Preoperative evaluation 2019

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Disclosures

- I do not have any relevant financial or personal conflicts of interest with this material.

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Learning Objectives

1. Apply current AHA/ACC guidelines on perioperative cardiovascular risk.
2. Supplement these guidelines with recent findings that may warrant practice change.
3. Identify (and manage!) patients where existing guidelines may not apply.

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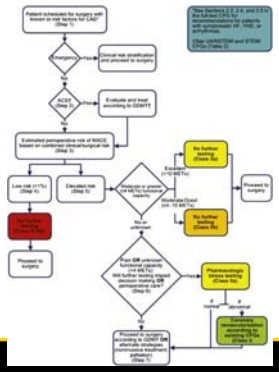
2014 ACC/AHA perioperative guideline[1]



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1. Fleisher et a, JACC 2014

A patient

- 56-year-old woman presents for preop evaluation before elective right TKA.
- She is active, and rides her bike 50 miles every week.
- She has hypertension, treated with metoprolol. She has no other home meds or medical history.
- She had normal blood work and EKG 1 month ago.

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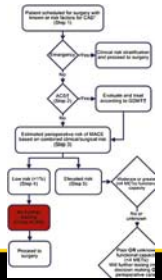
Welcome to easy mode

- Step 1: Is this emergent?
  - No
- Step 2: Is the patient having ACS?
  - Probably not.
- Step 3: Is this low-risk?



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Risk-assessment models

- "A validated risk-prediction tool can be useful in predicting the risk of perioperative MACE in patients undergoing noncardiac surgery." (Class IIa, LoE B)
- Three tools are suggested in the guideline:
  - RCRI
  - MICA (based on NSQIP)
  - ACS-SRC (based on NSQIP)

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From www.MDCalc.com

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What happened?

- A few months ago, MD Calc updated the calculator using numbers from the 2016 Canadian CV Society guidelines.[1]
- These estimates were based on high-risk populations (vascular surgery, hip fx) and used Myocardial Injury after Noncardiac Surgery (MINS) as endpoint.
- Other authors have found that an RCRI = 0 DOES correlate with expected risk < 1%.

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Duceppe et al, Can J Cardiol 2017

MICA

- A newer CV risk calculator (400,000 patients)
  - Age
  - Creatinine
  - ASA class
  - Functional status
  - Procedure site

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ACS-SRC

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https://riskcalculator.facs.org/RiskCalculator/

Risk calculator comparison

- MICA and SRC estimate this patient's CV risk as below 1% (low-risk).
- No further testing is indicated.
- From prior studies, the ACC/AHA recommend continuing preoperative beta blockers without interruption. (Class I, LoE B).

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That was easy!

- While these guidelines work well for many patients, many patients are more complex.
- Let's change things up a little bit.

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A patient, again

- 56-year-old woman will present Friday afternoon for preop evaluation before elective TKA.
- She is active, and still rides her bike 50 miles every week.
- She has hypertension, treated with metoprolol. She has no other home meds or medical history.
- She had routine blood work and EKG 1 month ago (all normal).

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A patient, continued

- On the way out of your clinic, the patient falls.
- She is diagnosed with a right femoral fracture.
- Your surgeon has a birthday party to attend at 1000 the next morning.

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How urgent is this operation?

A. This is emergent. Take the patient Class A to the OR and fix that hip!

B. This needs to happen Saturday.
   Maybe they can save some cake.

C. This can wait until Sunday. Enjoy the party.

D. What's your rush? Fix the hip on Monday!

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What does science say?

- **Association between wait time and 30-day mortality in adults undergoing hip fracture surgery.**
  - Pincus D et al. *JAMA*. 2017 Nov 28;318(20):1994-2003. PMID: 29183076
- Objective
  - "To identify the optimal time window in which to conduct hip fracture surgery before the risk of complications increases."
- They're looking for evidence to take patients to OR on a Saturday instead of Sunday or Monday.

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Results

- Overall 30-day mortality was 7.0%.
- The minimum 30-day mortality was for patients with a wait time of ~24 hours.
- Of 42k total patients, 14k received surgery within this time.

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Pincus D et al. JAMA. 2017

On the other hand…


Journal of the American Geriatrics Society

AGS

Regulatory Measures Expedited Hip Fracture Surgery Without Lowering Overall Patient Mortality

Abstract

OBJECTIVES

Previous observational research has shown that elderly patients with hip fractures who are operated early (within 48 hours from admission) benefit from less short- and long-term mortality compared to those operated later. The objective of this study was to

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What did this team find?

