

Concurrent Session 6: Evidence Based Nutrition

Dietary lycopene and asthma control: A randomized control trial

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Background – An antioxidant-rich diet has been associated with reduced asthma prevalence in epidemiological studies. However, there has been no direct evidence that altering the intake of antioxidant-rich foods affects asthma outcomes.

Objectives – This study aimed to investigate changes in asthma control and airway inflammation resulting from a low antioxidant diet and subsequent use of lycopene-rich supplements.

Design – Adults with stable asthma (n=32) consumed a low antioxidant diet for 10 days, then commenced a placebo controlled, randomized, cross-over trial using lycopene-rich supplements. 17 subjects completed the trial in which they received 3 x 7 day treatment arms (placebo, lycopene concentrate and tomato juice), each separated by a 10 day washout. The tomato juice and lycopene concentrate each provided 45mg/day lycopene. Clinical status was monitored using spirometry and the Asthma Control Score questionnaire. Airway inflammation was assessed using total and differential cell counts from induced sputum. Plasma carotenoids and tocopherols, were measured by HPLC.

Outcomes – Following the initial washout period on the low antioxidant diet, plasma carotenoid concentrations decreased (p=0.026) and asthma control worsened, including increased Asthma Control Score (0.035) and decreased %FEV₁ (0.004) and %FVC (0.002). Furthermore, airway inflammation worsened, with increased %neutrophils in induced sputum (p=0.038). Supplementation with both tomato juice and lycopene concentrate reduced neutrophilic airway inflammation (placebo: 55.1 (35.0, 91.1) % versus tomato juice: 42.0 (21.0, 67.8) % versus lycopene concentrate: 39.8 (18.4, 77.5) %; (p=0.006).

Conclusion – A low antioxidant diet worsens asthma control, lung function and noneosinophilic airway inflammation. Lycopene-rich supplements reverse this trend in airway inflammation. Dietary antioxidant consumption is an important variable that modifies clinical asthma status, and changes in dietary antioxidant intake may be relevant to the rising asthma prevalence and as a therapeutic intervention.

Zinc status of toddlers at baseline of a randomised-controlled diet intervention trial

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Background – There is evidence to suggest that mild zinc deficiency may be present in New Zealand (NZ) children. Toddlers may be at an increased risk of zinc deficiency due to their high zinc requirements for growth and low intakes of meat, which is a highly bioavailable source of dietary zinc.

Objectives – To examine the baseline zinc status of 12-20 month old South Island NZ children who participated in a randomised controlled trial designed to determine the efficacy of a meat-based or a fortified cow's milk-based dietary intervention on biochemical zinc status.

Design – A 20-week randomised-controlled intervention trial was conducted with each of 225 toddlers randomised into one of the two diet groups or the control group. At baseline, a hair and non-fasting serum sample were collected using trace-element free techniques for zinc analysis by flame atomic absorption spectrophotometry. Dietary intakes were assessed via a three-day weighed food record. Trained anthropometrists measured weight and length.

Outcomes – At baseline, the toddlers in this study had a mean (SD) age of 17.1 (2.8) months and 56.4% (n=127) were boys. Mean Z-scores (SD) for length-for-age were 0.14 (1.13) and for BMI-for-age were 0.77 (1.04) (n=225). Mean (SD) dietary zinc intake was 4.8mg/day (1.2; n=224), with 1.6% estimated to be at risk of inadequate zinc intakes. Mean serum zinc concentration at baseline was 9.8 µmol/L (n=183) with 38.3% of toddlers classified as having a low serum zinc concentration using time-of-day specific cut-offs. The mean hair zinc concentration at baseline was 1.83 µmol/g (n=215), with 31.6% of toddlers found to have a low hair zinc concentration using season-specific cut-offs.

Conclusions – Baseline results suggest the existence of mild zinc deficiency in these NZ toddlers, which may be related to low dietary intakes of zinc.