Canterbury Medical Research Foundation

Final report for Grant in Aid GIA2020-4

Grant recipient

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Grant details

GRANT TYPE	Grant in Aid	FUNDING ROUND	2020 Grant In Aid
GRANT REFERENCE	GIA2020-4	GRANT AMOUNT	$5,000

Final report

1. Scientific Assessing Committee report

The grant in aid funded further analysis of stored urine samples from a clinical trial of exclusive and partial enteral nutrition in people with Crohn's disease and healthy people. The analysis included measurement of urinary vitamin C and urinary creatinine. These two values provide an estimate of blood vitamin C saturation because once the blood is saturated with vitamin C, the excess is excreted in urine.

The objectives of this research project were:
• To measure urinary vitamin C excretion four weeks after finishing enteral nutrition therapy in patients with Crohn's disease (CD) (n=23) and a healthy control group (n=17) and compare with baseline values.
• To measure the temporal change in vitamin C excretion in patients with CD consuming a known dose of vitamin C from enteral nutrition therapy (n=23).

We measured urinary vitamin C, corrected for urine concentration by also measuring urinary creatinine, in 136 samples from both patients with Crohn's disease and healthy controls. These are more samples than we originally suggested because we measured vitamin C at all timepoints including 4 months post enteral nutrition treatment. This provides a better estimate of persistence of vitamin C saturation.

The main findings are that vitamin C excretion significantly increased when both patients and healthy controls start on exclusive enteral nutrition (Figure 1). This suggests that their usual intake of vitamin C is less than they consumed in the nutrition formula. The average vitamin C intake from the nutrition formula was 168 mg/day (range, 108 – 252 mg/day). The median vitamin C intake of New Zealander adults is approximately 90 - 110 mg/day. In the Crohn's disease cohort, urinary vitamin C excretion remained stable through the eight weeks of exclusive enteral nutrition treatment (Figure 1). Urinary vitamin C excretion was measured in both groups four weeks after exclusive enteral nutrition was completed. During the previous four weeks, all participants consumed their usual diet. Urinary vitamin C excretion dropped in both groups but was still slightly elevated (M=8.6, range 0.5, 43.6) in the Crohn's disease group, but was not significantly different to pre-treatment concentrations in the healthy control and Crohn's disease groups. By week 26, four months post treatment urinary vitamin C excretion was similar to baseline (M=3.85, range 0.2, 21.4).
At baseline (n=38), low urinary vitamin C excretion was significantly correlated (r= -0.38, 95% CI -0.62 to -0.06, p = 0.019) with greater depression symptoms (Hospital anxiety and depression score). It is well documented that active Crohn's disease inflammation is associated with increased symptoms of depression, and inflammation influences vitamin C concentrations. At week 26 (n=14), there was no longer a correlation between vitamin C excretion and depression symptoms but there were only two patients with mild symptoms of depression.

One of the limitations of this research is the lack of usual dietary intake of vitamin C. Based on these findings, our current Crohn's disease study is collecting dietary data at all time points to enable us to better understand the habitual vitamin C intake of patients with Crohn's disease before and after gastrointestinal surgery. The data from this research strongly suggest that the usual vitamin C intake

of Cantabrians with and without Crohn's disease is inadequate and that vitamin C saturation occurs when both groups were provided with a vitamin C fortified dietary treatment. Once both groups returned to eating their usual diet, urinary vitamin C excretion reduced to pre-treatment concentrations. These data suggest there may be link between depression symptoms in patients with active Crohn's disease and vitamin C status. This hypothesis requires further investigation.

3. Attachments

View an attachment by double clicking the icon to the left of the file name. Icons are not displayed and attachments are not accessible when this PDF is viewed in a web browser; you must open it in PDF reader software.

Figure 1 for CRMF report.pdf
51.6 KiB

4. Feedback

Publication

Date