METHOD OF PREVENTION AND CORRECTION OF DISORDERS OF ADAPTIVE PROCESSES IN CHILDREN

T.V. Potupchik, Cand. Med. Sci.[1]; L. S. Evert, MD[2]; Cand.of Physical and Mathematical Sci.[2]; O.F. Veselova Cand. Med. Sci[1], Ya.R. Nartsissov[3]

[1]Prof. V.F. Voino-Yasenetsky Krasnoyarsk State Medical University
[2]Research Institute for Medical Problems of the North, Krasnoyarsk
[3]Institute of Cytochemistry and Molecular Pharmacology

Presents some aspects of adaptive processes of first-graders. The data of complex clinical and instrumental examination of children in one of schools of Krasnoyarsk.

Possibilities of application of glycine during the period of adaptation of children to educational institutions.

Key words: adaptation, children, glycine.

Beginning of school education is one of the most crisis stages in child's life. It implicates considerable changes in the way of living, local protection decreasing, exertion of hypothalamic-pituitary-adrenal, sympathoadrenal and vegetative nervous systems [8], emotional and behavioral response adjustment. Neurotic reactions and neurosis are developed in 50% of children. Disordered motor activity in the form of hyperkinetic syndrome, active protest reactions or phobic manifestations, in some cases asthenic syndrome and syncopal conditions are also reported [7,8].

Central nervous system (CNS) is a developing core of the child's organism adaptation programs directed at functionality and performance efficiency maintenance in inappropriate conditions [4]. The youngest schoolchildren are required of specific attention. The child is exceedingly sensitive about environmental factors because of morphological and functional development incompleteness and physiological processes lability during this time period. Although school and study loads conditions are fare from extreme, in total with unfavorable climate and ecological conditions they could have stress factor nature.

Physiological and hygienical studies of the past few years are showing that child's capability to adaptation is defined of structural-functional organization of the brain. It was established that defined level of brain structural organization maturity and appropriate kind of corticosubcortical and corticostem regulatory

systems activity are the base of successful child's adaptation to study loads. It was revealed by surveys of children of 7-8 years old that neurophysiological mechanisms of cortical activity selectable modulation provide brain structures with selective adjustment to cognitive tasks solution at that age, which subjected to functional states of regulatory structures conformity with age-appropriate normal value. Interhemispheric discrepancies and specific modular type dominance (sinistrocerebral) of cortical area functional interactions are omitted for children of 7-8 years old [6]. The leading factor of brain damage is hypoxia. That's why metabolic processes in brain matter are interrupted even in brief vascular spasms which have an effect on neuronal functioning. It is known that irreversible changes in neuronal cells and neuronal cells death are appraised after 5-10 minutes of complete anoxia [3].

Let's give attention to some data about complex clinical instrument-aided survey of children in one of school of Krasnoyarsk. 271 first-graders (6-8 years old) were surveyed in the beginning and the end of study year during the course of 6 study years. In the group with favorable course of adaptation summation frequency of asthenic syndrome clinical manifestations (headache, dizziness, undue fatiguability, sleep loss) is equal to 52,6% before school entrance and 68,1% – at the end of the first study year, i.e. grown up to 15,5%; in the group with semi-favorable course of adaptation this measures comprised 66,7–84,6% and 17,9% respectively; in the group with unfavorable course of adaptation – 61,9 – 91,3 and 29,4%.

The existence of disordered motor activity, complaint reactions, phobias and compulsive movements suggesting about presentations of attention deficient hyperactivity disorder amongst surveyed children was considered. In the group with favorable course of adaptation disordered motor activity and attention deficient occurred to 16,8% of children in the first half-year period and to 17,0% of children in the second half-year period, in the group with semi-favorable course of adaptation – to 19,2% and 11,5% respectively, in the group with unfavorable course of adaptation – to 31,6% of children in the first and the second half-year period. The amount of children with disordered motor activity and attention deficient in the second half-year period was significantly higher in the group with unfavorable course of adaptation than in the group with semi-favorable course ($p_{2-3}=30,3*10^{-3}$).

According to rheoencephalography data, distonic changings in cerebral vessels by hypertonic type was shown for the most part of the surveyed children: 4,35% – in the group with favorable course of adaptation, 25,0% – in the group with semi-favorable course, and 50,0% – in the group with unfavorable course ($p_{1-3}=22,5*10^{-3}$). Asymmetry of blood filling in the vertebral artery system occurred to 43,5%; 55,6% and 50,0%, respectively. Increased value of sphygmic blood filling

in the carotids system occurred to 30,4%; 22,2% and 100,0%, respectively. Asymmetry of blood filling in the vertebrobasilar system occurred to 62,5% and 100,0%, respectively.

In preventive measures in the school maladaptation it is recommended to prioritize a feature set (risk criterion) for each child associated with unfavorable or semi-favorable prognosis for an adaptation course, to assess an organization risk of certain type adaptation course (high, mean, low) and to pursue preventive activities accounting to these data.

One of the ways of medicamental prevention and adaptive mechanism disturbances correction is administration of drug “Glycine” [7]. Glycine is an agonist of glycine area of NMDA-receptor of glutamatergic structures. It enhances methabolic processes in brain tissues, exerts sedative and antidepressant action, normalizes an excitation and inhibition processes in CNS, increases mental efficiency, positively contributes to vegetal regulation [5]. Glycine preserves tissues from intoxication during hypoxia or reperfusion. In hypoxia conditions it increases lifetime of cortical brain neurons and substantially decreases amount of oxidative stress products in ischemia area, which is shown in focal ischemia experiments. A.A. Selin at al. (2012) measured accumulation of reactive oxygen intermediate (ROI) in mitochondria after brief hypoxia exposure. According to investigation data, glycine defends energetic of brain mitochondria. The most feasible mechanism of this process is deterioration of ROI production. In hypoxia conditions glycine is conductive to prevention of cognitive disturbances [2]. Antioxidative action of glycine is reported. It’s manifested in either decreasing of lipid peroxidation products content – malondialdehyde and diene conjugated metabolites, and increasing of antioxidative enzyme activity – superoxide dismutase and catalase [1].

Efficiency and safety of solid drug formulations based on pharmaceutical formulation of microencapsulated glycine and magnesium stearate (Glycine) in patients affected by adaptation disturbances with predominance of other emotion disturbances were investigated in boundary psychiatry department of State scientific-research center of social and forensis psychiatry V.P Serbskogo. The investigation has shown that status of patients administrated Glycine during 4 weeks was improved [3].

Glycine is administerd sublingually or transbuccally (as a tablet or as a powder after grinding of a tablet) 100 mg 2-3 times a day for 14-30 days for practically healthy children and adolescents with psycho-emotional tenses during adaptation to school loads period, nervous stress disorder, memory and

concentration impairment, reduced mental efficiency, mental retardation or deviant behavior.

In case of functional and organic disorders of CNS, accompanied with hyperexcitability, emotional instability and sleep disorders, for children under 3 years – 0.5 tablet (50 mg) 2-3 times a day for 7-14 days, further 1 time a day for 7-10 days (daily dose – 100-150 mg, course dose – 2000-2600 mg); for children over 3 years and adolescents – 2-3 times a day for 7-14 days. The duration of treatment can be increased to 30 days, if necessary, the course may be repeated after 30 days.

Thereby, Glycine administration is recommended to pre-school and schoolable children as a medicamental prevention and correction of adaptive mechanism disturbances.

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