The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE
Volume 333:1301-1308 November 16, 1995 Number 20 Next ▸

Prevention of Coronary Heart Disease with Pravastatin in Men with Hypercholesterolemia

James Shepherd, M.D., Stuart M. Cobbe, M.D., Ian Ford, Ph.D., Christopher G. Isles, M.D., A. Ross Lorimer, M.D., Peter W. Macfarlane, Ph.D., James H. McKillop, M.D., Christopher J. Packard, D.Sc., for The West of Scotland Coronary Prevention Study Group

ABSTRACT

Background Lowering the blood cholesterol level may reduce the risk of coronary heart disease. This double-blind study was designed to determine whether the administration of pravastatin to men with hypercholesterolemia and no history of myocardial infarction reduced the combined incidence of nonfatal myocardial infarction and death from coronary heart disease.

Methods We randomly assigned 6595 men, 45 to 64 years of age, with a mean (±SD) plasma cholesterol level of 272±23 mg per deciliter (7.0±0.6 mmol per liter) to receive pravastatin (40 mg each evening) or placebo. The average follow-up period was 4.9 years. Medical records, electrocardiographic recordings, and the national death registry were used to determine the clinical end points.

Results Pravastatin lowered plasma cholesterol levels by 20 percent and low-density lipoprotein cholesterol levels by 26 percent, whereas there was no change with placebo. There were 248 definite coronary events (specified as nonfatal myocardial infarction or death from coronary heart disease) in the placebo group, and 174 in the pravastatin group (relative reduction in risk with pravastatin, 31 percent; 95 percent confidence interval, 17 to 43 percent; P<0.001). There were similar reductions in the risk of definite nonfatal myocardial infarctions (31 percent reduction, P<0.001), death from coronary heart disease (definite cases alone: 28 percent reduction, P = 0.13; definite plus suspected cases: 33 percent reduction, P = 0.042), and death from all cardiovascular causes (32 percent reduction, P = 0.033). There was no excess of deaths from noncardiovascular causes in the pravastatin group. We observed a 22 percent reduction in the risk of death from any cause in the pravastatin group (95 percent confidence interval, 0 to 40 percent; P = 0.051).

Conclusions Treatment with pravastatin significantly reduced the incidence of myocardial infarction and death from cardiovascular causes without adversely affecting the risk of death from noncardiovascular causes in men with moderate hypercholesterolemia and no history of myocardial infarction.

THIS ARTICLE
- Abstract
- PDF

COMMENTARY
- Letters
- Letters
- Letters

TOOLS & SERVICES
- Add to Personal Archive
- Add to Citation Manager
- Notify a Friend
- E-mail When Cited

MORE INFORMATION
- PubMed Citation

Earlier trials of lipid-lowering drugs in the primary prevention of coronary heart disease have demonstrated that lowering cholesterol levels in middle-aged men with hypercholesterolemia reduces the incidence of myocardial infarction.[1,2,3,4] However, these studies, because of their design and low rates of observed events, were unable to show a clear effect of therapy on the risk of death from coronary heart disease or death from any cause. A meta-analysis of the trials provided support for the likelihood that therapy lowered the risk of death from coronary heart disease, but it also aroused concern that the risk of death from noncardiovascular causes might be increased by treatment.[5,6,7,8] Whether this latter association was due to chance, to the reduction in cholesterol itself, or to an adverse effect of the drugs is not clear.

Recently, a new class of lipid-lowering drug, the 3-hydroxy-3-methylglutaryl–coenzyme A reductase inhibitors, has been introduced into clinical practice. These drugs block endogenous synthesis of cholesterol and reduce the levels of low-density lipoprotein (LDL) cholesterol. They slow the progression of coronary disease and reduce the incidence of death from coronary causes and death from any cause in men with manifest coronary heart disease.[9,10,11,12,13,14,15] The present study was designed to evaluate the effectiveness of a reductase inhibitor, pravastatin (Pravachol), in preventing coronary events in men with moderate hypercholesterolemia and no history of myocardial infarction.

Methods

Design

The objective was to enroll approximately 6000 middle-aged men, randomly assigned in a double-blind fashion to receive either pravastatin (40 mg each evening) or placebo and to record their clinical progress over a period of five years. The details of the study design, including the definitions of the end points, have been described previously.[16] Briefly, the primary end point of the study was the occurrence of nonfatal myocardial infarction or death from coronary

heart disease as a first event; these two categories were combined. Other principal end points were the occurrence of death from coronary heart disease and nonfatal myocardial infarction. In all categories, the events were classified as either definite or suspected. In addition to the main end points, the effect of treatment on death from cardiovascular causes, death from any cause, and the frequency of coronary revascularization procedures was analyzed.

All subjects provided written informed consent. The study was approved by the ethics committees of the University of Glasgow and all participating health boards.

Recruitment and Follow-Up

Coronary screening clinics were established in primary medical care facilities throughout the West of Scotland district. Approximately 160,000 men ranging in age from 45 to 64 years were invited to attend the clinics to assess their coronary risk factors. A total of 81,161 appeared for the first visit, and those whose nonfasting plasma cholesterol level was at least 252 mg per deciliter (6.5 mmol per liter) but who had no history of myocardial infarction were given lipid-lowering dietary advice[17] and asked to return four weeks later. A total of 20,914 men returned for the second visit, at which time a lipoprotein profile was obtained that measured plasma cholesterol, the cholesterol content of LDL and high-density lipoprotein (HDL), and plasma triglycerides while the subjects were fasting. If on this occasion the LDL cholesterol level was at least 155 mg per deciliter (4.0 mmol per liter) and the subject had no exclusion criteria,[16] he was advised to stay on the lipid-lowering diet for a further four weeks and then to return for a third visit (13,654 attended), at which time a second lipoprotein profile and a 12-lead electrocardiogram (ECG) were obtained. On the fourth visit the patients underwent randomization if they met the following criteria: fasting LDL cholesterol level of at least 155 mg per deciliter during the second and third visits, with at least one value of 174 mg per deciliter or above (4.5 mmol per liter) and one value of 232 mg per deciliter or below (6.0 mmol per liter); no serious ECG abnormalities according to Minnesota code[18] 1 (pathologic Q waves), 4-1, 5-1, or 7-1-1 or arrhythmia such as atrial fibrillation; and no history of myocardial infarction or other serious illness, although men with stable angina who had not been hospitalized within the previous 12 months were eligible. Further details of the inclusion and exclusion criteria were described previously.[16]

The subjects were seen at three-month intervals, and dietary advice was reinforced on each occasion. A fasting lipoprotein profile was obtained every six months, and an ECG was recorded annually or as required clinically. The subjects received a full medical examination by a physician each year.

Laboratory Analyses

The cholesterol measurement during the first visit was performed on a Reflotron bench-top analyzer (Boehringer–Mannheim, Lewes, Kent, United Kingdom). All subsequent laboratory analyses, including biochemical, hematologic, and lipoprotein profiles, were conducted at the central laboratory at the Glasgow Royal Infirmary. Lipoprotein profiles were determined according to the Lipid Research Clinics protocol[19] with enzymatic cholesterol and triglyceride assays. The laboratory was certified through the Lipid Standardization Program of the Centers for Disease Control and Prevention in Atlanta. Abnormalities in the results of blood tests were identified with the use of published reference ranges.[16]

Siemens Sicard 440 electrocardiographs were used to record the 12-lead ECGs, and the data were transmitted by telephone to the ECG core laboratory at the Glasgow Royal Infirmary for storage on a central Mingocare data base (Siemens Elema, Stockholm, Sweden) and subsequent automated classification according to the Minnesota code, including serial comparisons.[18,20,21,22] All ECG results were verified by visual inspection.

