

Concurrent Session 4: Cardiovascular Disease

Blood pressure response to dietary modifications is related to use of anti-hypertensive therapy

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Background – We have previously reported that a DASH-type diet (OD; high in fruits, vegetables and low-fat dairy foods) and a low sodium, high potassium diet (LNAHK) lowers blood pressure (BP), with a greater BP reduction achieved after consuming the LNAHK compared with the OD. Whether anti-hypertensive medications affects the BP response to either the OD or the LNAHK diets is not known.

Objective – To determine: 1) if the OD and LNAHK diets can enhance the BP-lowering effects of antihypertensive medications; and 2) whether there is a selective effect of diet on BP with different types of antihypertensive medication (renin-angiotensin system blockade, ACE/AT1; or other therapies, OAH).

Design – Ninety-four subjects, which included 24 men and 18 women taking antihypertensive therapy, completed a 12 week study where, following a two-week control diet (CD), all subjects followed two dietary regimes in random order: the OD, plus either a LNAHK or high dairy diet with a second two-week CD period between diets. Seated home BP was measured daily for the last two weeks in each phase.

Outcomes – Compared with CD (mean difference \pm SEM), the OD selectively enhanced systolic BP reduction in subjects receiving ACE/AT1 (-4.2 ± 0.2 mmHg, $n=15$, $P<0.01$) but not in those on OAH ($+0.6 \pm 1.2$ mmHg, $n=27$). There was a greater fall in BP in those consuming the LNAHK and taking ACE/AT1 (systolic/diastolic $-9.5 \pm 2.4/-4.1 \pm 1.3$ mmHg, $n=7$, $P<0.01$ and $P<0.05$ respectively), compared to CD. LNAHK with OAH significantly lowered systolic BP (-4.4 ± 1.4 mmHg, $n=13$, $P<0.01$) but not diastolic (-2.5 ± 1.3 mmHg, $P>0.05$), compared to CD. The high dairy diet had no effect on BP.

Conclusion – Implementation of a LNAHK diet can be a useful adjunct treatment, to assist in reducing BP, particularly in those taking ACE/AT1 antihypertensive medication.

Long term effects of weight loss from a very-low-carbohydrate diet on endothelial function in subjects with abdominal obesity

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Background – Although very low carbohydrate diets are often used to promote weight loss, the long term effects on brachial artery flow-mediated dilatation (FMD) and markers of endothelial function are unknown.

Objective – To compare the effects of an energy reduced very low carbohydrate, high saturated fat diet (LC) and an isocaloric conventional high carbohydrate, low fat diet (HC) on markers of endothelial function after 12-months.

Design – 49 overweight and obese patients (age 50.0 ± 7.7 yrs, body mass index 33.7 ± 4.1 kg/m²) were randomly assigned to either an energy restricted ($\sim 6-7$ MJ, 30% energy deficit), planned isocaloric LC or HC with mixed carbohydrate sources for 52 weeks in an outpatient clinical study. Body weight, FMD, augmentation index (AIx) and pulse wave velocity (PWV) were assessed pre- and post intervention.

Outcomes – Weight loss was similar in both groups (LC -14.9 ± 10.5 kg, HC -11.5 ± 7.4 kg; $P=0.20$). There was a significant time x diet effect for FMD ($P=0.045$), such that FMD decreased in LC diet ($5.70 \pm 3.59\%$ to $3.65 \pm 2.65\%$, $P=0.001$) but remained unchanged in the HC diet (HC $5.86 \pm 2.54\%$ to $5.51 \pm 3.52\%$; $P=0.60$). PWV improved in both groups (LC 10.74 ± 2.89 m/s to 9.31 ± 1.68 m/s, HC 10.98 ± 2.71 m/s to 9.48 ± 2.18 m/s; $P=0.001$ time) with no significant diet effect ($P=0.80$ time x diet). AIx did not change in either diet group (LC $29.25 \pm 10.18\%$ to $29.71 \pm 10.52\%$, HC $27.09 \pm 10.01\%$ to $28.02 \pm 8.21\%$; $P=0.80$ time, $P=0.16$ time x diet).

Conclusion – Both diets achieved similar reductions in body weight and were associated with improvements in PWV. However, LC impaired FMD, suggesting the long-term consumption of LC may have detrimental effects on endothelial function.

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