

CLINICAL PRACTICE GUIDELINE: SYSTEMATIC REVIEW

Perioperative Beta Blockade in Noncardiac Surgery: A Systematic Review for the 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery



A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

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OBJECTIVE To review the literature systematically to determine whether initiation of beta blockade within 45 days prior to noncardiac surgery reduces 30-day cardiovascular morbidity and mortality rates.

METHODS PubMed (up to April 2013), Embase (up to April 2013), Cochrane Central Register of Controlled Trials (up to March 2013), and conference abstracts (January 2011 to April 2013) were searched for randomized controlled trials (RCTs) and cohort studies comparing perioperative beta blockade with inactive control during noncardiac surgery. Pooled relative risks (RRs) were calculated under the random-effects model. We conducted subgroup analyses to assess how the DECREASE-I (Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography), DECREASE-IV, and POISE-1 (Perioperative Ischemic Evaluation) trials influenced our conclusions.

RESULTS We identified 17 studies, of which 16 were RCTs (12,043 participants) and 1 was a cohort study (348 participants). Aside from the DECREASE trials, all other RCTs initiated beta blockade within 1 day or less prior to surgery. Among RCTs, beta blockade decreased nonfatal myocardial infarction (MI) (RR: 0.69; 95% confidence interval [CI]: 0.58 to 0.82) but increased nonfatal stroke (RR: 1.76; 95% CI:1.07 to 2.91), hypotension (RR: 1.47; 95% CI: 1.34 to 1.60), and bradycardia (RR: 2.61; 95% CI: 2.18 to 3.12). These findings were qualitatively unchanged after the DECREASE and POISE-1 trials were excluded. Effects on mortality rate differed significantly between the DECREASE trials and other trials. Beta blockers were associated with a trend toward reduced all-cause mortality rate in the DECREASE trials (RR: 0.42; 95% CI: 0.15 to 1.22) but with increased all-cause mortality rate in other trials (RR: 1.30; 95% CI: 1.03 to 1.64). Beta blockers reduced cardiovascular mortality rate in the DECREASE trials (RR:0.17; 95% CI: 0.05 to 0.64) but were associated with trends toward increased cardiovascular mortality rate in other trials (RR: 1.25; 95% CI: 0.92 to 1.71). These differences were qualitatively unchanged after the POISE-1 trial was excluded.

CONCLUSIONS Perioperative beta blockade started within 1 day or less before noncardiac surgery prevents nonfatal MI but increases risks of stroke, death, hypotension, and bradycardia. Without the controversial DECREASE studies, there are insufficient data on beta blockade started 2 or more days prior to surgery. Multicenter RCTs are needed to address this knowledge gap.

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