Guidelines in review: Comparison of the 2014 ACC/AHA guidelines on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery and the 2014 ESC/ESA guidelines on noncardiac surgery: Cardiovascular assessment and management

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Received Jul 30, 2016; accepted Aug 1, 2016
doi:10.1007/s12350-016-0643-8

Two sets of clinical practice guidelines (Table 1) were published in 2014 related to the cardiovascular assessment of patients undergoing noncardiac surgery: one endorsed by the American College of Cardiology and the American Heart Association (2014 ACC/AHA guidelines on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery),[1] and the other by the European Society of Cardiology and the European Society of Anaesthesiology (2014 ESC/ESA guidelines on noncardiac surgery: Cardiovascular Assessment and Management).[2] We have previously summarized the ACC/AHA guidelines in the *Journal* focusing on the recommendations pertaining to noninvasive imaging and coronary revascularization.[3] Since many of our readers are not familiar with both sets of guidelines, we will present here the recommendations from both documents side-by-side (Tables 2, 3, 4, 5, 6, 7). The Class (I, IIa, IIb, III) and the level of evidence (A, B, C) are shown next to each recommendation. We also include a flowchart comparing the stepwise approach of both guidelines toward the evaluation of patients undergoing noncardiac surgery (Figure 1). Our summary will be followed by 2 editorials: The first by Kristensen [4] summarizes the ESC/ESA guidelines focusing on the changes that have been introduced compared to previous versions of these guidelines. The editorial raises awareness to situations where imaging, angiography, and revascularization are and are not indicated in this setting. The second editorial by Port [5] reflects on the similarities and the differences between the 2 sets of guidelines and the implications of these to clinical care. It highlights situations whereby imaging may be indicated by one set of guidelines but not the other. We hope

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J Nucl Cardiol 2017;24:165–70.
1071-3581/$34.00

Table 1. Comparison of ACC/AHA and ESC/ESA guidelines on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery

Characteristic	ACC/AHA	ESC/ESA
Year of publication	2014	2014
Length of document in pages	61	49
References	490	279
Recommendations	69	120
Recommendations relevant to imaging	16	19
Class of recommendations		
Class I	15	50
Class IIa	17	30
Class IIb	21	26
Class III	16	14
Level of evidence (LOE)		
LOE A	3	9
LOE B	38	44
LOE C	28	67

Table 2. Recommendations regarding perioperative ECG

	AHA/ACC		EHS/ESA	
Indication	Class	LOE	Class	LOE
Patients with risk factors undergoing intermediate- or high-risk surgery			I	C
Patients with known CAD, significant arrhythmia, peripheral arterial disease, cerebrovascular disease or other cardiac structural abnormalities, except those undergoing low-risk surgery	IIa	B		
Patients with risk factors undergoing low-risk surgery			IIb	C
Patients with no risk factors, age >65 years undergoing intermediate-risk surgery			IIb	C
Asymptomatic patients without known CAD except those undergoing low-risk surgery	IIb	B		
Patients with no risk factors scheduled for low-risk surgery			III	B
Asymptomatic patients undergoing low-risk surgery	III	B		

CAD, coronary artery disease

Table 3. Recommendations regarding perioperative assessment of left ventricular (LV) function

	AHA/ACC		EHS/ESA	
Indication	Class	LOE	Class	LOE
Patients with dyspnea of unknown origin	IIa	C		
Heart failure patients with worsening dyspnea or change in clinical status	IIa	C		
Reassessment of LV function in stable patients with known LV dysfunction without an assessment within a year	IIb	C		
Patients undergoing high-risk surgery			IIb	C
Routine preoperative evaluation of LV function	III	B		
Routine assessment prior to low- or intermediate-risk surgery			III	C

