CLINICAL AND NEUROLOGICAL FEATURES AND LIQUORODYNAMIC DISORDERS IN TRAUMATIC BRAIN INJURY IN CHILDREN

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Abstract. In a number of cases, during the clinical and clinical-expert assessment of such patients, methodological difficulties arise, especially when a complex post-traumatic defect prevails in the clinical structure. This, in particular, applies to liquorodynamic disorders, cerebral post-traumatic arachnoiditis, which is a chronic process in which immune disorders play a large role.

Keywords. symptoms, traumatic brain, neurotrauma, arachnoiditis, liquorodynamic disorders.

The urgency of the problem of the study of childhood traumatic brain injury (TBI) is due to the significant prevalence, high percentage of disability and mortality in children. According to the WHO, there is a constant increase in the incidence of TBI by 1-2% per year. A number of authors publish data that TBI in childhood occurs more often than in adult patients. This is due to a number of factors: the relatively large size of the head in children relative to the body, imperfect coordination of movements, greater activity and curiosity of children [3].

The clinical and social significance of traumatic brain injury (TBI) is determined both by the frequency (in Russia, about 4 cases per 1000 population), and by the variety of its consequences of varying severity, leading to more than 100 thousand people with disability annually, and 40-60% of them are recognized disabled people of groups II and I (in 30-35% of cases many years after injury) (10). The studies carried out indicate a change in the structure of injuries, an increase in the proportion of neurotrauma, especially TBI, and an increase in the number of multiple, concomitant and combined injuries (2). Simultaneously with the increase in the total number of victims with brain injuries, the number of patients with the consequences of mild TBI, which are not always adequate to the severity of the acute period of trauma and often have a progressive course, also grows (6). Patients with the consequences of TBI for a long time, and often for life,
are not socially adapted, have significantly pronounced neurological and psychiatric dysfunctions, and are recognized as disabled.

Despite the expansion of diagnostic capabilities, in clinical and expert practice at the moment, two pathogenetic variants of cerebral arachnoiditis are poorly distinguished: a true (actual) active adhesion process of an autoimmune nature, which occurs with the formation of antibodies to the membranes of the brain with a chronic progressive and intermittent course, and a residual state after traumatic brain injury resulting in obliteration, fibrosis of the membranes with the formation of adhesions and cysts at the site of necrosis (7). At the same time, patients from the health care system with the main diagnosis “actual cerebral post-traumatic arachnoiditis” are often sent to the bureau of medical and social expertise, in whom this diagnosis is not confirmed later, but CSFD disorders expressed in varying degrees are revealed (5).

In the clinical course of TBI, its various consequences and complications can appear. Meanwhile, these two widely used concepts, which must certainly be differentiated, are usually confused. Their detailed definitions are absent in the literature, including the special monograph "Complications and Sequelae of Head Injury", published in 1993 by the American Association of Neurological Surgeons [9].

The discrepancy between the severity of the trauma suffered and the subsequent consequences forced to revise the unified classification of TBI in adults (from 1986) with the separation of childhood TBI into a separate classification (1992), which was supplemented taking into account the peculiarities of the clinical picture observed in childhood. ... Currently, there are 3 periods of TBI: acute, intermediate and distant. When characterizing the periods of TBI, it is necessary to take into account premorbid neurological pathology, concomitant somatic diseases and the age of children. In them, the acute period is shorter than in adults and, depending on the clinical form, lasts from 10 to 28 days (in adults, from 2 to 10 weeks). With mild TBI - up to 10 days, with moderate severity - up to 15–20 days, and with severe trauma - 21–28 days. The intermediate period in children is longer than in adults: with mild TBI - up to 6 months, with moderate severity - up to 1–1.5 years, with severe TBI - up to 2 years. The long-term period in children with mild and moderate TBI lasts up to 1.5-2.5 years, with severe TBI - up to 3–4 years [17].

The aim of the study is to identify clinical features or kvorodynamic disorders in children with concussion, mild and moderate contusions, depending on the period of TBI.
Material and research methods. We examined 185 children who underwent concussions, minor and moderate bruises, who were treated in the department of surgical injury to children of the Bukhara branch of the Republican Scientific Center for Emergency Medical Aid (Republican Scientific Center for Emergency Medical Aid) at the age of 3 to 14 years, 69 (37 , 3%) girls and 116 (62.7%) boys. All patients underwent: clinical and neurological examination, MSCT, fundus examination, cerebrospinal fluid examination. The diagnosis took into account the classification of clinical forms of damage to the skull and brain.

