Lumbar spine areal bone mineral density and 25-Hydroxyvitamin D serum concentrations at two-years follow-up in patients with osteogenesis imperfecta

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BACKGROUND: **Cyclic treatment with Bisphosphonates** (BP) is by now considered a **"standard care" for children with osteogenesis imperfecta** (OI).
Vitamin D is a necessary nutrient for bone health for all children, especially for those with OI.
In the literature few studies have considered the relationship between bone mineral density, vitamin D and pubertal stage in children treated with BP for OI.

OBJECTIVE: The purpose of this study is to evaluate the **vitamin D status** and to asses the **relationship between 25-Hydroxyvitamin D** (25OH-D) **level**, **pubertal stage** and the **variation in lumbar spine areal bone mineral density** (LS-aBMD) measurements during a **two-years follow-up in children with OI**.

METHOD: This retrospective study comprised **28 patients affected by OI treated with neridronate** for at least four years. Charts of these 28 patients were reviewed for mean 25OH-D level and mean variation in LS-aBMD (%ΔBMD) in two years follow-up.
The patient cohort was divided into **three groups according to pubertal stage**: **prepubertal** group (SP1), **pubertal** group (SP2) and **postpubertal** group (SP3).
Each group was divided into **two subgroups** numerically similar **according to 25OH-D serum concentrations** (A:>26 ng/mL;B:<26 ng/mL).

RESULTS: Almost **60%** of our patients have **insufficient** (<30ng/mL) or **deficient** (<20ng/mL) **level of 25OH-D**.
The mean serum 25OH-D concentrations was 28,9 ng/mL (SP1 35,58±15,48 ng/mL; SP2 25,24±5,62 ng/mL;SP3 25,90±8,81 ng/mL).
In **prepubertal** SP1 and **postpubertal** SP3 **subgroups BMD improved, but not significantly**, during the two years follow-up (%ΔBMD SP1 A:18%,B:14%, p:0,271; %ΔBMD SP3 A:5%,B:6,93%,p:0,322).
In **pubertal subgroup** SP2 %ΔBMD **increased more in patients of subgroup A respect patients of subgroup B**, with a **significantly difference between the two subgroups** (%ΔBMD SP2 A:27,72%,B:11,84%,p:0,029).

	PREPUBERTAL GROUP	PUBERTAL GROUP	POSTPUBERTAL GROUP
25-OH-D ng/mL	35,58 ± 15,48	25,24 ± 5,62	25,90 ± 8,81
%ΔBMD SUBGROUP A 25-OH-D > 26 ng/mL	14	27,72	5
%ΔBMD SUBGROUP B 25-OH-D < 26 ng/mL	18	11,84	6,93

CONCLUSIONS: **We find a positive association between high vitamin D status and LS-aBMD in pubertal patients with OI. Stable vitamine D level above 30 ng/mL during pubertal development may keep low PTH level decreasing bone resorption and potently stimulate the increase of bone mass during treatment with BP in adolescents with OI.**