Dilemmas in Perioperative Medicine

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Conflicts/Off label usage

- No conflicts
- No off label usage

Preoperative Risk Assessment in 2018

62 yo m with PAD is scheduled to undergo a fem-pop bypass in 2 weeks. You lead a perioperative care team that will manage the patient preoperative and postoperatively.

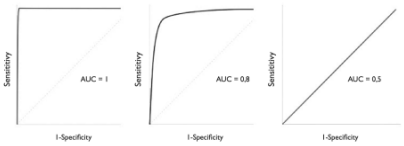
What is the most accurate way to risk stratify the patient?

A. Revised Cardiac Risk Index (RCRI)
B. National Surgical Quality Improvement Project (NSQIP) risk calculator
C. Bedside semiquantitative assessment (Number of METS achieved)
D. Vascular Study Group of New England Cardiac Risk Index (VSG-CRI)
E. Noninvasive stress testing

Basics Statistical Info

Receiver Operator Curve discrimination value – C-statistic

0.5 – No value, coin flip
0.5-0.69 – weak
0.7-0.79 – moderate
0.8-0.89 – good
0.9 or > – excellent



Arias, M, Sangrador, A. Basics of Evidence-Based Medicine. Evid Pediatr. 2017;13:12.

ACC/AHA Clinical Practice Guidelines

- Step 1 - Emergency procedure… go to surgery
- Step 2 – Is pt having an Acute Coronary Syndrome… then Treat!
- Step 3 – Estimate pt's periop risk
  - If low, <1%, go on to surgery, step 4
  - if >1%, go to step 5

RCRI

Revised Cardiac Risk Index
- Patients from 1989-1994 at one hospital
- Both derivation and validation cohorts
- Found six variables:
  1. High risk surgery (vascular, thoracic or abdominal)
  2. Insulin-requiring diabetes
  3. History of ischemic heart disease
  4. History of cerebrovascular disease
  5. History of heart failure
  6. Serum creatinine >2mg/dL

Original RCRI Risk
- 0 points – 0.4%
- 1 point – 0.9%
- 2 points – 7%
- 3 or more – 11%

RCRI – Oldie but Goodie!

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Original RCRI Risk
Updated RCRI Risk 2013
- 0 points – 0.4% 0.5%
- 1 point – 0.9% 0.6%
- 2 points – 7% 6.2%
- 3 or more – 11% 10.1%

MICA (Gupta)

- Data from the National Surgical Quality Improvement Program
- Five inputs: type of surgery, dependent classification, SCr abnormality, ASA classification and age
- Predicted MICA: Myocardial infarction or Cardiac arrest
- Greater patient-specificity than RCRI
- Excellent internal validation

American College of Surgeons – Surgical Risk Calculator

- Based on >3.8 million operations at >700 hospitals
- Predicts a host of complications (UTI, Pna, readmission, death, others)
- Longer list of inputs

Vascular Study Group of New England Cardiac Risk Index (VSG-CRI)

- VSG-CRI derived from 8000 patients, validated in another 1800
- Different inputs for 4 procedures:
  - Carotid endarterectomy
  - Endovascular aortic repair
  - Infrainguinal bypass surgery
  - Open AAA repair
- More accurate than RCRI in vascular patients
- Inputs: Age, elevated SCr, results of prior stress, CAD presence, DM, CHF, Prior revascularization (+others for specific surgery)

So which is best??

Calculator	ROC (C-statistic)
• RCRI	0.76
• MICA (NSQIP)	0.88
• ACS-SRC (also NSQIP)	0.80
• VSG-CRI	0.71

All accurate, all have tendencies to over/under estimate sometimes

Am J Cardiol 2018;121:125–130

Stress testing

Multiple studies show stress testing accurate, specifically:
- Patients with large areas of ischemia
- No areas of ischemia
- Most patients- intermediate… this is less helpful

