Pre-anesthetic Evaluation

Katie Schenning
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Outline

• Goals of preoperative evaluation
• History
• Physical
• Further testing
• Super fun examples
Goals of Pre-op Evaluation

- Stratify risks
  - ASA status, type of surgery, comorbidities, length of surgery
- Optimize patient before surgery
  - Smoking cessation, treat active infections
- Prepare patient for day of surgery
  - Decrease stress/anxiety
  - Medications to take, NPO instructions, CPAP
  - Anesthetic options
- Preoperative testing (as needed)
- Formulate the best anesthetic plan possible for the individual patient
ASA Physical Status Classification

- ASA 1
  - Normal, healthy patient
- ASA 2
  - Mild systemic disease w/o fx limitations
- ASA 3
  - Severe systemic disease w/ fx limitations
- ASA 4
  - Severe systemic disease with constant threat of life
- ASA 5
  - Moribund, not suspected to survive without surgery
- ASA 6
  - Declared brain dead for organ donor procedures
- ASA + E
  - Any patient requiring emergency operation
Optimization

• If seeing patients in a pre-op clinic well in advance:
  – Smoking cessation (8 wks)
  – Antibiotics/postpone surgery for infection
  – Educate
    • Lung-expansion maneuvers
    • NPO
    • Pre-op meds
    • Expected post-op course, pain control
  – Nutrition
History

• HPI: reason for operation, exercise tolerance, NPO status, GERD, pain, possibility of pregnancy?
• PMH, PSH, Meds, Allergies, SH
• Anesthesia History
  – Personal hx PONV, difficult intubation, pain control issues, delirium, allergies, MH
  – Family history anesthesia complications
    • Malignant Hyperthermia
    • Pseudocholinesterase deficiency
• Review of organ systems
Physical Exam

• Vital signs- need baseline
• Directed exam
  – Body habitus: difficulty expected with positioning? Regional anesthesia? Potential IV access?
  – Airway
  – CV: auscultate, periph pulses, cyanosis, periph edema
  – Pulm: auscultate
  – Neuro: Mental status
    • More in-depth if regional technique is planned or patient reports neuro deficits
• Labs, imaging, further workup, etc
Preoperative Testing

- CBC, BMP, LFTs, Coags
- T&S
- CXR
- ECG
- Echo, stress test, angiography
- PFTs
## Pre-operative testing

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<th>INR</th>
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First ask about NPO status

• What are the guidelines?
  – 8hr after regular meal
  – 6 hr after light meal
  – 6 hr after formula/non-human milk
  – 4 hr after breast milk
  – 2hr after water or other clear, non-particulate liquids

• NPO status
  – What will you do if not NPO?
H & P Cardiovascular System

- Hx of chest pain, SOB
- Hx of HTN
- Hx of CHF, angina, MI, valvular abnormality
- Dysrhythmias/pacemaker
- Results of cardiac evaluation in past
- Cardiac risk factors
- Current medication
- Exercise tolerance
When to Consider Preop EKG

• History/physical suggesting heart disease
• Men > 40-45 years old
• Women > 55 years old
• Systemic conditions that may be associated with unrecognized cardiac abnormality eg. HTN, smoking, DM
• Medications that can cause cardiac toxicity or ECG changes
• Patients at risk for major electrolyte abnormalities
Cardiac Risk

Low Risk (<1%)
- Endoscopic
- Superficial (derm)
- Cataract
- Breast
- Ambulatory

Intermediate Risk (1-5%)
- Intraperitoneal
- Intrathoracic
- CEA
- Head and Neck
- Orthopedic
- Prostate

High Risk (>5%)
- Vascular
  - Aortic
  - Peripheral
Clinical Assessment

• Presence of 1 or more “major clinical risk factors” mandates intensive management and may result in delay or cancellation of surgery (unless surgery is emergent)

• Number of “clinical risk factors” important in algorithm

• Minor predictors recognized as markers for CV disease that have not been proven to increase perioperative risk independently. Not incorporated into algorithm
Cardiac eval & care algorithm for noncardiac surgery based on active clinical conditions, known CV disease, or cardiac risk factors for pts >49 yo