Identification and Classification of End Points

At each follow-up visit, adverse events were documented on the basis of the subjects' recall, and if appropriate, further information was obtained from hospital records. All data on randomized subjects were flagged electronically on national computer data bases so that the numbers of deaths, incident cancers, hospitalizations, and cardiac surgeries could be monitored according to previously described methods.[23] Potential end points were reviewed and classified according to predefined criteria[16] by the End-Points Committee, whereas non–coronary heart disease events were reviewed and classified by the Adverse-Events Committee. The progress and conduct of the study were monitored regularly by the independent, unblinded Data and Safety Monitoring Committee. Except for the trial statistician and his assistant, all trial personnel remained unaware of the subjects' treatment assignments throughout the study.

Statistical Analysis

All data were analyzed according to the intention-to-treat principle. The results of the two fasting lipoprotein profiles obtained during visits 2 and 3 were averaged to produce base-line values. The LDL cholesterol results were analyzed according to both the treatment actually received and the intention-to-treat principle. The analysis based on actual treatment used only the measured lipid levels in subjects who had attended the previous scheduled visit and who had been issued with trial medication at that visit. For the intention-to-treat analysis, all recorded levels were included, without reference to the subjects' degree of compliance at previous visits. In addition, in cases in which no lipid value was available for a scheduled visit and no medication had been issued at the previous visit, the subject's base-line level was used. For each end-point category, the lengths of time to a first event were compared with use of the log-rank test, and the relative reduction in risk resulting from pravastatin treatment, with 95 percent confidence intervals, was calculated with the Cox proportional-hazards model.[24] In addition, Kaplan–Meier time-to-event curves were used to estimate the absolute risk of each event at five years for each treatment group. When a silent myocardial infarction was detected on the basis of serial comparison of ECGs, the event was considered to have occurred midway between the first diagnostic ECG and the previous ECG. Two-tailed P values were used throughout.

For the primary end point, an analysis was performed for predefined subgroups[16] characterized at base line according to age (<55 years or >55 years), smoking status (smoker or nonsmoker of cigarettes, cigars, or pipes), and whether at least two of the following risk factors were present: smoking, hypertension, a history of chest pain or intermittent claudication (as indicated by positive responses on the Rose questionnaire), diabetes, and a minor ECG abnormality associated with coronary heart disease (Minnesota code 4-2, 4-3, 5-2, or 5-3).

In addition, the effect of treatment was examined in a subgroup with and a subgroup without vascular disease at base line. Vascular disease was considered to be present if there was evidence of angina, intermittent claudication, stroke, transient ischemic attack, and ECG abnormalities according to the Minnesota code. Finally, the influence of base-line lipid levels on the effect of treatment was assessed by dividing the randomized population according to the median plasma cholesterol, LDL or HDL cholesterol, or plasma triglyceride concentration.

The Data and Safety Monitoring Committee conducted annual reviews of the main end points according to the O'Brien and Fleming criteria for stopping the trial prematurely.[25] The overall P value indicating statistical significance was set at 0.01.

Results

A total of 6595 subjects underwent randomization. The clinical characteristics of the subjects who were screened and those who were randomized have been described previously.[26] The first patient was enrolled on February 1, 1989, and recruitment was completed by September 30, 1991. The final visits were made between February and May 1995, by which time the study population had accrued 32,216 subject-years of follow-up (an average of 4.9 years per subject). At the end of the study, the vital and clinical status of all randomized subjects was ascertained. The base-line characteristics of the pravastatin and placebo groups are summarized in Table 1. As expected in a trial of this size, the groups were well balanced. For the study population as a whole, the average (±SD) plasma cholesterol level was 272±23 mg per deciliter (7.0±0.6 mmol per liter), the LDL cholesterol level was 192±17 mg per deciliter (5.0±0.5 mmol per liter), and the HDL cholesterol level was 44±9 mg per deciliter (1.14±0.26 mmol per liter). On the basis of positive responses on the Rose questionnaire, evidence of angina was present in 5 percent of the men, whereas 8 percent had ECG ST-T wave changes (Minnesota codes 4-2, 4-3, 5-2, and 5-3). The prevalence of self-reported diabetes mellitus was 1 percent, and that of hypertension was 16 percent; 44 percent of the subjects were current smokers.

View this table: **Table 1.** Base-Line Characteristics of the Randomized Subjects, According to Treatment Group.
[in this window]
[in a new window]

Withdrawals

The cumulative rates of withdrawal from treatment in the placebo and pravastatin groups were 14.9 percent and 15.5 percent, respectively, at year 1, 19.1 percent and 19.4 percent at year 2, 22.5 percent and 22.7 percent at year 3, 25.2 percent and 24.7 percent at year 4, and 30.8 percent and 29.6 percent at year 5. There was no significant difference in the withdrawal rates between the two groups at any time. The disproportionate increase from year 4 to year 5 can be attributed to the withdrawal from the study of some subjects who had completed the five years of follow-up and who could have proceeded further but did not wish to do so.

Reduction in Lipid Levels

When the data were analyzed according to the treatment actually received, pravastatin was found to have lowered plasma levels of cholesterol by 20 percent, LDL cholesterol by 26 percent (Figure 1), and triglycerides by 12 percent, whereas HDL cholesterol was increased by 5 percent. There were no such changes with placebo. When the data were analyzed according to the intention-to-treat principle, because such analysis includes subjects who withdrew and noncompliant subjects, there was an apparent reduction in the observed difference in LDL cholesterol levels between treatment groups over time. This result is in contrast to that based on actual treatment, which showed that the differnce was maintained.

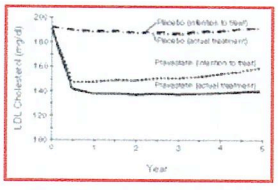


Figure 1. Effects of Pravastatin Therapy on Plasma LDL Cholesterol Levels.

To convert values for cholesterol to millimoles per liter, multiply by 0.026.

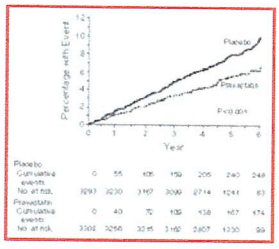
View larger version (3K):
[in this window]
[in a new window]

End Points

As compared with placebo, pravastatin produced a significant reduction in the risk of the combined primary end point of definite nonfatal myocardial infarction and death from coronary heart disease (reduction, 31 percent; 95 percent confidence interval, 17 to 43 percent; P<0.001; absolute difference in the risk at five years, 2.4 percentage points) (Table 2 and Figure 2). The effects of pravastatin on other principal end points are given in Table 2, Figure 3A, Figure 3B, Figure 3C, Figure 3D, and Figure 3E. The reduction in the risk of nonfatal myocardial infarction was significant (P<0.001) whether the definite cases of myocardial infarction were considered alone or in combination with suspected cases. Excluding silent myocardial infarctions from the analysis of the primary end point did not affect the outcome (Table 2). For the end point of death from coronary heart disease, there was a significant treatment effect in the analysis of both definite and suspected cases (risk reduction, 33 percent; 95 percent confidence interval, 1 to 55 percent; P = 0.042), but not in the analysis of definite cases alone, probably because of the smaller number of events in this group. However, there was a similar reduction in risk (28 percent). When the effect of treatment with pravastatin on death from all cardiovascular causes was analyzed, a 32 percent reduction in risk (95 percent confidence interval, 3 to 53 percent; P = 0.033) was observed. Treatment with pravastatin was associated with similar reductions in the frequency of coronary angiography (31 percent; 95

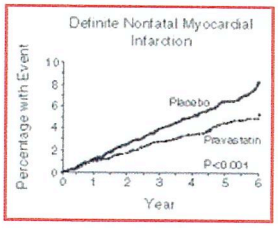
percent confidence interval, 10 to 47 percent; P = 0.007) and revascularization procedures (37 percent; 95 percent confidence interval, 11 to 56 percent; P = 0.009).

