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Effects of 3 months of energy restriction on serum lipids and lipoprotein responses in overweight adults

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Recent technological advances now enable the identification and assessment of lipoprotein subclasses, particle numbers and sizes, which provides additional insight into obesity-related risk for cardiovascular diseases (CVD) beyond traditional lipid measures (i.e. elevated triglyceride (TG), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), or low high-density lipoprotein cholesterol (HDL-C)). This study[1] investigated lipid and lipoprotein responses to 3 months of energy restriction (ER, -30% energy) in 140 overweight or obese adults (age: 47.5 ± 10.8 years; body mass index: 30.7 ± 2.2 kg/m^2). Participants were randomly allocated to one of two diets matched on energy. Fasting blood samples were collected at baseline and after 3 months. Serum lipids and lipoprotein particle size and number profiles were measured using nuclear magnetic resonance spectroscopy. Prevalence of dyslipidaemia, according to the Australian criteria,[2] at each visit were compared using a chi-squared test. Changes in body weight and lipid profiles over time were analysed using random effects mixed models, with Bonferroni post hoc tests. While some lipoprotein particle concentrations showed significant group-by-time differences (including very small triglyceride-rich lipoprotein [TRL] particles, medium and small LDL particles), this abstract focuses on the effects of ER over time and groups have been combined to assess the overall effects. Body weight decreased by 8.0% after ER ($p < 0.01$) and rates of dyslipidaemia decreased from 63.0% at baseline to 55.3% after ER ($p = 0.2$). After ER, reductions of TG (−0.2 ± 0.04 mmol/L), TC (−0.5 ± 0.07 mmol/L), LDL-C (−0.3 ± 0.06 mmol/L), VLDL-C (−0.1 ± 0.02 mmol/L), non-HDL-C (−0.4 ± 0.06 mmol/L), apolipoprotein (Apo) B (−0.1 ± 0.01 g/L), Apo A1 (−0.1 ± 0.02 g/L) and HDL-C (−0.1 ± 0.02 mmol/L) were observed (all $p < 0.001$; except for VLDL-C, $p = 0.002$). The mean size of TRL particles decreased by 2.9 ± 0.8 nm ($p < 0.001$) while there were no significant increases in the mean size of LDL and HDL particles (+0.03 ± 0.04 nm and +0.04 ± 0.02 nm; both, $p > 0.05$). Reductions of total (−14.2 ± 4.9 nmol/L), large (−2.1 ± 0.4 nmol/L) and medium (−4.4 ± 1.2 nmol/L) TRL particle numbers, total LDL particle number (−125.3 ± 24.7 nmol/L), and total (−2.0 ± 0.2 μmol/L), medium −0.7 ± 0.2 μmol/L) and small (−1.4 ± 0.3 μmol/L) HDL particle numbers were observed after ER (all $p <$ 0.05). Changes in other lipoprotein particle numbers were not significant ($p > 0.05$). This study demonstrated that 3 months of ER improved the majority of lipids and lipoprotein markers assessed, with a shift towards a less atherogenic lipid profile overall. More studies are needed to investigate the long-term effects of an energy-restricted diet on lipid profiles and their relationships with CVD.

References

1. Carter S, Hill AM, Yandell C, *et al.* (2020) *BMJ Open* **10**, e036542.
2. Lin CF, Chang YH, Chien SC, *et al.* (2018) *Int J Gerontol* **12**, 2–6.