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PREVENTION AND TREATMENT OF HEMIPARESIS IN CHILDREN

(literature review)

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Abstract: Hemiparesis is a persistent motor disorder that lends itself well to comprehensive rehabilitation. The earlier rehabilitation is started, the higher the rehabilitation potential will be. Hemiparesis occurs with cerebral circulation disorders, tumors, traumatic brain injuries, purulent and infectious processes, parasitosis, some types of epilepsy, and toxic brain lesions. The cause of hemiparesis is determined by the results of a survey, neurological examination, echoencephalography, radiography, tomographic studies, and laboratory tests. Treatment includes pathogenetic and symptomatic therapy followed by restorative measures. Sometimes surgery is required[1].

Key words: Neurological examination, echoencephalography, radiography, tomographic studies, hemiparesis.

INTRODUCTION.

Hemiparesis is a decrease in muscle strength in the right or left half of the body due to damage to cortical neurons or pathways. During the transition from the brain to the spinal cord, the nerve tracts intersect, so hemiparesis in most cases develops on the side opposite to the pathological focus. May develop acutely or gradually. It is often combined with aphasia, cognitive disorders, and pelvic dysfunction[2]. With simultaneous involvement of the brain stem and cranial nerve nuclei, alternating syndromes are formed - conditions in which hemiparesis on one side is combined with loss of function of one or more cranial nerves on the other side.

Strokes are characterized by acute manifestation, rapid progression of symptoms, and persistent nature of the disorders. Hemorrhagic stroke develops rapidly. At the onset, general cerebral manifestations predominate, accompanied by signs of focal lesions. Ischemic stroke is characterized by a slower increase in symptoms and a predominance of focal manifestations over cerebral ones[3].

When the brain is damaged in the carotid artery basin, central hemiparesis is formed with loss or decrease in muscle strength and increased muscle tone. Smoothing of the nasolabial fold, facial distortion, and lagophthalmos are revealed. Hemianopsia, apraxia, aphasia, and critical impairment are possible. With lacunar strokes, hemiparesis can be observed in isolation. In patients with transient cerebrovascular accidents, hemiplegia and hemiparesis are rarely diagnosed, and the decrease in muscle strength is insignificant or moderate. Dysarthria and anisoreflexia may be detected. Sometimes epileptic seizures occur. All neurological functions are completely restored within 24 hours[4,5,6].

Hemiparesis develops in every second patient with a brain tumor. The disorders progress gradually, appearing against the background of general cerebral symptoms (dizziness, headache, vomiting, which does not bring relief) and focal manifestations. They are detected when the motor cortex is involved, brainstem lesions and craniospinal neoplasia. Hemiplegia or hemiparesis is determined in patients with pineoblastomas, meningiomas, astrocytomas, medulloblastomas, other primary tumors, cerebral metastases with the spread of malignant neoplasia of other organs. With predominantly unilateral localization of pathological foci,

weakness of the muscles of half the body can accompany cerebral gliomatosis, carcinomatosis of the meninges. Sometimes the cause of hemiparesis is neuroleukemia.

The phenomena of hemiparesis are found in victims with traumatic brain injuries. With a mild contusion of the brain, muscle weakness is short-term and is not always detected. For a brain contusion of moderate severity, hemiparesis persists for 1-1.5 months. In case of severe bruises, neurological symptoms partially regress, and persistent residual consequences are observed.

The cause of hemiparesis can be subarachnoid hemorrhage, intracerebral, subdural or epidural hematoma. Unilateral muscle weakness is considered one of the most persistent symptoms of hematoma; it often occurs after a clear interval and is accompanied by headache, psychomotor agitation, disturbances of consciousness, vomiting, aphasia, anisocoria, bradycardia, and increased blood pressure.

Brain abscess becomes a consequence of injuries, postoperative complications, hematogenous spread of infection in inflammatory lung diseases. Otogenic intracranial complications play a significant role in the structure of pathology[7,8,9]. The likelihood of developing hemiparesis is determined by the location and extent of the abscess. The clinical picture includes cerebral and focal manifestations. With empyema, meningeal symptoms may appear.

