PRE-OPERATIVE EVALUATION AND MANAGEMENT FOR NON-CARDIAC SURGERY– AN INTERNIST'S PERSPECTIVE

2018 EDITION

Michael Tuchfarber, MD

DISCLOSURES

- No financial or corporate disclosure
- Any brand names mentioned are for example only, not an endorsement of a specific product

OBJECTIVES

- 1) Review the goals of medical evaluation in the pre-operative setting
- 2) Examine the cardiac pre-operative assessment
- 3) Briefly review the management of anti-coagulation in the pre-operative setting
- 4) Briefly discuss the implications of accurate documentation for facility reimbursement

LECTURE OBJECTIVES

- Overview of pre-operative evaluation
- Cardiac risk stratification
- Pre-operative anti-coagulation management

PRE-OPERATIVE MEDICAL EVALUATION – WHY?

- Improve patient safety and outcomes by reducing peri- and post-operative risk
- Appropriate risk stratification based on a thorough history and physical with appropriate, guided diagnostic testing
- Cost control through evidence based or guideline driven testing
- Improvement of patient flow through the medical experience

MULTI-SPECIALTY APPROACH

- Patient-centric model of medical care in 2018 requires provider coordination and cooperation
- One physician ultimately must be responsible for a patient's care, but responsibility for individual issues should be based on each practitioners' skill set and scope
- Communication is key to a safer patient experience! Surgeons, anesthesiologists, and internists should be in constant communication throughout a patient's medical experience.

THERE IS NO SUCH THING AS "CLEARING" A PATIENT…

- An Internist should never "clear" a patient
- Instead, we risk stratify
- Each specialty should focus on its own area – Internists should not be recommending what type of anesthesia should be used, surgical approach, etc.
- "This patient is medically optimized to proceed to OR without further testing or interventions for X procedure"

TIMING

- Within 30 days of the procedure, but not so close that testing might delay the procedure (OR schedules are tight!)
- Enough time out to hold anticoagulation or anti-platelet agents if needed (anywhere from 3-7 days)
- Enough time to get any pre-operative testing done and follow-up on results
- Obviously, in hospitalized or emergent cases, do the best you can with what time you have.

PRE-OPERATIVE EVALUATION

- Thorough, complete History and Physical
- Problem list of diagnoses with severity
- Recommended tests
- Specific comments on:
    - Oral medication administration
    - Specific prophylaxis to minimize complications
    - Anticoagulation recommendations
    - Specific recommendations (dose and route of which beta blocker, not just “would use beta-blocker)

DOCUMENTATION IS KEY!

- The better you document your thought process, the better other care providers will be able to understand your plan
- In an era of copy and pasted electronic medical records, a well written, concise summary is golden
- Documentation is a key element in reducing malpractice claims – sometimes, bad outcomes occur despite your best preparation; documentation shows your best preparation occurred

DON'T JUST FOCUS ON THE HEART!

Too often, pre-operative evaluations are "cardiac clearance".

Lung disease, diabetes, bleeding disorders, delirium risk, renal issues, aspiration risk, and many, many others deserve mention

LECTURE OBJECTIVES

Overview of pre-operative evaluation

Cardiac risk stratification

Pre-operative anti-coagulation management

PRE-OPERATIVE CARDIAC RISK ASSESSMENT

- Peri-operative Myocardial Infarction and Coronary Artery Disease are significant sources of morbidity and mortality
- Goal of evaluation is to quantify risk through a history and physical, make appropriate referrals for diagnostics and testing, and help direct appropriate peri-operative care

TWO TYPES OF RISK

- Procedure specific risk
- Patient specific risk

PROCEDURAL RISK OF CARDIAC DEATH OR NON-FATAL MYOCARDIAL INFARCTION

- High risk (5%+) – emergent major operation, aortic/major vascular, peripheral vascular, prolonged surgery with major blood loss/fluid shifts

INTERMEDIATE RISK

- 1-5%
- Carotid endarterectomy, ENT surgery, Intraperitoneal, Non-cardiac Intrathoracic, Orthopedic, Prostate

