

**Risk Stratification for Noncardiac Surgery**

In their discussion of a new preoperative testing modality, Massie and Manganon conclude that risk assessment should not routinely include supplemental cardiovascular testing to confirm the presence of ischemic heart disease. They argue that the decision to use a test should be based primarily on the clinical evaluation. Once the probability of coronary artery disease is determined on the basis of the history, physical examination, and core laboratory data, we believe that weight should be given to the proposed surgery as the initial point in the preoperative evaluation.

We have recently proposed an alternative strategy, in which the starting point of the clinical evaluation begins with (1) the ischemic potential of the proposed surgical procedure. Once this is determined, (2) the clinical presentation of overt or asymptomatic coronary artery disease is combined with (3) the patient's exercise tolerance to determine the need for further testing to better define the patient's cardiovascular status. In this era of cost-consciousness, this three-tier approach to the patient provides the clinician with sufficient information to induce anesthesiology safely with a minimum of risk.

In choosing to start with the ischemic potential of the surgical procedure, we assume that the need to further define the cardiovascular status is a function of the increased risk associated with the surgery compared with daily life. For example, cataract surgery is associated with minimal stress and exceedingly low morbidity and mortality rates, even after a recent myocardial infarction. Similarly, transurethral resection of the prostate, a procedure frequently performed in patients with coronary artery disease, has very low incidences of cardiac complications. In such patients, perioperative management is rarely changed by the cardiovascular status unless the patient demonstrates unstable angina or overt congestive heart failure. These two conditions represent a prohibitive risk and require medical treatment irrespective of the surgery. Therefore, the utility of further confirmatory tests of cardiac disease or ventricular function will be small to nonexistent in the surgical procedure with a low risk of developing perioperative ischemia.

In patients undergoing surgery associated with significant increases in perioperative myocardial ischemia and cardiac morbidity, the utility of further confirmatory information is much greater. Even within this high-risk surgical group, variability in the level of perioperative stress and the incidence of myocardial ischemia exists. For example, ischemic potential and incidence of perioperative cardiac morbidity increases with the level of aortic cross-clamp in patients undergoing revascularization. Since further determination of cardiac status may change perioperative care, i.e., coronary artery revascularization or invasive monitoring, the benefit of further evaluation and treatment can be greater than the associated costs or risks. In these patients, the choice of cardiovascular testing is dependent on clinical evaluation, as discussed by the authors of the editorial comment. The pretest probability of disease is an important determinant of the utility of any test, as determined by Bayes' theorem. For example, Eagle and colleagues demonstrated that in patients undergoing vascular surgery, the presence of multiple risk factors places the patient at a high perioperative risk, and the optimal preoperative test is coronary angiography. In contrast, the authors demonstrated that patients with no risk factors have an exceedingly low incidence of morbidity, negating any value of further testing.

When determining the preoperative evaluation strategy for a particular patient, the risk of developing myocardial ischemia and cardiac dysfunction for the procedure performed at that institution by a particular surgeon should be assessed. For example, carotid endarterectomy has traditionally been considered a procedure associated with significant cardiac morbidity. However, two recent studies have demonstrated very low incidences of cardiac complications for these surgeries. Therefore, further refinement of cardiovascular status may not be required at these institutions.

In conclusion, we agree with the authors of the editorial that clinical evaluation is important in determining which patients might benefit from preoperative testing. However, we believe that the surgical procedure should be included as a starting point in the decision process.

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**References**


**Reply**

We thank Drs Fleisher and Barash for their comments concerning our editorial comment, “Risk stratification for noncardiac surgery: how (and why)?” They advocate an individualized strategy that takes into account the ischemic risk of the surgical procedure and presence of manifest or suspected coronary disease. This approach is appropriate if the goal is to identify groups of patients at increased risk for surgery, and is very similar to that presented by Eagle et al. Such a selective use of testing procedures is certainly preferable to a policy of routine testing and should yield a higher positive predictive accuracy for subsequent complications. However, in many institutions, including our own, the sensitivity and specificity of noninvasive imaging techniques for perioperative events may not be as high as is often cited.
Risk stratification for noncardiac surgery.
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