Preoperative Risk Assessment: an evidence based approach

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What are the components of a good preoperative evaluation?

What are not?

“Clear for Surgery”

Preoperative Evaluation: important components - from an Anesthesiologist's point of view

• Clinical history, physical exam
• Medical summary
• Evidence based risk assessment
• Risk reduction strategy
• Communication of risk & strategy to patient, surgeon, anesthesiologist & ?? others

Cardiac Risk

Risk Assessment Tools:

• AHA/ACC Guidelines
  vs.
• Revised Cardiac Risk Index
Cardiac Risk

AHA/ACC Guidelines:

- History of CAD
- History of CHF
- Insulin use
- CVA/TIA
- Serum Cr > 2.0
- High Risk Surgery


Cardiac Risk:

RCRI:

- High Risk Surgery*
- Suprainguinal vascular
- Intrathoracic
- Major intraperitoneal
- Neurosurgery
- Renal transplant
- Emergency
- ?? Procedures w/ sig blood loss & vol shifts


Cardiac Risk:

RCRI: quantitative risk

- Zero RCRI: low risk (0.4 - 1%)
- 1 - 2 RCRI: moderate risk (2.2 - 7%)
- 3 - 4 RCRI: high risk (9 - 18%)
- ≥ 5 RCRI: very high risk (>30%)

*Very, very, very high risk: unstable angina current CHF sx valvular dz MI w/in 6 weeks

Cardiac Risk Reduction:

A special word or two about -

1. Preoperative cardiac stress testing?
2. Coronary revascularization: a perioperative risk reduction strategy?
   - CARP trial
Cardiac Risk Reduction:
Another word or two about -

1. Preoperative coronary interventions:
   • Baremetal stents
   • Drug eluting stents
2. Timing of intervention
3. Perioperative planning for antiplt therapy
   • ??? bridging therapy for DES

Risk assessment in patients with DES:
1. Obtain necessary info:
   • Type of DES: sirolomus vs. paclitaxel
   • Date of procedure
   • Associated complexities: bifurcations, vessel diameter, total stent length
   • Comorbidities: CRI, diabetes, depressed EF

Risk reduction in patients with DES:
2. Proposed bridging strategy -
   • DC Plavix 5 days prior to procedure
   • Continue ASA throughout periop period
   • Admit patient to hospital 2 days prior to procedure for bridging therapy. IV eptifibatide & heparin
   • DC eptifibatide/heparin infusions 6 hours prior to surgery
   • Restart Plavix or eptifibatide ASAP following surgery

Cardiac Risk Reduction:
Yet, another word or about -

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Cardiac Risk Reduction:
medical therapy -

• β-Blockers
• Clonidine
• Statins
• Normothermia
• Cardiology/Medicine co-follow

Cardiac Risk Reduction:
medical therapy -

• Clonidine

Cardiac Risk Reduction:
other strategies:

• Statins

Effect of Clonidine on Cardiac Mortality after Noncardiac Surgery

Efficacy of Clonidine for Prevention of Postoperative Hypotension

Pulmonary Risk Assessment:

- Current Smoking
- Dep. functional status
- Age > 60
- ASA ≥ 2
- COPD, CHF
- Albumin < 3.5
- Impaired sensorium

**Preop spirometry, PFTs & CXR most often not indicated**

Pulmonary Risk Assessment:

Physical Exam:
1. Decreased breath sounds
2. Prolonged expiration
3. Rales
4. Wheezes
5. Rhonchi
6. Cough test*

OR for #1 - 5 = 5.8, OR for #6 = 3.8


Pulmonary Risk Assessment:

- Aortic, thoracic, abdominal, neurosurgery, head & neck, vascular surgery
- Emergency surgery
- General anesthesia
- Anesthesia > 3 hours

Pulmonary Risk Assessment:

- Development and Validation of a Multifactorial Risk Index for Predicting Postoperative Pneumonia after Major Noncardiac Surgery


Risk Class | Risk Score | Risk of Pneumonia
---|---|---
1 | 10 | 0.2%
2 | 16-25 | 1.2%
3 | 26-40 | 4.0%
4 | 41-55 | 9.4%
5 | > 55 | 15.3%

QuickTime™ and a TIFF (LZW) decompressor are needed to see this picture.

Pulmonary Risk Assessment:

- Aronoff, A., et al. Multifactorial Risk Index for Predicting Postoperative Respiratory Failure in Men After Major Noncardiac Surgery

Risk Class | Risk Score | Risk of Respiratory Failure
---|---|---
1 | 1 | 0.5%
2 | 11-19 | 2.2%
3 | 20-29 | 7.5%
4 | 30-39 | 11.6%
5 | > 40 | 30.5%

QuickTime™ and a TIFF (LZW) decompressor are needed to see this picture.

