Abstract 15

Does Perioperative Statin Treatment Affect Hospital and ICU Length of Stay Following Cardiac Surgery: A Systematic Review

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Background: Studies of patients randomized to preoperative statin treatment have suggested trends towards reduced length of stay (LOS). We searched the literature to evaluate the effect of statin treatment on hospital and intensive care unit (ICU) LOS in those undergoing cardiac surgery.

Methods: MEDLINE via PubMed, Embase, and Cochrane CENTRAL Register were searched using Boolean logic to incorporate a variety of terms, including statins, cardiac surgery, and LOS. Filters limited retrieved articles to prospective, double-blind, placebo-controlled, randomized, controlled trials. A total of 176 unique articles and conference abstracts were retrieved from the electronic search. Lengths of hospital and ICU stay were abstracted and tabulated.

Results: Five studies met our inclusion criteria.[1–5] The studies were similar in design, methodology, and intervention. All patients underwent coronary artery bypass grafting surgery. In each study, no statistically significant difference was reported among those randomized to statins with respect to comorbidities, age, gender, medication use, etc. The mean hospital LOS for those randomized to statin treatment was 8.3 days (6.3–11.5 days) vs a mean of 9.0 (6.9–11.6), in controls. The mean ICU LOS in statin-treated patients was 2.0 days (1.4–2.5) vs a mean LOS of 2.1 days (1.8–2.4). Absolute differences were 0.7 days and 0.1 days in hospital and ICU LOS respectively **(Table)**.

Conclusions: High-quality studies of those undergoing cardiac surgery report reduced lengths of hospital and ICU stay in patients randomized to statin therapy. The mechanism for this effect is unclear but may relate to the pleiotropic effects of statins leading to reductions in adverse events and shorter hospitalizations. Alternatively, the "healthy-user" effect or confounding by unmeasured variables may explain this phenomenon. The limited number of randomized studies and the moderate size of this effect warrant careful interpretation of this finding.

TABLE
Characteristics of the studies included in analyses

Study author	Size (n)	Type of surgery	Statin type, dose and, administration protocol	Length of stay (days)					
				Hospital			ICU		
				Control	Statin	Δ	Control	Statin	Δ
Christenson[1]	77	CABG	Simvastatin 20 mg/d started 28 days preoperatively	11.6	11.5	0.1	2.1	2.0	0.1
Chello[2]	40	CABG	Atorvastatin 20 mg/d started 21days preoperatively	7.2	6.9	0.3	2.1	1.9	0.2
Patti[3]	200	CABG	Atorvastatin 40 mg/d started 7 days preoperatively	6.9	6.3	0.6	NR	NR	NR
Berkan[4]	46	CABG	Fluvastatin 80 mg/d started 21days preoperatively	10.4	8.5	1.9	1.8	1.4	0.4
Tamayo[5]	44	CABG	Simvastatin 20 mg/d started 21 days preoperatively	NR	NR	NR	2.4	2.5	0.1

CABG = coronary artery bypass grafting; ICU = intensive care unit; NR = not reported

1. *Christenson JT. Preoperative lipid-control with simvastatin reduces the risk of postoperative thrombocytosis and thrombotic complications following CABG. Eur J Cardiothorac Surg 1999; 15:394–399.*

2. *Chello M, Goffredo C, Patti G, et al. Effects of atorvastatin on arterial endothelial function in coronary bypass surgery. Eur J Cardiothorac Surg 2005; 28:805–810.*

3. *Patti G, Chello M, Candura D, et al. Randomized trial of atorvastatin for reduction of postoperative atrial fibrillation in patients undergoing cardiac surgery: results of the ARMYDA-3 (Atorvastatin for Reduction of MYocardial Dysrhythmia After cardiac surgery) study. Circulation 2006; 114:1455–1461.*

4. *Berkan O, Katrancioglu N, Ozker E, Ozerdem G, Bakici Z, Yilmaz MB. Reduced P-selectin in hearts pretreated with fluvastatin: a novel benefit for patients undergoing open heart surgery. Thorac Cardiovasc Surg 2009; 57:91–95.*

5. *Tamayo E, Alvarez FJ, Alonso O, et al. Effects of simvastatin on systemic inflammatory responses after cardiopulmonary bypass. J Cardiovasc Surg (Torino) 2009; 50:687–694.*