

## EFFECTIVENESS OF PREVENTIVE USE OF VITAMIN D IN YOUNG CHILDREN

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**Annotation:** 75 children aged from 1 to 12 months were examined. life. During the period of minimal insolation, vitamin D deficiency was detected in more than half of young children (58.3%). Without drug prevention of hypovitaminosis D, the level of 25(OH)D in the blood serum of infants was 8.7 (6.3 - 14.8) ng/ml, which was significantly higher than with artificial feeding, a low level of 24.55 (19.0 - 32.0) ng/ml. ml. It has been established that taking cholecalciferol preparations in a prophylactic dose (500-1500 IU per day) significantly increases the supply of vitamin D to children, regardless of the nature of the diet.

**Key words:** children, vitamin D, vitamin D status, calcidiol, 25(OH)D, prevention of hypovitaminosis D.

## ЭФФЕКТИВНОСТЬ ПРОФИЛАКТИЧЕСКОГО ПРИМЕНЕНИЯ ВИТАМИНА D У ДЕТЕЙ РАННЕГО ВОЗРАСТА

**Аннотация:** Обследовано 75 детей в возрасте от 1 до 12 месяцев. жизни. В период минимальной инсоляции дефицит витамина D выявлен более чем у половины детей раннего возраста (58,3%). Без медикаментозной профилактики гиповитаминоза D уровень 25(OH)D в сыворотке крови у детей грудного возраста составлял 8,7 (6,3 - 14,8) нг/мл, что было достоверно выше, чем при искусственном вскармливании низкий уровень - 24,55 (19,0 - 32,0) нг/мл. мл. Установлено, что прием препаратов холекальциферола в профилактической дозе (500-1500 МЕ в сутки) существенно увеличивает обеспеченность витамином D детей независимо от характера диеты.

**Ключевые слова:** дети, витамин D, статус витамина D, кальцидиол, 25(OH)D, профилактика гиповитаминоза D.

Relevance. Around the world, the result of the close attention of doctors of various specialties to the problem of vitamin D supply has been a significant increase in publications and the emergence of numerous consensuses, meta-analyses, as well as national and continental recommendations for the diagnosis, prevention and treatment of hypovitaminosis D in various population groups. Despite the increased relevance, the issue of optimal dosing of cholecalciferol preparations remains unresolved. Data from fundamental and clinical studies convincingly demonstrate that the currently recommended daily intake of vitamin D for children in Russia - 400 IU / day - is significantly underestimated.

The purpose of the study is to analyze the supply of vitamin D to infants depending on the type of feeding and the effectiveness of diet supplementation schemes with cholecalciferol preparations.

**Research methods.** During the period from November 2021 to March 2023 and in November–December 2022, 132 children (72 boys, 60 girls) aged from 1 month to 1 year were examined, including 76 (57.6%) children in the first half of life; 56 (42.4%) - in the second half of life. 58 (43.9%) children were breast-fed, 74 (56.1%) were bottle-fed. Drug prevention of rickets and vitamin D deficiency was carried out in 78 (59.1%) children, while the proportion of patients receiving cholecalciferol preparations while breastfed was 65.5%, and on artificial feeding – 54.1%. To assess the supply of vitamin D, the level of 25(OH)D, the main metabolite of vitamin D, reflecting its status in the body, was determined using the competitive chemiluminescent immunoassay (CLIA) method on the apparatus Liason DiaSorin Pleutschland GmbH, Germany, reagent LIASON 25OH Vitamin D TOTAL Assay at the Central Research Laboratory of the State Medical Institute Andijan city. The assessment of vitamin D status was carried out in accordance with the recommendations of the International Society of Endocrinology (2011): deficiency - 25(OH)D level less than 20 ng/ml; insufficiency – 21–29 ng/ml; normal content is 30–100 ng/ml. Concentrations below 10 ng/mL were interpreted as severe deficiency, and levels greater than 100 ng/mL were considered vitamin D excess.

**Results and discussion.** Infants showed a rather low supply of vitamin D, the median level of 25(OH)D was 25.9 (17.1–36.2) ng/ml. The analysis showed that only 55 (41.7%) children had sufficient levels of vitamin D, 38 (28.8%) had insufficiency, 21 (15.9%) had deficiency, and 18 (13.6%) had severe deficiency. %) of children in the first year of life. The median content of 25(OH)D in the blood serum in patients in the first six months of life was 25.2 (14.7 – 32.9) ng/ml, and in children aged 6 to 12 months – 31.7 (21.6 – 39.5) ng/ml. Severe deficiency was detected in 13 (17.1%) children under 6 months of age and in 5 (8.9%) children older than six months; deficiency was identified in 14 (18.4%) and 7 (12.5%) patients, respectively. low supply - in 23 (30.3%) and 15 (26.8%) examined; satisfactory supply of vitamin D was found in 26 (34.2%) and 29 (51.8%) examined, respectively. When comparing groups of children aged 1 to 6 and 6–12 months. There is a significant increase in the proportion of patients with a blood calcidiol level of more than 30 ng/ml in the second half of life. The level of 25(OH)D from the minimum in the first month of life progressively increased during the first six months of life, reaching a maximum by 6 months. life, the correlation of calcidiol levels with age in the first half of life is extremely indicative. In the second half of life, the calcidiol level curve was undulating, apparently reflecting ongoing changes in the nature and mode of feeding, the introduction of complementary foods, while the median level of 25(OH)D did not clearly correlate with age.

