

Concurrent Session 8A: PUFA/Heart Disease

Dietary polyphenolics and potential for drug interactions

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Background – The consumption of polyphenolics and related phytonutrients is rising, as they are thought to provide a range of health benefits. However, it is important to recognise that the uptake, metabolism and elimination of such dietary constituents all utilise the same pathways – metabolising enzymes, transporters, efflux pumps – as the majority of therapeutic drugs. For example, grapefruit polyphenolics have been reported to inhibit the intestinal CYP3A4 drug metabolising system, esterase and the P-glycoprotein efflux pump, affecting the serum concentration of several medications. The most notable adverse interactions have been with the calcium channel blocking anti-arrhythmics, anti-hypertensives, and the statin class of drugs. Conversely, rather than affecting such mechanisms directly, polyphenols may increase drug efficacy by activation of complementary mechanisms, for instance by reducing peripheral vascular resistance, which may potentiate the action of antihypertensive agents.

Objective – To investigate the effect of long-term consumption of red wine polyphenolic compounds (RWPC; Provinol™) on the therapeutic efficacy of enalapril, an ACE-inhibitor class of blood pressure (BP) lowering drug.

Design – Thirty six adult spontaneously hypertensive rats (SHR) were assigned to 3 groups. The control group received water, and two other groups were treated with enalapril (4 mg/kg/day). After stabilisation of BP (5 weeks), one of the treatment groups was also supplied with RWPC (40 mg/kg/day; 4 weeks). Tail-cuff BP was monitored throughout the treatment period. Vascular relaxation properties of RWPC were assessed *in vitro* using the aortic ring and mesenteric vascular bed preparations isolated from normotensive WKY rats.

Outcomes – Treatment with enalapril at the selected dosage caused an approximately 55% reduction in BP which remained stable (SHR 213±2.3; +enalapril 178±3.1; WKY 150±1.9 mmHg). RWPC did not influence the reduction in BP induced by enalapril: final BP values were, +enalapril 171±1.2; RWPC+enalapril 174± 1.9 mmHg (P>0.05). RWPC caused dose-dependant relaxation in isolated vascular preparations.

Conclusions – The co-administration of RWPC did not alter the pharmacological efficacy of enalapril, suggesting that this group of polyphenolics may not compete for the same biochemical pathways in the intestinal wall.

Validation of an electronic polyunsaturated fatty acid food frequency questionnaire

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Background – Polyunsaturated fatty acids (PUFA) have shown great potential in the area of cardiovascular disease, mental illness, and inflammatory conditions. For this reason, a simple non-invasive method, which estimates the intakes of omega-3 and omega-6 PUFA in a healthy adult population, would be a valuable instrument.

Objective – To evaluate an electronic food frequency questionnaire (FFQ) which estimates intakes of omega-3 and omega-6 PUFA for validity, reproducibility and usability.

Design – A comparison of estimated PUFA intakes from the FFQ in a healthy population (n = 41) against a 3-day weighed food record (FR) and appropriate blood biomarkers (red blood cells (RBC) and plasma), using the method of triads model. For reproducibility, 25 healthy volunteers completed the PUFA questionnaire a second time after a 2-4 month interval and Spearman correlation co-efficients were used to assess reproducibility.

Outcomes – The PUFA FFQ adequately estimated intakes for eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), total long chain (LC) omega-3 PUFA, linoleic acid (LA), total omega-6 PUFA, and total PUFA which were comparable with results from the 3-day FR. EPA, DHA and total LC omega-3 PUFA intakes from the FFQ showed good correlations with RBC (0.79, 0.54, and 0.62, p < 0.05, respectively). Spearman correlation co-efficients between the repeat PUFA intakes ranged from 0.48 to 0.76 (p<0.05) for the various PUFA. The electronic format of the PUFA FFQ was found to be time-efficient and easy to use by participants.

Conclusion – This study showed that the self-administered electronic FFQ was time-efficient and user-friendly, and can provide useful estimates of PUFA intakes in a healthy adult population.