Table 4. Recommendations regarding stress testing for myocardial ischemia

Recommendation	AHA/ACC		EHS/ESA	
	Class	LOE	Class	LOE
For patients with >2 risk factors* and poor functional capacity (<4 METs) undergoing high-risk surgery imaging stress test is recommended			I	C
For patients with elevated risk** and excellent functional capacity (>10 METS), it is reasonable to forgo further exercise testing with cardiac imaging and proceed with surgery	IIa	B		
For patients with elevated risk** and poor functional capacity (<4 METs), it is reasonable to undergo pharmacologic stress testing, if it will change management	IIa	B		
For patients with elevated risk** and unknown functional capacity, it is reasonable to perform exercise testing to assess functional capacity, if it will change management	IIb	B		
For patients with elevated risk** and moderate-to-good functional capacity (METS 4-10), it is reasonable to forgo further exercise testing with cardiac imaging and proceed to surgery	IIb	B		
For patients with elevated risk** and poor functional capacity (<4 METs) it may be reasonable to perform exercise testing with cardiac imaging, if it will change management	IIb	C		
For patients with 1–2 risk factors and poor functional capacity (<4 METs) undergoing intermediate- or high-risk surgery, imaging stress test may be considered			IIb	C
Routine stress testing is not useful for low-risk surgery	III	B	III	C

*Clinical risk factors include CAD (angina and/or prior myocardial infarction), heart failure, stroke or transient ischemic attack, renal insufficiency (serum creatinine >2mg/dl or creatinine clearance <60ml/min/1.73 m^2), and diabetes requiring insulin therapy
** Defined as >1%. Estimation of risk based on the Revised Cardiac Risk Index score or the American College of Surgeons NSQIP risk calculator

Table 5. Recommendations regarding coronary angiography

Recommendation	AHA/ACC		EHS/ESA	
	Class	LOE	Class	LOE
Indications for preoperative angiography and revascularization are similar to those in the the nonsurgical setting			I	C
STEMI in the setting of nonurgent noncardiac surgery			I	A
NSTEMI in setting of nonurgent noncardiac surgery			I	B
Patients with proven ischemia and unstabilized chest pain* on optimal medical therapy, undergoing nonurgent noncardiac surgery			I	C
Stable cardiac patients undergoing nonurgent carotid endarterectomy			IIb	B
Routine coronary angiography is not recommended	III	C		
Stable patients undergoing low-risk surgery			III	C

* Canadian Cardiovascular Society Class III–IV
STEMI, ST elevation myocardial infarction; *NSTEMI*, Non-ST elevation myocardial infarction

Table 6. Recommendations regarding elective coronary revascularization prior to noncardiac surgery

Indication	AHA/ACC Class	AHA/ACC LOE	EHS/ESA Class	EHS/ESA LOE
Revascularization before noncardiac surgery is recommended in circumstances in which revascularization is indicated according to clinical practice guidelines	I	C	I	B
Late revascularization after successful noncardiac surgery should be considered in accordance to clinical practice guidelines			I	C
Prophylactic revascularization before high-risk surgery may be considered, depending on the extent of the stress-induced perfusion defect			IIb	B
Routine revascularization before low- and intermediate-risk surgeries in patients with known CAD is not recommended			III	B
Routine revascularization is not recommended before noncardiac surgery exclusively to reduce perioperative events	III	B		

Table 7. Surgical risk estimate of 30-day cardiovascular risk of myocardial infarction and cardiovascular death according to ESC/ESA guidelines

Low-risk surgery (<1%)	Intermediate-risk surgery (1–5%)	High-risk surgery (>5%)
Superficial surgery	Intraperitoneal	Pulmonary or liver transplant
Breast	Carotid, Symptomatic	Total cystectomy
Dental	Intrathoracic minor	Aortic and major vascular surgery
Endocrine: Thyroid	Peripheral arterial angioplasty	Duodeno-pancreatic surgery
Reconstructive	Endovascular aneurysm repair	Liver-resection bile duct surgery
Eye	Head and neck surgery	Esophagectomy
Carotid, symptomatic	Major orthopedic, neurological, gynecologic or urological procedure	Repair of perforated bowel
Minor gynecologic	Renal transplant	Adrenal Resection
Minor orthopedic		Pneumonectomy
Minor urologic		

