

# Atorvastatin was at least as effective as PTCA for reducing ischemic events in patients with stable coronary artery disease

Pitt B, Waters D, Brown WV, et al., for the Atorvastatin versus Revascularization Treatment Investigators. Aggressive lipid-lowering therapy compared with angioplasty in stable coronary artery disease. *N Engl J Med.* 1999 Jul 8;341:70-6.

## QUESTION

In patients with stable coronary artery disease (CAD), is atorvastatin as effective as percutaneous transluminal coronary angioplasty (PTCA) plus usual care for reducing ischemic events?

## DESIGN

Randomized, blinded (outcome assessors),\* controlled trial with 18-month follow-up.

## SETTING

37 clinical centers in North America and Europe.

## PATIENTS

341 patients (mean age 59 y, 85% men, 95% white) recommended for PTCA who had stable CAD and asymptomatic or Canadian Cardiovascular Society class I or II angina, low-density lipoprotein (LDL) cholesterol level  $\geq 3.0$  mmol/L (115 mg/dL), triglyceride level  $\leq 5.6$  mmol/L (500 mg/dL), and stenosis  $\geq 50\%$  in  $\geq 1$  coronary artery. Exclusion criteria were left main CAD, triple-vessel disease, ejection fraction  $< 40\%$ , or recent unstable angina or myocardial infarction (MI). Follow-up was 100%.

## INTERVENTION

164 patients were allocated to atorvastatin, 80 mg/d, and were required to stop other lipid-lowering therapies. 177 patients were allocated to PTCA and usual care, which could include lipid-lowering drugs.

## MAIN OUTCOME MEASURES

Ischemic events (death from cardiac causes, resuscitation after cardiac arrest, nonfatal MI, coronary artery bypass grafting, cerebrovascular accident, angioplasty, or worsening angina that required hospitalization).

## MAIN RESULTS

All patients were included in the intention-to-treat analysis. Survival analysis showed that patients in the atorvastatin group had a reduced rate of ischemic events ( $P = 0.048$ , which was not statistically significant after adjustment for interim analysis) (Table), a longer time to first ischemic event ( $P = 0.03$ ), but less improvement in

angina scores ( $P = 0.009$ ) than did patients in the PTCA group. Patients in the atorvastatin group also had lower levels of LDL cholesterol (2 mmol/L [77 mg/dL] vs 3 mmol/L [119 mg/dL],  $P < 0.05$ ), total cholesterol, and triglycerides ( $P < 0.05$ ). The groups did not differ for quality of life or adverse events.

## CONCLUSIONS

Atorvastatin was at least as effective as PTCA plus usual care for reducing the rate of ischemic events in patients with stable coronary artery disease. PTCA offered better control of angina symptoms.

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\*See Glossary.

## Atorvastatin vs percutaneous transluminal coronary angioplasty (PTCA) plus usual care for patients with stable coronary artery disease†

Outcome at 18 mo	Atorvastatin	PTCA	RRR (95% CI)	NNT (CI)
Any ischemic event	13.4%	20.1%	35.8% (-3 to 60)	Not significant

†Abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article.

## COMMENTARY

PTCA is widely used in patients with stable angina. Several studies comparing PTCA with medical therapy in patients with stable CAD showed an improvement in angina in the PTCA group but no reduction (and in some cases an increase) in ischemic events. Abundant evidence suggests that stabilization of vulnerable plaque with statins reduces ischemic events and that MIs are more likely to arise from mild and moderate stenoses than from the severe stenoses targeted for PTCA. Until now, no study has included aggressive lowering of LDL cholesterol levels in patients randomly assigned to medical therapy, and for this, the Atorvastatin vs Revascularization Treatment (AVERT) investigators are to be congratulated.

The study was limited because the patient sample was at relatively low risk for ischemic events, the sample size was small, stents were used less than in contemporary practice, a cost-effectiveness evaluation was not done, and lowering of LDL cholesterol levels was not applied equally to both groups. This latter point is important for 2 reasons. First, patients in the PTCA group did not usually meet the U.S. National Cholesterol Education Program target of an LDL

cholesterol level  $< 2.6$  mmol/L (100 mg/dL). Second, we must understand exactly what PTCA offers patients with stable CAD—relief of angina but not necessarily the decrease in ischemic events or mortality that cholesterol level-lowering drugs have shown. If lowering of LDL cholesterol levels were equal in both groups, it would be possible to isolate the incremental value of PTCA.

Hence, the AVERT trial ushers in a new era, reassuring us that medical therapy is a reasonable, safe, and perhaps preferable initial strategy for low-risk patients with stable CAD. The trial blazes the path for a larger study that is powered to look at hard end points and includes higher-risk patients and in which the PTCA group receives the same risk-factor reduction as the medical group. The optimal therapy for all but very-high-risk patients with CAD is possibly a combination of PTCA and aggressive risk reduction, which would give such patients the best of both worlds: better relief of symptoms with PTCA and slower progression of atherosclerosis with risk-factor control.

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