Proceedings of the Nutrition Society (2015), **74 (OCE4)**, E213 doi:10.1017/S0029665115002554

Irish Section Meeting, 17–19 June 2015, Nutrition at key life stages: new findings, new approaches

A randomized, double-blind, placebo-controlled of vitamin D3 for Irish children with asthma

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We have recently reviewed that many mechanisms[(1)] and human studies[(2)] linking vitamin D deficiency (VDD) to asthma. Associations between vitamin D and both asthma/allergy appear stronger in children than adults[(3)], with some even suggesting that childhood asthma may be caused by VDD[(4)]. Conversely, an alternative hypothesis suggests increased vitamin D status is associated with increased asthma/allergy incidence and severity[(5)]. In line with these opposing theories, several recent randomized trials of vitamin D supplementation in paediatric asthma have demonstrated inconsistent results. We wanted to assess the effects of vitamin D_3 supplementation on subjective asthma measures, lung function, biomarkers of inflammation/allergy and self-reported exacerbation/infection rate in Caucasian, asthmatic children residing at high latitude over the winter season.

After obtaining ethical approval, we conducted a 15 week double-blind, randomized, placebo-controlled trial of vitamin D supplementation (2,000IU/d) in 44 urban, Caucasian children at high latitude (Ireland, 53°N). Assessments were completed at baseline and after 15 weeks. The primary outcome was change in paediatric asthma control test (P-ACT). Secondary outcomes included lung function using computerized spirometry, subjective asthma control (GINA score, mini paediatric asthma quality of life questionnaire) and biochemical parameters of serum vitamin D (25(OH)D), allergy (total IgE), systemic inflammation (high sensitivity CRP), airway inflammation (eosinophil cationic protein), immunity (IgA) and bone homeostasis (parathyroid hormone, albumin corrected calcium, phosphate). Finally, parents/gaurdians completed a weekly diary during the trial regarding infection and exacerbation frequency.

39 children completed the trial. There was no significant differences in 25(OH)D levels at baseline. At follow up, 25(OH)D increased significantly in the vitamin D_3 group (57 to 104 nmol/L) compared to the placebo group (53 to 58 nmol/L) ($p < 0{\cdot}0001$). There was no significant change in our primary endpoint (P-ACT) or secondary endpoints. However, there were non-significant, advantageous changes in the placebo group compared to the vitamin D group in subjective asthma control, inflammation and lung function, particularly $FEV_1\%$ ($+1{\cdot}8$ vs $-4{\cdot}5$; $p = 0{\cdot}06$).

Vitamin D_3 supplementation (2,000IU/d) for 15 weeks led to a significant increase in serum 25(OH)D, but this change was not accompanied by significant changes in asthma control.

This work was supported by National Children's Hospital Foundation.

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