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Fund “Nauka” Project № 19023 Resume – Competition-Based Session 2019:

“Bone health in children with celiac disease”

Project leader: Prof. Miglena Dimitrova Georgieva, MD, PhD

Celiac disease (CD) is a chronic autoimmune disorder that leads to malabsorption syndrome. One of the serious complications of CD, related to malabsorption, is the violation of the bone structure – osteopenia/ osteoporosis. This is a condition of decreased bone mineral density (BMD), which is often associated with fractures. That is why approaches to prevent and overcome this condition are especially important for children with this disease.

The clinical picture of CD is very variable. The autoimmune response is directed mainly to the intestinal mucosa, but it can also occur with various extraintestinal manifestations. One of the important extraintestinal manifestations and/ or complications of CD is osteopenia and/ or osteoporosis. Approximately 50% of children and 75% of adults have low BMD at the time of diagnosis. Low BMD is present even in atypical or asymptomatic CD at the time of diagnosis. This low density leads to severe degrees of osteoporosis. Bone changes are a consequence of impaired absorption of calcium, vitamin D, protein, secondary hyperparathyroidism. It is mainly due to the atrophy of the villi of the proximal small intestine, where micronutrients are most actively absorbed. The malabsorption that has developed, and is observed in untreated CD is essential for bone health in patients.

The main goal of the project is to monitor bone health in children with CD. The goal will be achieved through informed consent containing comprehensive information, the purchase of kits for the study of new bone markers – osteocalcin and osteoprotegerin, the study of traditional biochemical and clinical indicators and radiological methods for osteopenia/ osteoporosis. An algorithm for the application of innovative non-invasive methods for modern diagnosis of the problem and its implementation in the training of medical students, postgraduates and doctoral students in hepatology and gastroenterology will be created. The results will be processed using the methods of statistical analysis using a statistical program.

The use of new bone markers in the study of bone health in children with CD will lead to a deepening of basic knowledge about the pathogenesis and evolution of the problem. This will facilitate early, rapid and extremely modern diagnosis of the disease, which has social significance in childhood.

The research tasks are:

- To monitor bone health;
- To determine laboratory indicators for bone health;

- To summarize the data from the X-ray examination – bone age and DEXA method in the bone status;
- To treat children with celiac disease and bone disease;
- Purchase a kit to investigate new bone markers to assess bone health;
- Follow children with treatment;
- To summarize the data from the study of children with CD with bone health disorders.

The results aimed at are a clarification of bone health in children with chronic disease (CD) and taking adequate treatment measures for the prevention of CD.

Completed activities:

- Monitoring bone health in children with celiac disease;
- Determination of laboratory indicators for bone health;
- Summarizing of the data from the X-ray examination – bone age and DEXA method in the bone status;
- Children with celiac disease and bone disease were treated and monitored;
- Research on new bone markers of bone health assessment – serum osteocalcin and serum osteoprotegerin;
- Currently, the data from the study of children with bone health disorders are summarized. Collected results will be processed using the methods of statistical analysis through a statistical program.

Achieved scientific results:

The main goal of the project is to monitor bone health in children with celiac disease. It was achieved through:

- Informed consent containing complex information;
- Purchase of kits for research of new bone markers;
- Study of the methods of biochemical and clinical indicators and radiological for osteopenia/ osteoporosis;
- Creation of an algorithm for application of the innovative non-invasive methods for modern diagnostics of the problem and its implementation in the training of students, specialists and doctoral students in hepatology and gastroenterology.

The use of new bone markers in the study of bone health in children with celiac disease will lead to a deepening of basic knowledge about the pathogenesis and evolution of the problem. This will facilitate early, rapid and state-of-the-art diagnostics of demand that has social significance in childhood.

The results will be processed using the methods of statistical analysis through the statistical program. The processing of statistical data from the research, the completion of the dissertation and the forthcoming defense are forthcoming (by the end of 2022).