VITAMIN D STATUS OF ADULTS WITH GROWTH HORMONE DEFICIENCY

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Vitamin D and growth hormone/insulin-like growth factor-1 (GH/IGF-1) axis are reported to interplay at both endocrine and paracrine levels, with a positive correlation between IGF-1 and 25-hydroxyvitamin D (25(OH)D) in healthy subjects. Hyposomatotropism is among the conditions predisposing to lower vitamin D status due to several direct and indirect mechanisms.

Aim of the research

The aim of the study was to evaluate vitamin D status in a representative sample of adults with GH deficiency (GHD) and to investigate the association between serum 25(OH)D and age, gender and onset of hyposomatotropism.

Patients and methods

This cross-sectional study included 129 adult patients (70 males, aged 42.1 16.6 years) diagnosed with GHD [childhood-onset GHD] (COGHD): n=54] in the Clinical Centre of Endocrinology in Sofia, Bulgaria (latitude 41°-44° N). **Total serum 25(OH)D** was the vitamin D metabolite used to assess vitamin D status and was measured by electro-chemiluminescence binding assay (COBAS, Roche Diagnostics International Ltd.; analytical sensitivity - 4.01 ng/ml; within-run and intermediate precisions - ≤ 6.5% and ≤ 11.5%, respectively) which employs vitamin D binding protein to capture both 25-hydroxyvitamin D3 and D2. Vitamin D status and GHD were defined according to the Endocrine Society Clinical Practice Guideline recommendations. Statistical analysis was performed using SPSS for Windows, version 23.0.

Results

Serum 25(OH)D levels were evaluated in 70 men and 59 women with hyposomatotropism, with men being 8 years younger in their mean age (p = 0.006). The two study subgroups divided in accordance with the onset of the GHD also differed significantly in their mean age – the 54 subjects with **COGHD were almost twice** younger than AOGHD patients (p < 0.0001). (Table 1)

| | AII | Men | Women | COGHD | AOGHD |
|-----------------------|------------|------------|------------|-------------|-------------|
| Number (%) | 129 (100%) | 70 (54.3%) | 59 (45.7%) | 54 (41.9%) | 75 (58.1%) |
| Age min – max (years) | 18 – 82 | 18 - 77 | 18 - 82 | 18 – 58 | 20 – 82 |
| Mean age SD (years) | 42.1 16.6 | 38.5 16.4* | 46.5 16.1* | 29.4 12.1** | 51.3 12.9** |

Table 1. Descriptive characteristics of the study population

Only **6.2%** (n=8) of our study participants **had adequate vitamin D status** with serum 25(OH)D concentrations of 30 ng/ml or higher. The predominant part of the study cohort was diagnosed with vitamin D deficiency - 102 subjects (79.1%); the remaining 14.7% (n=19) of the patients were with vitamin D insufficiency (serum 25(OH)D between 20 and 29.9 ng/ml). (Table 2)

| 25(OH)D (ng/ml) | All | Men | Women | COGHD | AOGHD |
|-------------------|------------|------------|----------------|------------|------------|
| Min – Max | 3.9 – 49.9 | 6.8 - 35.6 | 3.9 – 49.9 | 5.4 – 35.6 | 3.9 – 49.9 |
| Mean ± SD | 15.1 ± 7.6 | 15.7 ± 7.2 | 14.5 ± 8.1 | 16.8±8.0* | 14.0±7.2* |
| ≥ 30.0 (%) | 6.2% | 8.6% | 3.4% | 11.1% | 2.6% |
| 20.0 - 29.9 (%) | 14.7% | 14.3% | 15.3% | 14.8% | 14.7% |
| < 20.0 (%) | 79.1% | 77.1% | 81.3% | 74.1% | 82.7% |

Table 2. Serum 25(OH)D levels of the study population p < 0.05 mean 25(OH)D levels of COGHD patients vs. AOGHD patients

We also analyzed the distribution of the participants in the 3 categories of vitamin D status (adequate, insufficient and deficient) but found no significant difference comparing men vs. women (p=0.115) and COGHD vs. AOGHD subjects (p=0.239).

Mean 25(OH)D levels (15.1 7.6 ng/ml) corresponded to the high prevalence of impaired vitamin D status in our cohort of GHD patients. 25(OH)D concentrations did not differ between men and women (p = 0.387) (Table 2) and were negatively and weakly correlated with age (r = -0.256; p = 0.003) (Data not shown). In the younger group of **COGHD subjects**, however, mean serum 25(OH)D was significantly higher compared with AOGHD participants (p = 0.039) (Table 2).

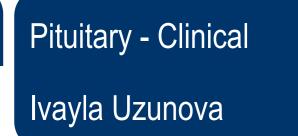
Conclusion

Data from our study demonstrated considerably high prevalence of hypovitaminosis D in GHD adults, with lower 25(OH)D concentrations among the subgroup with AOGHD. Therefore, 25(OH)D testing is highly recommended in patients with hyposomatotropism. Normalization of vitamin D status might have beneficial effects in GHD subjects, especially considering the additive effects of vitamin D and GH replacement.

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^{*}p < 0.05 mean age of men vs. women

^{**}p < 0.05 mean age of COGHD patients vs. AOGHD patients