

# **AHD: Perioperative Medicine**

## **Facilitator Guide**

### **Case # 1**

**A 48 yo male has been admitted with an ankle fracture suffered during a soccer game. Ortho has consulted you for medical clearance prior to surgery. You review his chart to find he has a PMH of HTN and HLD and is on lisinopril and atorvastatin. Labs including a renal panel and CBC on admission are normal.**

**Can you clear a patient for surgery?**

**Describe the focused history and exam you will obtain**

**How do you advise the patient and your surgical colleagues?**

**What do you consider to be a low or high risk of MACE? Compare with other group members.**

**What risk factors for major adverse cardiac events do you think are missing from the RCRI?**

**Case #2**

A 63 yo male has been admitted with a fracture of the humerus after he slipped on icy steps. Ortho has consulted you for medical clearance prior to surgery. You review his chart to find he has a PMH of HTN, HLD, type II DM, and CKD. He is a current smoker and has a 50 pack year history of smoking. His meds include valsartan, atorvastatin, and insulin. The patient walks 6 blocks from his bus stop to his office building in the mornings and goes up 2 flights of stairs to get to his office. His review of systems is negative.

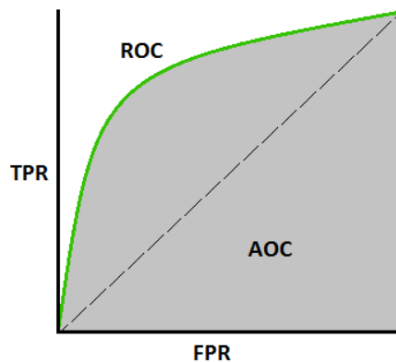
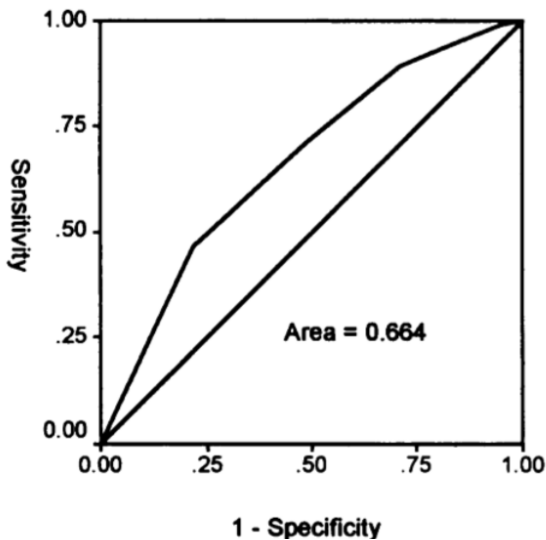
Vitals and exam are unremarkable except for bruising over high left proximal arm and ROM limited by pain. Labs show a creatinine at baseline of 2.1.

How do you advise the patient and the surgical teams?

As we discussed, the Canadian Cardiovascular Society guideline does not recommend subjective functional status assessment as part of perioperative cardiac risk assessment. In the study referenced below, METs were estimated for nearly 6000 inpatients who were admitted for elective, noncardiac surgery. Receiver operator characteristic curves were constructed to graphically demonstrate the sensitivity and specificity of METs for cardiac complications and death. Does this study support the conclusion of the ACC/AHA guideline or the CCS guideline?

**3e.**

**Receiver Operator Curve:  
METs versus Cardiac Complication**



Wiklund RA, Stein HD, Rosenbaum SH. Activities of daily living and cardiovascular complications following elective, noncardiac surgery. *Yale J Biol Med* 2001;74:75-87.

A subsequent study published in 2018 (referenced below) concluded that subjectively assessed preoperative functional capacity had no significant adjusted association death or major post-operative complications, whereas scores on the Duke Activity Status Index DID have an adjusted association with those outcomes. Take a look at the DASI. Is it practical? Do you think the next ACC/AHA guideline will change its recommendation with respect to functional status assessment?

Wijeysundera, Duminda N., et al. "Assessment of functional capacity before major non-cardiac surgery: an international, prospective cohort study." *The Lancet* 391.10140 (2018): 2631-2640.

Would you recommend obtaining an ECG in this patient prior to surgery?

This patient uses 15 units of glargine nightly and 5 units of Humalog with meals. Will you adjust his insulin prior to surgery?

### Case #3

A 67 yo male with a PMH significant for HTN, type II DM, and ischemic stroke 4 years ago has been admitted for repair of an AAA. He is non-ambulatory and lives with his wife who is his caretaker. He has a 63 pack year history of smoking (quit after stroke). He is on amlodipine, Insulin, aspirin, atorvastatin, and fiber supplements. Cardiopulmonary ROS is negative.

Vitals are normal. Patient is non-ambulatory. Labs on admission are unremarkable.

General surgery has consulted medicine for clearance prior to proceeding with AAA repair. What do you discuss with the patient and the surgical team?

As you advised, a pharmacologic stress test is performed and is positive with regions of inducible ischemia. Will revascularization reduce this patient's risk of MACE?

Let's take a look at the CARP trial (Coronary-Artery Revascularization before Elective Major Vascular Surgery)

Clinical question: In patients with stable CAD undergoing major elective vascular surgery, is there a mortality benefit in preoperative coronary artery revascularization?

