Maximizing Outcomes: Preoperative Anesthesia Assessment & Pearls

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Disclosures:
None
Objectives

- Discuss 3 key elements influencing surgical outcomes
- Identify the contents of the preoperative basic health assessment
- Review guidelines for preoperative testing with associated rationale
- Summarize recommended alterations in medication schedules prior to surgery
- Describe the American Society of Anesthesiologists (ASA) Physical Classification System and its use
- Explain the concern for untreated/noncompliance in preoperative patients with Obstructive Sleep Apnea
- Discuss definition of ERAS (Enhanced Recovery After Surgery)
- Identify Basic Elements of ERAS Protocols

Change in Approach

<table>
<thead>
<tr>
<th>Historical</th>
<th>Current</th>
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<tbody>
<tr>
<td>“Medical Clearance”</td>
<td>Minimizing intra &amp; post operative complications</td>
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<tr>
<td>Are you safe to survive this surgery without extreme Detriment</td>
<td>Maximizing the surgical outcome</td>
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Elements Influencing Outcomes

- Anesthesia
- Surgical Procedure
- Patient
Baseline Health Status
Age
Activity Level

Elements to Review Prior to Surgery

- Health History
- Review of all systems
- Current Activity Level of the patient
- Risk of the planned surgery
- Preoperative Testing
- Preventative measures that can be taken to reduce cardiac risks and perioperative/postoperative complications?

American Society for Anesthesiologists (ASA) Classifications

<table>
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<tr>
<th>ASA Classification</th>
<th>Description</th>
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</table>
| ASA I | A healthy patient
| ASA II | A patient with mild systemic disease
| ASA III | A patient with severe systemic disease
| ASA IV | A patient who has a high risk for anesthesia and/or operation
| ASA V | A patient who is not expected to survive without the operation
| ASA VI | A patient who is a deceased or postnatal patient

*The addition of “A” denotes emergency surgery. (An emergency is defined as existing when delay in treatment of the patient would result in a significant increase in the risk of death or morbidity)
Activity Level Corresponding to Risk

SURGICAL PROCEDURE

Classification System
Surgical Procedure Classification System

**LOW**
- Breast Augmentation
- Breast Biopsy
- Breast Reduction
- Cataract Surgery
- Cystoscopy
- D&E
- ESWL
- Hand Surgery
- Knee Arthroscopy
- Urinary Bladder Dehnation
- Uterine Myomectomy
- Lumbar Discectomy
- Nerve Stimulation
- Removal of Skin Lesions
- Obstructive Facial edema

**INTERMEDIATE**
- ACL Reconstruction
- Arterioveinous
- Carotid Endarterectomy
- Gastric Banding/Bypass
- Hemodialysis
- Laryngectomy
- Laparoscopy
- Laparoscopic Cholecystectomy
- Minilaparotomy
- Oophorectomy
- ORIF of Fractures
- Pancreatectomy
- Total Knee/ Hip
- VS

**HIGH**
- AAA Repair (Open)
- Cardiac Aneurysm Clipping
- Carotid Bypass
- Peripheral Vascular Bypass
- Thoracotomy
- Valve Surgery

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Anesthesia

- **Types of Anesthesia**
  - Light Sedation
  - Moderate Sedation
  - Regional
  - General
  - Combination of Various Anesthetic Techniques
Preoperative Assessment

Components of the Preoperative Assessment

- Health History
- Physical Examination
- Medication History
- Perioperative Risk Assessment
- Cardiovascular Risk Assessment
- Laboratory Tests

Indications for Laboratory Tests

Complete Blood Count
- Chronic cardiovascular, pulmonary, renal and/or hepatic or malignancy disease
- Known or suspected anemia, bleeding diathesis, myelosuppression

BMP (Electrolytes & Creatinine)
- Hypertension
- Renal Disease
- Diabetes
- Pituitary or adrenal disease
- Digoxin or diuretic therapy or drug therapies which affect electrolytes
Indications for Laboratory tests

PT/INR
• Anticoagulation therapy
• Bleeding diathesis
• Liver disease

Blood Glucose Levels
Diabetics, Infants
• FBS (repeat right before surgery)
• HgA1C

Laboratory Results Needing Further Investigation Prior to Surgery

• Hemoglobin <10
• Creatinine >1.2
• Platelets <100
• Elevated WBC > 10,000
• HgA1c >8
• Fasting Blood Sugar >200

Indications for Specific Testing

EKG
• Cardiovascular disease, hypertension, diabetes
• Other conditions increasing risk for CD (age)
• Subarachnoid or intracranial hemorrhage, CVA, head trauma

*PEARL*: New onset of ischemia, New onset of LBBB, Recent MI cause for concern

Radiographic Study (Chest X-Ray)
• Cardiac or Pulmonary Disease
• Malignancy
• Smoking & Age
Medication History

- Most medications continue up to day of surgery
- Herbal supplements stop at least 2 weeks prior
- Oral contraceptives stop 6 weeks prior
- Medications potentiating bleeding Aspirin, Coumadin, etc. - practitioner will need to do a risk/benefit analysis

Preoperative Medication Management

- Beta Blockers: continue
- Alpha Agonists: continue
- Calcium Blockers: continue prn
- ACE/ARB: stop preoperatively - start when stable
- Statins: continue
- Diuretics: as needed

