THE RELATIONSHIP BETWEEN THE EFFECTIVENESS OF VITAMIN D FROM DOSE AND FORM IN THE PREVENTION AND TREATMENT OF RICKETS.

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Abstract: The drug Aquadetrim in a dose of two drops (1000 IU), unlike the drug OsteoFIT Mono D in a dose of two tablets (1000 IU), significantly increases the level of 25 (OH)D3 and especially phosphorus - P <0.01 and P <0.001, respectively. Therefore, the drug Aquadetrim in a dose of two drops, according to the results of our research, turned out to be the most effective. Treatment with vitamin D3, along with general restorative therapy, has significantly improved the effectiveness of preventing rickets. At the same time, there was a decrease in alkaline phosphatase, an increase in the content of 25(OH)D3 in blood serum, as well as the level of calcium and phosphorus.

Keywords: rickets, vitamin D, OsteoFIT Mono D, Aquadetrim, calcium, phosphorus, alkaline phosphatase, 25(OH)D3 content.

The relevance of the problem. In recent years, the multifaceted effect of vitamin D on various physiological processes in the human body and, especially, on the growth and development of children has been actively discussed in the literature [2,8,11]. Despite convincing evidence on the benefits of vitamin D, especially for children, the recommendations of district pediatricians are not always followed by parents. More often, parents give this drug only during the first months of life, and later, as a rule, they stop giving it [14,16]. It should also be noted that today there are various forms of vitamin D in the pharmacy chain, but many parents do not have information about their differences [1,12]. Sometimes it happens that parents claim unquestioning compliance with the doctor's recommendations, but there are signs of vitamin D deficiency in the form of signs of rickets in their children [3,10,17]. In their opinion, this is due to the inefficiency of the drug they use [6]. In order to have our own opinion on this issue, as well as dispel the doubts of parents, we decided to study the effectiveness of various forms and doses of vitamin D in the prevention and treatment of rickets [4,9,15]. In this regard, we consider it necessary to determine the level of 25(OH)D3 in blood serum, alkaline phosphatase, total calcium and phosphorus to find out the true causes of rickets in children of the first year of life [5,7,13]. Only such an in-depth examination makes it possible to identify children at

risk for rickets, clarify the etiology, and most importantly, carry out differentiated prevention, and, if necessary, treatment.

The purpose of the work: To evaluate the effectiveness of various forms and dosages of vitamin D by studying the levels of 25(OH)D3, calcium, phosphorus, alkaline phosphatase and justify correction methods.

Materials and methods of research. 80 children aged from 1 to 12 months were under our supervision. The examination of children was conducted on the basis of clinical examination, questionnaires and analysis of outpatient records in the children's department of the polyclinic No. 2 in Samarkand. Parents were explained the purpose of the study and received written consent.

As a result, the children were divided into 2 groups: group 1 (healthy) - (20 children – 25%), group 2 - children with signs of rickets (60 children - 75%), who did not receive rickets prevention. There were 17 (28%) children with rickets under the age of 6 months, 36 (60%) under 12 months. The number of children under the age of 3 months was 7 (12%). Of the total number of children, there were 48 boys (60%), while the number of girls was 32 (40%).

To complete the tasks and clarify the diagnosis, we conducted biochemical studies: determination of the level of 25 (OH)D3, alkaline phosphatase, calcium and phosphorus in blood serum. All children were consulted by a pediatrician, a neurologist and doctors of other narrow specialties.

Discussion of the results obtained. The study of serum levels of 25(OH)D3, alkaline phosphatase, calcium and phosphorus in 40 children of the first year of life who did not receive rickets prevention was carried out. The biochemical parameters are presented in (Table No. 1).

Table No. 1

The study of biochemical parameters in children

№	Indicators	Healthy children		Children who did not receive prevention		P
		M	m	M	m	
1	25 (OH) D	34,16	1,31	19,89	1,97	**<0,001**
2	Alkaline phosphatase	289,83	10,79	318,46	62,26	**>0,5**
3	Total calcium	2,371	0,014	1,997	0,019	**<0,001**
4	Phosphorus	1,205	0,016	0,922	0,011	**<0,001**

As can be seen from Table 1, the content of 25 (OH)D3 in the blood serum of healthy children was on average 34.16±1.31. Whereas in children who did not receive vitamin D3 prophylaxis, it was equal to 19.89±1.97 mmol/l, which is significantly lower than in healthy children (<0.001). A significant difference was found in the examined groups in terms of calcium and phosphorus levels. Thus, the total calcium content in healthy children was 2.371±0.014 mmol/l, and in children of the second group this indicator was 1.997±0.019 mmol/l (<0.001). In children who did not receive rickets prophylaxis, phosphorus levels were significantly reduced compared with those of healthy children - 0.922±0.011 mmol/l and 1.205±0.016, respectively. Alkaline phosphatase in children who did not receive vitamin D3 prophylaxis tended to increase (318.46±62.26 and 289.83±10.79, respectively).