- A total of 5377 patients studied under three time periods from 2006 to 2016.
- Demographics and comorbidities were stable.
- Operations within 48 hours increased from 55% to 85%.
- Mortality at 1-month (3.9→5%) and 1-year (19.2→19.6%) were similar.

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Take Home

- If feasible, fix the hip Saturday morning.
- Unfortunately there's still no clear answer as to who is "too sick" for immediate surgery.
- Monitor your quality improvement programs for expected benefits.

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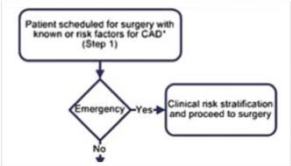
Step 1: Is this emergent surgery?

If yes, proceed to surgery.



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Fleisher et al, JACC 2014

A patient, v2

- After a lengthy recuperation and treatment for her (previously undiagnosed) osteoporosis, the patient returns.
- The **57**-year-old woman has recovered from her hip repair, and would really like her knee replaced ASAP.
- Her medications are now metoprolol, calcium, vitamin D, and alendronate.

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Unfortunately

- In fact, the patient would like a knee replacement so badly, she appears pale and diaphoretic.
- Apologizing to your staff, you again send her to the ED.
- She is diagnosed with an NSTEMI, and a DES is placed in her RCA.

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Now what?

- 4 weeks after stenting the patient returns.
- Her surgeon is reluctantly willing to perform the operation on aspirin and clopidogrel.
- Her cardiologist reports that echo was normal, no residual obstruction on cath, and the patient is "low ischemic risk."[1]

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1. Yes, this really happened.

How soon after PCI can this patient safely receive TKA?

A. If the surgeon is willing to continue aspirin and clopidogrel, take her today. (4 weeks)

B. Back in 2008 we did 3 months of clopidogrel. That sounds reasonable. (3 months)

C. C! The answer is always C! (6 months)

D. We should complete 12 months of clopidogrel, stop clopidogrel, and then do surgery. (1 year)

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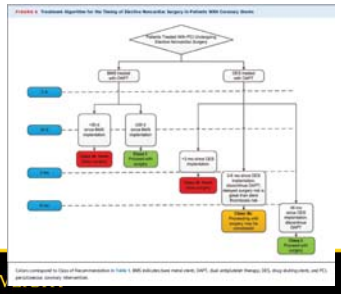
The 2016 update to the ACC/AHA guidelines.[1]



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Levine et al, JACC 2016

A few notes

- Contemporary DES may be lower risk.
- Patients with PCI due to AMI are higher risk.
  - Consider 3 months for elective PCI.
  - Consider 6 months for AMI.
- This may also apply to BMS—it's uncertain!
- The risk of MACE is elevated for the first 3-6 months regardless of whether clopidogrel is stopped.

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What about aspirin?

- Post-hoc subgroup analysis of POISE-2 data found a SIGNIFCANT benefit to continuing aspirin in patients with stents.
- Death or MI: 6% vs. 11.5% (NNT: 18)
- In patients with (remote) stents, ok to stop clopidogrel but continue aspirin unless VERY high bleeding risk.
- Less clear what to do in stroke, PAD, MI without stent.

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Graham et al, Annals of Int Med 2018

Take Home

- Delay elective surgery for 6 months after an MI.
- Continue aspirin in patients with coronary stents unless absolutely contraindicated.
- Stop aspirin in most patients with no prior MI, stent, or strokes.
- Unclear what to do in patients with MI and no stents, strokes, or PAD.

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A patient, v2 continued

- You regretfully inform the very frustrated woman that she should wait 6 months before getting her knee replaced.
- You tell the (grateful) surgeon to stop the clopidogrel at that time, but continue aspirin.
- Surgery goes well.

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Five years later…

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A patient, v3

- Now her **left** knee needs replacing.
- Because of her prior experience, the patient waited until she was severely limited by knee pain.
- Her current medications are aspirin, atorvastatin, alendronate, calcium, vitamin D, furosemide, lisinopril, metformin and metoprolol.
- She no longer follows with a cardiologist. There is 2+ pedal edema on exam.

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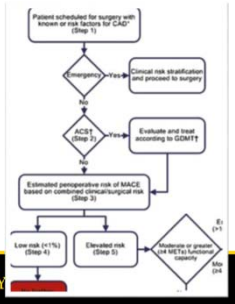
Now it gets trickier



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You plug in the numbers into your favorite risk calculator:

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You don't like that answer, so you try something else:

- MICA: 1.12% for MI or arrest.
- ACS-SRC: 0.2% cardiac complication.
- Now what?