Step 1: Need for emergency noncardiac surgery?  
Yes (Class I, LOE C) → Operating room → Perioperative surveillance and postoperative risk stratification and risk factor management
No

Step 2: Active cardiac conditions?  
Yes (Class I, LOE B) → Evaluate and treat per ACC/AHA guidelines → Consider operating room
No

Step 3: Low risk surgery  
Yes (Class I, LOE B) → Proceed with planned surgery†
No

Step 4: Functional capacity greater than or equal to 4 METs without symptoms‡  
Yes (Class IIa, LOE B) → Proceed with planned surgery§
No or unknown

Step 5:  
3 or more clinical risk factors||  
Vascular surgery → Class IIa, LOE B → Consider testing if it will change management¶
Intermediate risk surgery

1 or 2 clinical risk factors||  
Vascular surgery → Proceed with planned surgery with HR control¶ (Class IIa, LOE B) or consider noninvasive testing (Class IIb, LOE B) if it will change management
Intermediate risk surgery

No clinical risk factors||  
Class I, LOE B → Proceed with planned surgery†
Major Clinical Risk Factors

• Unstable coronary syndromes
  – Unstable or severe angina
  – Recent MI (>7 days and <30 days)
  – Acute MI (7 days or less before surgery)
• Decompensated HF (NYHA class IV, worsening, or new onset HF)
• Significant arrhythmias
  – High grade AV block, Mobitz II AV block, 3rd degree block
  – Symptomatic ventricular arrhythmias, new V-tach
  – SVTs (incl. Afib) with uncontrolled rate (HR >100 bpm at rest)
  – Symptomatic bradycardia
• Severe valvular disease (severe AS, symptomatic MS)
Clinical Risk Factors

- Hx of ischemic heart disease
  - Hx of MI or abnormal Q waves on ECG
- Hx of compensated or prior HF
- Hx cerebrovascular disease
- Diabetes mellitus
- Renal insufficiency
Minor predictors

• Age > 70 yo
• Abnormal ECG (LVH, LBBB, ST-T abnormalities)
• Rhythm other than sinus
• Uncontrolled systemic HTN
Energy Requirements

- **MET 1**
  - Can you take care of yourself?
  - Eat, dress or use the toilet?
  - Walk indoors around the house?
  - Walk a block or two on level ground @ 2 to 3 mph?
  - Do light work around the home like washing dishes?

- **MET 4**
  - Climb up a flight of stairs or walk up hill?
  - Walk on level ground at 4 mph?
  - Do heavy work around the house?
  - Participating in moderate recreational activities like golf, bowling, dancing?

- **> MET 10**
  - Participating in strenuous sports like swimming, football, skiing, hiking?
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- No clinical risk factors‖ → Class I, LOE B → Proceed with planned surgery†
H & P Pulmonary System

- Exercise tolerance
- Hx of asthma, COPD, OSA, smoking
- Symptoms: SOB, wheezing, CP
- Current or recent infection
- Hx lung surgery
- Current medication
  - inhalers, oxygen, steroids
Pulmonary System

• Patient-related risk factors for perioperative pulmonary complications
  – Smoking
  – ASA > 2
  – Age > 70 yo
  – Obesity
  – COPD
  – Reactive airway disease (asthma)

• Procedure-related risk factors
  – Surgery > 3 h
  – General anesthesia
  – Type of surgery
# Airway Exam

<table>
<thead>
<tr>
<th>Airway Exam Component</th>
<th>Findings Suggestive Difficult Intubation</th>
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<tbody>
<tr>
<td>Length of upper incisors</td>
<td>Long compared to rest of dentition</td>
</tr>
<tr>
<td>Relation max &amp; mand incisors during protrusion of mandible</td>
<td>Pt cannot bring mandibular incisors ant to max incisors</td>
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<tr>
<td>Relation max &amp; mand incisors during jaw closure</td>
<td>Prominent overbite</td>
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<tr>
<td>Interincisor distance (open wide)</td>
<td>&lt;3 cm</td>
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<tr>
<td>Visibility of uvula (Mallampati)</td>
<td>Not visible when tongue protruded when pt is sitting</td>
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<tr>
<td>Shape of palate</td>
<td>Highly arched or very narrow</td>
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<tr>
<td>Compliance of mandibular space</td>
<td>Stiff, indurated, mass, nonresilient</td>
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<tr>
<td>Thyromental distance</td>
<td>&lt;3 finger breadthals</td>
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<tr>
<td>Length of neck</td>
<td>Short neck</td>
</tr>
<tr>
<td>Thickness of neck</td>
<td>Thick neck</td>
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<tr>
<td>Range of motion of head and neck</td>
<td>Pt cannot touch tip of chin to chest or unable to extend</td>
</tr>
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Airway Exam: Mallampati

