Pre-Op Case 2018
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DEFINITION OF URGENCY

- **Emergent**: Life or Limb threatened if not in OR within 6 hours
- **Urgent**: Life or limb is threatened if not in the OR, typically between 6 and 24 hours
- **Time Sensitive**: Delay of >1 to 6 weeks to allow for an evaluation will negatively affect outcome
- **Elective**: Procedure could be delayed for up to 1 year
Definitions of Risk

Low Risk

Major adverse cardiac event (MACE) of death or myocardial infarction

<1%

Elevated Risk

>1%
Not an Emergency: Assess

- Acute coronary syndrome
  - If YES, STOP & treat per Guideline
- Unstable CHF
- Unstable Arrhythmias
- Severe VHD specifically MS or AS
Question 1: Under what circumstances should evaluations for ischemia be performed in the pre-operative period?
Clinical Pearl 1: Who needs pre-op ischemia work up?

• Functional capacity should be determined because it is the single best predictor of preoperative cardiac risk. Functional status is expressed in METs, with 1 MET being defined as the rate of oxygen uptake in an average person (40-year-old, 70-kg man) at rest, or 3.5 ml O2/kg/min. Various scales of METs have been described

• Watching TV 1.0 METs
• Walking (2.5 mph) 3.0 METs
• Walking (5.5 mph) 3.6 METs
• Jogging 7.0 METs
• Push ups/pull ups 8.0 METs
• Rope Jumping 10.0 METs
Clinical Pearl 1: Who needs pre-op ischemia work up?

• A threshold for functional status has also been defined as the inability to walk four blocks or climb two flights of stairs; risk for cardiovascular events was significantly increased in such patients undergoing noncardiac surgery. In patients with poor functional status in whom high-risk surgery is planned, further preoperative evaluation may be reasonable if management will change.

• PE should include BP measurement and auscultation for bruits and murmurs, rales, and check perfusion of extremities

• An EKG should be obtained in patients with known cardiovascular disease, prior arrhythmia, or known structural heart disease. In Asx pts without known cardiovascular disease, an EKG may be obtained but is often not helpful and is not recommended in Asx pts undergoing low-risk surgery. The EKE should be studied for the presence of significant ST-segment changes, conduction disease, Q waves, or QTc prolongation.
Algorithm for Perioperative Cardiac Assessment

ASSESS FUNCTIONAL CAPACITY
ASSESS FUNCTIONAL CAPACITY

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, singles tennis, football, basketball, and skiing (>10 METs)
Excellent or moderate capacity

- Moderate or greater (≥4 METs) functional capacity
  - Excellent (>10 METs) → No further testing (Class Ila)
  - Moderate/Good (≥4–10 METs)
    - No further testing (Class IIb)
- No or unknown → Proceed to surgery
Poor or unknown functional status

- Poor OR unknown functional capacity (<4 METs): Will further testing impact decision making OR perioperative care? (Step 6)
  - Pharmacologic stress testing (Class IIa)
    - If normal
    - If abnormal
      - Coronary revascularization according to existing CPGs (Class I)
  - Proceed to surgery according to GDMT OR alternate strategies (noninvasive treatment, palliation) (Step 7)
Step 3: Calculate RCRI

- Low risk (<1%) (Step 4)
- No further testing (Class III: NB)
- Proceed to surgery
High Risk Surgery

1. Active HF symptoms
2. Physical examination findings of peripheral edema, jugular venous distention, rales, third heart sound
3. Chest x-ray with pulmonary vascular redistribution or pulmonary edema
4. History of HF

DM on Insulin

CVA

CAD

CHF

Cr>2

Revised Goldman Cardiac Risk Index

Low

High

0/1

2
Revised Goldman Cardiac Risk Index

Derivation and Prospective Validation of a Simple Index for Prediction of Cardiac Risk of Major Noncardiac Surgery

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Background—Cardiac complications are important causes of morbidity after noncardiac surgery. The purpose of this prospective cohort study was to develop and validate an index for risk of cardiac complications.