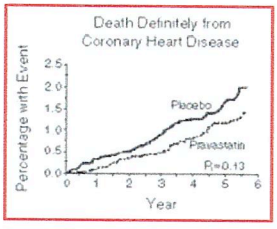
View this table: **Table 2.** End Points of the Study.
[in this window]
[in a new window]

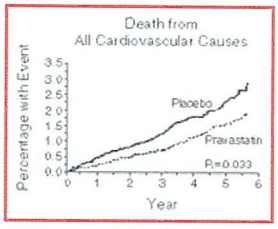


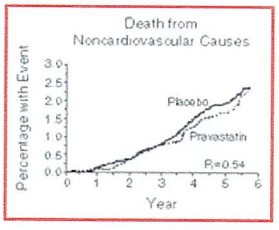
View larger version (3K):
[in this window]
[in a new window]

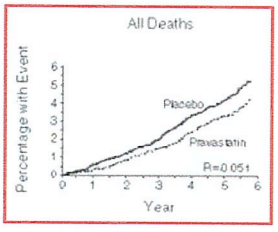
Figure 2. Kaplan–Meier Analysis of the Time to a Definite Nonfatal Myocardial Infarction or Death from Coronary Heart Disease, According to Treatment Group.











View larger version (10K):
[in this window]
[in a new window]

Figure 3. Kaplan–Meier Analysis of the Time to a Definite Nonfatal Myocardial Infarction (Panel A), Death Definitely from Coronary Heart Disease (Panel B), Death from All Cardiovascular Causes (Panel C), Death from Noncardiovascular Causes (Panel D), and Death from Any Cause (Panel E), According to Treatment Group.

There were 56 deaths from noncardiovascular causes in the pravastatin group and 62 in the placebo group (P = 0.54). There was no significant difference between treatment groups in the numbers of deaths from cancer, suicide, or trauma. There were 46 strokes (6 of which were fatal) in the pravastatin group and 51 (4 fatal) in the placebo group. In the pravastatin group, the reduction in the number of deaths from cardiovascular causes in the absence of any increase in the number of deaths from noncardiovascular causes resulted in a 22 percent reduction in the overall risk of death (95 percent confidence interval, 0 to 40 percent; P = 0.051).

The beneficial effects of pravastatin therapy were evident in all subgroups (Table 3). The numbers of subjects in the subgroups with either multiple risk factors at base line or vascular disease at base line were too small to show a statistically significant effect.

View this table: **Table 3.** Incidence of the Primary End Point, According to Subgroup.
[in this window]
[in a new window]

Other Adverse Events

In the pravastatin group 116 subjects had incident (fatal or nonfatal) cancers, as compared with 106 in the placebo group (P = 0.55). These figures include cases of malignant melanoma but not minor skin cancers. For the placebo and pravastatin groups, respectively, there were 30 and 31 gastrointestinal cancers, 26 and 32 genitourinary cancers, 28 and 27 respiratory tract cancers, and 22 and 26 other cancers. Twenty subjects in the pravastatin group reported myalgia, and 97 muscle aches. The corresponding numbers in the placebo group were 19 and 102 (P not significant). Four subjects (three in the pravastatin group and one in the placebo group) had asymptomatic episodes of elevated creatine kinase concentrations (>10 times the upper reference limit). Elevations in aspartate aminotransferase and alanine aminotransferase values (>3 times the upper reference limits) were recorded for 26 and 16 subjects, respectively, in the pravastatin group, as compared with 20 and 12 subjects in the placebo group (P not significant).

Discussion

As compared with placebo, pravastatin reduced the risk of fatal or nonfatal coronary events in middle-aged men with hypercholesterolemia and no history of myocardial infarction by approximately 30 percent. The beneficial effects of treatment were remarkably consistent across a variety of coronary end points. In contrast to the results of studies using resins, fibrates, or other 3-hydroxy-3-methylglutaryl–coenzyme A reductase inhibitors,[1,2,3,4,9] the time-to-event curves began to diverge within six months of the initiation of treatment and continued to do so at the same rate throughout the trial. The frequency of the need for coronary angiography and revascularization procedures was significantly lower in the pravastatin group than in the placebo group.

The subjects in this study were representative of the general population in terms of socioeconomic status and risk factors (Table 1). Their plasma cholesterol levels were in the highest quartile of the range found in the British population.[27] A number had evidence of minor vascular disease, and in order to make the findings of the trial applicable to typical middle-aged men with hypercholesterolemia, they were not excluded.

In line with accepted guidelines,[28] the LDL cholesterol level was used as a criterion for entry into the study. As compared with placebo, pravastatin produced a major reduction in this lipoprotein fraction (Figure 1) and moderate decreases in plasma triglycerides, as well as an increase in HDL cholesterol. These changes are in line with the expected response to pravastatin,[29] and all could potentially result in clinical benefit. The changes in the LDL cholesterol level are more substantial than those observed in earlier primary prevention studies.[1,2,3,4]

When the subjects were divided into two groups according to their lipid levels at base line, we found that coronary risk was related to higher plasma LDL cholesterol and triglyceride levels (i.e., levels above the median values) and lower HDL cholesterol levels (i.e., levels below the median value) (Table 3). The plasma cholesterol level was not a significant factor, principally because of the narrow range of cholesterol values used as a criterion for entry into the study. The relative reduction in risk with pravastatin therapy was statistically significant and of a similar magnitude in subjects with lipid values above and below the median.

The relative reductions in risk attributable to pravastatin therapy were not affected by age (<55 years vs. >55 years) or smoking status. Furthermore, a significant treatment effect was seen in the subgroup without multiple risk factors and the subgroup without preexisting vascular disease. Thus, it is possible to conclude that in the subjects who might be considered to fall strictly into the primary-prevention category, pravastatin therapy produced a significant reduction in the relative risk of a coronary event.

Pravastatin therapy was well tolerated and resulted in no more study withdrawals than placebo. In particular, as in an earlier study,[15] there was no evidence that pravastatin adversely affected liver function or caused myopathy. Our results support those of a recent secondary-prevention trial[9] that found that lipid lowering with a 3-hydroxy-3-methylglutaryl–coenzyme A reductase inhibitor is not associated with an increased risk of death from noncardiovascular causes. As in that earlier trial,[9] a comparison of the treatment and placebo groups showed no significant increase in the incidence of fatal or incident cancers or deaths due to suicide or trauma. More data on the adverse-event profile of this class of drugs will become available as the results of other prevention trials are published. In the current study, the benefit of pravastatin therapy with respect to fatal coronary events and the absence of any increase in the number of deaths from other causes led to a 22 percent reduction in the relative risk of death from any cause (P = 0.051).

From the data in Table 2, it can be estimated that treating 1000 middle-aged men with hypercholesterolemia and no evidence of a previous myocardial infarction with pravastatin for five years will result in 14 fewer coronary angiograms, 8 fewer revascularization procedures, 20 fewer nonfatal myocardial

infarctions, 7 fewer deaths from cardiovascular causes, and 2 fewer deaths from other causes than would be expected in the absence of treatment. Since these figures are based on an intention-to-treat analysis, the magnitude of the benefit in fully compliant subjects is likely to be greater. These findings can be compared favorably with the results of the Medical Research Council trial[30,31] of the treatment of mild hypertension in middle-aged subjects. In that study, it was estimated that five years of active treatment of 1000 men ranging in age from 35 to 64 years would result in six fewer strokes and two fewer cardiovascular events than would be expected. Thus, our results indicate that reducing cholesterol levels with pravastatin reduces the risk of coronary events in asymptomatic subjects with hypercholesterolemia.

Supported by a research grant from the Bristol-Myers Squibb Pharmaceutical Research Institute, Princeton, N.J.

* The members of the West of Scotland Coronary Prevention Study Group are listed in the Appendix.

