Pre-op Assessment by Primary Providers
What we really want to know

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Outline

• Discuss anesthesia specific risk
• Discuss patient specific risk
• Surgery specific risk
• Pre-operative laboratory and studies
• Example case
Reason for evaluation

- Anesthesia and surgery are physiologically stressful, invasive interventions which may exacerbate or uncover underlying disease processes.
- Some of the most feared complications include catastrophic events such as myocardial infarction, difficulty oxygenating or ventilating, and cerebral vascular accident, among others.
- A proper pre-operative assessment allows the perioperative providers (anesthesiologist and surgeon) the ability to stratify and reduce risk for the patient.
Why is anesthesia risky?

• There can be difficulty obtaining an airway to adequately oxygenate and ventilate
• Induction (i.e. “going to sleep”): time of hemodynamic stress – patient may become hypotensive from the induction agents or hypertensive with laryngoscopy and intubation
• Maintenance (bulk of case): differing degrees of stimulation, fluid shifts, blood loss
• Emergence (i.e. “waking up”): physiologically stressful, secure airway may be lost, hypothermia
• Anaphylactic reactions to medications, injury during laryngoscopy, neuropathy from positioning
• Even spinal/epidural carries risk: inadequate, need to convert to general, sympathectomy with vasodilation, etc
ACC/AHA Guideline Update for Perioperative Cardiovascular Evaluation for Noncardiac Surgery – Executive Summary

• Published in 2002 in *Circulation* 105:1257-1267.
• Eagle KA et al
• Guidelines for evaluation of cardiac risk
Clinical Predictors of Increased Perioperative Cardiovascular Risk

• MAJOR
  – Unstable coronary syndromes
    • Acute (<7d) or recent MI (<1mo) with evidence of ischemic risk
    • Unstable or severe angina
  – Decompensated heart failure
  – Significant arrhythmias
    • High-grade AV block
    • Symptomatic ventricular arrhythmia
    • SVT uncontrolled rate
  – Severe valvular disease
Clinical Predictors of Increased Perioperative Cardiovascular Risk

• INTERMEDIATE
  – Mild angina pectoris
  – Previous myocardial infarction (>1mo) by history of pathological Q waves
  – Compensated or prior heart failure
  – Diabetes mellitus (particularly insulin dependent)
  – Renal insufficiency (creatinine >2.0)
Clinical Predictors of Increased Perioperative Cardiovascular Risk

• MINOR
  – Advanced age
  – Abnormal ECG (LVH, LBBB, ST-T abnormalities)
  – Rhythm other than sinus (e.g. a fib)
  – Low functional capacity (e.g. inability to climb one flight of stairs with a bag of groceries)
  – History of stroke
  – Uncontrolled systemic hypertension
Clinical Predictors of Increased Perioperative Cardiovascular Risk

• Functional Capacity
  – Metabolic equivalents
  – 1 MET – Can you take care of yourself? Eat, dress, use the toilet? Walk a block or two on level ground 2-3 MPH
  – 4 METs – Do light work around the house like dusting or washing the dishes? Climb a flight of stairs?
  – >10 METs – Participate in strenuous sports like swimming, singles tennis, football?
Clinical Predictors of Increased Perioperative Cardiovascular Risk

• Functional Capacity
  – Perioperative cardiac and long-term risks are elevated in patients unable to obtain 4-MET demand
    – www.1000takes.com
Surgery-specific risk

• Two important factors
  – The type of surgery and degree of hemodynamic stress
Surgery Specific Risk

• High (Reported risk >5%)
  – Emergent major operations, particularly in elderly
  – Aortic and other major vascular surgery
  – Surgical procedures associated with large fluid shifts and/or blood loss

www.services.epnet.com
Surgery Specific Risk

• Intermediate (Reported risk <5%)
  – Carotid endarterectomy
  – Head and neck surgery
  – Intraperitoneal and intrathoracic procedures
  – Orthopedic surgery
  – Prostate surgery
Surgery Specific Risk

• Low (Reported risk <1%)
  – Endoscopic procedures
  – Superficial procedures
  – Cataract surgery
  – Breast surgery

www.steenhall.com
The Algorithm

• Step 1: What is the urgency of surgery?
  – Emergency: No time for further evaluation

• Step 2: Coronary revascularization in the past five years?
  – Free ticket for five years if no new symptoms have arisen (chest pain or SOB)

• Step 3: Coronary evaluation in the past 2 years?
  – Free ticket for two years if no new symptoms
The Algorithm

• Step 4: Unstable coronary syndrome or major predictor of risk?
  – Will lead to cancellation or delay of surgery
• Step 5: Intermediate clinical predictors of risk?
• Step 6:
  – Intermediate clinical predictors and moderate to excellent functional capacity are good candidates for intermediate risk surgery
  – Intermediate clinical predictors and poor functional capacity or moderate to excellent functional capacity with high risk surgery often need further testing
The Algorithm

• Step 7:
  – Minor or no clinical predictors with moderate or excellent functional capacity usually need no further testing
  – Minor or no clinical predictors with poor functional capacity and high risk surgery may need further testing

• Step 8: Results of non-invasive testing determines need for invasive testing or intervention
Pre-operative Tests

• 12-Lead ECG
  – Class I: Recent episode of chest pain or ischemic equivalent etc
  – Class IIB:
    • Prior coronary revascularization
    • Asymptomatic male >45yrs old or female >55 yrs old with 2 or more risk factors
    • Prior hospital admission for cardiac causes
  – Class III: Routine in asymptomatic individuals
Pre-operative Tests

• Echo
  – Class I: Patients with current or poorly controlled heart failure
  – Class IIa: Prior heart failure and dyspnea of unknown origin
  – Class III: As a routine test
Pre-operative Tests

