

Perioperative Screenings – Clearing a Patient for Surgery

ARTHUR OHANNESSIAN, MD
ASSISTANT CLINICAL PROFESSOR
RESIDENCY ASSOCIATE PROGRAM DIRECTOR
UCLA DEPARTMENT OF FAMILY MEDICINE
DISTRICT IV DIRECTOR, CALIFORNIA CHAPTER
AMERICAN ACADEMY OF FAMILY PHYSICIANS

October 12, 2019



CALIFORNIA ACADEMY OF
FAMILY PHYSICIANS

STRONG MEDICINE FOR CALIFORNIA

Disclosures

I have no conflicts of interest or financial relationships to disclose.



Objectives

Identify a patient's risk factors for a cardiac event perioperatively

Learn to use the Revised Cardiac Risk Index (RCRI)

Assess functional status by calculating MET's

Learn and apply the 2014 ACC/AHA Guideline on perioperative cardiovascular risk evaluation and management



What is “cardiac clearance”?



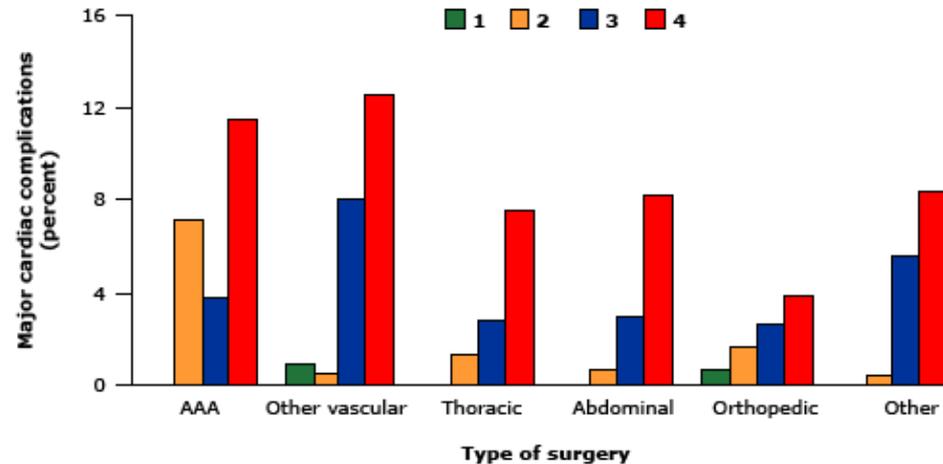
All patients scheduled to undergo noncardiac surgery should have an assessment of the risk of a perioperative cardiac event.

Purpose is to weigh risk/benefit of surgery and optimize timing of surgery

Ask whether further cardiovascular testing will change management and improve outcome

Risk Factors Correlate with Cardiac Complications

⇒ Identification of risk factors is derived from the history and physical examination; the type of proposed surgery influences the risk of perioperative cardiac event.



Risks Differ with Surgery Types Low vs. Intermediate vs. High

Description	Odds ratio* (95% CI)	Estimated cardiac risk of hypothetical patient [†] (%)
Low intrinsic cardiac risk		
Partial mastectomy (lumpectomy)	0.22 (0.15-0.31)	0.05
Arthroscopic rotator cuff repair	0.32 (0.19-0.54)	0.07
Simple mastectomy (complete breast)	0.37 (0.26-0.50)	0.08
Laparoscopic appendectomy	0.45 (0.33-0.62)	0.10
Laparoscopic cholecystectomy	0.62 (0.53-0.72)	0.14
Intermediate intrinsic cardiac risk		
Transurethral resection of bladder tumor, large	0.85 (0.61-1.20)	0.19
Laparoscopic prostatectomy	0.88 (0.69-1.12)	0.19
Open appendectomy	0.95 (0.51-1.75)	0.21
Total hip arthroplasty	0.95 (0.83-1.08)	0.21
Laparoscopic radial hysterectomy with bilateral salpingo-oophorectomy	1.05 (0.57-1.94)	0.23
High intrinsic cardiac risk		
Laparoscopic total abdominal colectomy with ileostomy	1.50 (0.92-2.44)	0.33
Breast reconstruction with free flap	1.52 (0.81-2.86)	0.33
Open cholecystectomy	1.55 (1.25-1.92)	0.34
Open ventral hernia repair, incarcerated or strangulated, recurrent	1.78 (1.29-2.44)	0.39
Whipple procedure, pylorus-sparing	4.70 (4.00-5.53)	1.02

