

## ACC/AHA Guidelines for the perioperative cardiac assessment of the non-cardiac surgical patient

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The American College of Cardiology and the American Heart Association have jointly published guidelines on issues of cardiovascular disease since 1980. The third iteration of the guidelines dealing with the perioperative cardiovascular evaluation and care of patients presenting for non-cardiac surgery was published online in the October 2007 issues of the *Journal of the American College of Cardiology* and the journal *Circulation*<sup>(1)</sup>. The overriding theme of the document is not simply to lower the risk of surgery but rather asks whether an intervention is necessary regardless of the preoperative context. The purpose of the preoperative evaluation is not to give «medical clearance» but rather to provide an evaluation of the patient's current medical status and to make recommendations regarding the potential for cardiac risk throughout the perioperative period and any possible interventions that may reduce that risk. Finally, no test should be performed unless it is likely to influence the perioperative care of the patient.

The Guidelines are divided into several recommendations: a Class I recommendation is a treatment or procedure that should be performed; a Class IIa is a treatment or procedure that is reasonable to perform; a Class IIb is a treatment or procedure that might be considered; and a Class III is a treatment or procedure that is not recommended. The Guidelines are also divided into three levels of evidence behind each of the recommendations. Level A evidence is based on several large, randomized, blinded trials; Level B is based on 1-2 randomized, blinded trials; and, Level C is based on either non-randomized studies or relies on expert opinion. The Guidelines is a comprehensive document touching on over 20 topics dealing with cardiac issues in the non-cardiac surgery patient. Some of the topics included within the Guidelines deal are recom-

mendations as to the following subjects: preoperative non-invasive evaluation of LV function; preoperative resting 12-lead ECG; noninvasive stress testing before non-cardiac surgery; preoperative coronary revascularization; beta-blocker therapy; statin therapy; preoperative ICU monitoring; use of volatile anesthetic agents; prophylactic nitroglycerin; use of TEE; maintenance of normothermia; glucose control; use of pulmonary artery catheters; intraoperative and postoperative ST-segment monitoring; surveillance for perioperative myocardial infarction; and the issue of when patients with cardiac stents can safely undergo elective surgery.

There are a few active cardiac conditions where the patient should be evaluated and treated before non-cardiac surgery. These are: unstable coronary syndromes; decompensated CHF; significant arrhythmias (high-grade AV block, Mobitz II AV block, symptomatic ventricular arrhythmias, SVT with heart rate > 100, symptomatic bradycardia) and newly recognized ventricular tachycardia; severe valvular disease (aortic valve area less than 1.0 cm<sup>2</sup>, mean gradient > 40 mmHg or symptomatic) or symptomatic mitral stenosis. If the patient has an active cardiac condition and must have emergency surgery to save life or limb the patient may be taken to the operating room and perioperative surveillance and postoperative risk stratification and risk factor management should be performed.

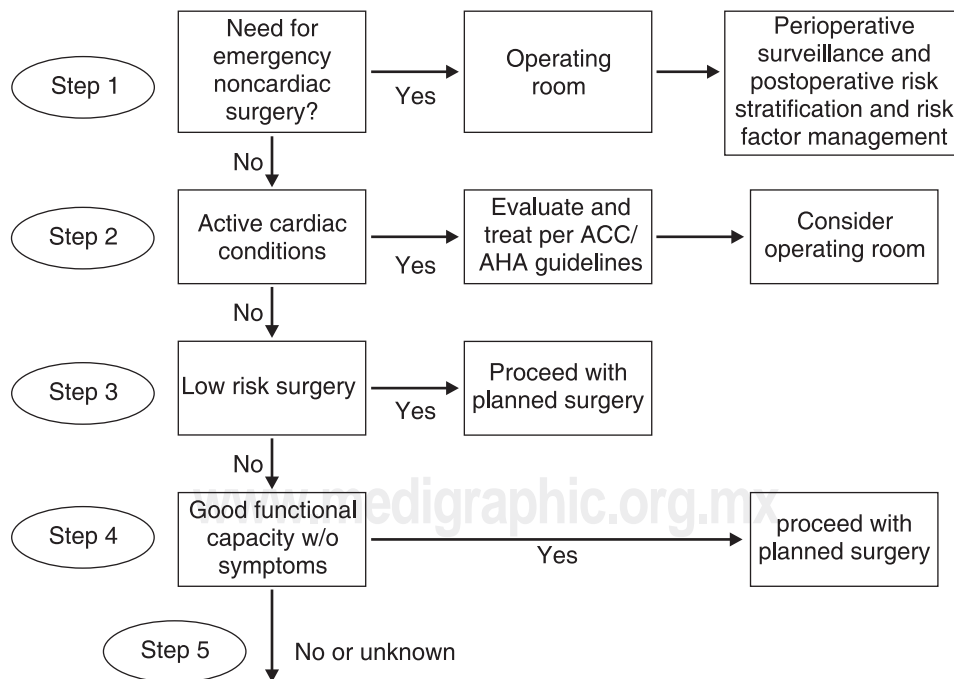
In deciding on taking a patient to surgery the Revised Cardiac Risk Index should be considered. The indices are a history of ischemic heart disease, history of heart failure, history of cerebrovascular disease, diabetes mellitus, and renal insufficiency. The Guidelines provide a stepwise approach in dealing with patients based on the nature of the surgery, the patient's cardiac risk index, and the patient's overall functional capacity.

