Abstract

Eur J Clin Nutr. 2017 Dec;71(12):1371-1380.

Effects of vitamin C supplementation on glycaemic control: a systematic review and meta-analysis of randomised controlled trials.

Ashor AW, Werner AD, Lara J, Willis ND, Mathers JC, Siervo M.

Human Nutrition Research Centre, Institute of Cellular Medicine, Newcastle University, Campus for Ageing and Vitality, Newcastle, UK; College of Medicine, University of Al-Mustansiriyah, Baghdad, Iraq; Department of Applied Sciences, Faculty of Health and Life Sciences, Northumbria University, Newcastle, UK.

OBJECTIVE: Randomised controlled trials (RCTs) have observed contrasting results on the effects of vitamin C on circulating biomarkers of glycaemic and insulin regulation. We conducted a systematic review and meta-analysis of RCTs testing the effect of vitamin C administration on glucose, HbA1c and insulin concentrations.

METHODS: Four databases (PubMed, Embase, Scopus and Cochrane Library) were used to retrieve RCTs published from inception until April 2016 and testing the effects of vitamin C in adult participants. The screening of 2008 articles yielded 22 eligible studies (937 participants).

RESULTS: Overall, vitamin C did not modify glucose, HbA1c and insulin concentrations. However, subgroup analyses showed that vitamin C significantly reduced glucose concentrations (-0.44 mmol/l, 95% CI: -0.81, -0.07, P=0.01) in patients with type 2 diabetes and in interventions with a duration greater than 30 days (-0.53%, 95% CI: -0.79, -0.10, P=0.02). Vitamin C administration had greater effects on fasting (-13.63 pmol/l, 95% CI: -22.73, -4.54, P<0.01) compared to postprandial insulin concentration. Meta-regression analyses showed that age was a modifier of the effect of vitamin C on insulin concentration. Furthermore, the effect size was associated with baseline BMI and plasma glucose levels, and with the duration of the intervention.

CONCLUSION: In conclusion, greater reduction in glucose concentrations observed in patients with diabetes, older individuals and with more prolonged supplementation. Personalised interventions with vitamin C may represent a feasible future strategy to enhance benefits and efficacy of interventions. Nevertheless, results need to be interpreted cautiously due to limitations in the primary studies analysed.

PMID: 28294172