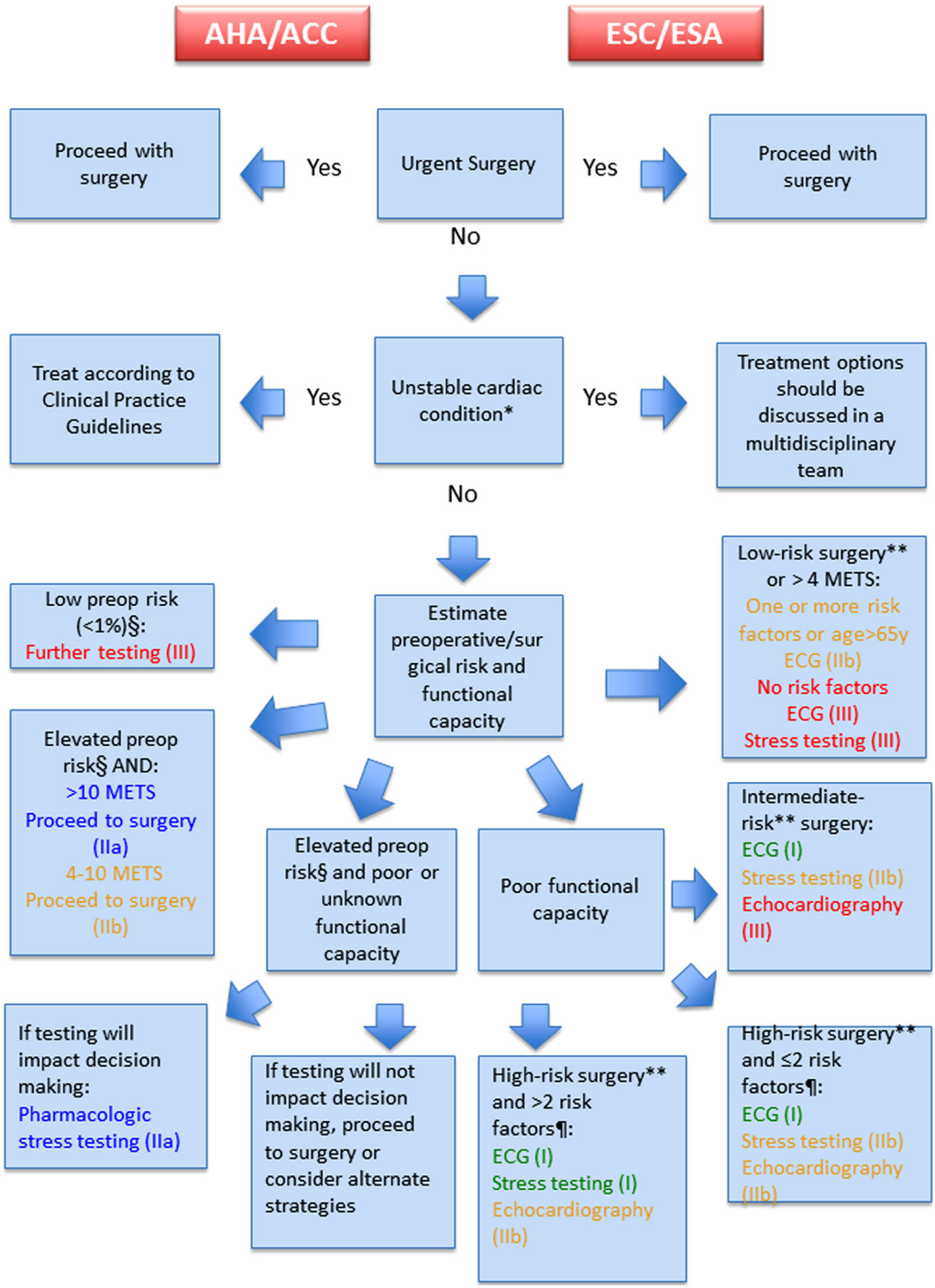

Figure 1. Comparison of stepwise approach based on AHA/ACC and ESC/ESA guidelines. * Unstable angina, acute hart failure, significant cardiac arrhythmia, symptomatic valvular heart disease, myocaridal infarction within the past 30 days and residual myocardial ischemia. **See Table 6. § Estimation of risk based on the Revised Cardiac Risk Index score or the American College of Surgeons NSQIP risk calculator. ¶ According to the Revised Cardiac Risk Index Score.

that this new series initiated by the *Journal* will provide an important service to the imaging community by highlighting the similarities and the differences between the American and the European guidelines and providing a perspective that may not be apparent from reading one set of guidelines.

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