Research results. Clinical and neurological features were studied for 3 periods of TBI: acute - in 109 (58.9%) children, intermediate - in 61 (32.9%) children, and 5 (2.7%) children - distant.

Results of clinical and neurological studies: The clinical picture of mild brain contusion in 102 (55.1%) cases, consisted of cerebral and stem symptoms. Loss of consciousness was short-term (from several seconds to several minutes), and was absent in 8 (4.3%) cases. After trauma, patients showed lethargy, drowsiness, weakness, significant pallor and "marbling" of the skin, general hyperhidrosis, moderate bradycardia 88 (86.2%) and 14 (13.7%) children had tachycardia, lability of blood pressure. After the restoration of consciousness, the children mainly complained of headache, dizziness, nausea, and vomiting. In the neurological status, nystagmus, impaired convergence, and pyramidal insufficiency were noted.

According to the literature we studied, in infants, brain contusion is often complicated by subdural or subarachnoid hemorrhage, which can occur without pronounced meningeal symptoms. In young children, a fracture of the bones of the cranial vault is often observed in the absence of data on loss of consciousness [3].

The clinical picture of moderate brain contusion in 83 (44.9%) children consisted of meningeal, cerebral and focal (stem and hemispheric) symptoms. Impairment of consciousness after trauma in 81 (97.6%) children lasted from several tens of minutes to 4-6 hours. There were 4 (4.8%) cases of retro- and 6 (7.2%) cases of antegrade amnesia. In young children, in 12 (14.5%) children, impaired consciousness was noted within a few seconds or minutes, followed by vomiting, general lethargy, and adynamia. Transient brady- or tachycardia, arterial hypertension, tachypnea, low-grade fever were observed. Focal symptoms were manifested by oculomotor disorders, paresis of the extremities, and focal seizures. An increase in intracranial pressure was noted. In case of fractures of the base and calvarium with subarachnoid hemorrhage, they were transferred to the intensive care unit. The acute period usually lasts up to 15–20 days in children. [6]
Liquorodynamic disturbances in TBI in children were noted as a frequent condition in which both an increase in intracranial pressure (ICP) in the acute and intermediate periods, and its decrease, especially in the long-term period, were established. The most common variation in ICP is its increase (intracranial hypertension). These changes were characterized by a triad of symptoms:

1. Headache was observed in 181 cases (97.8%), especially an increase in its intensity in the early morning hours or immediately after awakening, due to circadian rhythms of CSF production (40% of cerebrospinal fluid is formed from 4 to 6 am). Vomiting often occurred with increasing intensity of the headache.

2. Vomiting was associated in 177 (95.7%) cases, as well as headache more often in the morning. After vomiting, the intensity of cephalalgia often decreased or the headache sometimes disappeared altogether.

3. Congestion in the fundus was observed in 175 (94.6%) cases, which are a very pathognomonic sign of intracranial hypertension.

Thus, clinical, neurological and CSF dynamic changes require consideration of the main aspects of the treatment of children with traumatic brain injury, to determine the indications for pathogenetic therapy aimed at compensating for CSF disturbances. This is necessary in order to prevent the liquorodynamic consequences of TBI such as hydrocephalus, porencephalus, meningoencephalocele, the formation of chronic hygromas or corpus cysts, etc., which can aggravate the child's condition and lead to his disability.

Conclusions.

1. Clinical features of TBI are expressed in the fact that impairments of consciousness do not correspond to the severity of brain damage, which is explained by the complexity of the pathogenesis of the disease. In this regard, in patients with brain contusion of any degree, it is necessary to undergo MSCT or MRI for the timely diagnosis and neurosurgical treatment of complications.

2. Clinical increase in ICP was confirmed by MSCT, as well as changes in the fundus with a normal cellular composition of the cerebrospinal fluid. For the clinical picture of liquorodynamic disorders in TBI in children in the acute period, the syndrome of intracranial hypertension was established, which was characterized by a triad of main symptoms. These conditions dictate the need to search for effective drugs that contribute to the normalization of liquorological disorders.
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