

Vitamin D and Growing Pain in Children

Projet: 403

Pia Ferrat, Traudel Saurenmann, Leonhard Ramseier, Stefan Dierauer, Christian Braegger, Heike A. Bischoff-Ferrari

Background:

Diffuse bone and muscle pain is a clinical sign of severe vitamin D deficiency.

Objective: (1) To assess 25-hydroxyvitamin D (25(OH)D) serum concentrations in Swiss children with and without growing pain. (2) To correlate markers of bone metabolism, including 25(OH)D and PTH, with severity of leg growing pain in children. (3) To test whether growing pain improves with 1000 IU vitamin D3 supplementation per day among children who suffer from growing pain since at least 6 months.

Methods: (1) We examined 25-hydroxyvitamin D status in 100 children at the Children's Hospital in Zurich, 57 with growing pain in their legs (mean age 7.1 years, SD +/-2.5; 97% had previous treatments for growth pain) and 43 without growing pain who were admitted to the emergency room for minor infections or accidents (mean age 6.8 years, SD +/- 2.5 years). (2) In children with growing pain, pain severity was assessed with an age-appropriate validated tool (scale 0 to 10; with 10 indicating maximum pain). Multivariate analyses assessed independent correlates of leg pain at baseline, including 25-hydroxyvitamin D and intact PTH levels, adjusting for age, gender, skin type, and bmi. (3) All children with growing pain were treated with 1000 IU vitamin D3 supplementation and were re-assessed at 3 month.

Results:

(1) Mean 25(OH)D levels did not differ significantly between children with or without growing pain, and were 19.6 ng/ml (SD +/- 7.4) in children with growing pain and 18.7 ng/ml (SD +/- 10.9) without growing pain. Vitamin D insufficiency below 20 ng/ml was prevalent in 58% of children with and 65% of children without growing pain. Vitamin D adequacy of 30 ng/ml or higher were reached by 10.9% of the children with growing pain and 9.3% of children without growing pain. Among children with leg pain, we explored independent predictors of 25(OH)D status at baseline: adjusting for age, gender, bmi, only skin type and season were independent and significant predictors of baseline 25(OH)D levels in children.

(2) Among 47 children with growing pain (mean score = 6.6; SD +/-2.0; duration = 3.1 years; SD +/-2.2) at baseline, pain intensity was higher among those with a higher intact PTH level (p-value = 0.02), and those of younger age (p-value = 0.008), independent of baseline 25(OH)D level, body mass index, and gender. 25(OH)D level were not correlated with pain intensity at the univariate or adjusted level. 25(OH)D levels and intact PTH levels were not correlated at baseline.

(3) Among 47 children with a 3 month assessment after treatment with 1000 IU vitamin D3 per day, there was a significant reduction in pain intensity (mean reduction = 4.6, SD +/-2.8; p-value paired t-test < 0.0001), while 25(OH)D levels increased significantly by 12.2 ng/ml (SD +/- 9.9) bringing 43% of children to an adequate 25(OH)D level of at least 30 ng/ml and leaving less than 12% below 20 ng/ml. At 3 month of follow-up after vitamin D supplementation, 55.6% of children had no pain, 82.2% had pain intensity levels of 4 or less, and 17.8% reported a follow-up pain intensity between 5 and 8 at follow-up.

PTH levels did not decrease appreciably with treatment and we did not find a significant correlation between change in 25(OH)D levels or PTH levels and decrease in pain intensity, both at the univariate and multivariate level.

Conclusion:

Vitamin D insufficiency below 20ng/ml for 25(OH)D is highly prevalent in more than 50% of Swiss children with or without growing pain. While 25(OH)D level did not correlate with baseline pain level, a higher baseline intact PTH level correlated with greater pain intensity. 1000 IU vitamin D shifted 43% of children to an adequate 25(OH)D status of 30 ng/ml and only 12% of children were still below 20 ng/ml. Although the significant

29.4.2011