

Introduction

There is no agreement on the optimal treatment of children with vitamin D deficiency or insufficiency without obvious signs of rickets.

Aim

To compare the efficacy and side effects of two different stoss therapy regimens (10.000 IU/kg and 300.000 IU vitamin D₃) in children with vitamin D deficiency or insufficiency without rickets.

Materials-Methods

The children and adolescents who had been referred to the pediatric endocrinology department due to vitamin D deficiency or insufficiency between January 2014 and January 2015 and treated with two different stoss therapy doses (10.000 IU/kg and 300.000 IU, oral, single dose vitamin D₃) were retrospectively studied. Patients with chronic diseases such as malabsorption, liver disease, renal disease, gastrointestinal, hematologic and rheumatologic diseases etc., and drug usage influencing vitamin D metabolism were excluded from the study. Patients' age, gender, anthropometric measurements, season of admission and complaints at presentation were recorded. A serum level of 25-hydroxyvitamin D (25-OH-D) between 15-20 ng/mL was considered as vitamin D insufficiency, <15 ng/mL as vitamin D deficiency and <5 ng/mL as severe vitamin D deficiency. The serum levels of calcium, phosphate, alkaline phosphatase (ALP), 25-OH-D, parathyroid hormone, spot urine calcium/creatinine (UCa/UCr) ratio before and after treatment (weeks 2, 4 and 12) and renal ultrasonography (USG) outcomes were compared.

Results

Thirty-two patients were treated with the dose of 10.000 IU/kg and the remaining 32 patients received 300.000 IU single dose oral vitamin D₃. No significant difference was found in the levels of 25-OH-D between the two groups at presentation (10.8±4.9 and 8.8±3.6 ng/mL, respectively). The mean level of 25-OH-D was significantly higher in 10.000 IU/kg group at the second week of therapy, but vitamin D levels were not different between the groups at the post-treatment 4 and 12 weeks. 25-OH-D level was found below optimal level (≥30 ng/mL) in 66.5% and below 20 ng/mL in 21.8% of the patients at the third month of therapy in both groups. None of the patients in both groups developed hypercalcemia or hypercalciuria. Nephrolithiasis was detected only in one patient in the 10.000 IU/kg group.

Table 1. Clinical and laboratory characteristics (before and two weeks after treatment) of patients

Patients	10.000 IU/kg	300.000 IU	p
Age (years)(mean, range)	8.7±4.3 SDS, (3-17)	9.4±3.8 SDS, (3-17)	>0.05
Female /male	19/13	22/10	>0.05
Weight SDS	0.06±0.9	0.12±0.9	>0.05
Weight range (kg)	13-72	16-76	
Height SDS	-0.21±0.84	0.18±1.0	>0.05
Body mass index (kg/m ²)	0.29±1.1 SDS	0.40±0.8 SDS	>0.05
Admission			
Spring	10%	12%	>0.05
Summer	6%	4%	
Autumn	8%	4%	
Winter	76%	80%	
Calcium (mg/dL)	Before treatment: 9.6±0.6 After treatment :10.0±0.3	Before treatment: 9.5±0.3 After treatment : 9.7±0.4	>0.05 >0.05
Phosphorus (mg/dL)	Before treatment: 4.7±0.6 After treatment : 4.8±0.6	Before treatment: 4.4±0.6 After treatment : 4.5±0.5	>0.05 >0.05
ALP (IU/L)	Before treatment: 260±125 After treatment : 235±93	Before treatment: 223±158 After treatment : 214±150	>0.05 >0.05
PTH (pg/mL)	Before treatment: 56±40 After treatment : 34.2±12	Before treatment: 50.1±28.6 After treatment : 34.5±22	>0.05 >0.05

Data are given as mean±SDS (Standart Deviation Score).
ALP: alkaline phosphatase, PTH: parathyroid hormone

Figure 1. The number of patients with symptoms before and two weeks after treatment

