



The effects of low-carbohydrate, high-fat meal consumption on postprandial lipaemia and cardiovascular risk: A systematic review of randomised controlled trials

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Postprandial lipaemia (PPL) is associated with increased risk of endothelial dysfunction (ED), a precursor of atherosclerotic cardiovascular disease (ASCVD)⁽¹⁾. Recent studies highlight the role of diet in influencing postprandial metabolic response⁽²⁾. Previous studies have established the importance of circulating triglyceride (TG) concentrations as a quantitative risk marker and predictor of ASCVD⁽³⁾. However, none have systematically reviewed the effects of low-carbohydrate, high-fat (LCHF) meal consumption on postprandial triglycerides (PPTG), LDL particle structure, and ED. The current systematic review sought to address the question: “To what extent do meals low in carbohydrates but high in monounsaturated, polyunsaturated, or saturated fatty acids contribute to PPL response?”.

CINAHL Plus, PubMed, Cochrane Central, and Web of Science were searched for randomised controlled trials (RCTs) published between January 2012 and July 2022. Results were reported according to the ‘Preferred Reporting Items for Systematic Reviews and Meta-Analysis’ statement. Full-text articles were independently reviewed by two authors. Risk of bias across all studies was assessed using the Cochrane Risk of Bias Tool. All trials reported postprandial analysis of triglycerides following consumption of LCHF meals (<26% of total energy).

11 studies were eligible to be included in the current review. PPTG increased significantly across 7 studies ($p < 0.05$), with associations between LCHF consumption and PPL observed in both healthy adults and individuals with increased cardiometabolic risk. Meal macronutrient composition was found to play a key role in determining postprandial lipid response, whilst exercise preceding and post-consumption of a high-fat meal (HFM) had no effect on PPL. Consumption of a LCHF meal high in saturated fatty acids may contribute to ED through reduction of flow-mediated dilation (FMD) but not peripheral arterial tone (PAT).

Consumption of a single LCHF meal increased PPTG but did not improve PPL response in acute intervention studies. The extent to which LCHF meals contribute to CVD health outcomes remains unclear due to paucity of available studies and absence of reported factors including quantification of LDL subclasses and analysis of different classifications of fatty acids. Further research is warranted to elucidate the role of PPTG on LDL particle structure as an atherogenic marker of ASCVD, objectively measure the extent to which diet induced PPTG contributes to endothelial dysfunction, and further explicate the potential utility of LCHF diets to improve cardiometabolic health and inform future nutritional recommendations at a population level.

References

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