LOW RISK

- <1% Risk
- Endoscopy, superficial procedures, cataract surgery, breast surgery

PATIENT SPECIFIC CARDIAC RISK – 2014 ACC/AHA (A BRIEF 105 PAGE READ)

- Take a full history and physical
- Functional capacity evaluation – helps determine metabolic efficiency – can be limited by peripheral vascular disease or osteoarthritis

OLDER RISK ASSESSMENT TOOLS

- Goldman risk index (which evolved into RCRI)
- Detsky modified risk index
- Eagle criteria
- Fleisher-Eagle criteria (Fleisher is the chair of the ACC committee currently reviewing guidelines)

CURRENT MODELS

- RCRI score is still used by the ACC – well established, well validated model with external validation
- Gupta Cardiac Calculator/National Surgical Quality Improvement Program database (NSQIP) – up and coming, some studies show it may be a better predictor, but there is no external validation yet
- Both are likely good models, RCRI is still more widely used, still recommended by ACC

REVISED CARDIAC RISK INDEX (RCRI)

- Replaced old “intermediate” risk factors
- They are:
    - History of ischemic heart disease (includes angina) or prior MI based on pathologic Q wave on resting 12 lead EKG
    - History of heart failure, prior or currently compensated
    - History of cerebrovascular disease (includes TIA)
    - Diabetes mellitus requiring insulin
    - Renal insufficiency (pre-op creatinine >2.0 mg/dL)
    - The surgical risk itself (don’t forget to include this as a “point”!)

MAJOR PREDICTORS

- Recent MI – the closer to 6 months out, the lower the risk. Within 3 months carries the highest risk of recurrent ischemia
- Recent PCI – drug eluting stents need advanced antiplatelet agents!
- Decompensated heart failure
- Class III/IV angina (Canadian Cardiovascular Society scoring)
- Severe Aortic stenosis or severe Mitral Regurgitation
- High grade atrioventricular block, sustained v.tach, nsvt with underlying heart dz, and SVT with uncontrolled ventricular rate

- All of these should be obvious signs that the patient is sick anyway!

MINOR PREDICTORS

- No longer considered to be “validated” as risk factors – instead, they should increase clinical suspicion of underlying heart disease

  - Age >70
  - EKG with LVH, LBBB, non-specific ST/T changes
  - Atrial fibrillation (though this does increase complication risk, just not obvious increase in risk of fatal MI/ventricular arrhythmia)
  - Uncontrolled systemic hypertension

USING RCRI, CARDIAC RISK CAN BE ASSESSED

- No risk factors — 0.4 percent (95% CI 0.1-0.8 percent)
- One risk factor — 1.0 percent (95% CI 0.5-1.4 percent)
- Two risk factors — 2.4 percent (95% CI 1.3-3.5 percent)
- Three or more risk factors — 5.4 percent (95% CI 2.8-7.9 percent)

- Risk assesses cardiac death, non-fatal MI, and non-fatal cardiac arrest

STEPWISE APPROACH TO CARDIAC RISK ASSESSMENT – STEP 1 – EMERGENCY?

- Is the case emergent?
- Yes – go straight to OR, close post-op monitoring
- No – step 2

STEP 2 – MAJOR CARDIAC RISK FACTORS

- Active Major risk factors?
- Yes – eval and treat as indicated, consider OR when stable
- No – proceed to step 3

STEP 3 – SURGICAL RISK

- Assess surgical risk
- Low risk – proceed to OR, no further work-up indicated
- Moderate or High risk – step 4

STEP 4 – FUNCTIONAL CAPACITY

- Functional capacity evaluation
- Mets ≥4 – proceed with planned surgery
- Mets < 4 or unobtainable – step 5

FUNCTIONAL CAPACITY – IN METABOLIC EQUIVALENTS

- 1 MET = 3.5 mL O2 uptake/kg/min
- >4 METS associated with decreased complication risk for surgery