Hemiparesis sometimes develops with encephalitis (post-vaccination, Japanese mosquito, tick-borne, influenza) and meningoencephalitis. A high risk of this disorder is observed in vascular neuroAIDS - vasculitis of cerebral vessels, which is characterized by the transition of ischemic strokes to hemorrhagic ones. In addition, hemiparesis is detected with progressive multifocal encephalopathy, which more often develops in patients with AIDS.

Stroke-like symptoms with hemiparesis are sometimes observed in the later stages of neurosyphilis. As a rare cause of unilateral muscle weakness, one can consider syphilitic gumma, which is located mainly in one half of the brain stem and, as it grows, compresses the pathways.

Cerebral palsy is characterized by a variety of manifestations and significant variability in the clinical picture. Monotetra or hemiparesis are possible. Increased muscle tone and dysarthria are typical. When the muscles of the larynx and pharynx are affected, dysphagia occurs. Hyperkinesis, epilepsy, and intellectual impairment are often detected. Due to delayed development of the involved limbs, skeletal deformities form as the child grows.

Todd's palsy occurs after an epileptic seizure and is manifested by central hemiparesis, less often - monoparesis of varying degrees of severity. The symptom persists for 1-2 days, then muscle strength is gradually restored. The pathological condition is more often observed after prolonged epistatus, secondary generalized seizures and paroxysms of Jacksonian epilepsy.

Other reasons: The symptom can be detected in the following pathologies; Sturge-Weber syndrome. Congenital angiomatosis is manifested by vascular spots on the skin of the face, the formation of angiomas on the body and meninges. Due to the predominantly homolateral nature of the lesion, hemiparesis predominates among movement disorders.

- Birth injuries. The cause of the disorder is intracranial hemorrhage in the conduction pathways or motor parts of the brain due to trauma during childbirth. Muscle weakness is present from birth.

• Hypertensive encephalopathy. Mild hemiparesis is observed with pyramidal syndrome. May be accompanied by cephalalgia, dizziness, decreased cognitive abilities, and psycho-emotional disorders.

Hemiparesis is sometimes diagnosed with tetralogy of Fallot and dissecting aortic aneurysm. In the first case, muscle weakness develops after dyspnea-cyanotic attacks, in the second it is the result of cerebral ischemia due to tearing of the aortic wall, hematoma formation and compression of the arterial branches.

MATERIAL AND METHODS

When we looked at 100 children with hemiparesis and collected their anamnesis, we saw that they had the following symptoms**:** hemihypotrophy on the affected side; limited movements in the affected arm and leg; violation of fine motor skills; stiffness, and later the formation of contracture in the affected arm and leg, difficulties in making symmetrical gestures with limbs; refusal to try to use the affected limbs as a support and use the hand as a dominant one.

Often the child begins to ignore the affected part of the body. Among the most common manifestations of hemiparesis in a child are: formation of orthopedic complications (dislocations, subluxations, joint contractures, pelvic distortion, functional shortening of the leg; speech, hearing and memory defects; reduced intellectual activity; epileptic seizures; emotional and personality disorders; increased body temperature; fatigue, weakness; arthralgia. Often, the gait with hemiparesis is slanting and is called hemiparetic, when the leg describes a semicircle.

DIAGNOSIS OF HEMIPARESIS IN CHILDREN

To clarify the diagnosis, the following methods are used:

