ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ ПРОФИЛАКТИКИ РАХИТА ПУТЕМ НАЗНАЧЕНИЯ ПРАВИЛЬНЫХ ДОЗ ВИТАМИНА Д

Шарипов Рустам Хаитович - д.м.н., доцент
Расулова Нодира Алишеровна - к.м.н., доцент
Самаркандский государственный медицинский университет (Самарканд, Узбекистан)

Аннотация. *Исследования показали, что развитие рахита связано с низким уровнем основного метаболита витамина D, а также кальция и фосфора в сыворотке крови. Это подтверждается анализом биохимических показателей кальций-фосфорного обмена и уровня 25(OH)D3 у детей, которые проходили обследование до начала профилактики витамином D, по сравнению с данными здоровых детей. Применение витамина D3 в сочетании с общеукрепляющей терапией значительно повысило эффективность профилактики рахита. В результате наблюдалось снижение уровня щелочной фосфатазы, а также увеличение содержания 25(OH)D3, кальция и фосфора в сыворотке крови.*

Ключевые слова: *рахит, витамин D, кальций, фосфор, щелочная фосфатаза, содержание 25(OH)D_3.*

D VITAMININING TO‘G‘RI DOZALARINI BERISH ORQALI RAXIT PROFILAKTIKASI SAMARADORLIGINI OSHIRISH

Sharipov Rustam Xaitovich - t.f.d., dotsent
Rasulova Nodira Alisherovna - t.f.n., dotsent
Samarqand davlat tibbiyot universiteti (Samarqand, O‘zbekiston)

Annotatsiya. *Tadqiqotlar shuni ko‘rsatdiki, raxitning rivojlanishi D vitaminining asosiy metaboliti, shuningdek, qon zardobida kalsiy va fosforning past darajasi bilan bog‘liq. Bu sog‘lom bolalar ma’lumotlari bilan solishtirganda D vitamini profilaktikasi boshlanishidan oldin tekshirilgan bolalarda kalsiy-fosfor almashinuvining biokimyoviy ko‘rsatkichlari va 25 (ON) D3 darajasining tahlili bilan tasdiqlanadi. D3 vitaminini umumquvvatlovchi terapiya bilan birgalikda qo‘llash raxit profilaktikasi samaradorligini sezilarli darajada oshirdi. Natijada ishqoriy fosfataza miqdorining kamayishi hamda qon zardobida 25 (OH) D3, kalsiy va fosfor miqdorining ortishi kuzatildi.*

Kalit so'zlar: *raxit, D vitamini, kaltsiy, fosfor, ishqoriyfosfataza, tarkibi 25 (OH) D3.*

INCREASING THE EFFECTIVENESS OF RICKETS PREVENTION BY PRESCRIBING THE CORRECT DOSES OF VITAMIN D

Sharipov Rustam Khaitovich - D.M.Sc., associate professor
Rasulova Nodira Alisherovna - C.M.Sc., associate professor
Samarkand State Medical University (Samarkand, Uzbekistan)

Annotation. *Studies have shown that the development of rickets is associated with low levels of the main metabolite of vitamin D, as well as calcium and phosphorus in blood serum. This is confirmed by the analysis of biochemical indicators of calcium-phosphorus metabolism and 25(OH)D3 level in children who were examined before vitamin D prophylaxis, compared to the data of healthy children. The use of vitamin D3 in combination with general strengthening therapy significantly increased the effectiveness of rickets prophylaxis. As a result, there was a decrease in the level of alkaline phosphatase, as well as an increase in the content of 25(OH)D3, calcium and phosphorus in serum.*

Key words: *rickets, vitamin D, calcium, phosphorus, alkaline phosphatase, 25(OH)D3 content.*

The relevance of the problem. An important role in the formation of rickets is played by insufficient provision of vitamin D, calcium and phosphorus, in this regard, it is of interest to study its level in blood serum in comparison with the level of calcium and phosphorus [2,4]. Although to date there is no consensus on the optimal level – 25 (OH) D, most experts determine vitamin D deficiency at its level of less than 20 ng/ml (50 nmol/L). The level of 25 (OH)D from 21 to 29 ng/ml (from 52 to 72 nmol/L) is considered as vitamin D deficiency, and the normal concentration of vitamin D should reach 30 ng/ml or higher [7]. The reasons that cause a decrease in the level of Ca in the blood are numerous. These include vitamin D deficiency associated with insufficient intake from food, impaired absorption in the intestine, suppression of the biosynthesis of active forms, as well as an unbalanced content of inorganic phosphates and magnesium in food and other factors [6].

The high prevalence of rickets in young children, their polyetiology predetermine the need for a differentiated approach to the diagnosis, treatment and prevention of rickets at the pediatric site [1,3]. It has to be stated that practical medicine cannot resist

the rapid spread of this pathology among children, meanwhile, missed opportunities for timely prevention of the observed deviations determine the expansion of the scale of the process at subsequent age stages. The active appeal of doctors to this topic, the identification of risk groups, the introduction of modern methods of diagnosis and treatment will allow us to solve this problem qualitatively [1,5].

In this regard, we consider it necessary to determine the level of 25 (OH)D3 in the blood serum to find out the true causes of rickets in children of the first year of life. Only such an in-depth examination makes it possible to identify children at risk for rickets, to clarify the etiology, and most importantly, to carry out differentiated prevention. That is why it is of interest to study its level in blood serum in comparison with the levels of calcium and phosphorus.