The results show that despite the recommendations of the district doctor, parents do not always follow them. As a result, there is a risk of developing rickets in children. All of the above dictates the need for this work not only to increase the reliability of preventive and therapeutic measures, but also, most importantly, to find out which form of vitamin D3 is still the most effective.

It is known that there are different forms of vitamin D release. Currently, a modern affordable drug has appeared on the pharmaceutical market, which is an aqueous solution of cholecalciferol (Aquadetrim 1 drop contains 500 IU of an aqueous solution of vitamin D3). In a polyclinic, OsteoFIT Mono D, which contains 500 IU of vitamin D3 in one tablet, was also prescribed to children for the prevention of rickets. The drug was distributed in polyclinics in Samarkand in the form of humanitarian aid.

Depending on the level of 25(OH)D3, calcium and phosphorus in the blood serum, we prescribed Aquadetrim in a dose of one or two drops, and OsteoFIT Mono D in one or two tablets.

To determine the degree of difference in the parameters, we decided to conduct a comparative assessment of the studied parameters depending on the dose of each of the drugs separately. In this regard, children who did not receive rickets prevention were divided into several subgroups:

1. 15 children who received one drop of Aquadetrim;

2. those who received two drops of Aquadetrim – 15 children;

3. 15 children who received one OsteoFIT Mono D tablet;

4. 15 children who received two OsteoFIT Mono D tablets.

A comparative analysis of the main indicators of calcium-phosphorus metabolism in children who received Aquadetrim is presented in Table No. 2.

Table No. 2

Comparative analysis of the main indicators of calcium-phosphorus metabolism in children who received Aquadetrim

№	Indicators	Subgroup 1 drop		Subgroup 2 drops		P
		M	m	M	m	
1	25 (OH) D	38,12	2,88	52,86	5,75	<0,02
2	Alkaline phosphatase	252,39	21,57	318,46	62,26	>0,2
3	Total calcium	2,60	0,06	2,57	0,04	>0,5
4	Phosphorus	1,70	0,05	2,02	0,06	<0,001

It turned out that a significant difference depending on the dose of Aquadetrim is noted in the level of 25(OH)D3 and phosphorus. So, if, upon receipt of one drop, the metabolite of vitamin D was equal to 38.12 ±2.88 mmol / l, then when the dose was increased to two drops, this indicator significantly increased (P<0.02) and reached the level of 52.86 ±5.75. A more significant difference was found depending on the dose of phosphorus levels - 1.70±0.05 and 2.02±0.06 mmol/l (P<0.001). The level of alkaline phosphatase and total calcium did not differ statistically, i.e. the dose of vitamin D did not significantly affect these parameters.

The dose dependence during prophylaxis with OsteoFIT Mono D is of interest. A comparative analysis of the main indicators of calcium-phosphorus metabolism in the examined children (OsteoFIT Mono D) is presented in Table No. 3.

Table No. 3.

Comparative analysis of the main indicators of calcium-phosphorus metabolism in children who received OsteoFIT Mono D

№	Indicators	Subgroup 1 tablet		Subgroup 2 tablets		P
		M	m	M	m	
1	25 (OH) D	29,90	5,70	33,95	4,39	>0,5
2	Alkaline phosphatase	257,09	12,77	235,79	10,14	>0,2
3	Total calcium	2,44	0,04	2,50	0,04	>0,2
4	Phosphorus	1,70	0,04	1,68	0,04	>0,5

It turned out that when prescribing Osteoset MonoD, the studied indicators did not significantly differ when the dose of the drug was increased from one tablet to two. As can be seen from the table, there was no statistically significant difference in any of the studied indicators.

Conclusion: It was found that despite the recommendations of the district doctor, parents do not always follow them, as evidenced by the low level of the main metabolite of vitamin D, calcium and phosphorus in the blood serum. It turned out that Aquadetrim at a dose of 1000 IU has a more significant effect on the level of 25(OH)D3 and phosphorus than at a dose of 500 IU. When prescribing Osteoset MonoD, the studied parameters did not significantly differ when the dose of the drug was increased from one tablet to two.

The drug Aquadetrim in a dose of two drops (1000 IU), unlike the drug OsteoFIT Mono D in a dose of two tablets (1000 IU), significantly increases the level of 25 (OH)D3 and especially phosphorus - $P < 0.01$ and $P < 0.001$, respectively. Therefore, the drug Aquadetrim in a dose of two drops, according to the results of our research, turned out to be the most effective.

In general, the presented material once again demonstrates that the formation of rickets is facilitated by a low level of the main metabolite of vitamin D, calcium and phosphorus in the blood serum.

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