High-dose statins are cost-effective compared with conventional-dose statins in patients with acute coronary syndromes

Chan PS, Nallamothu BK, Gurm HS, Hayward RA, Vijan S. **Incremental benefit and cost-effectiveness of high-dose statin therapy in high-risk patients with coronary artery disease.** Circulation. 2007;115:2398-409.

Clinical impact ratings: Cardiology ★★★★★☆☆

QUESTION

In patients with acute coronary syndromes (ACSs) or stable coronary artery disease (CAD), is high-dose statin therapy cost-effective compared with conventional-dose statin therapy?

METHODS

Design: Cost-effectiveness study using a Markov decision-analysis model developed from 4 international, randomized, controlled trials with follow-up of 2 years (2 ACS trials, *n* = 8659, 77% men) or 5 years (2 stable CAD trials, *n* = 18 889, 81% men).

Setting: United States.

Patients: Hypothetical cohorts of 60-year-old patients with ACS or stable CAD.

Intervention: High-dose (e.g., atorvastatin, 80 mg/d; cost $1380/y) or conventional-dose (e.g., simvastatin, 20 mg/d; cost $870/y) statin therapy.

Outcomes: Incremental cost-effectiveness ratio (ICER) per quality-adjusted life-year (QALY) gained. Endpoints considered were death, myocardial infarction, stroke, rehospitalization for ACS, and revascularization. Direct costs of inpatient and outpatient medical care for life were estimated from Medicare reimbursement rates in 2005 U.S. dollars.

MAIN RESULTS

Risks for all endpoints were lower with high-dose compared with conventional-dose statins (relative risk 0.76 to 0.99). Using high-dose statins for the rest of their lives, a cohort of 60-year-old patients would gain 0.35 QALYs if they initially had ACS (mainly from a reduction in mortality) and 0.10 QALYs if they initially had stable CAD (mainly from a reduction in stroke) (Table). Costs were higher with high-dose statins, resulting in an ICER of $12 900 per QALY for patients with ACS and $33 400 for patients with stable CAD, assuming a difference in daily drug costs of $1.40 (Table). In ACS, a difference in daily drug costs of up to $3.50 resulted in an ICER < $44 000; however, in stable CAD, the difference in daily drug costs had to be < $1.70 to keep the ICER at < $50 000.

CONCLUSIONS

Compared with conventional-dose statin therapy, high-dose statin therapy is cost-effective in patients with acute coronary syndromes. Its cost-effectiveness in patients with stable coronary artery disease is less clear and depends on the difference in drug costs.

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Lifetime cost-effectiveness of high-dose vs conventional-dose statin therapy in hypothetical cohorts of 60-year-old patients with acute coronary syndromes (ACSs) or stable coronary artery disease (CAD)*

Initial disease	QALYs			Costs		ICER (per QALY gained)
	High-dose statin	Conventional-dose statin	Gain	High-dose statin	Conventional-dose statin	
ACS	13.59	13.24	0.35	$70 581	$66 033	$12 900
Stable CAD	13.77	13.67	0.10	$67 134	$63 920	$33 400

*QALY = quality-adjusted life-year; ICER = incremental cost-effectiveness ratio. Costs are in 2005 U.S. dollars. Model assumes that risk reductions from trial results (5 y follow-up) are sustained throughout life and that the difference in daily drug costs is $1.40.

COMMENTARY

Statin therapy is both effective and cost-effective when used for secondary prevention of ACS (1). However, the incremental benefits of high compared with conservative dosing are less clear. Chan and colleagues concluded that high-dose statins are cost-effective in patients with ACS; however, in patients with stable CAD, the cost-effectiveness ratios were less favorable and dependent upon assumptions related to cost and efficacy.

Many would hypothesize that differences in cost-effectiveness between ACS and stable CAD populations result from differences in baseline risk for CAD events (2, 3). However, in the study by Chan and colleagues, the cost-effectiveness advantages in ACS seem to be driven by a differential therapeutic effect on total mortality—a phenomenon driven not by baseline risk per se, but perhaps attributable to the effect of statin intensity on plaque stabilization (4).

So can the incremental cost-effectiveness advantages of high-dose statins in ACS be generalized to the treatment of higher-risk stable CAD subgroups, such as those with peripheral or multiterritory vascular disease? Not necessarily. The mechanisms of death may differ between ACS and stable vascular disease. Also still unclear is the optimal target level for low-density lipoprotein (LDL) cholesterol in ACS. At least 1 study showed that the relative efficacy of high-dose statins diminished as baseline LDL cholesterol levels fell below 2 mmol/L (2).

In conclusion, high-dose statins seem to be cost-effective in ACS. However, their cost-effectiveness in stable CAD is limited. Decisions to advocate for high-dose statins in *high-risk stable* CAD must remain individualized, based on patient risks, benefits, and preferences.

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