ACC/AHA Guideline

High risk (reported risk of cardiac death or nonfatal myocardial infarction [MI] often greater than 5%)
•Aortic and other major vascular surgery
•Peripheral artery surgery
Intermediate risk (reported risk of cardiac death or nonfatal MI generally 1 to 5%)
•Carotid endarterectomy
•Head and neck surgery
•Intraperitoneal and intrathoracic surgery
•Orthopedic surgery
•Prostate surgery
Low risk* (reported risk of cardiac death or nonfatal MI generally less than 1%)
•Ambulatory surgery [†]
•Endoscopic procedures
•Superficial procedures
•Cataract surgery
•Breast surgery

J Am Coll Cardiol 2007; 50:e159.

ACC/AHA Guideline



Multiple Risk Indices

- ⇒ **Revised cardiac risk index (RCRI) (aka Lee index)**
- ⇒ **American College of Surgeons National Surgical Quality Improvement Program (NSQIP) risk prediction rule**
- ⇒ **Other models include:**
 - ⇒ Goldman cardiac risk index
 - ⇒ Detsky modified risk index
 - ⇒ Eagle criteria
 - ⇒ American University of Beirut-Pre-Operative Cardiovascular Evaluation Study (AUB-POCES)

Revised Cardiac Risk Index (RCRI)

Six independent predictors of major cardiac complications ^[1]
High-risk type of surgery (examples include vascular surgery and any open intraperitoneal or intrathoracic procedures)
History of ischemic heart disease (history of myocardial infarction or a positive exercise test, current complaint of chest pain considered to be secondary to myocardial ischemia, use of nitrate therapy, or ECG with pathological Q waves; do not count prior coronary revascularization procedure unless one of the other criteria for ischemic heart disease is present)
History of heart failure
History of cerebrovascular disease
Diabetes mellitus requiring treatment with insulin
Preoperative serum creatinine >2.0 mg/dL (177 micromol/L)
Rate of cardiac death, nonfatal myocardial infarction, and nonfatal cardiac arrest according to the number of predictors ^[2]
No risk factors - 0.4% (95% CI: 0.1-0.8)
One risk factor - 1.0% (95% CI: 0.5-1.4)
Two risk factors - 2.4% (95% CI: 1.3-3.5)
Three or more risk factors - 5.4% (95% CI: 2.8-7.9)
Rate of myocardial infarction, pulmonary edema, ventricular fibrillation, primary cardiac arrest, and complete heart block ^[1]
No risk factors - 0.5% (95% CI: 0.2-1.1)
One risk factor - 1.3% (95% CI: 0.7-2.1)
Two risk factors - 3.6% (95% CI: 2.1-5.6)
Three or more risk factors - 9.1% (95% CI: 5.5-13.8)

What will risk determine?

- surgery should proceed without further cardiovascular testing;
- be postponed pending further testing such as stress testing or echocardiography
- be changed to a lesser risk procedure (if possible) or a non-surgical alternative (eg, radiation and/or chemotherapy or palliative care)
- or be cancelled so that a procedure such as coronary revascularization or heart valve replacement can

Management Based on Risk

Low-risk patients — Patients whose estimated risk of death is less than 1 percent are labeled as being low risk and require no additional cardiovascular testing