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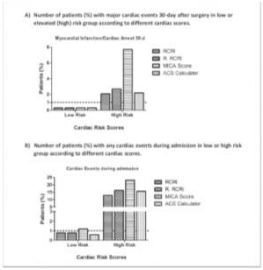
How the calculators compare[1]

Reconstructed-RCRI[1]
(MI/Cardiac Arrest, complete heart block, pulmonary edema **during admission**)
High-risk surgery (3 categories)
Ischemic heart disease
Congestive heart failure
Cerebrovascular disease
Renal insufficiency (GFR < 30 cc/min)



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1. Cohn et al, The Am J of Card 2018

MICA may be better for MI or arrest

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Take Homes

- Of the 3 calculators, there was disagreement on "low-risk" vs. "elevated-risk" in 29% of cases.[1]
- If a patient is "low-risk" (e.g. RCRI = **0**) by any of the calculators, they are unlikely to have severe cardiac complications.[1,2]
- Be wary of blind spots (e.g. cirrhosis).

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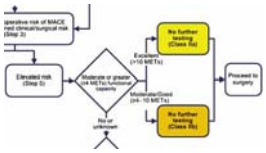
1. Glance et al, Anesthesiology 2018
2. Cohn et al, The Am J of Card 2018

When in doubt, assume the worst

- If the patient is elevated-risk, can the patient perform?
- Many orthopedic patients struggle with aerobic exercise.
- Sometimes METs are unclear.



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The METS study (on METs)[1]

- 1400 at-risk patients
- Primary outcome: 30-day death or MI
- Pre-op assessment:
  - Subjective interview
  - Duke Activity Status Index (DASI)
  - Peak exercise consumption
  - NT pro-BNP
- DASI: Can the patient?
  - Take care of self
  - Walk indoors
  - Walk 1-2 blocks
  - Run a short distance
  - Do light housework
  - Do moderate housework
  - Do heavy housework
  - Climb a flight of stairs
  - Do yardwork
  - Have sex
  - Play moderate sports
  - Play strenuous sports

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1. Wijeysundera et al. Lancet 2018

METS results

- Only 2% of participants (28 pts) suffered primary outcome.
- Patient interview was not predictive.
- DASI score predicted METs, 30-day post-op events better than subjective assessment.
- NT-proBNP predicted 1-year events.

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Take Home

- All 3 major calculators still work well in 2019.
- Risk calculators supplement but do NOT replace clinical judgment.
- The DASI can be useful for evaluating functional status in marginal performers.
- Upcoming: researchers are looking to see if 4 METs is still the appropriate DASI cutoff.

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A patient, v3 Part 2

- The patient's DASI score of 7.2 correlates with 3.6 METs of activity.
- As the patient no longer has a cardiologist, you order a pharmacologic stress test.
- The nuclear stress test shows a small area of possible reversible inferior ischemia.

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Now What?

A. It's only a small area. No further testing required.

B. It's a positive stress test! Let's refer the patient for elective PCI.

C. It's a positive stress test! The patient is no longer a candidate for elective surgery!

D. I have no idea! Send her back to cardiology!

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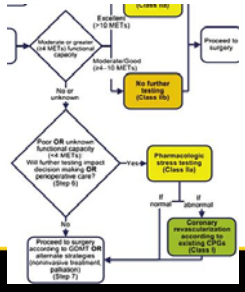
Did this stress test help?

- The patient was referred back to cardiology.
- They felt the findings on the stress test did not require further evaluation.
- They classified the patient as "moderate risk" and recommended no additional testing.



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What does the AHA say?[1]

- Routine noninvasive stress testing is **not** useful for low-risk noncardiac surgery (III, LoE B)
- It is "reasonable" to perform stress testing for patients at elevated risk and poor functional status. (IIa, LoE B)
- They summarize the data as follows:
  - Presence of moderate to large areas of ischemia predict death.
  - Normal study has a high negative predictive value.
  - The presence of an MI scar has little utility.

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1. Fleisher et a, JACC 2014

Do stents change risk?

