CALCIUM DEFICIENCY: CAUSES, CONSEQUENCES AND PREVENTIVE MEASURES.

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Abstract: Calcium deficiency is widespread in children of various age groups, which is primarily due to insufficient intake of calcium from food, high demand due to rapid growth and accumulation of bone mass, as well as a wide range of genetically determined, congenital or acquired diseases of organs and systems, accompanied by a violation of mineral metabolism and the development of secondary calcification . The article presents generalized data on the biological role and functions of calcium in the body of a child, discusses the physiology of calcium metabolism, as well as the main exogenous and endogenous causes of calcification and clinical symptoms of the early stages of a deficient state. In view of the widespread prevalence of calcium deficiency, the probable outcomes of this condition are presented depending on the age of the child.

Keywords: calcium, children, deficiency, dietary intervention, vitamin D, bone tissue, prevention.

Nutrition is one of the most important factors that ensure the maintenance of health, physical efficiency, longevity, creativity, and disease prevention . Consumption of insufficient amounts of nutrients affects not only the physical development of children, but also their cognitive and psychosocial development . According to studies conducted in different countries, a significant number of children at different ages have latent or severe deficiencies of various nutrients including proteins, fats, vitamins, and minerals. A prerequisite for growth, physical and neuropsychic development of a child, a balanced course of all metabolic processes is adequate provision of the body with organic (proteins, lipids, carbohydrates, vitamins) and inorganic (water, mineral elements) substances. A huge number of studies are devoted to the study of the characteristics of mineral metabolism, the disclosure of the role of individual chemical elements in human physiology and pathology, their synergistic and antagonistic relationships. The complex multilateral interaction between essential macro- and microelements explains the imbalance of elemental homeostasis with a deficiency of even one component, which becomes the starting point for the development of many pathological processes in children and adults.

Calcium is one of the key minerals needed to ensure many physiological processes in the body of the child, including regulation of hormone secretion, participation in muscle contraction and nerve impulse transmission, immune system function, mental performance, and bone development . Ensuring proper calcium intake can prevent the development of various disorders, help minimize growth problems, prevent osteoporosis and osteopenia, and protect against future bone fractures . Calcium metabolism is closely dependent on vitamin D, parathormone, and calcitonin levels. Vitamin D stimulates intestinal absorption of calcium

and phosphorus, as well as regulates serum calcium levels, maintaining the proper mineralization of the skeleton. Insufficient intake of calcium or vitamin D in children can lead to disorders of bone mineralization, as well as disorders of the muscular, nervous, immune, and other systems.

In clinical practice, pediatricians are much more likely to experience calcification rather than excess calcium. The causes of this deficiency can be exogenous, endogenous factors, as well as their combination, both genetically determined and congenital or acquired. states. Moreover, the frequency calcification in children is significantly associated with age aspect - the maximum falls on periods of increased bone metabolism (0–3 years, preschool age, prepubertal and puberty). According to epidemiological studies conducted by foreign and domestic researchers, calcium deficiency is one of the world's most common nutritional deficiencies in children and adults, leading to leading to serious metabolic disorders and the formation of pathology of various organs and systems, especially the musculoskeletal system (rickets - in young children, osteoporosis - in all age groups).

In the clinical practice of a pediatrician, given the widespread prevalence of calcium deficiency in children and adult populations and extremely serious consequences for health in long-standing uncorrected calcification, emphasis should be placed on primary preventive measures. Especially this important during critical periods of bone mass accumulation, since attempts to correct the deficiency in later terms do not give a full effect on the restoration of the structure and mineral density of bone tissue. Non-specific preventive measures include rational nutrition for regular nutritional supplementation of calcium and vitamin D, taking into account physiological needs, providing adequate physical activity for the age of the child, sufficient insolation, if possible, the elimination of social and environmental risk factors (ecopathogens, harmful habits, etc.)

First of all, calcium performs a structural function, being a part of bones, nails and teeth in the form of phosphate, carbonate and organic salts, it provides the supporting function of bones and their strength. Bone tissue acts as a depot of calcium and in case of insufficient intake from the outside and / or an increase in the body's need, the necessary amount is mobilized from it for metabolic processes. In chemical terms, calcium ions are highly active due to the presence of two valences and a relatively small atomic radius, which provides them with a dominant position in competition with other metals and compounds for the active sites of proteins, so they can successfully compete with radionuclides and heavy metals on all stages of metabolism. Thus, a systemic biological analysis revealed that the functions of approximately 10% of the proteins of the human proteome to some extent depend on the calcium content in the body, and 625 proteins have Ca2+ as a cofactor.

Calcium metabolism is a complex multi-level process, inextricably linked with the metabolism of phosphates and vitamin D, which involves the digestive tract, kidneys (reabsorption in the tubules, excretion in the urine), bone (as the main "consumer" and depot), blood (as tissue - intermediary). It is under strict control by the endocrine system: parathyroid glands (parathyroid hormone), thyroid gland (calcitonin), calciferols (vitamin D), which explains a rather narrow range of fluctuations in the concentration of total calcium in the blood, so this parameter is an insufficiently informative indicator of calcium status .

To assess the nutritional behavior of the participants, a questionnaire was used which was self-reported by the children together with their parents. The questionnaire contained questions on basic eating habits and eating behavior of the child at home and at school. The

questionnaires were distributed at parent meetings in the respective schools after coordination with the school administration and the Department of Education of Lviv. Moreover, a 24 h dietary recall was used to assess individual characteristics of the diet and daily nutrient intake of participants . The dietary recall was collected over 3 days (two weekdays and one weekend day). Parents carefully wrote down all the food items that the child ate in a diary, noting their weight and volume. Parents were given special electronic scales for weighing food. The results were processed using a licensed program Dietplan 7 . Calcium and vitamin D were calculated and included in the analysis. The results were interpreted according to the recommended daily allowance (increased, decreased, or normal intake) for each macro- or micronutrient.

Conclusions: In study participants, the deficiency of daily intake of calcium and vitamin D depended on gender and was more common in girls. In a fairly large proportion of children with insufficient daily intake of calcium and/or vitamin D, there was a low level of total and ionized calcium in the serum, as well as reduced calcium levels in hair. Modification of the diet along with supplementation of calcium and vitamin D seems to be a more effective method for increasing the level of calcium among children aged 6 to 11 years.

References:

1.Oberlis D., Harland B., Skalny A. Biologicheskaya rol macroi mikroelimov u cheloveka i jivotnyx. Pod ed. Skalnogo A.V. Orenburg, 2018.

2.Namazova-Baranova L.S. Vitaminy and mineralnye veshchestva and pediatrician in practice. M.: Pediatrician; 2016.

3. Optimizing the program is important in detail v Rossiyskoy Federatsii: methodicheskie rekomendatsii. M.; 2019.

4.Tutelian V.A., Baturin A.K. The influence of nutrition on human health and active longevity: A modern view. In: Lishenko V.F., editor. The Future of the Food System in Russia (Assessment of the Expert Community) Economics; Moscow, Russia: 2014. 309p