• By itself, Mallampati has low positive predictive value in identifying pts who are difficult to intubate
Airway Exam

• Factors affecting mask ventilation
  – Beard
  – BMI > 26 kg/m²
  – Missing teeth
  – Age > 55
  – Hx of snoring

• Discuss dentition: dentures, loose teeth, caps, crowns
H & P Renal System

• Known renal disease? Can cause impaired platelet fx, anemia, electrolyte imbalances, abnormal pharmacokinetics

• Chronic renal insufficiency - baseline Cr

• ESRD
  – Fluid restriction?
  – Dialysis (intervals, last time)
  – Current electrolytes
    • Within several hrs
H & P Gastrointestinal System

- Obesity
- ETOHism
- PUD
- Sx: N/V/D, bloody stool
- GERD, hiatal hernia- aspiration
- GI disease can increase potential for aspiration, dehydration, electrolyte disturbances, anemia
- Liver- disease can cause abnormal coagulation, altered drug pharmacokinetics, can contribute to other organ dysfx
  - Hx of hepatitis
  - Signs of hepatic dysfunction
H & P Endocrine System

• Thyroid gland
  – Thyroid storm
  – Hypothyroidism

• Diabetes mellitus
  – Type, duration, severity, control (A1c)
  – Current therapy/medication
  – associated end-organ dysfx (Creatinine?)
  – Peripheral neuropathies

• Adrenal dysfunction/Steroid use
  – Need stress-dose steroids?
  – Pheochromocytoma

• Carcinoid syndrome
H & P Neurologic, Psychiatric and Musculoskeletal Systems

- Seizures, convulsions, tremor
- Multiple sclerosis, headaches
- Neuropathy, nerve injuries
- Stroke, head injuries, dementia
- Neuromuscular disease (SCh)
- Arthritis (esp. RA)
- Chronic pain, herniated disks
- Acute: increased ICP, hemorrhage
- Prolonged Immobility (SCh)
- Depression, anxiety, potential for drug withdrawal
H & P Coagulation System

• Bleeding disorder
  – Coag factors (hemophilia, VW), platelet disorders, liver disease
  – Excessive bleeding after surgery in the past
  – Epistaxis, other signs of bleeding disorder

• Jehovah’s Witness

• Cancer, other hypercoaguable state

• Anticoagulation therapy guidelines for surgery and regional anesthesia
  – Coumadin, ASA/Plavix, Heparin, LMWH

• Implications for pts with stent
  – Bare metal (Plavix x 6 weeks)
  – Drug-Eluting (Plavix x 12months)
Hints: Before pushing back...

• Discuss/review anesthetic plan
  – PARQ
• IV access
• Equipment/drugs ready
• Dentures out, jewelry & glasses off, blue hat on
• Consent signed, site marked

GIBBLETOONS

Unfortunately your HMO doesn’t cover anesthesia so we’re going to have to use our low-budget procedure to put you out.
Questions?
Case 1

- 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**
H&P

• What else do you want to know about her history?
• Physical exam?
• Extra credit 1: what is her ASA?
• Extra credit 2: which meds should she take DOS?
H&P

• Indication for surgery?
• Personal/Family anesthesia history?
• Exercise tolerance?
• GERD?
• Pain?
• ROS?
• Airway exam? MP 2, Neck FROM
• BMI?
H&P