Methods and Results—We studied 4315 patients aged ≥50 years undergoing elective major noncardiac procedures in a tertiary-care teaching hospital. The main outcome measures were major cardiac complications. Major cardiac complications occurred in 56 (2%) of 2893 patients assigned to the derivation cohort. Six independent predictors of complications were identified and included in a Revised Cardiac Risk Index: high-risk type of surgery, history of ischemic heart disease, history of congestive heart failure, history of cerebrovascular disease, preoperative treatment with insulin, and preoperative serum creatinine ≥2.0 mg/dL. Rates of major cardiac complication with 0, 1, 2, or ≥3 of these factors were 0.5%, 1.3%, 4%, and 9%, respectively, in the derivation cohort and 0.4%, 0.9%, 7%, and 11%, respectively, among 1422 patients in the validation cohort. Receiver operating characteristic curve analysis in the validation cohort indicated that the diagnostic performance of the Revised Cardiac Risk Index was superior to other published risk-prediction indexes.

Conclusions—In stable patients undergoing nonurgent major noncardiac surgery, this index can identify patients at higher risk for complications. This index may be useful for identification of candidates for further risk stratification with noninvasive technologies or other management strategies, as well as low-risk patients in whom additional evaluation is unlikely to be helpful. (Circulation. 1999;100:1043-1049.)
Question 2: What considerations should be made regarding surgery in patients who had a recent cardiac catheterization procedure in the last year?
Clinical Pearl 2: What considerations post cardiac catheterization?

• Coronary stents are at increased risk for thrombosis in at least first 4-6 weeks in the peri-operative period

• After PCI, interruption of antiplatelet therapy is NOT recommended save for emergent or urgent purposes.

• Revascularization before surgery is ONLY recommended in circumstances in which revascularization would be indicated independent of surgery.
Stents and Timing of Non Urgent Surgery

Delay elective noncardiac surgery:

- 14 days after balloon angioplasty
- 30 days after BMS implantation
- 365 days after drug-eluting stent (DES) implantation
Availability of a 24 hour cath lab service in place is suggested for cases of major surgery within 6 months post PCI.
Clinical Pearl 3: What about statins, aspirin and beta blockers in the peri-operative period?

- Peri-operative beta blockers have been the subject of extensive study and debate. Multiple meta-analyses have been recently performed.

- Beta-blockade be continued peri-operatively in patients who have been stable on beta-blocker therapy. If patients have three or more Revised Cardiac Risk Index (RCRI) risk factors, it is considered reasonable to initiate beta-blocker therapy before surgery. Importantly, beta-blockade should be started well in advance of the planned surgery to allow for clinical effectiveness and to assess for tolerability. Beta-blockade should not be initiated on the day of surgery.

- RCRI simple index/algorithm: 6 predictors of risk equally weighted: History of CAD/ History of CHF/ History of stroke/TIA/ History of insulin dependent DM/ History of chronic kidney disease (Cr > 2 mg/dl) and undergoing suprainguinal vascular, intraperitoneal or intrathoracic surgery. Three or more the risk of major non-cardiac surgery is >11%, two or more is 6.6% and one predictor is 0.9%. Circulation 1999;100:1043-1049.
Clinical Pearl 4: What about statins, aspirin and beta blockers in the peri-operative period?

• Statin therapy should be continued in patients who are already on a statin. In patients undergoing surgery who meet criteria for statin treatment based on the 2014 ACC/AHA perioperative guideline, initiation can be considered. Patients undergoing vascular surgery should be started on a statin.

• Peri-operative aspirin has not been shown to have benefits over placebo. In addition, in patients already taking aspirin, it can be safely stopped unless they have a previously placed coronary stent.

• No other optimizing measured can be supported by clinical trial data
Minimal delay for P2Y₁₂ interruption

Days after surgery

Expected average platelet function recovery

1 Decision to stop aspirin throughout surgery should be made on a single case basis taking into account the surgical bleeding risk.

2 In patients not requiring OAC.
<table>
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<tr>
<th>CARDIAC ISSUE</th>
<th>PERIOPERATIVE MANAGEMENT</th>
<th>CLASS OF RECOMMENDATION</th>
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</table>
| Beta blockers | • Continue beta blockers in patients who are on beta blockers chronically  
                • Beta-blocker therapy should not be started on the day of surgery | I  
                        III |
| Statins       | • Continue statins in patients currently taking statins  
                • Perioperative initiation of statin use is reasonable in patients undergoing vascular surgery | I  
                        IIA |
| ACE inhibitors| • Continue perioperatively | IIA |
| Cardiac devices | • Patients with ICDs should be on a cardiac monitor continuously during the entire period of inactivation  
                    • *Ensure that ICDs are reprogrammed to active therapy* | I |