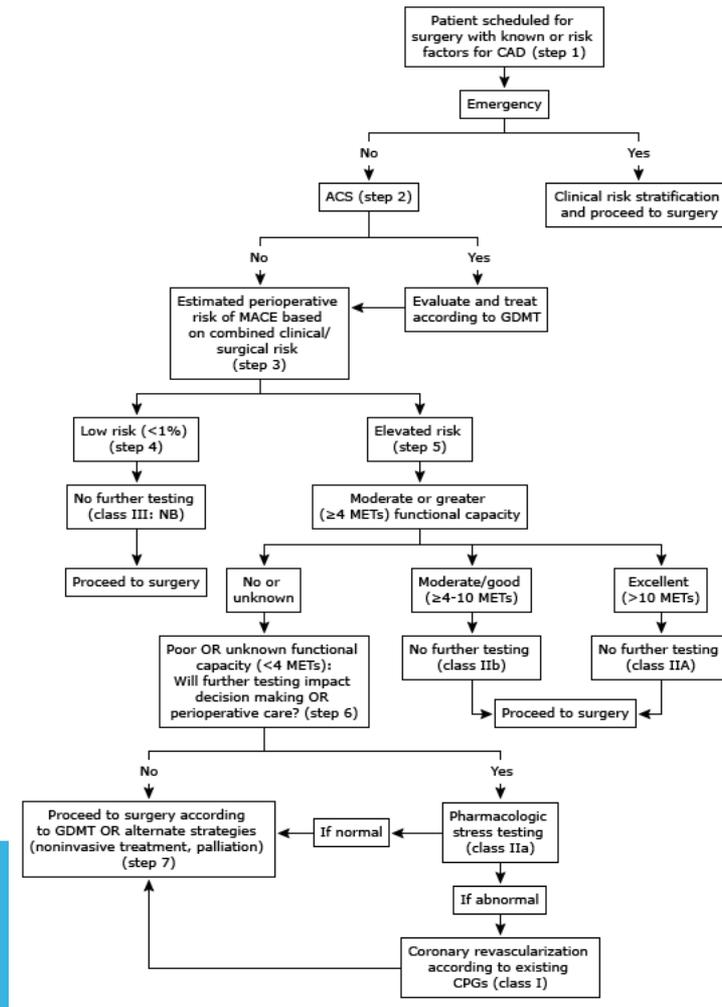
Higher-risk patients — Patients whose risk of death is 1 percent or higher may require additional testing

2014 American College of Cardiology/American Heart Association (ACC/AHA) guideline of perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery

=> the patient's functional capacity plays an important role



Management Based on Risk



2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery, J Am Coll Cardiol 2014.

Management Based on Risk



Functional Status Using MET's

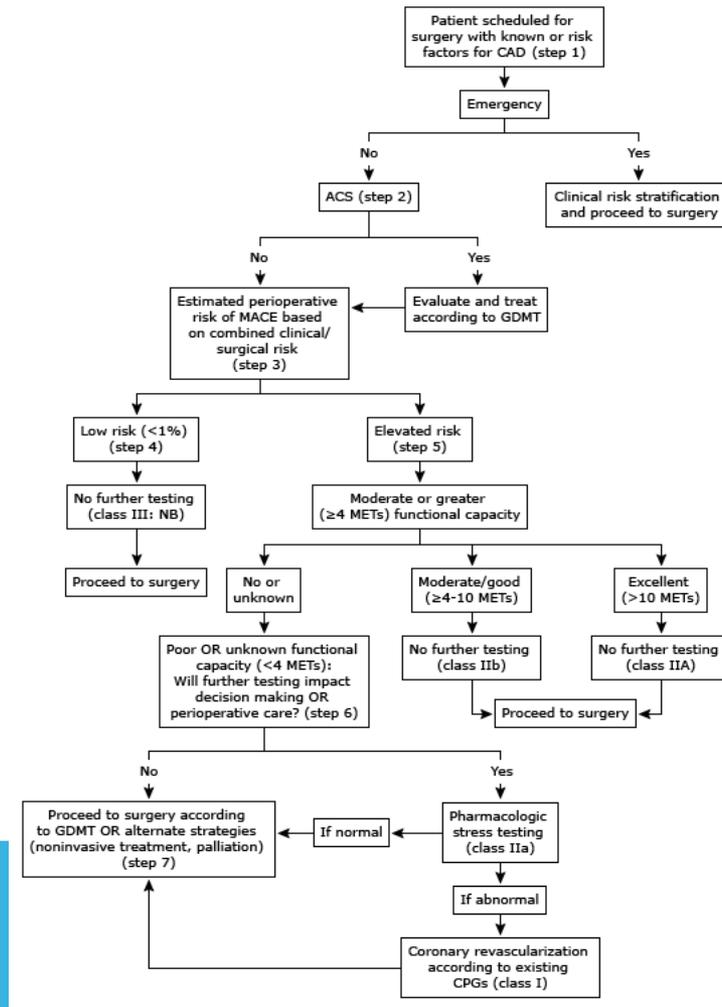
Functional status can be expressed in metabolic equivalents