- Neurological examination. The doctor examines reflexes, assesses the sensitivity and strength of muscles on the healthy and diseased sides, and detects other neurological manifestations.
- Echoencephalography. A basic method used for the primary diagnosis of tumors, hematomas, abscesses, parasitic lesions, and confirmation of displacement of brain structures.
- Vascular studies. Rheoencephalography and vascular ultrasound are performed to assess the state of cerebral circulation.
- X-ray of the skull. Included in the mandatory examination program for TBI, it is prescribed to determine the nature and severity of fractures. Informative for abscesses that have arisen against the background of osteomyelitis of the skull bones.
- CT scan of the brain. It is used for a detailed study of space-occupying formations, differentiation of strokes, and clarification of the nature and prevalence of inflammatory changes. Can be native or contrasting.
- MRT of the brain. Performed at the final stage of diagnosis. Recommended for head injury, neoplasia, stroke, abscesses, aspergillosis. If indicated, it is supplemented with MR angiography.
- Lab tests. Necessary for establishing the etiology and severity of inflammation, assessing the state of the body during tumors and purulent processes. In some cases, to determine the type and degree of differentiation of neoplasia, a morphological study of the material obtained during stereotactic biopsy is performed[10,11,12].

TREATMENT AND PREVENTION

Treatment tactics are determined by the stage of the disease and the duration of hemiparesis. In the acute period, pathogenetic and symptomatic measures are carried out, and complications are prevented. In the future, restorative techniques play a leading role. The treatment plan includes:

Drug therapy: antibiotics, muscle relaxants, anticonvulsants and vascular drugs, drugs to stimulate local metabolism, neuroprotectors, B vitamins.

- Physiotherapeutic procedures: electromyostimulation, reflexology, electrophoresis, diadynamic therapy, ultrasound, water procedures, mud applications.
- Manual influence: various types of massage and manual therapy.

• Active rehabilitation: exercise therapy, programs for restoring motor skills during self-care, mechanical therapy, swimming, use of special exercise equipment.

• Psychotherapy: individual sessions with a psychologist are aimed at adapting to changes in health status and preventing depression. They are supplemented by group trainings to improve everyday and social skills.

• Work with a speech therapist: speech therapy sessions are recommended for patients with speech disorders.

- Taking into account the etiology of hemiparesis, the following operations are performed:
- Circulatory disorders: thrombolysis, extra-intracranial anastomosis, vertebral artery reconstruction, carotid endarterectomy, AVM removal, aneurysm occlusion.
- Tumors: removal of intracerebral tumors and brainstem neoplasms, excision of metastatic neoplasia, stereotactic surgery, embolization.
- Trauma: transcranial, stereotactic or endoscopic removal of hematomas.
- Purulent processes: drainage of abscesses and empyemas, transcranial excision of the abscess along with the capsule.

In the long-term period, orthopedic interventions may be indicated for patients. Joint redress for contractures, arthrodesis in a functionally advantageous position, and tendon and muscle transplantation are possible[13,14,15,16]. The success of treatment for hemiparesis depends on determining the cause of the condition: birth injury; benign and malignant formations in the brain that compress brain structures and destroy brain cells; ischemic stroke, when paresis provokes hemorrhage in the brain; TBI leading to tissue death; toxic effects of neuroinfection; anomaly of intrauterine development[17,18]; multiple sclerosis, in which the nerve sheaths and nerves themselves are destroyed[19]; atrophy of brain tissue with subsequent death of neurons.

RESULTS

With insufficient rehabilitation of children with hemiparesis, the quality of life deteriorates: more pronounced spasticity leads to severe limitations of movements in the arm and leg. Contractures in the ankle-foot joints do not allow the foot to step on the full toe, recurvation is formed in the knee joints, adductor contractures in the hip joints, and contractures in the carpal-radial joint block the correct grip of objects with the hand.

The effectiveness of treatment depends on many factors. Physical rehabilitation is very important: massage, exercise therapy, joint development, swimming. Physiotherapy: low-frequency magnetic therapy, shock wave therapy, laser puncture, electrotherapy. RT (reflexotherapy) is a method that stimulates reflexogenic zones, thereby activating the body's internal reserves, promoting the activation of memory, movement, speech zones and improving the functioning of the system of perception and signal processing, as well as the formation of conscious responsible actions. There are acupuncture and laser puncture[20,21].

Prevention of the formation of hemiparesis in children is based on early diagnosis and diagnosis. Rehabilitation should also be aimed at preventing and eliminating complications.

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