

Supplemental dietary nitrate for dilated cardiomyopathy: a randomized, double-blind, placebo-controlled, crossover trial

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Dilated cardiomyopathy (DCM) is a disease of the myocardium, typically manifesting as a weakened left ventricle. DCM is a common cause of heart failure (HF) and can be life threatening. We have recently demonstrated that dietary nitrate can acutely increase exercise tolerance in COPD⁽¹⁾. Further it has recently been demonstrated that dietary nitrate can acutely increase exercise tolerance in HF patients⁽²⁾. Since patients with DCM, a common precursor to HF, commonly suffer fatigue, dyspnoea and decreased exercise tolerance, we hypothesized that dietary nitrate supplementation might acutely improve exercise capacity in DCM.

We compared the acute effect of nitrate-rich beetroot juice (BRJ) on exercise capacity and arterial systolic blood pressure in DCM patients compared to a matched nitrate-depleted BRJ. After ethical approval and informed consent form, eleven subjects (7 male) with DCM were recruited (mean BMI = 32.4 ± 4, mean age = 58 ± 11). The subjects had a mean ejection fraction of 35%; mean brain natriuretic peptide level of 351 ng/L and a mean New York Heart Association classification of 2 collectively indicating moderate cardiomyopathy. Resting blood pressure was assessed in duplicate (manual sphygmomanometer). Heart rate and arterial oxygen concentration (pulse oximetry) as well as self-reported breathlessness and leg fatigue (Borg dyspnea scale) were assessed pre- and post-incremental shuttle walk test (primary endpoint). Subjects were then randomized to drink nitrate-rich BRJ or nitrate-depleted BRJ and the protocol was repeated 3 hours later. The 3 h rest period was to allow for sufficient recovery from baseline testing and has been found to correspond with peak plasma nitrite concentrations following oral consumption of dietary nitrate⁽³⁾. After a 7-day washout period, the protocol was repeated with the crossover beverage.

There were no significant differences in heart rate, arterial oxygen concentrations, breathlessness, leg fatigue or blood pressure at any time point with either beverage. However, DCM subjects who took dietary nitrate walked significantly further than when they took placebo (table 1).

Table 1:

	Pre-PL	Post-PL	Pre-BRJ	Post-BRJ	P-value
ISWT (m)	437	432	431	496	0.006

Dietary nitrate has potential as a novel, therapeutic, adjunct strategy to increase exercise tolerance in DCM. However, our preliminary results require confirmation in larger trials.

1. Kerley CP, Cahill K, Bolger K, *et al.* (2015) *Nitric oxide* **44**; 105–11
2. Zamani P, Rawat D, Shiva-Kumar P *et al.* (2015) *Circulation* **131**; 371–80.
3. Webb AJ, Patel N, Loukogeorgakis S, *et al.* (2008) *Hypertension* **51**; 784–90.