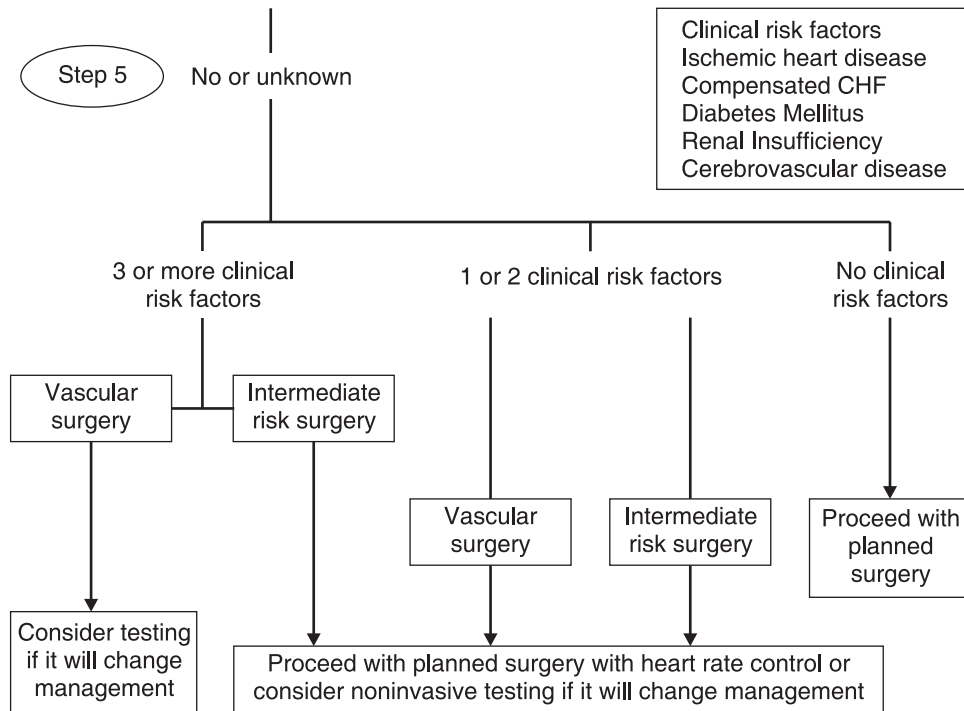
**THE FOLLOWING ARE CLASS I RECOMMENDATIONS IN THE PERIOPERATIVE CARDIOVASCULAR EVALUATION OF THE PATIENT PRESENTING FOR NON-CARDIAC SURGERY**

- Preoperative Resting 12-Lead ECG is recommended for patients with at least 1 clinical risk factor who are undergoing vascular surgical procedures.
- Preoperative resting 12-lead ECG is recommended for patients with known coronary heart disease, peripheral arterial disease, or cerebrovascular disease who are undergoing intermediate-risk surgical procedures.
- Patients with active cardiac conditions in whom non-cardiac surgery is planned should be evaluated and treated per ACC/AHA guidelines before non-cardiac surgery.
- Coronary revascularization before non-cardiac surgery is useful in patients with stable angina who have significant left main coronary artery stenosis.
- Coronary revascularization before non-cardiac surgery is useful in patients with stable angina who have 3-vessel disease.
- Coronary revascularization before non-cardiac surgery is useful in patients with stable angina who have 2-vessel disease with significant proximal left anterior descend-

