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## Pomegranate juice supplementation lowers blood pressure but does not influence pulse wave velocity or antioxidant status in healthy young and middle-aged men and women

A. Lynn<sup>1</sup>, H. Hamadeh<sup>1</sup>, W. C. Leung<sup>1</sup>, J. M. Russell<sup>2</sup> and M. E. Barker<sup>1</sup>  
<sup>1</sup>Human Nutrition Unit, School of Medicine, University of Sheffield, S10 2RX and <sup>2</sup>CICS, University of Sheffield, S10 2HB, UK

Pomegranate juice is a particularly rich source of polyphenolic antioxidant compounds<sup>(1)</sup>. Rodent studies show that supplementation increases antioxidant status, reduces oxidative stress, limits atherogenic modification of LDL-cholesterol and diminishes the size of atherosclerotic lesions<sup>(2,3)</sup>. Supplementation studies in human subjects have also shown increased antioxidant status, decreased plasma lipid susceptibility to oxidation<sup>(2)</sup> and reduced carotid intima-media thickness<sup>(4)</sup>. However, statistical comparison with a control group was lacking in these studies, and a more recent supplementation study that had a randomised placebo-controlled design, showed no benefit for carotid intima-media thickness<sup>(5)</sup>.

We conducted an open-label randomised placebo-controlled parallel study to examine the effect of pomegranate juice on pulse wave velocity (PWV), blood pressure (BP), serum angiotensin converting enzyme (ACE) and antioxidant status (ferric reducing ability of plasma; FRAP) in fifty one healthy adults (30–50 years). Participants consumed 330 ml/d of pomegranate juice or control drink for 4 weeks. Measurements were made at baseline and at 4 weeks. Our primary outcome variable was change in PWV; our secondary outcome variable was change in systolic blood pressure (SBP) and diastolic blood pressure (DBP). The University of Sheffield Ethics Committee approved the study, and all volunteers gave written informed consent.

Brachial-knee PWV was measured using a Nicolet Vasoguard Microlight system (VIASYS Healthcare, USA)<sup>(6)</sup>. BP and heart rate were measured using a semi-automated Accutorr Plus<sup>TM</sup> sphygmomanometer (Datascop<sup>®</sup>, USA). Mean SBP, DBP and heart rate were calculated from three measurements taken at 2.5 min intervals. Mean arterial pressure (MAP) was calculated as  $(2 \text{ DBP} + \text{SBP})/3$ . All vascular measurements were taken in the supine position. Fasted blood samples were collected at baseline and end of intervention to determine plasma FRAP and serum ACE. FRAP was measured using a COBAS bioanalyser<sup>(7)</sup> and serum ACE was measured using a commercially available ELISA kit from R&D Systems.

There was no effect of the intervention on PWV ( $P = 0.694$ ) and plasma FRAP ( $P = 0.700$ ). However, there was a significant fall in systolic blood pressure ( $-3.14 \text{ mm Hg}$ ,  $P < 0.001$ ), diastolic blood pressure ( $-2.33 \text{ mm Hg}$ ,  $P < 0.001$ ) and mean arterial pressure ( $-2.60 \text{ mm Hg}$ ,  $P < 0.001$ ). The fall in BP was not paralleled by changes in concentration of serum ACE ( $P = 0.401$ ).

We conclude that pomegranate juice supplementation has benefits for BP in the short term, but has no effect on PWV. Even though our supplementation period was short, the effects we observed on BP were highly significant and similar in size to those achieved by dietary interventions of Na and K. Further studies are warranted to confirm that consumption of pomegranate juice can reduce blood pressure and to elucidate a mechanism of action.

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