Source Information

From the Departments of Pathological Biochemistry (J.S., C.J.P.), Medical Cardiology (S.M.C., A.R.L., P.W.M.), and Medicine (J.H.M.), University of Glasgow and Royal Infirmary, Glasgow; Robertson Centre for Biostatistics, University of Glasgow, Glasgow (I.F.); and the Department of Medicine, Dumfries and Galloway District General Hospital, Dumfries (C.G.L) — all in Scotland.

Address reprint requests to Dr. Ford at the Robertson Centre for Biostatistics, Boyd Orr Bldg., University of Glasgow, Glasgow G12 8QQ, Scotland.

References

1. A co-operative trial in the primary prevention of ischaemic heart disease using clofibrate: report from the Committee of Principal Investigators. Br Heart J 1978;40:1069-1118. [Free Full Text]
2. The Lipid Research Clinics Coronary Primary Prevention Trial results. I. Reduction in incidence of coronary heart disease. JAMA 1984;251:351-364. [Abstract]
3. The Lipid Research Clinics Coronary Primary Prevention Trial results. II. The relationship of reduction in incidence of coronary heart disease to cholesterol lowering. JAMA 1984;251:365-374. [Abstract]
4. Frick MH, Elo O, Haapa K, et al. Helsinki Heart Study: primary-prevention trial with gemfibrozil in middle-aged men with dyslipidemia: safety of treatment, changes in risk factors, and incidence of coronary heart disease. N Engl J Med 1987;317:1237-1245. [Abstract]
5. Oliver MF. Might treatment of hypercholesterolaemia increase non-cardiac mortality? Lancet 1991;337:1529-1531. [CrossRef][Medline]
6. Hulley SB, Walsh JMB, Newman TB. Health policy on blood cholesterol: time to change directions. Circulation 1992;86:1026-1029. [Free Full Text]
7. Davey Smith G, Pekkanen J. Should there be a moratorium on the use of cholesterol lowering drugs? BMJ 1992;304:431-434.
8. LaRosa JC, Hunninghake D, Bush D, et al. The cholesterol facts: a summary of the evidence relating dietary fats, serum cholesterol, and coronary heart disease: a joint statement by the American Heart Association and the National Heart, Lung, and Blood Institute. Circulation 1990;81:1721-1733. [Free Full Text]
9. The Scandinavian Simvastatin Survival Study Group. Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S). Lancet 1994;344:1383-1389. [CrossRef][Medline]
10. MAAS Investigators. Effect of simvastatin on coronary atheroma: the Multicentre Anti-Atheroma Study (MAAS). Lancet 1994;344:633-638. [Erratum, Lancet 1994;344:762.] [CrossRef][Medline]
11. Furberg CD, Adams HP Jr, Applegate WB, et al. Effect of lovastatin on early carotid atherosclerosis and cardiovascular events. Circulation 1994;90:1679-1687. [Free Full Text]
12. Jukema JW, Bruschke AVG, van Boven AJ, et al. Effects of lipid lowering by pravastatin on progression and regression of coronary artery disease in symptomatic men with normal to moderately elevated serum cholesterol levels: the Regression Growth Evaluation Statin Study (REGRESS). Circulation 1995;91:2528-2540. [Free Full Text]
13. Crouse JR III, Byington RP, Bond MG, et al. Pravastatin, Lipids, and Atherosclerosis in the Carotid Arteries (PLAC-II). Am J Cardiol 1995;75:455-459. [Erratum, J Cardiol 1995;75:862.] [CrossRef][Medline]
14. Pitt B, Mancini GBJ, Ellis SG, Rosman HS, Park J-SP, McGovern ME. Pravastatin Limitation of Atherosclerosis in the Coronary Arteries (PLAC I): reduction in atherosclerosis progression and clinical events. J Am Coll Cardiol (in press).
15. The Pravastatin Multinational Study Group for Cardiac Risk Patients. Effects of pravastatin in patients with serum total cholesterol levels from 5.2 to 7.8 mmol/liter (200 to 300 mg/dl) plus two additional atherosclerotic risk factors. Am J Cardiol 1993;72:1031-1037. [CrossRef][Medline]
16. West of Scotland Coronary Prevention Study Group. A coronary primary prevention study of Scottish men age 45-64 years: trial design. J Clin Epidemiol 1992;45:849-860. [CrossRef][Medline]
17. EAS Task Force for Prevention of Coronary Heart Disease. Prevention of coronary heart disease: scientific background and new clinical guidelines. Nutr Metab Cardiovasc Dis 1992;2:113-156.
18. Prineas RJ, Crow RS, Blackburn H. The Minnesota code manual of electrocardiographic findings: standards and procedures for measurement and classification. Boston: John Wright, PSG, 1982.
19. Lipid Research Clinics manual of laboratory operations, 1975. Washington, D.C.: Government Printing Office, 1975. (DHEW publication no. (NIH) 85-268.)
20. Crow RS, Prineas RJ, Jacobs DR Jr, Blackburn H. A new epidemiologic classification system for interim myocardial infarction from serial electrocardiographic changes. Am J Cardiol 1989;64:454-461. [CrossRef][Medline]
21. Macfarlane PW, Devine B, Latif S, McLaughlin S, Shoat DB, Watts MP. Methodology of ECG interpretation in the Glasgow program. Methods Inf Med 1990;29:354-361. [Medline]
22. Macfarlane PW, Latif S, Shoat DS, Cobbe SM. Automated serial ECG comparison using the Minnesota Code. Eur Heart J 1990;11:Suppl:411-411.abstract
23. West of Scotland Coronary Prevention Study Group. Computerised record linkage: compared with traditional follow-up methods in clinical trials and illustrated in a prospective epidemiologic study. J Clin Epidemiol (in press).
24. Collett D. Modelling survival data in medical research. London: Chapman & Hall, 1994.
25. O'Brien PC, Fleming TR. A multiple testing procedure for clinical trials. Biometrics 1979;35:549-556. [CrossRef][Medline]
26. West of Scotland Coronary Prevention Study Group. Screening experience and baseline characteristics in the West of Scotland Coronary Prevention Study. Am J Cardiol 1995;76:485-491. [CrossRef][Medline]
27. Mann JI, Lewis B, Shepherd J, et al. Blood lipid concentrations and other cardiovascular risk factors: distribution, prevalence, and detection in Britain. BMJ 1988;296:1702-1706.
28. Summary of the second report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high

blood cholesterol in adults (Adult Treatment Panel II). JAMA 1993;269:3015-3023. [CrossRef][Medline]
29. Jones PH, Farmer JA, Cressman MD, et al. Once-daily pravastatin in patients with primary hypercholesterolemia: a dose-response study. Clin Cardiol 1991;14:146-151. [Medline]
30. Medical Research Council Working Party. MRC trial of treatment of mild hypertension: principal results. BMJ 1985;291:97-104.
31. Miall WE, Greenberg G. Mild hypertension: is there pressure to treat? An account of the MRC trial. Cambridge, United Kingdom: Cambridge University Press, 1987.

Appendix

The members of the West of Scotland Coronary Prevention Study are as follows: *Executive Committee (Voting Members)* — J. Shepherd (chairman), S.M. Cobbe, A.R. Lorimer, J.H. McKillop, I. Ford, C.J. Packard, P.W. Macfarlane, and G.C. Isles; *Data and Safety Monitoring Committee* — M.F. Oliver (chairman), A.F. Lever, B.W. Brown, J.G.G. Ledingham, S.J. Pocock, and B.M. Rifkind; *End-Points Committee* — S.M. Cobbe, B.D. Vallance, P.W. Macfarlane; *Adverse-Events Committee* — A.R. Lorimer, J.H. McKillop, and D. Ballantyne; *Data-Center Staff* — L. Anderson, D. Duncan, J. McGrath, S. Kean, A. Lawrence, V. Montgomery, and J. Norrie; *Population Screening* — M. Percy; *Clinical Coordination, Monitoring, and Administration* — E. Pomphrey, A. Whitehouse, P. Cameron, P. Parker, F. Porteous, L. Fletcher, and C. Kilday; *Computerized ECG Analysis* — D. Shoat (deceased), S. Latif, and J. Kennedy; *Laboratory Operations* — M.A. Bell and R. Birrell; and *Company Liaison and General Support* — M. Mellies, J. Meyer, and W. Campbell.