Methods: 510 patients scheduled for elective vascular surgery (without left main disease, LVEF < 20%, or severe aortic stenosis) were randomized to either preoperative revascularization (PCI or CABG) vs. no revascularization.

Results: After a median of 2.7 years, there was no difference in the primary outcome of long-term mortality (22% vs. 23% P=0.92). In addition, there was no difference in 30-day postoperative outcomes such as death, MI, stroke, reoperation and LOS.

So will revascularization reduce this patient's risk of MACE?

**Case #4**

A 61-year-old man is seen for preoperative evaluation before left total hip arthroplasty scheduled in 2 weeks. In addition to chronic left hip pain, his medical history is notable for CAD s/p PCI 5 months ago. TTE at the time revealed a normal LVEF and no structural heart disease. His physical activity is extremely limited due to hip pain, but he denies angina, dyspnea, palpitations, and syncope.

**PMHx:** CAD, HTN, HLD, OA

**Rx:** aspirin, clopidogrel, carvedilol, atorvastatin, and Lisinopril

**PE:** BP of 126/76, pulse of 64. Cardiopulmonary exam is normal.

Surgery has asked if this patient can stop his dual antiplatelet therapy prior to surgery. What do you advise?

What if the stent had been placed for chronic angina that was not adequately responding to medical therapy?

**Case #5**

**Below are some indications for anticoagulation. These patients' thrombotic risk can range from low to high. Try to give some examples of each risk category.**

	<b>Mechanical valves</b>	<b>Atrial fibrillation</b>	<b>VTE</b>
<b>High</b>			
<b>Moderate</b>			
<b>Low</b>			

The table below is from a 2015 JACC review article. Afib risk stratification has since been updated in a 2017 "Expert consensus" statement below

**Case #5**

A 68-year-old male is seen for preoperative evaluation prior to repair of an abdominal aortic aneurysm in 2 weeks. He has been in good health. He exercises on an elliptical for 30 minutes daily. He denies angina, dyspnea, palpitations, and syncope.

**PMHx:** atrial fibrillation, HTN

**Meds:** warfarin, amlodipine, atorvastatin, multivitamin

**PE:** BP 124/72, pulse is 60. Cardiovascular examination reveals a irregular rhythm, normal s1/s2.

INR from 3 days ago is within therapeutic range

ECG 2 months prior revealed atrial fibrillation with no other abnormalities

TTE 2 months prior revealed normal left ventricular function

**What do you do with this patient's anticoagulation?**

**Will bridging be necessary?**

**Same case, but patient has a prosthetic mitral valve. What do you do?**

## Case #6

How might initiation of beta-blockers affect perioperative risk of MACE?

What do you think are the risks of perioperative beta-blockers?

Let's take a look at the POISE trial:

**Clinical question:** In patients undergoing non-cardiac surgery, does the use of perioperative beta-blockers reduce the risk of CV events or death?

**Methods:** ~8,400 patients > 45 yo undergoing non-cardiac surgery but at elevated risk for MACE were randomized to initiation of beta-blockers or placebo several hours prior to surgery (initial dose 100 mg metoprolol succinate).

**Results:**

### Primary Outcomes

Composite of CV death, non-fatal MI, and non-fatal cardiac arrest at 30 days

5.8% vs. 6.9% (HR 0.84; 95% CI 0.70-0.99; P=0.0399)

### Secondary Outcomes

CV death

1.8% vs. 1.4% (HR 1.30; 95% CI 0.92-1.83; P=0.1368)

Non-fatal MI

3.6% vs. 5.1% (HR 0.70; 95% CI 0.57-0.86; P=0.0008)



Non-fatal cardiac arrest

0.5% in both groups (p=NS)

Any MI

4.2% vs. 5.7% (HR 0.73; 95% CI 0.60-0.89; P=0.0017)



Death

3.1% vs. 2.3% (HR 1.33; 95% CI 1.03-1.74; P=0.0317)



Stroke

1.0% vs. 0.5% (HR 2.17; 95% CI 1.26-3.74; P=0.0053)



Summarize the results above

POISE Study Group. "Effects of extended-release metoprolol succinate in patients undergoing non-cardiac surgery (POISE trial): a randomised controlled trial." *The Lancet* 371.9627 (2008): 1839-1847.



A 58 year old female with a PMH significant for HTN, HLD, type II DM, tobacco use, and CKD is seen for preoperative evaluation prior to a planned hysterectomy in 2 weeks. She is employed as a postal carrier and ambulates 6 miles a day along her route. Cardiopulmonary ROS is negative.

Meds: Lisinopril, amlodipine, glargine, lispro, and atorvastatin

Vitals and labs are normal.

Lab work from last week reveals a baseline serum creatinine of 2.5.

What is your assessment of his cardiac risk? Is any additional testing needed?

Should we start a beta-blocker for this patient prior to surgery to reduce his risk of myocardial Infarction?

The 2014 ACC/AHA guideline also makes a Class IIa LOE: B recommendation that "It is reasonable for the management of beta blockers after surgery to be guided by clinical circumstances, independent of when the agent was started."  
What does this recommendation mean?