

V. SUPPLEMENTAL PREOPERATIVE EVALUATION

A. Shortcut to the Decision to Test

The preoperative guidelines (ACC/AHA) are fairly straightforward about recommendations for patients about to undergo emergency surgery, the presence of prior cardiac revascularization, and the occurrence of major cardiac predictors. However, the majority of patients have either intermediate or minor clinical predictors of increased perioperative cardiovascular risk. Table 5 presents a shortcut approach to a large number of patients in whom the decision to recommend testing before surgery can be difficult. Basically, if 2 of the 3 listed factors are true, the guidelines suggest the use of noninvasive cardiac testing as part of the preoperative evaluation. In any patient with an intermediate clinical predictor, the presence of either a low functional capacity or high surgical risk should lead the consulting physician to consider noninvasive testing. In the absence of intermediate clinical predictors, noninvasive testing should be considered when both the surgical risk is high and the functional capacity is low. The guidelines define minor clinical predictors as advanced age, abnormal ECG, rhythm other than sinus, history of stroke, or uncontrolled systemic hypertension. These factors do not by themselves suggest the need for further testing, but when combined with low functional capacity and high-risk surgery, they should lead to consideration of preoperative testing. In making the decision to obtain noninvasive testing, there will occasionally be some practical circumstances when testing will be obtained after surgery, particularly if the results will not affect perioperative care. This test information may also be useful in predicting long-term risk of cardiac events (also see Section X). More specifically, identification of high-risk patients whose long-term outcome would be improved with medical therapy or coronary revascularization procedures is a major goal of preoperative noninvasive testing. Numerous studies using different preoperative noninvasive techniques before noncardiac surgery have demonstrated the ability to detect patients at increased risk of late cardiac events (254,261,265,267-270) (see Fig. 2).

B. Resting Left Ventricular Function

1. Summary of Evidence

Resting ventricular function has been evaluated preoperatively before noncardiac surgery by radionuclide angiography, echocardiography, and contrast ventriculography (23,96-105). Of 8 studies that demonstrate a positive relation between decreased preoperative ejection fraction and postoperative mortality or morbidity, 5 were prospective (96,97,100,103,271) and 3 retrospective (98,99,103). The greatest risk of complications was observed in patients with an LVEF at rest of less than 35%. In the perioperative phase, poor left ventricular systolic or diastolic function is mainly predictive of postoperative HF, and in critically ill patients, death. It is noteworthy, however, that resting left ventricular function was not found to be a *consistent* predictor of perioperative ischemic events.

Recommendations for Preoperative Noninvasive Evaluation of Left Ventricular Function

Class I

Patients with current or poorly controlled HF. (If previous evaluation has documented severe left ventricular dysfunction, repeat preoperative testing may not be necessary.)

Class IIa

Patients with prior HF and patients with dyspnea of unknown origin.

Class III

As a routine test of left ventricular function in patients without prior HF.

C. Assessment of Risk for CAD and Functional Capacity

1. The 12-Lead ECG

In patients with established or documented coronary disease, the 12-lead rest ECG contains important prognostic information that relates to long-term morbidity and mortality (272-275). The magnitude and extent of Q waves provide a crude

Table 5. Shortcut to Noninvasive Testing in Preoperative Patients if Any Two Factors Are Present

1. Intermediate clinical predictors are present (Canadian class 1 or 2 angina, prior MI based on history or pathologic Q waves, compensated or prior heart failure, diabetes, or renal insufficiency)
2. Poor functional capacity (less than 4 METs)
3. High surgical risk procedure (emergency major operations*; aortic repair or peripheral vascular surgery; prolonged surgical procedures with large fluid shifts or blood loss)

HF indicates heart failure; METs, metabolic equivalents; MI, myocardial infarction.

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*Emergency major operations may require immediately proceeding to surgery without sufficient time for noninvasive testing or preoperative interventions.