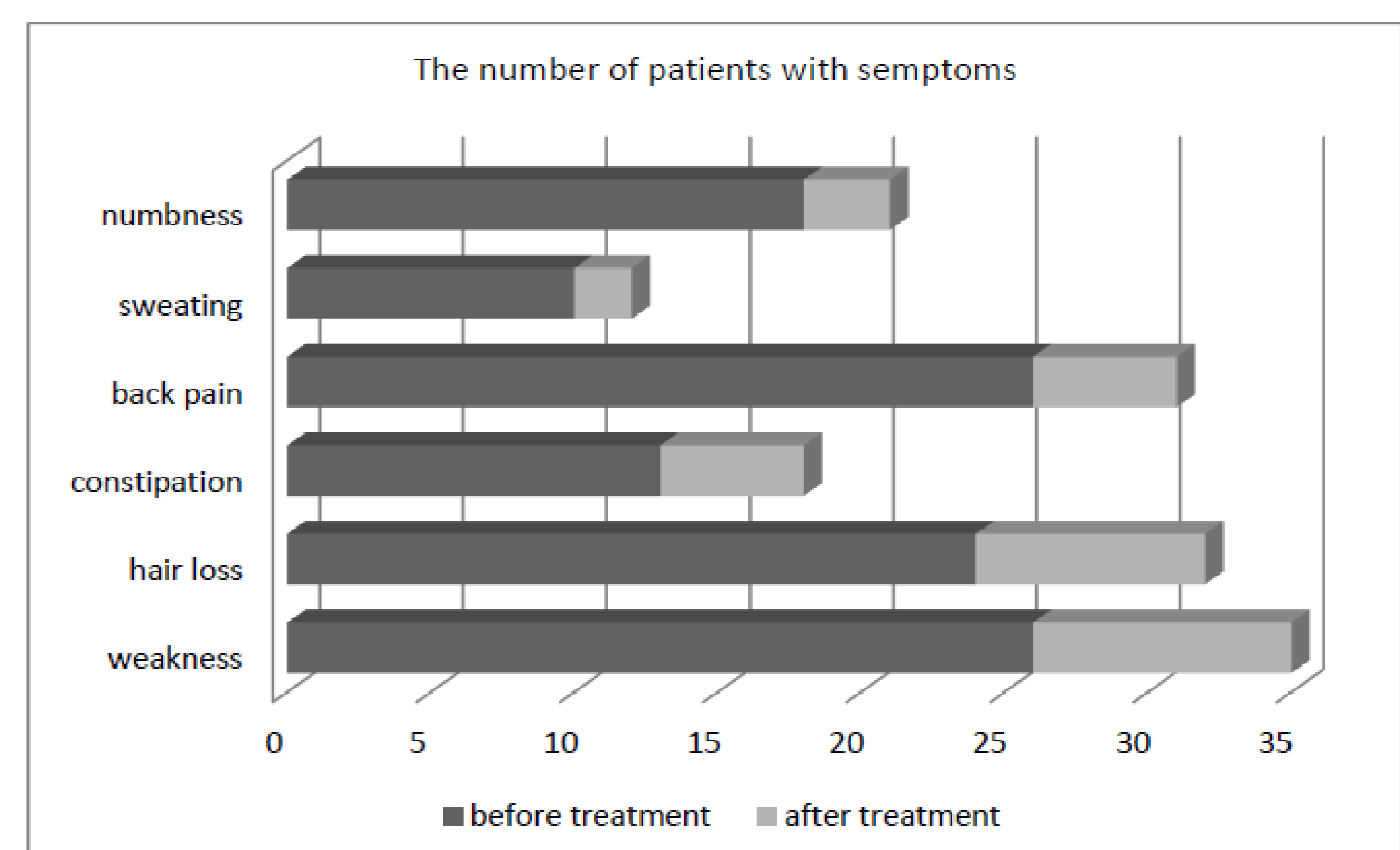
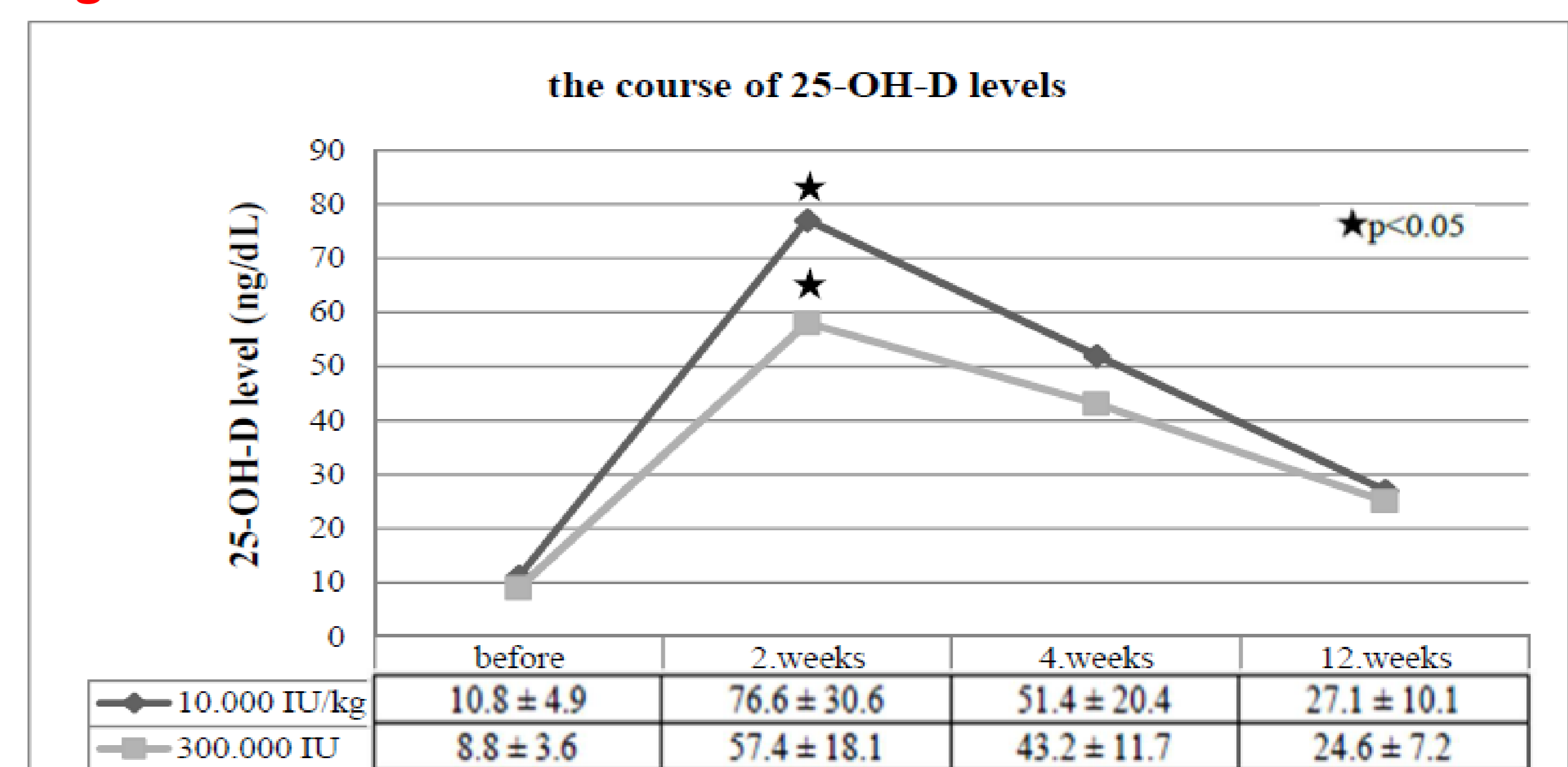


Figure 2. The course of 25-OH-D levels with time



Conclusion

10.000 IU/kg and 300.000 IU single dose vitamin D₃ are not superior to each other. However, the optimal serum level of 25-OH-D cannot be maintained for more than three months.