Physical activity	MET
Light intensity activities	< 3
sleeping	0.9
watching television	1.0
writing, desk work, typing	1.8
walking, 1.7 mph (2.7 km/h), level ground, strolling, very slow	2.3
walking, 2.5 mph (4 km/h)	2.9
Moderate intensity activities	3 to 6
bicycling, stationary, 50 watts, very light effort	3.0
walking 3.0 mph (4.8 km/h)	3.3
calisthenics, home exercise, light or moderate effort, general	3.5
walking 3.4 mph (5.5 km/h)	3.6
bicycling, <10 mph (16 km/h), leisure, to work or for pleasure	4.0
bicycling, stationary, 100 watts, light effort	5.5
Vigorous intensity activities	> 6
jogging, general	7.0
calisthenics (e.g. pushups, sit-ups, pullups,jumping jacks), heavy, vigorous effort	8.0
running jogging, in place	8.0
rope jumping	10.0

STEP 5 – RCRI SCORE

- RCRI = 0 – proceed to OR, no further testing
- RCRI = 1-2 – proceed to OR with heart rate control in carefully selected patients* or consider non-invasive testing **IF** it will change management

*Beta Blocker usage in the perioperative setting deserves its own lecture

STEP 5 RCRI CONTINUED

- For RCRI score of 3+, non-invasive testing may be indicated if it will change management for intermediate risk surgery or vascular surgery

GUIDELINES ARE NICE…

- But your clinical judgment is more important!
- Document your thought process

CORONARY ARTERY REVASCULARIZATION BEFORE ELECTIVE MAJOR VASCULAR SURGERY

- CARP trial
- 2004 VA trial
- Showed that coronary artery revascularization prior to elective vascular surgery (AAA, peripheral) in stable cardiac patients had no advantage long term over no revascularization, and just delayed surgery.

LECTURE OBJECTIVES

Overview of pre-operative evaluation

Cardiac risk stratification

Pre-operative anti-coagulation management

WARFARIN ANTICOAGULATION AND SURGERY

- Many “low bleeding risk” procedures do not have to have their chronic anticoagulant stopped at all (including many dental procedures and diagnostic endoscopy)
- Some anticoagulation can just be stopped if patient is at low risk for thrombotic event prior to procedure
- In patients with moderate to high risk for thrombotic complication, bridging anticoagulation is required

CHA2DS2-VASC SCORE

- Diagnosed heart failure, past or current (1 point)
- Hypertension, treated or untreated (1 point)
- Age ≥ 75 years (2 point)
- Age 65-74 (1 point)
- Diabetes Mellitus (1 point)
- History of ischemic stroke, TIA, or thromboembolism associated with atrial fibrillation (2 points)
- Vascular disease (1 point)
- Sex – female (1 point)

This score helps determine the increase in annual stroke risk without anticoagulation

- 0 Points: 0
- 1 Point: 1.3%
- 2 Points: 2.2%
- 3 Points: 3.2%
- 4 Points: 4.0%
- 5 Points: 6.7%
- 6 Point: 9.8%
- 7 Points: 9.6%
- 8 Points: 12.5%
- 9 Points: 15.2%

CHRONIC ANTICOAGULATION – TO BRIDGE OR NOT TO BRIDGE?

Risk Stratification	Mechanical Heart Valve	Atrial Fibrillation	Venous Thromboembolic History
High	1)All mitral valve 2)Caged ball/tilting disk aortic valves 3) CVA/TIA within 6 mos	1)CHADS2 score 5+ 2)TIA/CVA within 3 months 3)Rheumatic valve dz	1) Within 3 months 2) Prot C/S def 3) Anti-thrombin def 4) Antiphospholipid
Moderate	1)Bileaflet mechanical aortic with any of: a.fib, h/o cva/tia, htn, dm, CHF, age >75	1) CHADS2 3-4 not including TIA/CVA w/in 3mo	1) 3-12 mos 2) Non-severe thrombophilia 3) Active cancer 4) Recurrent VTE
Low	1) Bileaflet mechanical aortic valve prosthesis with none of the above risks	1) CHADS2 0-2 Not including TIA/CVA w/in 3mo	1) >12 mos provoked or no other risk factors

AMERICAN COLLEGE OF CHEST PHYSICIAN GUIDELINES

- Low risk – no bridging required
- Moderate risk – poor evidence – if surgery is high risk of bleeding, consider no bridging. If less bleeding risk, consider bridging
- High risk – consider delaying elective surgeries, or bridge with UFH or LMWH

MODERATE RISK FOR CLOT, HIGH RISK TO BLEED…WHAT TO DO?