• Indication for surgery- Severe aorto-iliac disease
• Personal/Family anesthesia history- Negative
• Exercise tolerance
  – “I can’t walk one flight of steps because my legs hurt!”
  – How many mets?
• GERD- None
• Pain- “My legs always hurt! 10/10 pain!”
• ROS- Otherwise negative
• Airway exam- MP 2, Neck- FROM
  – Good dentition, Opens mouth wide, normal non-obese neck, good jaw protrusion, no facial hair
• BMI- normal
Labs/Studies

- What if any further preoperative laboratory or investigative studies are necessary?
Laboratory

- Basic metabolic profile?
- CBC?
- Coagulation profile?
- Type & Cross!!!
Laboratory

• Pt has normal BMP, CBC, Coag profile and has been typed & screened. Blood available in OR fridge.
• Basic metabolic profile
  – Assessment of baseline renal function
• CBC
  – Hct and Platelets
• Coagulation profile
  – History of bleeding and/or bruising
Further investigations

• ECG?
• CXR?
• In-depth cardiac workup?
ECG?

• 12-Lead ECG
  – Class IIB:
    • Asymptomatic male >45yrs old or female >55 yrs old with 2 or more risk factors
ECG

- NSR with non-specific ST and T wave changes
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?

- Step 1: Emergent surgery?
- Step 2: Active cardiac conditions?
- Step 3: Risk of surgery?
- Step 4: Functional capacity?
- Step 5: # of clinical predictors?
- ACC/AHA recs:
Further cardiac evaluation?

- Step 1: Emergent surgery? No
- Step 2: Active cardiac conditions? No
- Step 3: Risk of surgery? High risk
- Step 4: Functional capacity? < 4 mets
- Step 5: # of clinical predictors? 1 - DM
- ACC/AHA recs:
  - Proceed w/ planned surgery w/HR control (Class IIa)
  - Consider noninvasive testing (Class IIb) if it will change management
Non-invasive testing

• Exercise or Pharmacological Stress Testing
  – Class IIa: Evaluation of exercise capacity when subjective assessment unreliable

• 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

• Coronary angiography?
Coronary angiography

• Class I
  – Evidence of adverse outcome from non-invasive test

• Coronary angiogram
  – Left main: normal vessel
  – LAD: 40% proximal lesion
  – Circumflex: 80% proximal lesion
  – RCA: severe diffuse disease with collateral filling from PCA
  – Procedure: one stent successfully placed in proximal circumflex artery
Now what about those legs?

- Patient placed on plavix
- Surgery postponed (how long?)
- Patient, surgeon, and anesthesiologist aware of tenuous blood supply to RCA territory but no stress-induced ischemia
Case 2

• 64 yo man for open suprapubic prostatectomy in one wk
• PMH:
  – Inferior non-Q wave MI 2 yrs ago. Tx’d w/ bare metal stent
  – SOB w/exertion, cold weather, & with URIs
  – HTN for many years
  – DMII diagnosed 5 yrs ago
• Social Hx:
  – Carpenter, carries boards around, does yard work
  – Smoker- 35 PY
• Meds: ASA 81 mg, atenolol, metformin, Byetta, albuterol inhaler, SL nitroglycerin
Questions

• What other info would you like to complete your preop evaluation?
• ASA status?
• CV risk? What preparation needed?
• Pulmonary risk? Can you optimize? Should he quit smoking?
• How should his DM be managed preop?
Answers

- What other info would you like?
  - Airway exam, Personal/fam hx anesthesia, PE
- ASA status?
  - II or III depending on severity/control of his comorbidities
- CV risk? What preparation needed?
  - Hx MI & stent 2 yrs ago (No current plavix). Good exercise tolerance. Continue ASA & B-blocker preop. No further testing.
- Pulmonary risk? Can you optimize? Quit smoking?
  - Pt at elevated risk: Age, ASA status, COPD, Cigarette smoking.
  - No CXR or PFTs indicated
  - If @ baseline- bring albuterol DOS. If below baseline, perhaps incr use inhaler, steroids, antibiotics.
  - Preop IS. Don’t quit smoking until after surgery
- How should his DM be managed preop?
  - No oral hypoglycemics DOS. Glucose checked preop, managed intraop. No short-acting or prandial insulin DOS. Basal (lantus) take night before. NPH-can take ½ usual dose DOS