



POSTER PRESENTATION

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Response to vitamin d replacement in overweight and normal weight children with vitamin D deficiency

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From 8th APPEs Biennial Scientific Meeting
Darwin, Australia. 29 October – 1 November 2014

Aims

Obesity is a risk factor for vitamin D deficiency (VDD), because the lipid soluble vitamin D can be sequestered in adipose tissue. Although it was suggested that higher dose of vitamin D might be required to treat VDD in obese individuals, little is known about treatment responses in overweight children. We investigated the response to vitamin D replacement in normal weight and overweight children.

Methods

This is a prospective study including 66 Korean children between 8 and 15 years of age diagnosed with VDD between Dec 2013 and Feb 2014. VDD was defined as serum 25OHD < 20 ng/mL, and vitamin D sufficiency as ≥ 30 ng/mL. Overweight was defined as body mass index (BMI) $\geq 85^{\text{th}}$ percentile ($n = 25$), and normal weight as BMI between 5^{th} and 84^{th} percentile ($n = 41$). All participants received vitamin D₃ supplementation (2000 IU/d) for 8 weeks. The level of serum 25OHD, PTH, and biochemical parameters were measured before and after treatment.

Results

The mean age was 9.9 ± 1.4 years in normal weight children and 10.0 ± 2.1 years in overweight children ($p = \text{ns}$). Baseline serum 25OHD level was lower in normal weight children (13.2 ± 3.2 ng/mL) than in overweight children (14.2 ± 2.1 ng/mL, $p = 0.011$). Baseline PTH level was 32.3 ± 9.5 and 39.5 ± 18.0 pg/mL in normal weight and overweight children, respectively ($p = 0.027$). After 8 weeks of treatment, 28 (68.3%) normal weight

children and 10 (40%) overweight children achieved vitamin D sufficiency ($p = 0.023$). The mean serum 25OHD level was 33.7 and 28.6 ng/mL in normal weight and overweight children, respectively ($p = 0.496$). The increase of 25OHD levels after treatment was significantly higher in normal weight children than in overweight children (20.6 ± 7.2 vs. 14.4 ± 7.9 ng/mL, $p = 0.002$). However, the decrease in PTH levels seemed to be slightly larger in overweight children compared to normal weight children (-3.2 ± 20.8 vs. -1.1 ± 11.1 pg/mL, $p = 0.05$). In multiple regression analysis, overweight was significantly related to the 25OHD increase after vitamin D replacement ($\beta = 0.323$, $p = 0.01$).

Conclusion

The response to vitamin D replacement can be influenced by adiposity, and overweight children require larger doses of vitamin D to achieve vitamin D sufficiency.

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Published: 28 April 2015

doi:10.1186/1687-9856-2015-S1-P76

Cite this article as: Kim et al.: Response to vitamin d replacement in overweight and normal weight children with vitamin D deficiency. *International Journal of Pediatric Endocrinology* 2015 **2015**(Suppl 1):P76.

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