Pulmonary Risk Reduction:

- Smoking cessation
- Medical treatment of chronic lung dz
- Regional anesthesia
- Laparoscopic surgery
- Postop epidural analgesia
- Incentive spirometry
- CPAP

QuickTime™ and a TIFF (LZW) decompressor are needed to see this picture.
Pulmonary Risk:
- Clinically significant pulmonary complications more common than cardiac complications*


Periop Risk & Cirrhosis


730 Patients; 1980 - 1991
Perioperative mortality = 11.6%
Perioperative morbidity = 30.1%
- pneumonia
- respiratory failure

Periop Risk & Cirrhosis: risk assessment

Child-Turcotte-Pugh classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Points</th>
<th>Lead metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5-6</td>
<td>Ascites, moderate; Encephalopathy, grade II/III</td>
</tr>
<tr>
<td>B</td>
<td>7-9</td>
<td>Ascites, severe; Encephalopathy, grade IV; INR &gt; 2.3</td>
</tr>
<tr>
<td>C</td>
<td>10-15</td>
<td>Ascites, severe or spontaneous bacterial peritonitis; Encephalopathy, grade IV; INR &gt; 3.5</td>
</tr>
</tbody>
</table>

Periop Risk & Cirrhosis:

Model for end-stage liver disease: MELD

**MELD SCORE:**
- 3.78 X loge (bilirubin in mg/dL)
- 11.2 X loge (INR)
- 9.57 X loge (creatinine in mg/dL)
- 6.43

- MELD

Mortality rate = 100% 
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Mortality rate = 100%

**MELD Model for end-stage liver disease (MELD) predicts nontransplant surgical mortality in patients with cirrhosis. Ann Surg 2005; 242:244**

**www.mayoclinic.org/meld/mayomodel6.html**

**Obstructive Sleep Apnea**

Facts & Figures:
- 1 - 9%
- Male:female 2:1
- BMI ≥ 30 20-40%
- Undiagnosed 80-95%
- Comorbidities: pulmonary HTN HTN CAD

Risk Assessment for OSA

1. BMI ≥ 35 g/m²
2. Neck circumference > 40 cm
3. HTN
4. Snoring
5. Observed apnic episodes
6. Daytime somnolence
7. Poor memory/concentration
8. Male gender
9. Nocturia
Obstructive Sleep Apnea

“BASHMM” Criteria
1. BMI ≥ 45
2. Age ≥ 38 yr
3. Observed sleep apnea
4. HbA1c ≥ 6%
5. Fasting plasma insulin ≥ 28 umol/L
6. Male sex
7. Neck circumference ≥ 43 cm

(SCORE ≥ 3)

Special consideration: postoperative sleep studies.

Obstructive Sleep Apnea

Sharma, SK et al. Prediction of obstructive sleep apnea in patients presenting to a tertiary care center. Sleep Breath; 2006 May 13;
1. Male gender
2. BMI ≥ 30
3. Choking index (graded scale 0-4)
4. Relative report snoring index (graded scale 0-4)
5. Neck circumference ≥ 39 cm

Obstructive Sleep Apnea: risk reduction -

Risk Reduction for OSA
1. Anticipatory airway management
2. Postop continuous pulse oximetry
3. Postop CPAP & supplemental O2
4. Regional anesthesia
5. Regional analgesia
6. Clear communication of risk to all perioperative health care providers

Perioperative Anticoagulation: thromboembolic risk

Patients on coumadin
1. Atrial fibrillation
2. History of DVT, PE & hypercoagulable state
3. Mechanical heart valves

NOT ALL PATIENTS ON COUMADIN ARE CREATED EQUAL - even those with same diagnosis/indication
Perioperative Anticoagulation: thromboembolic risk reduction

Surgical patients on coumadin:
1. Does coumadin need to be discontinued?
2. If so, DC coumadin 5-7 days prior to procedure.
3. Is preoperative bridging therapy necessary?
4. If so, start lovenox (1mg/kg BID) 1-2 days after DC coumadin.
5. Stop lovenox 12-24 hours prior to procedure.
6. Discuss postop anticoagulation plan with surgeon, hematologist.

Periop Risk & Alcohol

Facts & Figures:
- 1996 - 11 million (5% of American pop.) heavy drinkers
- 2- to 5-fold increase in perioperative morbidity
  - cardiopulmonary insufficiency
  - bleeding
  - EtOH withdrawal syndrome
- Inquire about EtOH use in every patient

Risk Assessment - CAGE + CDT, GGT & MCV

Strategy for Recognition & Rx of Alcohol Misuse in Surgical Patients

<table>
<thead>
<tr>
<th>CAGE</th>
<th>Labs</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 2</td>
<td>2</td>
<td>Consider preop or immediate postop prophylaxis</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Preop or immediate postop prophylaxis required</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
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</tbody>
</table>


Postoperative Delirium

- US population is aging
- Incidence ~ 30%
- 2.3 million elderly per year
- 17.5 million hospital days
- $4 billion in Medicare expenditures

Associated Preoperative Risk Factors:
- Increasing age
- Little education
- Prior episode of delirium
- Existing dementia or other cognitive impairment
- Recent surgery
- Thoracic, Vascular, Orthopedic procedures
- Medications (antiACh, H2 blockers, benzos, antipsychotics)
- Alcohol

POCD

- Associated Intraoperative Risk Factors:
  - Type of surgery (Orthopedics, Vascular, Thoracic)
  - Duration of anesthesia
  - Anemia
  - Medications
    - Benzodiazepines
    - Anticholinergics
POCD

• Associated Postoperative Risk Factors:
  – Metabolic derangements
  – Undertreated pain
  – Infection
  – Pulmonary complications
  – Polypharmacy

Delirium Risk Assessment
Risk Index:
- Age > 70
- Self reported EtOH
- Poor cognitive status
- Poor functional status
- Non-cardiac thoracic surgery
- Aortic aneurysm repair
- Abnormal Na⁺, K⁺, or glucose

Low 2% (0 pts.)
Medium 11% (1-2 pts)
High 50% (≥ 3 pts)


Other things to think about:
• Diabetes
• Pacemakers
• Implantable cardiac defibrillators

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Thank you.