrence rate was approximately 4%.

Upon admission to the hospital, all patients underwent a comprehensive diagnostic examination, including clinical and neurological assessment, laboratory blood tests and evaluation of hemostatic system parameters, as well as neuroimaging methods — MSCT or MRI of the brain.

Results

In 19 observations, during the primary surgical intervention, compression of the brain was caused by a hemispheric subdural hematoma. In 5 cases, the cause was an epidural hematoma, and in 2 cases — an epidural hematoma of the posterior cranial fossa. In another 2 observations, multiple hematomas were diagnosed, represented by a combination of intracerebral and subdural hematomas.



According to the nosological structure, recurrent hematomas were distributed as follows: epidural — 10 (35.7%) cases, subdural — 14 (50%), intracerebral — 2 (7.1%), and multiple — 2 (7.1%) observations. In the majority of patients — 26 (92.3%) — primary surgical intervention was performed within the first 24 hours after admission to the hospital. In two cases, surgical intervention was performed on the third day of hospitalization. Delayed operations were due to the compensated condition of the patients, as well as the presence of concomitant disorders of the hemostatic system.

Primarily, decompressive craniectomy (DC) was performed in 16 (57.1%) cases, osteoplastic craniotomy (OC) in 8 (28.6%) cases, resection craniotomy of the posterior cranial fossa (PCF) in 2 (7.1%) cases, and external drainage of hematomas in 2 (7.1%) cases.

Discussion

Diagnosis of hematoma recurrence was based on signs of clinical deterioration of the patients' condition, manifested by deepening impairment of the level of consciousness and progression of neurological deficit. In such cases, the appearance of anisocoria, worsening of contralateral hemiparesis, emergence of pathological plantar reflexes, as well as development of epileptic syndrome were observed.

All patients with suspected hematoma recurrence immediately underwent follow-up brain MSCT. Upon confirmation of hematoma recurrence, all patients underwent emergency repeated surgical intervention.

Hematoma recurrence was observed within the first 24 hours in 18 patients, on the second day in 2, and on the third day in 8 observations. During repeated surgical interventions, decompressive craniectomy was performed in 16 cases, osteoplastic craniotomy in 10, and resection craniotomy of the posterior cranial fossa in 2 observations. The cause of brain compression during repeated operations was subdural hematoma in 14 cases, epidural hematoma in 8, intracerebral hematoma in 2, epidural hematoma of the posterior cranial fossa in 2, and multiple hematomas also in 2 cases.

The identified sources of recurrent hematomas were: cortical arteries — 2 observations, cortical vein — 1 observation, basal vein — 1 case, bleeding from the diploic layer — 2 cases, diffuse bleeding in coagulation system disorders — 2 observations. The source of bleeding was not identified in 15 cases (53.6%).

We analyzed the mean volume of recurrent hematomas: for subdural hematomas it was 69 cm³, for epidural hematomas — 40 cm³, for intracerebral hematomas — 70 cm³, for epidural hematomas of the posterior cranial fossa — 40 cm³, while the total volume of multiple hematomas reached 100 cm³.

In total, 18 patients survived (64.3%), whereas 10 patients died, with mortality amounting to 35.7%. At the time of admission, all deceased patients had impaired consciousness with a Glasgow Coma Scale (GCS) score of 8 points or lower.

Among the survivors, treatment outcomes were assessed using the Glasgow Outcome Scale: good recovery was observed in 9 (32.1%) patients, moderate disability in 4 (14.3%), and severe disability in 5 (17.9%). The mean length of hospital stay among survivors was 37 bed-days.

Analysis of clinical cases of hematoma recurrence revealed that in 2 patients the recurrence was caused by disorders of the hemostatic system (coagulopathy, etc.).

We present a clinical example of a postoperative recurrent epi-subdural intracranial hematoma (Figures 1–3).

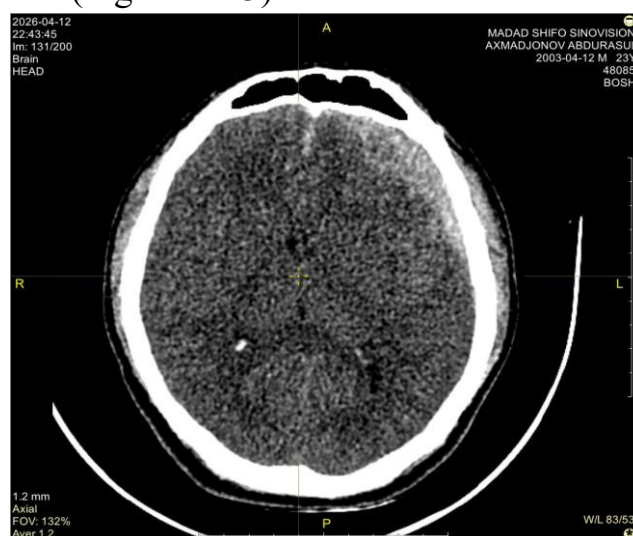


Figure 1. Patient A.A., 23 years old. Brain MSCT: signs of traumatic subdural hematoma of the left frontotemporal region with signs of dislocation syndrome (neuroimaging at the time of hospitalization and primary surgery).



Figure 2. Patient A.A., 23 years old. Brain MSCT (follow-up – 1): after craniotomy with removal of traumatic subdural hematoma of the left frontotemporal region and recurrence of epidural hematoma in this region (3rd postoperative day).



Figure 3. Patient A.A., 23 years old. Brain MSCT (follow-up – 2): after decompressive craniectomy of the left frontoparietotemporal region with removal of epidural hematoma of the left frontotemporal region (6th day after reoperation).



The formation of recurrent hematomas is accompanied by high mortality — 35.7% — and unfavorable functional outcomes according to the Glasgow Outcome Scale (GOS), while the proportion of patients with severe disability amounted to 17.9%. Among the survivors, prolonged durations of inpatient treatment were observed, averaging 37 bed-days. In 3 patients, removal of the bone flap was additionally performed during repeated operations, which led to increased disability rates and deterioration in quality of life.

Patients operated on for traumatic intracranial hematomas, especially those with disorders of the hemostatic system, required continuous monitoring by qualified on-duty medical personnel and follow-up MSCT within the first 24 hours after surgery. This made it possible to timely identify recurrences and perform repeated surgical intervention before the development of pronounced dislocation syndrome.

Conclusions

Recurrent intracranial hematomas are a complication of the postoperative period, since they lead to increased mortality, worsening of functional outcomes, and prolongation of inpatient treatment duration.

The main risk factors for the development of recurrent hematomas were: patient age (more often older age groups), low GCS scores associated with a more unfavorable prognosis, presence of combined injuries, severe TBI, and disorders of the hemostatic system (coagulopathy, etc.).

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Modern American Journal of Medical and Health Sciences

ISSN (E): 3067-803X

Volume 2, Issue 5, May 2026

Website: usajournals.org

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