Severe vitamin D deficiency was detected in 13 (24.1%) patients without subsidies and only in 5 (6.4%) children receiving cholecalciferol; vitamin D deficiency (from 10 to 20 ng/ml) was determined in 16 (29.6 %) and 5 (6.4%) children, respectively, insufficient supply was diagnosed in 15 (27.8%) and 23 (29.5%), normal supply (more than 30 ng/ml) - in 10 (18.5%) and 45 (57.7%) children, respectively.

**Table 1.**  
**Median serum 25(OH)D level (in ng/ml), depending on the dose**  
**of cholecalciferol preparations, Me (25Q–75Q)**

Daily dose of vitamin D	Type of feeding	
	artificia	breastfeeding
500 ME/сут	25,7 (17,0 – 36,2)	32,5 (25,4 – 36,7)
1000 ME/сут	29,7 (23,0 – 48,1)	47,8 (35,7 – 54,0)
1500 ME/сут	48,1 (29,5 – 66,7)	54,1(41,3 – 63,95)

Severe vitamin D deficiency was detected in 13 (24.1%) patients without subsidies and only in 5 (6.4%) children receiving cholecalciferol; vitamin D deficiency (from 10 to 20 ng/ml) was determined in 16 (29.6 %) and 5 (6.4%) children, respectively, insufficient supply was diagnosed in 15 (27.8%) and 23 (29.5%), normal supply (more than 30 ng/ml) - in 10 (18.5% ) and 45 (57.7%) children, respectively. It can be stated that failure to take cholecalciferol drugs in children in the first year of life increases the risk of developing severe vitamin D deficiency by almost 4 times. 55 (70.5%) children received cholecalciferol drugs at a dose of 500 IU/day, 17 (21.8%) children at a dose of 1000 IU/day, and 6 (7.7%) children at a dose of 1500 IU/day. while the average daily supplementation dose in the first year of life was  $691.3 \pm 38.0$  IU/day.

In table (Table 1) presents data on the effect of cholecalciferol dose on serum calcidiol levels in children depending on the type of feeding. Data analysis table. 1 shows that the use of cholecalciferol in infants for the prevention of hypovitaminosis D at doses of 1000 and 1500 IU/day significantly increases serum calcidiol levels compared with use of a dose of 500 IU/day. Moreover, in breastfed children, only a dosage of 1000 IU/day or more allows one to overcome the minimum threshold level of normal vitamin D supply. The correlation between the dose of cholecalciferol preparations and serum calcidiol levels in the first year of life is, while in the first half of life she's even taller. Presents data on the structure of vitamin D provision in children of the first year of life depending on the daily dose of cholecalciferol. Severe vitamin D deficiency occurred in 4 (7.3%) patients using cholecalciferol at a dose of 500 IU/day, and in 1 (5.9%) child receiving a subsidy of 1000 IU/day. The identification of severe deficiency in several children is due to the fact that these were children in the first 3 months. lives with low antenatal reserves, and the duration of cholecalciferol intake was less than 4 weeks. Vitamin D deficiency (level from 10 to 20 ng/ml) was recorded when using 500 IU/day. cholecalciferol in 5 (9.1%) cases, with a subsidy of 1000 IU/day. and higher, vitamin D deficiency was not detected. Low vitamin D levels (level 20–30 ng/ml) were detected in 19 (34.5%) patients who received prophylaxis at a dose of 500 IU/day, in 3 (17.6%) children who used 1000 IU/day, and in 1 (16.7%) child when using 1500 IU/day. Sufficient supply was found in 27 (49.1%) children who used vitamin D preparations of 500 IU/day, in 13 (76.5%) children who received 1000 IU/day, and in 5 (83.3%) - receiving 1500 IU/day. cholecalciferol. A supplementation dosage of 1000 IU leads to a significant increase in the proportion of children with a normal supply of vitamin D.

Conclusions Insufficient vitamin D levels during the period of minimal insolation were detected in more than half (58.3%) of children in the first year of life. The most vulnerable

group for the development of severe vitamin D deficiency are breastfed infants. Patients receiving adapted milk formulas are provided with vitamin D slightly better than children fed human milk. Artificial feeding without supplementation with cholecalciferol preparations does not completely eliminate the risk of vitamin D deficiency. Based on this, drug prevention of hypovitaminosis D in the first year of life should be mandatory for all children. Serum calcidiol levels closely correlate with the dose of cholecalciferol, with the use of vitamin D preparations at a dose of 1000–1500 IU/day. significantly improves the level of well-being in the first year of life without increasing the risk of overdose.

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