

Cerebrolysin influence on antioxidant and element homeostasis in children with minimal cerebral dysfunction

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Abstract. We evaluated the dynamics of malonic dialdehyde antioxidant status in plasma, erythrocytes, thrombocytes, and the content of 25 elements (K, Mg, Ca, Na, P, Se, Zn, Co, Cu, Fe, Mn, Mo, Si, Li, Ni, V, Pb, Sn, Cd, Al, As, Be, Bi, Ti), carrying out the analysis of hair in 36 children, aged 3 - 8 years, with minimal cerebral dysfunction (MCD) before and after the intramuscular Cerebrolysin therapy in the dose of 2 - 5 ml within 1 month. A clearly marked positive dynamic in the content of nervous system structural elements, Mg and K, has been demonstrated. The positive tendencies both in eliminating neuroactive trace element deficiency, Mn, Se, Cu, Zn, and in reducing the content of neurotoxic elements Al, Pb, have been observed. The spectral analysis of Cerebrolysin element structure was performed. It has been identified sufficient presence both of structural neuroactive elements Mg, K, P, and of essential trace element Se with marked antioxidant properties. Thus, Cerebrolysin therapy in children with MCD results in positive clinical effect and improvement of antioxidant and element homeostasis.

Key words: Cerebrolysin therapy - children - minimal cerebral dysfunction - trace element deficiency

Introduction

We evaluated plasma, erythrocyte, and thrombocyte malonic dialdehyde concentrations, and the content of 25 elements (K, Mg, Ca, Na, P, Se, Zn, Co, Cu, Fe, Mn, Mo, Si, Li, Ni, V, Pb, Sn, Cd, Al, As, Be, Bi, Ti) in the hair of 36 children (aged 3 - 8 years) with minimal cerebral dysfunction (MCD) before and after intramuscular therapy with Cerebrolysin in the dose of 2 - 5 ml within 1 month. It was determined that this medication exerted positive effect on MCD clinical manifestations, oxidant, and element homeostasis.

Atomic emission analysis of Cerebrolysin element content has been detected in the medication, a fairly high content of magnesium, potassium, phosphorus, and selenium which possess neuroactive and antioxidant properties.

The pathogenesis of MCD is multifactorial, and the management of the disease appears to be a complex task. The variety of clinical manifestations, termed MCD, is due

to biochemical pathology. Recently, acknowledged neurochemical concepts [Huch 1990, Reitses 1989, Sandstead 1986, Veltishchev et al. 1989] have extended the clinical spectrum of pathochemical abnormalities in MCD, thus indicating actual patterns for scientific research [Poirtral et al. 1993, Yase 1996, Yoshida 1996]. The role of cell antioxidant defense attenuation in MCD is being studied with special attention. Classical works on experimental pharmacology and neurochemistry have been identifying the group of structural and trace elements considered to be nervous system biomarkers [Kuang 1993, Reitses 1989].

Trace elements are constant biologically active nerve tissue ingredients, sometimes playing key roles in complex biochemical processes which constitute a chemical basis of central nervous system (CNS) activity [Reitses 1989]. They are comprised into important biochemical compounds. So, selenium is contained in glutathione, protecting cells from being toxically affected by free radicals of oxygen. Copper was found in the structure of electron-carrying proteins-neuropeptides, ensuring oxidant reaction of organic substrates by molecular oxygen, in particular, such organic substrates as ceruloplasmin, cytochrome oxidase, and amine oxidase [Petrid 1984]. Metal-containing enzymes of oxide reductase, transferase, and hydrolase comprise zinc and neurotropic vitamin B12 (cobalt). Metabo-

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Minimal Cerebral Dysfunction In Children

SA Adler



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