Cardiovascular Benefits of a Low-Fat Diet: Evidence Still Inconclusive

Hooper L, Summerbell CD, Higgins JP, et al. Dietary fat intake and prevention of cardiovascular disease: systematic review. BMJ 2001;322:757–63.

Study Overview

Objective. To determine the effects of reduction or modification of dietary fat intake on total and cardiovascular morbidity and mortality.

Design. Systematic review.

Data collection. A search was conducted for nutrition-based randomized controlled trials (RCTs) in the Cochrane Library, MEDLINE, Embase, CAB abstracts, CVRCT registry, and SIGLE. Further trials were identified by searching bibliographies and by contacting related Cochrane Research Groups and 60 experts. There were no language restrictions. Eligible studies met the following criteria: adequate randomization; inclusion of a usual or control diet or placebo group; reduction or modification of dietary fat or cholesterol intake as stated aim of intervention (unless intervention involved omega-3 fatty acids exclusively); intervention not multifactorial; intervention group not children, acutely ill, or pregnant; intervention (ie, diet provided or supplementation) continued for at least 6 months or follow-up (after dietary advice) lasted at least 6 months; data available on mortality or cardiovascular morbidity.

Main outcome measures. Primary outcomes were total mortality, cardiovascular mortality, combined cardiovascular events (including cardiovascular deaths, nonfatal myocardial infarction, stroke, angina, heart failure, peripheral vascular disease, angioplasty, and coronary artery bypass grafting), and quality of life. Event data were analyzed only if events occurred during provision of diet or supplement or while randomization and blinding were maintained.

Main results. Out of 16,821 papers screened, 27 were included in the meta-analysis. The pooled rate ratio for total mortality was 0.98 (95% confidence interval [CI], 0.86 to 1.12), indicating a very small, nonsignificant effect. Cardiovascular mortality data showed a 9% benefit from modification of dietary fat intake (rate ratio, 0.91 [95% CI, 0.77 to 1.07]) and a 16% reduction in cardiovascular events (0.84 [95% CI, 0.72 to 0.99]). (Unfortunately, the CIs for these measures included or were very close to 1). Trials in which the mean duration of follow-up exceeded 2 years showed a slightly greater reduction in cardiovascular events compared with trials that lasted less than 2 years (0.76 [95% CI, 0.65 to 0.90] versus 0.96 [95% CI, 0.75 to 1.23], respectively). Similar levels of protection from combined cardiovascular events were seen in studies that included patients at high initial risk (0.84 [95% CI, 0.70 to 0.99]) and those examining patients at low risk (0.82 [95% CI, 0.56 to 1.20]). In the dietary trials reviewed, mean initial serum cholesterol concentration was 5.8 mmol/L and demonstrated a small reduction of 0.64 mmol/L (11%) after intervention.

Conclusion. Reduction or modification of dietary fat intake is associated with a small reduction in cardiovascular risk, which may be significant for interventions of longer duration.

Commentary

Numerous observational and experimental studies have tried to demonstrate that a low-fat diet reduces risk for cardiovascular events and overall mortality. The DART study [1] (included in this meta-analysis) was a large RCT involving 2033 patients with recent myocardial infarction. Results did not show any reduction in mortality, possibly because the reduction in cholesterol levels was small. Another recent meta-analysis did not find any evidence to suggest that a low-fat diet improves mortality from coronary events [2].

Hooper and colleagues attempt to demonstrate a positive effect by pooling data from numerous RCTs. The strengths of this analysis lie in its exclusive use of RCTs, validity assessments of the different trials, and strict inclusion criteria. However, some serious shortcomings raise questions about the conclusions drawn by the authors. As in many meta-analyses, treatment differences among RCTs (ie, lack of homogeneity) are problematic. RCTs selected for analysis used several types of low-fat diets, some of which were not recorded accurately or included increased consumption of certain dietary fats such as olive oil or soybean oil. Some RCTs demonstrated more modest risk reductions than others. Moreover, follow-up periods for these cardiovascular risk interventions were relatively short. Given that coronary artery disease takes years to manifest, even the 2-year

follow-up used in the longest RCT may have been too brief to show any positive effects. Important covariates (eg, diabetes, smoking, hypertension) were not measured and could have substantially affected results. There is also no mention of exercise, which can affect lipid profile.

Applications for Clinical Practice

Based on these findings, the idea that a low-fat diet can reduce coronary events cannot be rejected or accepted. However, when the biologic plausibility such an intervention is considered, it still seems reasonable to encourage patients about changing their diet and lifestyle. Notably, the type of fat ingested may be more important than the amount; for example, an RCT examining a Mediterranean diet showed a substantial reduction in mortality to the point that the study was ended prematurely [3].

References

1. Burr ML, Fehily AM, Gilbert JF, et al. Effects of changes in fat, fish, and fibre intakes on death and myocardial reinfarction: diet and reinfarction trial (DART). Lancet 1989;2:757–61.
2. NHS Centre for Reviews and Dissemination, University of York. Cholesterol and coronary artery heart disease: screening and treatment. Effective health care bulletin, No. 4.1. Plymouth (GB): Latimer Trend & Company; 1998:1–12.
3. de Lorgeril M, Renaud S, Mamelle N, et al. Mediterranean alpha-linolenic acid-rich diet in secondary prevention of coronary heart disease [published erratum appears in Lancet 1995;345:738]. Lancet 1994;343:1454–9.