

## **Strategies to Reduce Cardiac Risk of Noncardiac Surgery: What is the Evidence?**

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The past several years has seen a dramatic increase in the number and quality of randomized and prospective studies to define the optimal and most cost-effective approach to preoperative cardiovascular evaluation and management for noncardiac surgery, including studies evaluating the role of coronary revascularization before noncardiac surgery and perioperative beta-blockers. In 2010, the Guidelines on Perioperative Cardiovascular Evaluation before Noncardiac Surgery were updated which included recent evidence and recommendations; however, there continues to be large areas of uncertainty for which new studies are warranted.

### **Should coronary revascularization be performed before noncardiac surgery?**

There is increasing evidence that coronary revascularization before noncardiac surgery does not reduce the incidence of perioperative cardiac morbidity. McFalls and colleagues reported the results of a multi-center randomized trial in the Veterans Administration Health System in which patients with documented coronary artery disease on coronary angiography (CARP), excluding those with left main disease or severely depressed ejection fraction (<20%), were randomized to coronary artery bypass grafting (CABG)(59%) or percutaneous coronary interventions (PCI)(41%) versus routine medical therapy.[1] At 2.7 years after randomization, mortality in the revascularization group was not significantly different (22%) percent compared to the no-revascularization group (23%) percent. Within 30 days after the vascular operation, a postoperative myocardial infarction, defined by elevated troponin levels, occurred in 12 percent of the revascularization group and 14 percent of the no-revascularization group (P=0.37). When patients who underwent coronary angiography in both the randomized and nonrandomized portion of the CARP trial, only the subset of patients with unprotected left main disease showed a benefit with preoperative coronary artery revascularization.[2] Poldermans and colleagues randomized 770 patients having major vascular surgery and considered as having intermediate cardiac risk, defined as the presence of 1 or 2 cardiac risk factors to either undergo further risk stratification with stress imaging or proceed right to surgery.[3] All patients received preoperative bisoprolol with a targeted heart rate (HR) of 60-65 initiated before, and continued after surgery. The 30 day incidence of cardiac death and non-fatal MI was similar in both groups (1.8% in the no testing group versus 2.3% in the tested group). The conclusion of the authors was that further risk stratification in this group of patients considered at intermediate risk based on clinical history alone was unnecessary as long as perioperative beta-blockers were used, and testing only delayed necessary vascular surgery.

The current evidence does not support the use of percutaneous transluminal coronary angioplasty (PTCA) beyond established indications for nonoperative patients, since the incidence of perioperative complications does not appear to be reduced in those patients in whom PTCA was performed less than 90 days prior to surgery. Coronary stent placement may be a unique issue and several studies suggest that a minimum of 30 days is required before the rate of perioperative complications is low.

### **What should be done with anti-platelet agents in high risk patients?**

Several reports suggest that drug-eluting stents may represent an additional risk over a prolonged period (up to 12 months), particularly if antiplatelet agents are discontinued. However, a recent case series suggests that an elevated risk continues beyond 1 year. The new Guidelines suggest continuing aspirin therapy in all patients with a coronary stent and discontinuing clopidogrel for as short a time interval as possible for patients with bare-metal stents <30 days or drug-eluting stents <1 year. There is no defined data with regard to discontinuation of aspirin in patients without a coronary stent. The areas of uncertainty include:

### **Should beta-blockers be given for high risk noncardiac surgery?**

Multiple studies have demonstrated improved outcome in patients given perioperative beta-blockers, especially if heart rate is controlled.[4, 5] However, newer studies have demonstrated that beta blockers may not be effective if heart rate is not well controlled, or in lower risk patients.[6-8] The POISE trial was published in which 8351 high-risk beta-blocker naive patients were randomized to high dose metoprolol CR versus placebo.[9] There was a significant reduction of the primary outcome of cardiovascular events, associated with a 30% reduction in MI rate, but with a significantly increased rate of 30-day all-cause mortality and stroke. In the DECREASE-IV study, patients at intermediate risk were randomized to statin therapy, beta-blocker therapy, both (started on average 30 days in advance) or double placebo.[10] Beta-blocker therapy was associated with significantly reduced incidence of perioperative cardiac events with no difference in the incidence of stroke or mortality. The current ACC/AHA Guidelines on perioperative beta-blockade advocate that perioperative beta-blockade is a Class I indication and should be used in patients previously.

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