Purpose of the work: To evaluate the effectiveness of rickets prevention carried out at the site by studying the levels of 25(OH)D3, calcium, phosphorus, alkaline phosphatase and to justify the methods of correction.

Materials and methods of research. 40 children aged from 1 to 12 months were under our supervision. The examination of children was carried out on the basis of clinical examination, questionnaires and analysis of outpatient records in the children's department of polyclinic No. 2 in Samarkand. Parents were explained the purpose of the study and received written consent. All children diagnosed with diseases, given the effect of an inadequate amount of vitamin D or someone who received vitamin D supplements at least a month before the visit, were excluded.

All children were considered practically healthy, were examined physically to establish the clinical features of rickets (delayed closure of the large fontanel, rickety rosary, wide wrist, muscle weakness, dystrophy, pale skin, excessive sweating, delayed teething, psychomotor development).

As a result, the children were divided into 2 groups: group 1 (healthy) - (20 children – 50%), group 2 - children with signs of rickets (20 infants – 50%) who did not have rickets prevention. There were 6 (30%) children with rickets under the age of 6 months, 10 (50%) under 12 months. The number of children under the age of 3 months was 4 (20%). There were 11 boys (55%), while the number of girls was 9 (45%).

To fulfill 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 conducted studies have shown that the main factors for the development of rickets in young children, when questioning mothers about the course of pregnancy, were: lack of vitamin D intake during pregnancy (78%), iron deficiency anemia (82%), unbalanced nutrition (64.5%), the young age of the mother during the 1st pregnancy (55%). In less than 50% of cases, low maternal education and complicated childbirth were determined, and toxicosis of pregnant women accounted for only 43%. When assessing the risk factors for the development of rickets in children, we found that the most important are the low content of 25(OH)D3 in the blood serum and insufficient prevention of rickets at the 1st year of life. A significant role was played by such factors as: insufficient exposure to fresh air - less than 20 minutes a day (69.25%), transferred acute respiratory infections (72.5%), time of birth (autumn-winter period) (66.75%), perinatal factors (58.75%), IDA (67.5%).

It was found that, despite the recommendations of the district pediatrician about giving vitamin D3 on the one hand, and about the mandatory implementation of the doctor's recommendation by parents on the other hand, the children we observed had signs of rickets. Considering this fact, we decided to conduct a control examination of children to substantiate the reliability of our assumptions. In this regard, it became necessary to determine the level of 25 (OH)D3 in the blood serum to find out the true causes of rickets in children of the first year of life. Only such an in-depth examination makes it possible to identify children at risk for rickets, to clarify the etiology, and most importantly, to carry out differentiated prevention.

The level of 25(OH)D3, alkaline phosphatase, calcium and phosphorus in the blood serum of 40 children of the first year of life was studied. Children, as indicated above, were divided into 2 groups: group 1 (healthy children) – (20 children - 50%), group 2 – children with signs of rickets (20 infants – 50%), who did not have rickets prevention.

Table 1.

The biochemical parameters are presented in

№	Indicators	Healthy children		Children who did not receive prevention		P
		M	m	M	m	
1	25(OH)D3	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 the table, 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 equal to 2.371±0.014 mmol/l, and in children of the second group this indicator was equal to 1.997±0.019 mmol/l (<0.001). In children who did not receive rickets prophylaxis, phosphorus levels were significantly reduced compared to 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 D 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 fulfill them. As a result, there is a risk of developing rickets in children, as evidenced by the low level of the main metabolite of vitamin D, calcium and phosphorus in the blood serum. All of the above dictates the need for preventive measures by directly instilling vitamin D to the child by a nurse.

It is known that there are different forms of release of this vitamin. 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). The vitamin D preparation was prescribed to children in prophylactic doses from 500 to 1000 IU (one or two drops) per day. In children with the initial period of rickets with a normal level of 25 (OH)D3 in the blood serum, treatment was started with a minimum dose of vitamin D – 500 IU, which, if necessary, was increased to 1000 IU after 7-10 days

Table 2.

The biochemical parameters are presented in

№	Indicators	Before the prevention		After the prevention		P
		M	m	M	m	
1	25(OH)D3	19,89	1,97	38,12	2,56	<0,001
2	Alkaline phosphatase	318,46	62,26	267,65	18,50	>0,5
3	Total calcium	1,997	0,019	2,53	0,02	<0,001
4	Phosphorus	0,922	0,011	1,78	0,03	<0,001

In the course of preventive measures, the level of 25 (OH)D3, calcium and phosphorus in the blood serum of children significantly increased to normal values. The level of alkaline phosphatase also changed. Thus, 25(OH)D3 increased to 38.71±2.56 (at baseline - 19.89±1.97 mmol/L, P<0.001), alkaline phosphatase decreased to 267.65±18.50 (at baseline - 318.46±62.26), the calcium level increased to normal values - 2.53±0.02 (at baseline - 1.997±0.019, P<0.001), the phosphorus level also normalized - 1.78± 0.03 (at baseline - 0.922± 0.011, P<0.001). The results obtained indicate the high efficiency of the proposed treatment regimen for rickets.

Conclusion. 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. In addition, it should be pointed out that of these risk factors on the part of the child, 2 more significant factors have been identified using statistical technologies: lack of vitamin D prevention in the first year of life P<0.00001; iron deficiency anemia in the child P<0.09. The data obtained became the basis for preventive measures consisting of prescribing vitamin D preparations. The treatment with vitamin D3, along with general restorative therapy, significantly increased 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.

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