Number-needed-to-treat analysis of the prevention of myocardial infarction and death by antidyslipidemic therapy

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Authors' objectives
To assess the effect of treating dyslipidaemia in the prevention of myocardial infarction (MI) and death.

Searching
MEDLINE was searched from 1966 to 1995 using the keywords 'atherosclerosis', 'coronary artery disease' and 'regression'. Recent literature reviews were also examined for additional studies.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Standard antidyslipidaemic therapy: diet; clofibrate, colestipol, colestyramine, gemfibrozil, pravastatin, niacin, partial ileal bypass, lovastatin, vegetarian diet, resin, simvastatin, any lipids, and exercise.

Participants included in the review
Seven studies included persons with multiple risk factors for coronary atherosclerosis but not known coronary atherosclerosis (primary prevention). Twenty six studies included participants with known coronary atherosclerosis (without MI, i.e. secondary prevention; with MI, i.e. tertiary prevention). Participants were mostly middle-aged men.

Outcomes assessed in the review
The number-needed-to-treat (NNT) to prevent MI and/or death was assessed.

How were decisions on the relevance of primary studies made?
The author does not state how the papers were selected for the review, or how many of the reviewers performed the selection. All of the included studies had to be randomised and involve standard antidyslipidaemic therapy (diet, pharmaceuticals and surgery). Four dietary studies were excluded because the reduction in total cholesterol in the treatment group, compared with the control group, was less than 4%. Studies involving non-standard treatment (triiodothyronine, garlic or walnuts) were excluded.

Assessment of study quality
The author does not state that validity was assessed, although a narrative discussion is employed to draw attention to important study variables.

Data extraction
Data from the individual studies were converted to NNT values. NNT is equal to one divided by the difference of the treatment and control event rates.

Methods of synthesis
How were the studies combined?
A cumulative meta-analysis was performed on the data. Absolute risk reduction and 95% confidence intervals (CIs) were calculated with the random-effects model. The Mantel-Haenszel fixed-effect model was also employed to calculate absolute risks. Subgroup analysis was employed for: studies using HMG-CoA reductase inhibitors; studies
using niacin; and those studies which were more recent, representing treatments typically employed in the 1990s.

How were differences between studies investigated?
A chi-squared analysis was used to determine heterogeneity.

Results of the review
Seven trials assessed primary prevention (9,512 control patients versus 9,544 treated patients); 23 trials assessed secondary and tertiary prevention (9,462 control patients versus 8,990 treated patients); 13 secondary and tertiary prevention trials assessed angiography data (1,365 control patients versus 1,458 treated patients); 7 secondary and tertiary prevention trials assessed dietary treatment alone (1,197 control patients versus 1,234 treated patients); 5 secondary and tertiary prevention trials employed niacin (3,229 control patients versus 2,719 treated patients); 8 secondary and tertiary prevention trials employed hydroxymethylglutaryl coenzyme A (HMG-CoA) reductase inhibitors (3,630 control patients versus 3,697 treated patients).

All results are reported as NNT.

Primary prevention studies: for all studies (excluding the British cooperative trial), the NNT was 53 to prevent a nonfatal MI and 190 to prevent all-cause death. Treatment of dyslipidaemia in people with atherosclerosis (secondary and tertiary prevention) was also effective in preventing MIs and death from all causes.

For 23 trials of secondary and tertiary prevention, the NNT was 37 to prevent death from any cause. In trials with quantitative angiography, the NNT was 7 to prevent progression of coronary atherosclerosis and 10 to induce regression of coronary atherosclerosis. Similar benefits were observed in those trials employing HMG-CoA reductase inhibitors. Benefits for niacin or dietary therapy did not reach statistical significance.

Authors' conclusions
The results support the overall clinical benefit of treating dyslipidaemia, both in persons with and without known atherosclerosis. The benefits are comparable to other secondary prevention measures such as aspirin and beta-blockers. The benefits appear to extend to persons aged over 65 years, with less clearly-defined benefits for women.

CRD commentary
A useful and constructive review. The similarity of results from analysis with both the fixed-effect and random-effects models suggests that the data presented are valid within the constraints of the review.

Funding
Lucille P Markey Charitable Trust; US Public Health Service, grant number HL38918.

Bibliographic details

PubMedID
8656168

Other publications of related interest
This additional published commentary may also be of interest. Spence JD. Meta-analysis: antidyslipidemic therapy prevents myocardial infarction and death. ACP J Club 1997;126:4.

Indexing Status
Subject indexing assigned by NLM

**MeSH**
Coronary Angiography; Coronary Artery Disease /complications /drug therapy; Disease Progression; Female; Humans; Hydroxymethylglutaryl-CoA Reductase Inhibitors; Hyperlipidemias /complications /drug therapy; Hypolipidemic Agents /therapeutic use; Male; Myocardial Infarction /etiology /prevention & control; Niacin /therapeutic use; Risk Factors; Treatment Outcome

**AccessionNumber**
11996001089

**Date bibliographic record published**
31/10/1997

**Date abstract record published**
31/10/1997

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.