- AHA: Do **not** perform routine revascularization before noncardiac surgery exclusively to reduce perioperative risk.[1]
- Randomized studies are limited, no evidence that stents decrease perioperative morbidity or mortality.[2]

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1. Fleisher et a, JACC 2014
2. Garcia et al, JAHA 2014

Alternative: The Canadian way[1]

- "We recommend against performing preoperative pharmacological stress echocardiography to enhance perioperative cardiac risk estimation."
- "We recommend against performing radionuclide imaging to enhance perioperative cardiac risk estimation."
- Instead, they use NT pro-BNP to further stratify high-risk patients.

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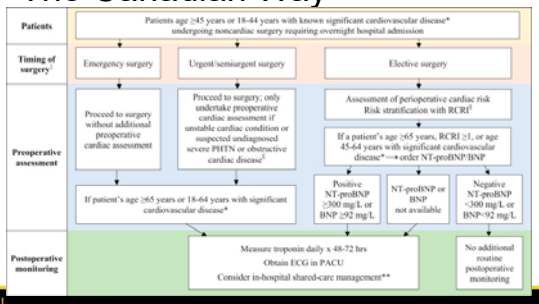
1. Duceppe et al, CJC 2017

The Canadian Way



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Take Home

- Stress tests can identify high-risk patients…
  - …but we have other ways to identify high-risk.
  - Additive assessment with other calculators is undefined.
  - Do not order a stress test unless you think delaying/cancelling surgery is reasonable.
- Expect major changes to indications for stress tests in future updates.

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A patient, epilogue

- The patient proceeds to the OR.
- Aspirin, beta blocker and statin were continued perioperatively.
- Post-op troponin was not measured.
- Surgery was uncomplicated, and she was discharged to a SNF on POD 3.

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FAQ

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How to do this in a busy clinic?

- Be prepared. Most of the information you need you should know before you walk in the room.
  - Type of surgery, date of surgery.
  - List of medications.
  - Comorbidities.
  - Most recent lab values and cardiac evaluations.
- The RCRI is the fastest standardized calculator, and is sufficient for MOST patients.
- Anticipate when you need external records, testing.

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What risk factors should be considered beyond cardiac?

- Certain diseases have a huge effect on perioperative risk and may contraindicate surgery
  - Cirrhosis
  - Pulmonary hypertension
  - Symptomatic valvular heart disease
- Diseases that impact perioperative management
  - Sleep apnea
  - Diabetes mellitus
  - Preoperative steroid use

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Respect frailty[1]

- The Society for Perioperative Assessment and Quality Improvement (SPAQI) published recommendations for perioperative frailty.
- These include:
  - Screen elderly patients for frailty before major elective surgery.
  - Multimodal prehabilitation MAY improve postoperative prognosis in frail patients

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1. Alvarez-Nebreda et al. JCA 2018

SPAQI recommends FRAIL for initial screening

Table 2. FRAIL Questionnaire Screening Tool.

Fatigue	Are you fatigued? (yes = 1 point)
Resistance	Can you walk up one flight of stairs? (no = 1 point)
Aerobic	Can you walk more than a block? (no = 1 point)
Illnesses	Do you have more than five illnesses? (yes = 1 point)
Loss of weight	Have you lost more than 5% of your weight in the past 6 months? (yes = 1 point)

Scoring: ≥3 points = **frail**, 1–2 points = **prefrail**, 0 points = **robust**.

(Adapted from Morley et al. [5].)

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What is the latest on pre-op beta-blockers?

- 2018 Cochrane review.[1]
- Cardiac surgery
  - Perioperative beta-blockers substantially reduce arrhythmias post-op.
  - Effect on mortality, AMI, stroke, CHF, BP, and HR are unclear.
- Non-cardiac surgery
  - New starts may increase mortality, stroke
  - May decrease AMI and arrhythmia

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1. Blessberger et al. Cochrane 2018

Overall, no changes in 2019

- Avoid starting beta-blockers in the immediate preoperative period.
- If a patient is already on beta-blockers, do not interrupt perioperatively due to potential rebound.
- If a patient should already by on beta blockers (e.g. CAD) try to start them weeks before surgery.

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Conclusions

- The 2014 AHA guideline looks simple, but subjectivity persists:
  - Urgency
  - Risk-stratification
  - Ischemic evaluation
- Recent articles may update prior practices:
  - Perioperative aspirin
  - Surgical timing after stenting
  - DASI risk calculator
- The decision to proceed to the OR for a high-risk patient requires collaboration between surgeon, patient, and anesthesia.
- Comorbidity demands collaboration.

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Why do ophthalmologists insist on pre-op evaluations for cataract surgery?

- Some questions have no answers.

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Thank you

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Questions?

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