• Exercise or Pharmacological Stress Testing
  – Class I:
    • Patients with intermediate pretest probability
    • Change in clinical status of patient with suspected or proven CAD
    • Proof of ischemia prior to revascularization
    • Evaluation of adequacy of medical therapy
  – Class IIA: Evaluation of exercise capacity when subjective assessment unreliable
Pre-operative Tests

- **Class IIb**
  - Diagnosis of CAD in patients with high or low pretest probability: resting ST depression <1mm, taking digitalis, or LVH
  - Detection of restenosis in high-risk asymptomatic patients

- **Class III**
  - Routine screening of asymptomatic patients
Pre-operative Tests

• Coronary Angiography
  – Class I
    • Evidence of adverse outcome from non-invasive test
    • Angina unresponsive to therapy
    • Unstable angina, especially with intermediate or high risk surgery
    • Equivocal noninvasive test in high clinical risk patient undergoing high risk surgery
Pre-operative Tests

- Class IIa
  - Multiple markers of intermediate clinical risk and planned vascular surgery
  - Moderate to large ischemia on non-invasive testing but without high-risk features and lower left ventricular function
  - Nondiagnostic noninvasive test results in patients at intermediate clinical risk
  - Urgent noncardiac surgery while recovering from acute MI
Pre-operative Tests

• Class IIb
  – Perioperative MI
  – Medically stabilized angina and low-risk surgery

• Class III
  – Low risk surgery with known CAD
  – Asymptomatic after coronary revascularization with excellent exercise capacity
  – Noncandidate for coronary revascularization owing to concomitant medical illness, severe left ventricular dysfunction (EF <20%)
Perioperative Therapy

• CABG
  – Indications for CABG same as for those not undergoing surgery
  – Consider in those who long-term outcome improved by CABG

• Percutaneous Coronary Intervention
  – Delay of 4-6 weeks for antiplatelet therapy for re-endothelialization
Day of Surgery

• History of present illness
• NPO status
• PMH
• PSH
  – Problems with anesthesia
    • Malignant hyperthermia
    • Post-operative nausea and vomiting
    • Difficulty with intubation – letter from anesthesiologist
Day of Surgery

• Allergies
  – Antibiotics, latex

• Vital signs (are vital)
  – Baseline blood pressure for cerebral autoregulation

• Physical examination (directed)
  – Airway examination
  – Cor
  – Lungs
  – Neurologic (especially if regional technique planned)
Day of Surgery

• Laboratory
  – Eg. Renal function, starting HCT, Platelets
  – Beta HCG women of childbearing age

• Imaging
  – CXR: Trauma, CHF, COPD
  – CT scan in thyroidectomy
Day of Surgery

• Assessment of patient
  – Risk of anesthesia and surgery
  – Monitoring
  – Technique of anesthesia and agents to be used
  – Post-operative care
Example of Patient

- 59 year old female presents for an Aorto-bifemoral bypass
- PMH:
  - HTN
  - DM II
  - Hypercholesterolemia
- PSH:
  - Hysterectomy at age 49
- Social HX: Tob 35 pack yr
- NKDA
- Meds: atenolol, glucophage, lipitor
- VS 145/73, P: 71, R:18, Sat 96%
- NAD, A&O x3
- MP 2, Neck FROM
- Cor: RRR
- Lungs: BS distant, no wheezing
- Abd: soft, no palpable mass
- Ext: lower ext cool, difficult to palpate pulses
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- What if any further preopative laboratory or investigative studies are necessary?
Laboratory

• Basic metabolic profile?

• CBC?

• Coagulation profile?
Laboratory

• Basic metabolic profile
  – Assessment of baseline renal function

• CBC
  – HCT and Platelets

• Coagulation profile
  – History of bleeding and/or bruising
Chest X-ray?
Chest X-ray

- Clinical characteristics to consider:
  - Smoking, COPD, recent respiratory infection, cardiac disease
  - If the above are stable, no unequivocal indication
Further cardiac evaluation?
Further cardiac evaluation

• Clinical predictors?
  – Intermediate i.e. diabetes mellitus

• Functional capacity?
Functional Capacity

• “I can’t walk one flight of steps because my legs hurt!”
• <4 mets
• Non-invasive testing
• Exercise or Pharmacological Stress Testing
  – Class IIa: Evaluation of exercise capacity when subjective assessment unreliable
  – www.users.interport.net
Non-invasive testing

• Dobutamine stress echo
  – EF 50%, mildly reduced ventricular function
  – Area of scar inferior segment
  – With injection of dobutamine, area of hypokinesis lateral segment of the left ventricle
    – www.folk.ntnu.no

• Coronary angiography?
Coronary angiography?

- **Class I**
  - Evidence of adverse outcome from non-invasive test

- **Coronary angiogram**
  - Left main: normal vessel
  - LAD: area of 40% proximal
  - Circumflex: 80% proximal lesion
  - RCA: severe diffuse disease with collateral filling from PCA
  - Procedure: one stent successfully placed in proximal circumflex artery
Coronary Angiography

• Patient placed on plavix and surgery postponed for six weeks
• Patient, surgeon, and anesthesiologist aware of tenuous blood supply to RCA territory but no stress-induced ischemia

• www.health.yahoo.com
Conclusion

• Preoperative evaluation is necessary to stratify risk to the patient

• The evaluation delineates patient clinical factors as well as extent of surgery

• The patient, surgeon, anesthesiologist are aware of the perioperative risk and may plan therapy accordingly
Conclusions

• Is this Patient Optimized for Surgery?
  – Are the co-morbidities identified and as well controlled possible. If not can the surgery or procedure wait until then.

• We are not asking you to prescribe the anesthetic, ie. spinal vs general

• A note on a script pad doesn’t help me
  – “Cleared for Surgery”