1 MET = 3.5 mL O₂ uptake/kg per min

(resting oxygen uptake in a sitting position)

- Can take care of self, such as eat, dress, or use the toilet (**1 MET**)
- Can walk up a flight of steps or a hill or walk on level ground at 3 to 4 mph (**4 METs**)
- Can do heavy work around the house, such as scrubbing floors or lifting or moving heavy furniture, or climb two flights of stairs (between **4 and 10 METs**)
- Can participate in strenuous sports such as swimming, tennis, football, basketball, and skiing (**>10 METs**).

Management Based on Risk



2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery, J Am Coll Cardiol 2014.

Art's Preop Eval Checklist

Step 1) Determine risk: Low or High?

- a) Low risk => no further testing, proceed to surgery
- b) High risk => may need further testing, got to step 2

Step 2) Determined High Risk, how many METs does patient have?

- a) greater or equal to 4 MET's => no further testing, proceed to surgery
- b) less than 4 MET's => go to step 3

Step 3) Will further testing impact management?

- a) No => proceed to surgery or alternate treatment (non-invasive procedure or palliation)
- b) Yes => pharmacologic stress test/echo, if abnormal, then revascularization per guidelines => then proceed to surgery

Cardiac Testing

- ⇒ **Consider obtaining an electrocardiogram (ECG) in patients with cardiac disease (except in those undergoing low-risk surgery)**
 - ⇒ to have a baseline available should a postoperative test be abnormal.
- ⇒ **For patients with known or suspected heart disease (ie, cardiovascular disease, significant valvular heart disease, symptomatic arrhythmias)**
 - ⇒ perform further cardiac evaluation if it is indicated in the absence of proposed surgery.

Case 1

54 y/o M with h/o HTN, DM2 (A1C 8.1, Cr 0.9) is scheduled to have total knee replacement for severe OA, he currently has significant difficulty walking up stairs due to his end-stage OA. He currently takes Lisinopril, Metformin, and Glimepiride. Does the patient need further cardiac testing/eval prior to surgery?

Yes or No?

NO => Low Risk per RCRI => proceed to surgery

Case 2

64 y/o M with h/o HTN, DM2 (A1C of 9.1 on insulin), HF with last Echo 2 years ago showing EF 45%, has been having biliary colic pain for 3 months is scheduled for a laparoscopic cholecystectomy. He does not complain of any chest pain but reports significant shortness of breath when trying to walk up a flight of steps. Does the patient need further cardiac testing/eval prior to surgery?

Yes or No?

YES => High risk and less than 4 METs

=>Needs pharmacologic stress testing, depending on results possible revascularization

Case 3

74 y/o M with h/o HTN, hypothyroidism, h/o of MI at age 70, with preserved EF 65%, hepatitis B, peripheral neuropathy, BPH, gout, h/o left hand pinky amputation after MVA, alopecia, celiac disease, mild anemia due to beta-thalassemia, h/o urosepsis 3 years prior from an indwelling foley, and onychomycosis. He enjoys playing tennis with his wife and his only complaint is his chronic blurry vision in his L eye due to a cataract. He is scheduled for cataract surgery in 2 weeks. Does the patient need further cardiac testing/eval prior to surgery?

Yes or No?

No => Low Risk => proceed to surgery; can consider getting baseline ECG

Questions?

