



POSTER PRESENTATION

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

Haejung Kim<sup>1\*</sup>, In Hyuk Chung<sup>2</sup>, Eun-Gyong Yoo<sup>1</sup>

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## 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  $\geq 30$  ng/mL. Overweight was defined as body mass index (BMI)  $\geq 85^{\text{th}}$  percentile ( $n = 25$ ), and normal weight as BMI between  $5^{\text{th}}$  and  $84^{\text{th}}$  percentile ( $n = 41$ ). All participants received vitamin D<sub>3</sub> 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  $9.9 \pm 1.4$  years in normal weight children and  $10.0 \pm 2.1$  years in overweight children ( $p = \text{ns}$ ). Baseline serum 25OHD level was lower in normal weight children ( $13.2 \pm 3.2$  ng/mL) than in overweight children ( $14.2 \pm 2.1$  ng/mL,  $p = 0.011$ ). Baseline PTH level was  $32.3 \pm 9.5$  and  $39.5 \pm 18.0$  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 ( $20.6 \pm 7.2$  vs.  $14.4 \pm 7.9$  ng/mL,  $p = 0.002$ ). However, the decrease in PTH levels seemed to be slightly larger in overweight children compared to normal weight children ( $-3.2 \pm 20.8$  vs.  $-1.1 \pm 11.1$  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.

## Authors' details

<sup>1</sup>Department of Pediatrics, CHA University, Sungnam, Korea. <sup>2</sup>Department of Pediatrics, National Health Corporation, Ilsan Hospital, Ilsan, Korea.

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<sup>1</sup>Department of Pediatrics, CHA University, Sungnam, Korea  
Full list of author information is available at the end of the article