Related Letters:

Prevention of Coronary Heart Disease with Pravastatin
Rogers S., Samani N. J., de Bono D. P., Davis D. R., Shepherd J., Cobbe S. M., Ford I., The West of Scotland Coronary Prevention Study Group , Pedersen T. R.
Extract | Full Text
N Engl J Med 1996; 334:1333-1335, May 16, 1996. **Correspondence**

Drugs in Cardiac Transplantation
Ballantyne C. M., von Moltke L. L., Greenblatt D. J., Kobashigawa J., Keogh A. M., Spratt P., Valantine H. A.
Extract | Full Text
N Engl J Med 1996; 334:400-402, Feb 8, 1996. **Correspondence**

Pravastatin and Coronary Heart Disease
Meyer F. P., Bloom J. M., Tonkin A., Hunt D., Simes R. J., The LIPID Study Group
Extract | Full Text
N Engl J Med 1999; 340:1115-1117, Apr 8, 1999. **Correspondence**

THIS ARTICLE
- Abstract
- PDF

COMMENTARY
- Letters
- Letters
- Letters

TOOLS & SERVICES
- Add to Personal Archive
- Add to Citation Manager
- Notify a Friend
- E-mail When Cited

MORE INFORMATION
- PubMed Citation

This article has been cited by other articles:

- Trivedi, H., Xiang, Q., Klein, J. P. (2009). Risk factors for non-fatal myocardial infarction and cardiac death in incident dialysis patients. *Nephrol Dial Transplant* 24: 258-266 [Abstract] [Full Text]
- Thompson, G. R. (2008). History of the cholesterol controversy in Britain. *QJM* 0: hcn158v2-hcn158 [Abstract] [Full Text]
- Jukema, J W., Bergheanu, S. C (2008). Statins: established indications and controversial subgroups. *Heart* 94: 1656-1662 [Full Text]
- Bhindi, R., Ormerod, O., Newton, J., Banning, A.P., Testa, L. (2008). Interaction between statins and clopidogrel: is there anything clinically relevant?. *QJM* 101: 915-925 [Abstract] [Full Text]
- Hothersall, E J, Chaudhuri, R, McSharry, C, Donnelly, I, Lafferty, J, McMahon, A D, Weir, C J, Meiklejohn, J, Sattar, N, McInnes, I, Wood, S, Thomson, N C (2008). Effects of atorvastatin added to inhaled corticosteroids on lung function and sputum cell counts in atopic asthma. *Thorax* 63: 1070-1075 [Abstract] [Full Text]
- Mills, E. J., Rachlis, B., Wu, P., Devereaux, P. J., Arora, P., Perri, D. (2008). Primary Prevention of Cardiovascular Mortality and Events With Statin Treatments A Network Meta-Analysis Involving More Than 65,000 Patients.. *J Am Coll Cardiol* 52: 1769-1781 [Abstract] [Full Text]
- Ridker, P. M, Danielson, E., Fonseca, F. A.H., Genest, J., Gotto, A. M. Jr., Kastelein, J. J.P., Koenig, W., Libby, P., Lorenzatti, A. J., MacFadyen, J. G., Nordestgaard, B. G., Shepherd, J., Willerson, J. T., Glynn, R. J., the JUPITER Study Group, (2008). Rosuvastatin to Prevent Vascular Events in Men and Women with Elevated C-Reactive Protein. *NEJM* 359: 2195-2207 [Abstract] [Full Text]
- Belch, J. (2008). Author's reply. *BMJ* 337: a2582-a2582 [Full Text]
- Wiesbauer, F., Heinze, G., Mitterbauer, C., Harnoncourt, F., Horl, W. H., Oberbauer, R. (2008). Statin Use Is Associated with Prolonged Survival of Renal Transplant Recipients. *J. Am. Soc. Nephrol.* 19: 2211-2218 [Abstract] [Full Text]
- Prakash, C., Chen, W., Rossulek, M., Johnson, K., Zhang, C., O'Connell, T., Potchoiba, M., Dalvie, D. (2008). Metabolism, Pharmacokinetics, and Excretion of a Cholesteryl Ester Transfer Protein Inhibitor, Torcetrapib, in Rats, Monkeys, and Mice: Characterization of Unusual and Novel Metabolites by High-Resolution Liquid Chromatography-Tandem Mass Spectrometry and 1H Nuclear Magnetic Resonance. *Drug Metab. Dispos.* 36: 2064-2079 [Abstract] [Full Text]
- Rosenzweig, J. L., Ferrannini, E., Grundy, S. M., Haffner, S. M., Heine, R. J., Horton, E. S., Kawamori, R. (2008). Primary Prevention of Cardiovascular Disease and Type 2 Diabetes in Patients at Metabolic Risk: An Endocrine Society Clinical Practice Guideline. *J. Clin. Endocrinol. Metab.* 93: 3671-3689 [Abstract] [Full Text]
- Steiner, M. J., Brown, W. D., Liles, E. (2008). An Assessment of the New Lipid Screening Guidelines. *Pediatrics* 122: 904-905 [Full Text]
- Alsheikh-Ali, A. A., Trikalinos, T. A., Kent, D. M., Karas, R. H. (2008). Statins, Low-Density Lipoprotein Cholesterol, and Risk of Cancer. *J Am Coll Cardiol* 52: 1141-1147 [Abstract] [Full Text]
- Antonicelli, R., Testarmata, P., Spazzafumo, L., Gagliardi, C., Bilo, G., Valentini, M., Olivieri, F., Parati, G. (2008). Impact of telemonitoring at home on the management of elderly patients with congestive heart failure. *J Telemed Telecare* 14: 300-305 [Abstract] [Full Text]
- Reynolds, T. M., Mardani, A., Twomey, P. J., Wierzbicki, A. S. (2008). Targeted versus global approaches to the management of hypercholesterolaemia. *The Journal of the Royal Society for the Promotion of Health* 128: 248-254 [Abstract]
- Lopez, J., Mendoza, R., Cleva Villanueva, G., Martinez, G., Castillo, E. F., Castillo, C. (2008). Participation of K+ Channels in the Endothelium-Dependent and Endothelium-Independent Components of the Relaxant Effect of Rosuvastatin in Rat Aortic Rings. *J CARDIOVASC PHARMACOL*