2 studies looking at revascularization preop showed no benefit

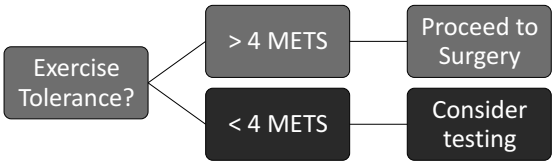
Recommendation: only stress test patients you would stress anyway

Exercise tolerance impact on Periop Risk

ACC/AHA Clinical Practice Guidelines

- Step 1 - Emergency procedure… go to surgery
- Step 2 – Is pt having an Acute Coronary Syndrome… then Treat!
- Step 3 – Estimate pt's periop risk
  - If low, <1%, go on to surgery, step 4
  - if >1%, go to step 5
- Step 5 – Assess function status
  - If > 4 METS achievable, then no further testing
  - If < 4 METS achievable, consider further testing (weak recommendation) Step 6
- Step 7 – If testing will not help: either go on surgery or come up with a new plan

ACC/AHA Clinical Practice Guideline – Step 5



62 yo man with PAD scheduled for fem-pop
Can climb 2 flight of stairs without CP/SOB

Patients moderate exercise tolerance is predictive of…

A. Lower likelihood of Perioperative CV event
B. Raises likelihood of Perioperative CV event
C. No change in likelihood of Perioperative CV event

METS study

1400 patient evaluated by

1) Subjective Functional Assessment
2) Standardized questionnaire
3) Exercise testing
4) BNP

Results:

- Subjective – failed miserably (only 1/8 that were <4 METS identified!)
- **Questionnaire- performed moderately well**
- Exercise testing – not as good as questionnaire
- BNP – identified high risk folks – different than other high risk pools

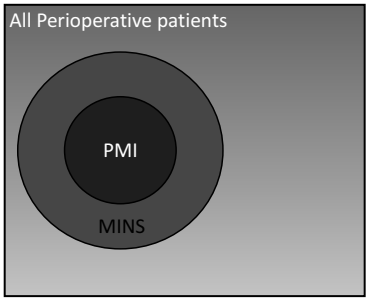
Lancet 2018; 391: 2631–40 DASI

Biomarkers and Perioperative Period

62 yo man with PAD scheduled for fem-pop
High Risk, day of surgery

What should we do now preop?

A. Check BNP
B. Check high-sensitive troponin test
C. Check ECG and biomarkers if symptomatic (CP/SOB)



Definitions

- Myocardial Injury after Noncardiac Surgery (MINS)
  *Biomarkers w/ or **w/o** signs/symptoms/ECG excluding non-cards cause (PE/Sepsis, e.g.)*
- Perioperative MI (PMI)
  biomarkers + Sx/Signs/ECG

What is prognostic preoperatively?

- Troponin NO
- HS-Troponin NO
- BNP YES

Screening for MINS/PMI postoperatively?

Typical cause of MINS:

1. Postop tachycardia/hypotension
2. ST depressions (sometimes)
3. Troponin release (+/- symptoms)
4. Attendant mortality – about 12% dead at 30days (compared with <1% dead if no MINS/PMI)

Screening

Pros	Cons
MINS/PMI assoc with mortality	We don't know to do w/data
Plausible conditions to improve	We have messed this up before (think revasc or beta blockers)
Retrospective studies show (statins, ACEi beneficial)	

62 yo man with PAD scheduled for fem-pop with mild CHF, elevated biomarkers?

What is the best next step?

A. Take to the cardiac cath lab for PCI
B. Add Statins and Aspirin to discharge regimen
C. After discharge anticoagulated with DOAC

Annals post-POISE article

Patients with PMI prescribed Statins and ACEi showed decrease mortality

No randomized/prospective data to confirm

Manage Trial

- Enrolled 1800 patients with MINS
- Randomized to dabigatran or placebo for 2 years post-MINS
- Composite cardiac outcome occurred in 15% of NOAC patients and 11% of Placebos (p= 0.012)
- Bleeding nearly identical ~3%

What is coming next?

What's next

- Future clinical algorithms
- Employment of biomarkers
- Lowering risk over time?

Thank you!

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