

2014 ESC/ESA guidelines on noncardiac surgery: Cardiovascular assessment and management

Are the differences clinically relevant? The European perspective

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In 2012, the European Society of Cardiology (ESC) and the European Society of Anaesthesiology (ESA) established a guideline task force comprising experts within the field of a noncardiac surgery. After a fruitful review process, the guideline document was published in 2014.^{1,2} The group consisted of experts within anaesthesiology, surgery, and all subspecialties of cardiology including cardiovascular imaging. In this issue of the Journal, Velasco et al. have prepared a comparison of the latest revision of the US and European guidelines on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery and the editorial by Port providing the US perspective.^{3,4}

The major goal of the European Guidelines was to provide a step-by-step guidance for clinicians managing cardiac patients undergoing noncardiac surgery. The following points were updated and emphasized:

- A multidisciplinary expert team should be consulted for perioperative evaluations of patients with known or high-risk cardiac disease undergoing high-risk surgery.
- The surgical risk assessment was completely updated (Table 3, Ref 1).

- Patient risk assessment was based on the Lee score,⁵ but also other validated risk scores such as NSQIP⁶ were recommended.
- The risk reduction section including the indication for preoperative use of beta-blockers was updated and changed.
- The recommendations of the use of aspirin and P2Y12 inhibitors were updated, and a section on new oral anticoagulants was included.
- The recommendations of the timing of noncardiac surgery in patients with recent revascularization were updated. Routine prophylactic myocardial revascularization before low- and intermediate-risk surgeries in patients with ischemic heart disease (IHD) is not recommended, but may be considered before high-risk surgery depending on the extent of stress-induced ischemia.
- The section on specific diseases including several cardiac and vascular conditions and also pulmonary and renal disease was updated.
- The perioperative monitoring section was updated, and new anaesthesiological techniques were recommended.

As for other ESC Guidelines, the approach is to establish recommendations and to evaluate the level of evidence on the best patient management to guide clinicians in their decision making. Clearly this also holds true for optimal use of preoperative cardiovascular imaging in these patients. In general, the view on this topic is that we should be careful not to overuse expensive imaging techniques that are not evidence based. In each case, the

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risk of surgery but also the patient's risk should be assessed. Particular clinical risk factors are ischemic heart disease, heart failure, stroke or transient ischemic attack, renal dysfunction, and diabetes mellitus requiring insulin therapy (Table 4, Ref 1). Patients should be interviewed on their physical capability and in general, patients with a high physical capability do not need to undergo stress tests (Fig. 1, Ref 1).

What about the use of noninvasive perioperative tests for risk assessment? Regarding use of 12-lead ECG, this is clearly indicated in patients with risk factor(s) (Table 4, Ref 1) undergoing intermediate- or high-risk surgery (Table 3, Ref 1), and should also be considered in patients with known heart disease with the exception for patients undergoing low-risk surgery. Preoperative ECG may be considered for patients who have risk factor(s) and are scheduled for low-risk surgery. Preoperative ECG may also be considered for patients who are above 65 years of age and are scheduled for intermediate-risk surgery.

Preoperative assessment of left ventricular (LV) function most often performed with transthoracic echocardiography should be considered in patients with dyspnoea of unknown origin, for heart failure patients with worsening dyspnoea or change in clinical status, and also for stable patients with known LV dysfunction without an LV assessment within the last year. Finally for patients undergoing high-risk surgery, preoperative evaluation of LV function may be considered.⁷ Routine preoperative evaluation of LV function should not be performed.

Regarding preoperative stress testing for myocardial ischemia, this should be performed in patients with more than two clinical risk factors (Table 4, Ref 1) and a poor functional capacity (<4 METs) (Fig 1, Ref 1) undergoing high-risk surgery. It may be considered in patients with one risk factor and poor functional capacity undergoing intermediate- or high-risk surgery. In the ESC/ESA guidelines, routine stress imaging testing is not recommended before low-risk surgery, regardless of the patient's clinical risk.

Noninvasive imaging using stress echocardiography has been widely used and has a high negative predictive value.⁸ However, a negative stress echocardiography performed before scheduled aortic surgery does not rule out postoperative myocardial necrosis.⁹ In patients with limited exercise capacity, pharmacological stress myocardial perfusion imaging (MPI) is used. Studies are performed both during stress and at rest, to determine the presence of reversible defects, reflecting jeopardized ischemic myocardium or fixed defects, reflecting scar or nonviable tissue.

Vasodilator thallium, Tc-99m sestamibi or Tc-99m tetrofosmin SPECT MPI have been extensively used for

preoperative evaluation.¹⁰ A meta-analysis of studies using nuclear MPI or dobutamine stress echo for risk stratification before vascular surgery demonstrated a prognostic value of stress imaging abnormality for perioperative ischemic events with similar magnitude of both pharmacological stress tests.¹¹ However, in patients with a low prevalence of ischemic heart disease, the diagnostic accuracy is reduced.

Cardiovascular magnetic resonance (CMR) imaging can be used for assessment of LV function and evaluation of ischemia in patients with chest pain and low-to-intermediate risk. Also CT scanning can be used to assess coronary stenoses. However, currently no data on the use of CT or CMR are available in the preoperative setting. All the noninvasive tests described have their limitations and strengths.

Regarding the use of invasive coronary angiography, the guidelines recommend the use of perioperative coronary angiography and revascularization in patients in which these tests are indicated anyway. Specifically in patients with acute coronary syndromes, urgent angiography is recommended before noncardiac surgery. Also in patients with signs of myocardial ischemia who are hemodynamical despite adequate medical therapy, perioperative coronary angiography is recommended. In stable cardiac patients undergoing nonurgent carotid atherectomy, perioperative angiography may be considered. However, for the vast majority of patients with stable coronary artery disease, preoperative angiography is not indicated.

In conclusion, the use of noninvasive advanced imaging technique and stress tests should be restricted to patients in whom the results might influence perioperative management. Patients with extensive stress-induced ischemia represent a high-risk group. More studies are needed using newer imaging modalities for evaluation of patients with clinical risk undergoing intermediate- and high-risk surgery. Based on the current evidence, the ESC/ESA's guidelines in general recommend a conservative use of the more sophisticated and expensive imaging techniques.

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