THER 13: 207-213 [Abstract]
- Herrler, T., Bohm, M., Heeschen, C. (2008). More good reasons for adherence to statin therapy during acute coronary syndromes. *Eur Heart J* 29: 2061-2063 [Full Text]
- Steinberg, D., Glass, C. K., Witztum, J. L. (2008). Evidence Mandating Earlier and More Aggressive Treatment of Hypercholesterolemia. *Circulation* 118: 672-677 [Full Text]
- Sakamoto, S., Kusuhara, H., Horie, K., Takahashi, K., Baba, T., Ishizaki, J., Sugiyama, Y. (2008). Identification of the Transporters Involved in the Hepatobiliary Transport and Intestinal Efflux of Methyl 1-(3,4-Dimethoxyphenyl)-3-(3-ethylvaleryl)-4-hydroxy-6,7,8-trimethoxy-2-naphthoate (S-8921) Glucuronide, a Pharmacologically Active Metabolite of S-8921. *Drug Metab. Dispos.* 36: 1553-1561 [Abstract] [Full Text]
- Foster, C., Porcari, J. P., Battista, R. A., Udermann, B., Wright, G., Lucia, A. (2008). The Risk in Exercise Training. *AMERICAN JOURNAL OF LIFESTYLE MEDICINE* 2: 279-284 [Abstract]
- Triplitt, C., Alvarez, C. A. (2008). Best Practices for Lowering the Risk of Cardiovascular Disease in Diabetes. *Diabetes Spectr.* 21: 177-189 [Abstract] [Full Text]
- Ishigaki, Y., Katagiri, H., Gao, J., Yamada, T., Imai, J., Uno, K., Hasegawa, Y., Kaneko, K., Ogihara, T., Ishihara, H., Sato, Y., Takikawa, K., Nishimichi, N., Matsuda, H., Sawamura, T., Oka, Y. (2008). Impact of Plasma Oxidized Low-Density Lipoprotein Removal on Atherosclerosis. *Circulation* 118: 75-83 [Abstract] [Full Text]
- Robinson, R. G., Jorge, R. E., Moser, D. J., Acion, L., Solodkin, A., Small, S. L., Fonzetti, P., Hegel, M., Arndt, S. (2008). Escitalopram and Problem-Solving Therapy for Prevention of Poststroke Depression: A Randomized Controlled Trial. *JAMA* 299: 2391-2400 [Abstract] [Full Text]
- Abe, M., Matsuda, M., Kobayashi, H., Miyata, Y., Nakayama, Y., Komuro, R., Fukuhara, A., Shimomura, I. (2008). Effects of Statins on Adipose Tissue Inflammation: Their Inhibitory Effect on MyD88-Independent IRF3/IFN-{beta} Pathway in Macrophages. *Arterioscler. Thromb. Vasc. Bio.* 28: 871-877 [Abstract] [Full Text]
- Taylor, G L, Murphy, N F, Berry, C, Christie, J, Finlayson, A, MacIntyre, K, Morrison, C, McMurray, J (2008). Long-term outcome of low-risk patients attending a rapid-assessment chest pain clinic. *Heart* 94: 628-632 [Abstract] [Full Text]
- Mamdani, M., Ching, A., Golden, B., Melo, M., Menzefricke, U. (2008). Challenges to Evidence-Based Prescribing in Clinical Practice. *The Annals of Pharmacotherapy* 42: 704-707 [Abstract] [Full Text]
- Lai, C.-L., Yuen, M.-F. (2008). What Is the Best End Point for Hepatitis B Treatment?. *ANN INTERN MED* 148: 560-560 [Full Text]
- Chiba, Y., Arima, J., Sakai, H., Misawa, M. (2008). Lovastatin inhibits bronchial hyperresponsiveness by reducing RhoA signaling in rat allergic asthma. *Am. J. Physiol. Lung Cell. Mol. Physiol.* 294: L705-L713 [Abstract] [Full Text]
- Ferns, G., Keti, V. (2008). HDL-cholesterol modulation and its impact on the management of cardiovascular risk. *Ann Clin Biochem* 45: 122-128 [Abstract] [Full Text]
- Sabatine, M. S., Ploughman, L., Simonsen, K. L., Iakoubova, O. A., Kirchgessner, T. G., Ranade, K., Tsuchihashi, Z., Zerba, K. E., Long, D. U., Tong, C. H., Packard, C. J., Pfeffer, M. A., Devlin, J. J., Shepherd, J., Campos, H., Sacks, F. M., Braunwald, E. (2008). Association Between ADAMTS1 Matrix Metalloproteinase Gene Variation, Coronary Heart Disease, and Benefit of Statin Therapy. *Arterioscler. Thromb. Vasc. Bio.* 28: 562-567 [Abstract] [Full Text]
- Vamvakopoulos, J. E, Kountouri, M., Marshall, T., Greenfield, S. M (2008). Lifestyle or Life-Saving Medicines? A Primary Healthcare Professional and Consumer Opinion Survey on Over-the-Counter Statins. *The Annals of Pharmacotherapy* 42: 413-420 [Abstract] [Full Text]
- Nassief, A., Marsh, J. D. (2008). Statin Therapy for Stroke Prevention. *Stroke* 39: 1042-1048 [Abstract] [Full Text]
- Bolland, M. J, Barber, P A., Doughty, R. N, Mason, B., Horne, A., Ames, R., Gamble, G. D, Grey, A., Reid, I. R (2008). Vascular events in healthy older women receiving calcium supplementation: randomised controlled trial. *BMJ* 336: 262-266 [Abstract] [Full Text]
- Glaros, E. N., Kim, W. S., Quinn, C. M., Jessup, W., Rye, K.-A., Garner, B. (2008). Myriocin slows the progression of established atherosclerotic lesions in apolipoprotein E gene knockout mice. *J. Lipid Res.* 49: 324-331 [Abstract] [Full Text]
- Tomkin, G. H. (2008). Targets for Intervention in Dyslipidemia in Diabetes. *Diabetes Care* 31: S241-S248 [Abstract] [Full Text]
- Iakoubova, O. A., Tong, C. H., Rowland, C. M., Kirchgessner, T. G., Young, B. A., Arellano, A. R., Shiffman, D., Sabatine, M. S., Campos, H., Packard, C. J., Pfeffer, M. A., White, T. J., Braunwald, E., Shepherd, J., Devlin, J. J., Sacks, F. M. (2008). Association of the Trp719Arg polymorphism in kinesin-like protein 6 with myocardial infarction and coronary heart disease in 2 prospective trials: the CARE and WOSCOPS trials.. *J Am Coll Cardiol* 51: 435-443 [Abstract] [Full Text]
- Shiffman, D., Chasman, D. I., Zee, R. Y.L., Iakoubova, O. A., Louie, J. Z., Devlin, J. J., Ridker, P. M. (2008). A kinesin family member 6 variant is associated with coronary heart disease in the Women's Health Study.. *J Am Coll Cardiol* 51: 444-448 [Abstract] [Full Text]
- Superko, H. R., King, S. III (2008). Lipid Management to Reduce Cardiovascular Risk: A New Strategy Is Required. *Circulation* 117: 560-568 [Full Text]
- Mizuno, K., Nakaya, N., Ohashi, Y., Tajima, N., Kushiro, T., Teramoto, T., Uchiyama, S., Nakamura, H., for the MEGA Study Group, (2008). Usefulness of Pravastatin in Primary Prevention of Cardiovascular Events in Women: Analysis of the Management of Elevated Cholesterol in the Primary Prevention Group of Adult Japanese (MEGA Study). *Circulation* 117: 494-502 [Abstract] [Full Text]
- Jenkins, D. J.A. MD PhD, Josse, A. R. MSc, Beyene, J. PhD, Dorian, P. MD MSc, Burr, M. L. MD DSc (Me, LaBelle, R. BSc, Kendall, C. W.C. PhD, Cunnane, S. C. PhD (2008). Fish-oil supplementation in patients with implantable cardioverter defibrillators: a meta-analysis. *CMAJ* 178: 157-164 [Abstract] [Full Text]
- Bibbins-Domingo, K., Coxson, P., Pletcher, M. J., Lightwood, J., Goldman, L. (2007). Adolescent Overweight and Future Adult Coronary Heart Disease. *NEJM* 357: 2371-2379 [Abstract] [Full Text]
- Natarajan, N., Putnam, R. W., Yip, A. M., Frail, D. (2007). Family practice patients' adherence to statin medications. *cfp* 53: 2144-2145 [Abstract] [Full Text]
- Tavridou, A., Kaklamanis, L., Papalois, A., Kourounakis, A. P., Rekka, E. A., Kourounakis, P. N., Charalambous, A., Manolopoulos, V. G. (2007). EP2306 [2-(4-Biphenyl)-4-methyl-octahydro-1,4-benzoxazin-2-ol, hydrobromide], A Novel Squalene Synthase Inhibitor, Reduces Atherosclerosis in the Cholesterol-Fed Rabbit. *J. Pharmacol. Exp. Ther.* 323: 794-804 [Abstract] [Full Text]
- Keddissi, J. I., Younis, W. G., Chbeir, E. A., Daher, N. N., Dernaika, T. A., Kinasewitz, G. T. (2007). The Use of Statins and Lung Function in Current and Former Smokers. *Chest* 132: 1764-1771 [Abstract] [Full Text]
- Rosengarten, B., Auch, D., Kaps, M. (2007). Effects of Initiation and Acute Withdrawal of Statins on the Neurovascular Coupling Mechanism in Healthy, Normocholesterolemic Humans. *Stroke* 38: 3193-3197 [Abstract] [Full Text]
- Henyan, N. N, Riche, D. M, East, H. E, Gann, P. N (2007). Impact of Statins on Risk of Stroke: A Meta-Analysis. *The Annals of Pharmacotherapy* 41: 1937-1945 [Abstract] [Full Text]
- Goodson, J. D. (2007). Unintended Consequences of Resource-Based Relative Value Scale Reimbursement. *JAMA* 298: 2308-2310 [Full Text]
- Thielmann, M., Neuhauser, M., Marr, A., Jaeger, B. R., Wendt, D., Schuetze, B., Kamler, M., Massoudy, P., Erbel, R., Jakob, H. (2007). Lipid-lowering effect of preoperative statin therapy on postoperative major adverse cardiac events after coronary artery bypass surgery.. *J. Thorac. Cardiovasc. Surg.* 134: 1143-1149 [Abstract] [Full Text]
- Feringa, H. H.H., Schouten, O., Karagiannis, S. E., Brugts, J., Elhendy, A., Boersma, E., Vidakovic, R., van Sambeek, M. R.H.M., Noordzij, P. G., Bax, J. J., Poldermans, D. (2007). Intensity of Statin Therapy in Relation to Myocardial Ischemia, Troponin T Release, and Clinical Cardiac Outcome in

