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**PERSONALIZED APPROACHES TO TREATMENT OF CHILDREN WITH
CARDIOMYOPATHIES IN THE REPUBLIC OF KARAKALPAKSTAN**

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Relevance: In recent years, data have been obtained on the relationship of vitamin D deficiency with cardiovascular pathology. Low levels of vitamin D in humans are associated with adverse risk factors for cardiovascular pathology, such as hypertension, diabetes mellitus, dyslipidemia, including strokes and heart attacks. Vitamin D has been shown to have a vasoprotective effect by improving endothelial dysfunction, inhibiting vascular and myocardial remodeling, improving blood pressure parameters, reducing the risk of left ventricular hypertrophy, delaying fibrosis processes, reducing the risk of atherosclerosis, reducing insulin resistance, and affecting inflammation and immunity.

Objective: To introduce personalized methods of correction of vitamin D insufficiency or deficiency in children with cardiomyopathies that improve the prognosis of the disease.

Rationale for the implementation of the innovation:

The introduction of personalized methods for correcting vitamin D insufficiency or deficiency in children with cardiomyopathies is of great practical importance in the activities of pediatricians and pediatric cardioreumatologists.

Materials and Methods:

We examined 165 children with different types of cardiomyopathy: hypertrophic (HCMP), dilative (DCMP), restrictive (RCMP) cardiomyopathy. The patients were hospitalized in the cardiology departments of Nukus RCMC of the Republic of Karakalpakstan and (Republican Specialized Scientific Practical Medical Center Pediatrics) RSSPMC Pediatrics of Tashkent. The age of the patients ranged from 1 to 16 years old. 25 children with different forms of cardiomyopathies (cystic fibrosis, DCMP and RCCMP) were selected for the study.

Studies were aimed at the development of methods of treatment of children with cardiomyopathies and evaluation of its effectiveness in the dynamics of treatment. Depending on treatment 2 groups for each nosological unit were formed: the 1st group (main) -37 (55.2%) patients who received vitamin D in complex therapy (20 children with DCMP, 17 children with CMP); the 2nd group (comparative) -30 (44.8%) patients who received traditional complex therapy (15 children with DCMP and HCMP each).

All patients received a water-soluble (micellized) form of vitamin D. Children with vitamin D deficiency received an aqueous vitamin D solution with a dose of 2000 IU, which the patients took for 2 months. After completion of the main course of treatment, all children regardless of insufficiency and vitamin D deficiency received maintenance therapy with a dose of 1000 IU per day, children with DCMP and HCMP with normal values of vitamin D. received the same dose.

The paper presents an analysis of the results of the evaluation of the effectiveness of personalized methods of correction of the identified disorders in children observed for 2018-2020.

The results obtained were subjected to statistical processing on a Pentium-4 personal computer using programs developed in the Excel package, using a library of statistical

functions, with the calculation of the arithmetic mean, standard deviation, standard error, relative values (frequency%), Student's test, with the calculation of the error probability. Correlation analysis was performed according to Spearman's method. Differences of mean values were considered reliable at significance level $P < 0.05$. The existing guidelines for statistical processing of clinical and laboratory results were followed.

The results show that vitamin D levels among the examined children corresponded to deficiency in 68,5% of children, with the highest number noted in HCMP (73,9%). Vitamin D deficiency was noted in 16,7% of children, with the highest number registered in DCMP (20,7%). In 5 children the vitamin D level was within the normative values, which amounted to 9,2% of all examined children.

As a result of vitamin D supplementation, positive dynamics of clinical symptoms was observed in children with DCMP and HCMP. Comparison of clinical manifestations before and after treatment in patients with DCMP showed more rapid disappearance of such symptoms as shortness of breath after exercise, rapid fatigability, palpitations, congestion in lungs, discomfort and intermittent heartbeat and orthopnea ($p < 0,05$). Decrease of heart palpitations by 2 times was observed after treatment in the main group (from 47,8 to 23,6%), unlike in the control group, in which this sign was 3 times more frequent after treatment (33,3%). The same tendency was observed when analyzing the incidence of orthopnea.

The frequency of dyspnea after physical exercise in children with DCMP after treatment decreased, so in the main group this index decreased 1,5 times, and in the comparison group - 0,4 times, which is almost 1, 2 times more than in the main group ($P < 0.05$).

Children with HCMP showed positive dynamics of clinical symptoms, especially pronounced indices were obtained in children of the main group, who were treated with the drug Aquadetrim. It was found that the frequency of dyspnea after physical activity decreased twofold and was registered only in 34,2% of the children in the main group, while in the comparison group there was not a single case. Troublesome sensations and pain in the heart area occurred in 24,2% of children in the main group, whereas in the comparison group it was registered in 38,3%, which is 1,5 times higher ($P < 0,05$).

Children in the comparison group were 1,5 times more likely to have symptoms of CHF stage IIa, which was 30% versus 46,7% in the main group. Children in the comparison group were 2 times more likely to have signs of pulmonary stasis (21,7% vs. 10%). The use of aquadetrim in children showed that the clinical data tended to positive dynamics, which was more pronounced in the main group.

Against the background of vitamin D administration there was a significant improvement of echocardiographic indices: LV EF increased to a greater extent and there was more noticeable left ventricular remodeling, namely, a greater degree of reduction of left ventricular end-systolic size (LVEF) and left ventricular end-systolic volume (LVEF) (Table).

End points	The difference between average changes (95% confidence interval)	P
Left ventricular ejection fraction	6,07 (3,20-8,94)	<0,001
Left Ventricular End Systolic Size (mm)	-2,09 (- 4,11- -0,06)	<0,05
-Left Ventricular End Systolic Volume (ml)	-12,65 (-24,76 - -0,54)	<0,05

More pronounced positive dynamics was noted in the main group, where the complex of treatment included the preparation Akvadetrim. Thus, Ca index in children of the main group increased to $2,5\pm 0,08$ mol/l against $2,0\pm 0,02$ mol/l before treatment; in comparison group children these indexes after treatment remained at the same level as before treatment ($2,0\pm 0,04$ mol/l, $P>0,05$).

Sufficient concentration of calcium ions in the blood is responsible for maintaining the tone of skeletal muscles, myocardial function, contributes to nerve excitement, and regulates blood clotting.

In children with CMP after treatment, there was a significant increase in vitamin D levels ($28.6\pm$ ng/mg versus 14.8 ± 1.04 ng/mg; $P<0.05$). But they did not reach the level of control values.

In the comparison group, these indices after treatment were insignificantly different from the initial ones and significantly different from those of the control group ($p<0,05$).

In our study, we did not observe any side-effect of including an aqueous vitamin D solution in the complex treatment of children with CMP.

Conclusions:

Thus, our results indicate that the inclusion of vitamin D in a dose of 2000-3000 IU/day in the complex treatment of children with CHF is appropriate. Its clinical efficacy consists in levelling the main symptoms of CHF, inverse remodeling of LV (tendency to normalization of size and volume parameters) with the absence of side effects, as well as the recovery of immunological parameters.

Inclusion of vitamin D in complex therapy of CHF contributes to improvement of clinical manifestations of heart failure and prognosis of the disease.

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