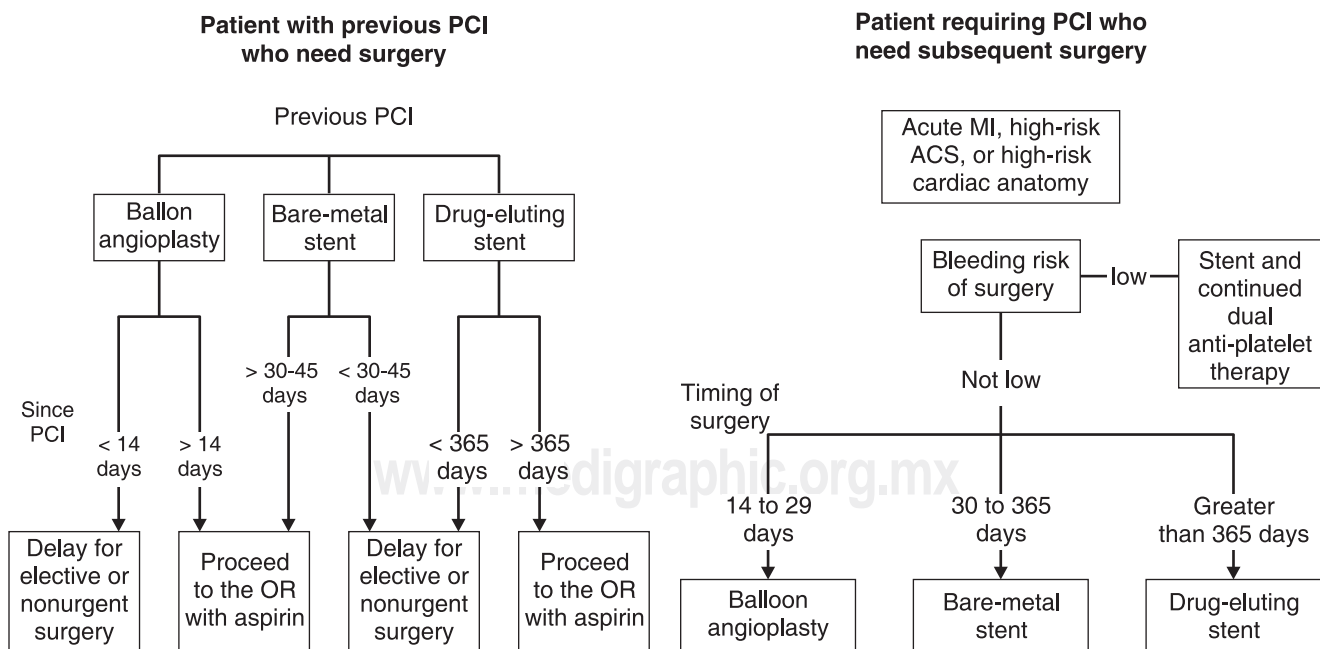
- ing stenosis and either ejection fraction less than 0.50 or demonstrable ischemia on noninvasive testing.
- Coronary revascularization before non-cardiac surgery is recommended for patients with high-risk unstable angina or non-ST-segment elevation myocardial infarction.
- Coronary revascularization before non-cardiac surgery is recommended in patients with acute ST-elevation MI.
- Beta-blockers should be continued in patients undergoing surgery who are receiving beta-blockers to treat angina, symptomatic arrhythmias, hypertension, or other ACC/AHA Class I guideline indications.
- For patients currently taking statins and scheduled for non-cardiac surgery, statins should be continued.
- Maintenance of body temperature in a normothermic range is recommended for most procedures other than during periods in which mild hypothermia is intended to provide organ protection (e.g., during high aortic cross-clamping).
- Postoperative troponin measurement is recommended in patients with ECG changes or chest pain typical of acute coronary syndrome.

The two graphs that follow provide a simple, easy-to-use algorithm that aids the clinician in performing a cardiovascular evaluation in the patient presenting for non-cardiac surgery:





The Guidelines also provide guidance to patients with coronary stents and patients without coronary stents but who may need such in anticipation of surgery. The following are algorithms within the Guidelines that deal with patients who have a previous percutaneous coronary intervention and patients who have had a recent myocardial infarction, high-risk acute coronary syndrome or have high-risk cardiac anatomy



Tricoci et al., in 2009<sup>(2)</sup> reviewed the AAC/AHA Guidelines for not just perioperative management of the patient for non-cardiac surgery but looked at 53 guidelines issued on 22 topics, including some 7196 recommendations. 24 of the joint guidelines issued were disease-based, 15 were interventional-based, and 14 were diagnostic procedure-based. Of the 53 guidelines 12 are revisions of previous guidelines. Tricoci found a mean time from publication of original guideline to revision to be 4.6 years, and also found that the total number of recommendations had increased from 1330 to 1973 (a 48%

increase). However, the trend was a shift away from Class I recommendations to more Class II recommendations and fewer Class III recommendations. Tricoci also found that in 1305 Class I recommendations only 245 have a Level A basis. The guideline dealing with the perioperative patient for non-cardiac surgery in particular had a 9.3% decline in class I recommendations and a 88.8% increase in Class II recommendations, which occurred at the expense of Class III recommendations which had fallen 53.4%. Only 6 of the Class I recommendations (12%) had Level A evidence.

## REFERENCES

1. [www.americanheart.org](http://www.americanheart.org)
2. Tricoci P. MD, MHS, PhD. JAMA, 2009; 301(8):831-841