Patients Undergoing Major Vascular Surgery. *J Am Coll Cardiol* 50: 1649-1656 [Abstract] [Full Text]
- Ford, I., Murray, H., Packard, C. J., Shepherd, J., Macfarlane, P. W., Cobbe, S. M., the West of Scotland Coronary Prevention Study Gro, (2007). Long-Term Follow-up of the West of Scotland Coronary Prevention Study. *NEJM* 357: 1477-1486 [Abstract] [Full Text]
- Domanski, M. J. (2007). Primary Prevention of Coronary Artery Disease. *NEJM* 357: 1543-1545 [Full Text]
- Authors/Task Force Members, , Graham, I., Atar, D., Borch-Johnsen, K., Boysen, G., Burell, G., Cifkova, R., Dallongeville, J., De Backer, G., Ebrahim, S., Gjelsvik, B., Herrmann-Lingen, C., Hoes, A., Humphries, S., Knapton, M., Perk, J., Priori, S. G., Pyorala, K., Reiner, Z., Ruilope, L., Sans-Menendez, S., Scholte op Reimer, W., Weissberg, P., Wood, D., Yarnell, J., Zamorano, J. L., Other experts who contributed to parts of the guid, , Walma, E., Fitzgerald, T., Cooney, M. T., Dudina, A., European Society of Cardiology (ESC) Committee for, , Vahanian, A., Camm, J., De Caterina, R., Dean, V., Dickstein, K., Funck-Brentano, C., Filippatos, G., Hellemans, I., Kristensen, S. D., McGregor, K., Sechtem, U., Silber, S., Tendera, M., Widimsky, P., Zamorano, J. L., Document reviewers:, , Hellemans, I., Altiner, A., Bonora, E., Durrington, P. N., Fagard, R., Giampaoli, S., Hemingway, H., Hakansson, J., Kjeldsen, S. E., Larsen, M. L., Mancia, G., Manolis, A. J., Orth-Gomer, K., Pedersen, T., Rayner, M., Ryden, L., Sammut, M., Schneiderman, N., Stalenhoef, A. F., Tokgozoglu, L., Wiklund, O., Zampelas, A. (2007). European guidelines on cardiovascular disease prevention in clinical practice: executive summary: Fourth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (Constituted by representatives of nine societies and by invited experts). *Eur Heart J* 28: 2375-2414 [Full Text]
- Cahoon, W. D Jr, Crouch, M. A (2007). Preprocedural Statin Therapy in Percutaneous Coronary Intervention. *The Annals of Pharmacotherapy* 41: 1687-1693 [Abstract] [Full Text]
- Colivicchi, F., Bassi, A., Santini, M., Caltagirone, C. (2007). Discontinuation of Statin Therapy and Clinical Outcome After Ischemic Stroke. *Stroke* 38: 2652-2657 [Abstract] [Full Text]
- Barter, P., Gotto, A. M., LaRosa, J. C., Maroni, J., Szarek, M., Grundy, S. M., Kastelein, J. J.P., Bittner, V., Fruchart, J.-C., the Treating to New Targets Investigators, (2007). HDL Cholesterol, Very Low Levels of LDL Cholesterol, and Cardiovascular Events. *NEJM* 357: 1301-1310 [Abstract] [Full Text]
- Lipson, A. H., Fallis, W. M., Wang, X., Yi, Y. (2007). Are patients with hyperlipidemia undertreated?: Study of patients admitted to hospital with coronary events. *cfp* 53: 1502-1507 [Abstract] [Full Text]
- Perler, B. A. (2007). Should Statins Be Given Routinely Before Carotid Endarterectomy?. *PERSPECT VASC SURG ENDOVASC THER* 19: 240-245 [Abstract]
- Mozayan, M., Lee, T. J. F. (2007). Statins prevent cholinesterase inhibitor blockade of sympathetic {alpha}7-nAChR-mediated currents in rat superior cervical ganglion neurons. *Am. J. Physiol. Heart Circ. Physiol.* 293: H1737-H1744 [Abstract] [Full Text]
- Zhu, X.-Y., Bentley, M. D., Chade, A. R., Ritman, E. L., Lerman, A., Lerman, L. O. (2007). Early changes in coronary artery wall structure detected by microcomputed tomography in experimental hypercholesterolemia. *Am. J. Physiol. Heart Circ. Physiol.* 293: H1997-H2003 [Abstract] [Full Text]
- Sakamoto, S., Kusuhara, H., Miyata, K., Shimaoka, H., Kanazu, T., Matsuo, Y., Nomura, K., Okamura, N., Hara, S., Horie, K., Baba, T., Sugiyama, Y. (2007). Glucuronidation Converting Methyl 1-(3,4-Dimethoxyphenyl)-3-(3-ethylvaleryl)-4-hydroxy-6,7,8-trimethoxy-2-naphthoate (S-8921) to a Potent Apical Sodium-Dependent Bile Acid Transporter Inhibitor, Resulting in a Hypocholesterolemic Action. *J. Pharmacol. Exp. Ther.* 322: 610-618 [Abstract] [Full Text]
- Alsheikh-Ali, A. A., Maddukuri, P. V., Han, H., Karas, R. H. (2007). Effect of the Magnitude of Lipid Lowering on Risk of Elevated Liver Enzymes, Rhabdomyolysis, and Cancer: Insights From Large Randomized Statin Trials. *J Am Coll Cardiol* 50: 409-418 [Abstract] [Full Text]
- Brewster, L. M., van Montfrans, G. A. (2007). Letter by Brewster and van Montfrans Regarding Article, "Risks Associated With Statin Therapy: A Systematic Overview of Randomized Clinical Trials". *Circulation* 116: e7-e7 [Full Text]
- Nogueira, J., Weir, M. (2007). The Unique Character of Cardiovascular Disease in Chronic Kidney Disease and Its Implications for Treatment with Lipid-Lowering Drugs. *CJASN* 2: 766-785 [Abstract] [Full Text]
- Nanayakkara, P. W. B., van Guldener, C., ter Wee, P. M., Scheffer, P. G., van Ittersum, F. J., Twisk, J. W., Teerlink, T., van Dorp, W., Stehouwer, C. D. A. (2007). Effect of a Treatment Strategy Consisting of Pravastatin, Vitamin E, and Homocysteine Lowering on Carotid Intima-Media Thickness, Endothelial Function, and Renal Function in Patients With Mild to Moderate Chronic Kidney Disease: Results From the Anti-Oxidant Therapy in Chronic Renal Insufficiency (ATIC) Study. *Arch Intern Med* 167: 1262-1270 [Abstract] [Full Text]
- Baba, S., Natsume, M., Yasuda, A., Nakamura, Y., Tamura, T., Osakabe, N., Kanegae, M., Kondo, K. (2007). Plasma LDL and HDL Cholesterol and Oxidized LDL Concentrations Are Altered in Normo- and Hypercholesterolemic Humans after Intake of Different Levels of Cocoa Powder. *J. Nutr.* 137: 1436-1441 [Abstract] [Full Text]
- Eichler, K., Puhan, M. A., Bachmann, L. M. (2007). The Role of Statins in Primary Prevention of Cardiovascular Disease. *Arch Intern Med* 167: 1100-1100 [Full Text]
- Tuzcu, E. M., Nicholls, S. J. (2007). Statins: Targeting Inflammation by Lowering Low-Density Lipoprotein?. *J Am Coll Cardiol* 49: 2010-2012 [Full Text]
- Kinlay, S. (2007). Low-Density Lipoprotein-Dependent and -Independent Effects of Cholesterol-Lowering Therapies on C-Reactive Protein: A Meta-Analysis. *J Am Coll Cardiol* 49: 2003-2009 [Abstract] [Full Text]
- Grundy, S. M (2007). Should women be offered cholesterol lowering drugs to prevent cardiovascular disease? Yes. *BMJ* 334: 982-982 [Full Text]
- Yanai, H., Yoshida, H., Tomono, Y., Tada, N. (2007). Atherosclerosis imaging in statin intervention trials. *QJM* 100: 253-262 [Full Text]
- Lewis, J. (2007). Treating Diabetic Nephropathy: Unfinished Success Is Not Failure. *CJASN* 2: 407-409 [Full Text]
- Yvan-Charvet, L., Matsuura, F., Wang, N., Bamberger, M. J., Nguyen, T., Rinninger, F., Jiang, X.-C., Shear, C. L., Tall, A. R. (2007). Inhibition of Cholesteryl Ester Transfer Protein by Torcetrapib Modestly Increases Macrophage Cholesterol Efflux to HDL. *Arterioscler. Thromb. Vasc. Bio.* 27: 1132-1138 [Abstract] [Full Text]
- Tardif, J.-C., Gregoire, J., L'Allier, P. L., Ibrahim, R., Lesperance, J., Heinonen, T. M., Kouz, S., Berry, C., Basser, R., Lavoie, M.-A., Guertin, M.-C., Rodes-Cabau, J., for the Effect of rHDL on Atherosclerosis-Safety a, (2007). Effects of Reconstituted High-Density Lipoprotein Infusions on Coronary Atherosclerosis: A Randomized Controlled Trial. *JAMA* 297: 1675-1682 [Abstract] [Full Text]
- Sattar, N., McConnachie, A., Ford, I., Gaw, A., Cleland, S. J., Forouhi, N. G., McFarlane, P., Shepherd, J., Cobbe, S., Packard, C. (2007). Serial Metabolic Measurements and Conversion to Type 2 Diabetes in the West of Scotland Coronary Prevention Study: Specific Elevations in Alanine Aminotransferase and Triglycerides Suggest Hepatic Fat Accumulation as a Potential Contributing Factor. *Diabetes* 56: 984-991 [Abstract] [Full Text]
- Zhu, X.-Y., Daghini, E., Chade, A. R., Napoli, C., Ritman, E. L., Lerman, A., Lerman, L. O. (2007). Simvastatin Prevents Coronary Microvascular Remodeling in Renovascular Hypertensive Pigs. *J. Am. Soc. Nephrol.* 18: 1209-1217 [Abstract] [Full Text]
- Kornblau, S. M., Banker, D. E., Stirewalt, D., Shen, D., Lemker, E., Verstovsek, S., Estrov, Z., Faderl, S., Cortes, J., Beran, M., Jackson, C. E., Chen, W., Estey, E., Appelbaum, F. R. (2007). Blockade of adaptive defensive changes in cholesterol uptake and synthesis in AML by the addition of pravastatin to idarubicin + high-dose Ara-C: a phase 1 study. *Blood* 109: 2999-3006 [Abstract] [Full Text]
- Patti, G., Pasceri, V., Colonna, G., Miglionico, M., Fischetti, D., Sardella, G., Montinaro, A., Di Sciascio, G. (2007). Atorvastatin Pretreatment Improves Outcomes in Patients With Acute Coronary Syndromes Undergoing Early Percutaneous Coronary Intervention: Results of the ARMYDA-ACS Randomized Trial. *J Am Coll Cardiol* 49: 1272-1278 [Abstract] [Full Text]
- Sampson, U. K., Pfeffer, M. A., McMurray, J. J.V., Lokhnygina, Y., White, H. D., Solomon, S. D., for the Valsartan in Acute Myocardial iNfarcTion (, (2007). Predictors of stroke in high-risk patients after acute myocardial infarction: insights from the VALIANT trial. *Eur Heart J* 28: 685-691