- Talk to your patient and the referring surgeon
- Document the patient's thoughts – "I would rather bleed to death than have a stroke"
- The surgeon is the one who has to do the cutting – they need to be involved in this discussion
- Above all else, DOCUMENT!

REMEMBER!

- Bleeding can kill just like a clot! If you aren't sure what to do, look up the surgical bleeding risk or ask a specialist (Heme, Cards) for an opinion

THE NEW ANTICOAGULANTS

- Dabigatran – *Pradaxa* – direct thrombin (IIa) inhibitor – can monitor somewhat with aPTT and Thrombin Time (TT)
- Rivaroxaban – *Xarelto* and Apixaban – *Eliquis* – direct factor Xa inhibitors – only way to really monitor is with chromagenic anti-Xa levels

DABIGATRAN

- Half life = 12-17 hours, goes up to 28 hours in CrCl < 30
- 80% renal clearance
- Can dialyze about 60% in case of severe bleed
- Reduced creatinine clearance = reduced dabigatran clearance
- For minor, low bleeding risk procedures, d/c 2 days prior if CrCl >50 mL/min, or 3-5 days for lower (CrCl<30 should be 5 days)
- For major surgery, or a spinal or epidural, d/c 4-5 days prior
- Bridge as for Coumadin

RIVAROXABAN

- Half life about 9-12 hours (closer to 9 with CrCl>50, higher for lower clearance)
- Only about 60% renal, 33% biliary clearance
- Low bleeding risk procedure with good CrCl, can stop 2 days in advance
- Major surgery or epidural, stop 3 days in advance
- Need to leave any epidural catheters in for 18 hours (24 hours if traumatic puncture) after last dose of Xarelto, and do not administer for at least 6 hours after catheter is removed (24 hours if traumatic) due to hematoma risk

DOCUMENTATION ACCURACY

- Accuracy and completeness of good documentation can dramatically increase Hospital reimbursement
- Use of HCC (Hierarchical Condition Categories) influences Quality Payment Program reimbursement from CMS
- Also clinically relevant, accurate documentation helps other providers understand the severity of a patient's disease processes

WHY SHOULD PHYSICIANS CARE WHAT THE HOSPITAL GETS PAID???

BENEFICIAL SYMBIOSIS!

SYMBIOSIS

- If a physician's host hospital thrives, better access to great patient care tools, better infrastructure, and better staffing
- Employed physicians benefit from a stronger employer with better insurance reimbursement
- Independent physicians benefit from better contract opportunities, better infrastructure
- The hospital, the physician, and the community all benefit

EXAMPLE – APPENDICITIS WITH MALNUTRITION

- Patient presents with Acute Appendicitis as primary diagnosis. The hospitalist notes the patient looks cachectic, has a BMI of <19, and temporal wasting

Secondary Diagnosis	Failure to thrive	Mild protein calorie malnutrition	Sever protein calorie malnutrition
Global length of stay	1.7	2.8	4.6
Reimbursement	$6,060	$8,543	$14,282
Severity of Illness/Risk of Mortality	1/1	2/1	3/2

TAKE HOME POINTS

- Pre-operative management is a team affair
- Only do testing if it will change management or an outcome
- Functional capacity and an RCRI score can help avoid unnecessary pre-operative testing
- Bridging anticoagulation needs to be though about days in advance
- Good documentation affects reimbursement

REFERENCES

- ACC/AHA 2014 Pre-operative evaluation guidelines
- ACCP 2012 Perioperative management of antithrombotic therapy
- Up-to-date
- An Overview of Perioperative Medicine 2012 – Mayo Clinic
- Remer MD, Erica – Optimal Preoperative Documentation, www.icd10md.com

SPECIAL THANKS TO

- Dr.Indu Rao
- Dr.David Stultz
- Dr.Robert Smith
- Dr.Richard Gregg
- Shelbi Wagner, for her eternal patience

ANY QUESTIONS?