[Abstract] [Full Text]
- Patel, T. N., Shishehbor, M. H., Bhatt, D. L. (2007). A review of high-dose statin therapy: targeting cholesterol and inflammation in atherosclerosis. *Eur Heart J* 28: 664-672 [Abstract] [Full Text]
- Yamamoto, E., Yamashita, T., Tanaka, T., Kataoka, K., Tokutomi, Y., Lai, Z.-F., Dong, Y.-F., Matsuba, S., Ogawa, H., Kim-Mitsuyama, S. (2007). Pravastatin Enhances Beneficial Effects of Olmesartan on Vascular Injury of Salt-Sensitive Hypertensive Rats, via Pleiotropic Effects. *Arterioscler. Thromb. Vasc. Bio.* 27: 556-563 [Abstract] [Full Text]
- Dietzen, D. J., Page, K. L., Tetzloff, T. A., Bohrer, A., Turk, J. (2007). Inhibition of 3-Hydroxy-3-Methylglutaryl Coenzyme A (HMG CoA) Reductase Blunts Factor VIIa/Tissue Factor and Prothrombinase Activities via Effects on Membrane Phosphatidylserine. *Arterioscler. Thromb. Vasc. Bio.* 27: 690-696 [Abstract] [Full Text]
- Hemmelgarn, B. R., Manns, B. J., Zhang, J., Tonelli, M., Klarenbach, S., Walsh, M., Culleton, B. F., for the Alberta Kidney Disease Network, (2007). Association between Multidisciplinary Care and Survival for Elderly Patients with Chronic Kidney Disease. *J. Am. Soc. Nephrol.* 18: 993-999 [Abstract] [Full Text]
- Bonovas, S., Sitaras, N. M. (2007). Does pravastatin promote cancer in elderly patients? A meta-analysis. *CMAJ* 176: 649-654 [Abstract] [Full Text]
- Nicholls, S. J., Tuzcu, E. M., Sipahi, I., Grasso, A. W., Schoenhagen, P., Hu, T., Wolski, K., Crowe, T., Desai, M. Y., Hazen, S. L., Kapadia, S. R., Nissen, S. E. (2007). Statins, High-Density Lipoprotein Cholesterol, and Regression of Coronary Atherosclerosis. *JAMA* 297: 499-508 [Abstract] [Full Text]
- Belay, B., Belamarich, P. F., Tom-Revzon, C. (2007). The Use of Statins in Pediatrics: Knowledge Base, Limitations, and Future Directions. *Pediatrics* 119: 370-380 [Abstract] [Full Text]