Herbal supplements

- **St John's Wort (hypericin)**
  - Multiple drug interactions
  - Induces liver enzymes and enhances opioids and anesthetics
- **Kava**
  - Additive sedative effects with barbs, benzos, etc.
- **Gingko biloba**
  - Reduce platelets & inhibits clotting
- **Garlic**
  - Bleeding / blood glucose / ↓BP
- **Ginseng**
  - HTN and ↑HR
- **Ephedra**
  - May cause malignant hypertension
**Herbal Supplements**

*PEARL*- any supplement with a “G” indicates higher risk for bleeding

Ginseng, Garlic, Gingko Biloba

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**Medications Potentiating Bleeding**

- ASA Stop 7-10 days
- NSAIDs Stop 7 days prior
- Thienopyridanes (clopidogrel) Stop 2 weeks prior
- Stop DOACs at least 3 drug half-lives prior to surgery
  - Dabigatran 42-51 hrs.
  - Rivaroxaban 15-27 hrs.
  - Apixaban 24-48 hrs.
- Oral anticoagulants Stop 4-5 days prior - Heparin bridging

May need to allow more time if age >75, impaired renal/liver function, high bleeding risk

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**Perioperative Management of Anticoagulants**

- No consensus
- Invasive surgery generally safe if INR <1.5
- Approximately 4 days after stopping oral agents to reach INR of 1.5
- Approximately 3 days to reach INR of 2 once restarted
Management Recommendations

- If pre-op INR 2-3 stop oral agent 4 days prior to surgery (or longer if > 3)
- Assess INR 1 day prior to surgery and if > 1.7 give antidote injection of Vitamin K
- Day of surgery if INR > 1.7 may need unit of fresh frozen plasma
- Bridge to unfractionated heparin or LMWH

Non-cardiac Surgery in Cardiac Patients

Risk of MI Post Non-cardiac Surgery
Case Studies

- 87-year-old white female with known critical AS fall and breaks her hip.
- No CHF, MI, syncope
- Stable and relatively independent before the fall.
- LVEF 65%

- 82-year-old white male with known CAD. Stable angina pectoris.
- Catheterization shows occluded LAD which was fed by collaterals
- No CHF
- AODM and HTN
- Severe worsening spinal stenosis and weakness
- LVEF 50%

Pearls

- Establish patient risk
- Assign procedural risk
- Test intermediate risk patients undergoing intermediate or high risk surgery
- Optimize medical therapy
- Revascularization when clinically indicated

NO preoperative CV testing should be performed if results will not change perioperative management

PCI MANAGEMENT
What Causes Perioperative Cardiovascular Events

- Catecholamine surges
- Prothrombotic milieu
- Blood loss
- Volume shifts
- Coronary plaque destabilization
- Fixed coronary disease

Diabetes

- Adequate control of BG (< 180 mg/dL)
- HgA1C < 8
- No oral anti-diabetic agents day of surgery

_PEARL:_ Identifications of hypoglycemia can be delayed post op due to anesthesia, analgesia, other agents received

Factors for Pulmonary Risk

- Proximity of surgical incision to diaphragm
- Length of surgery (> 3h), general anesthesia vs. spinal/epidural
- Underlying chronic pulmonary condition
- Recent respiratory infection (upper/lower)
- Smoker
- Age > 60
- Obesity
- Obstructive Sleep Apnea (OSA)
- Poor exercise tolerance or poor general health state
Obstructive Sleep Apnea (OSA)

- Apnea: brief period of breathing cessation
- Hypopnea: marked reduction in tidal volume
- Obstructive Sleep Apnea: defined by an apnea-hypopnea index (AHI-the total number of episodes of apnea and hypopnea per hour of sleep) of 5 or higher in association with excessive daytime somnolence.
- Sleep apnea occurs in 4% of men and 2% of women age 30-60
- Post-operative hypoxemia after general
- Diagnosis versus snoring
- Compliance with treatment

Stop-Bang Questionnaire

- S: Snoring: Do you snore loudly?
- T: Tired: Do you feel tired, sleepy during the daytime?
- O: Observed: Has anyone observed you stop breathing during sleep?
- P: Blood Pressure: Are you being treated or had you been treated for hypertension?
- B: BMI: Body mass index>35
- A: Age: Age over 50 years
- N: Neck: Neck Circumference greater than 40 cm
- G: Gender: Male gender

Increased M&M for patients with OSA

- In a study of 202 patients, complications were noted in 33% of OSA patients vs. 18% in the control group
- Serious complication occurred in 24% of patients with OSA vs. 9% in the control group
- Hospital stay was significantly longer for the OSA group at a SD of 6.6+/ 2.8 days vs. 5.1 +/- 4.1 days in the control group

PEARL
Any patient on OSA therapy needs to be compliant with CPAP for at least 2 weeks prior to surgery or may have difficulty coming off vent. If patient noncompliant, need copy of sleep study results
Regional Anesthesia in Anti-coagulated patient

PEARL
Spinal or Epidural may be contraindicated due to hematoma/bleeding considerations

American Society for Regional Anesthesia: Guidelines for Anticoagulation & Regional Anesthesia

- Xarelto 3 days
- Pradaxa 4-6 days
- Eliquis 3-5 days
- Coumadin 5 days
  INR <1.2
- Lovenox < 1.5mg/kg/day 12 hrs
- Lovenox 1.5mg/kg/day 24 hrs
- Plavix 7 days
- Mobic/Naprosyn 4 days
- Aspirin 6 days

Enhanced Recovery After Surgery (ERAS)

Protocols which are multimodal perioperative care pathways designed to achieve early recovery after surgery procedures maintaining preoperative organ function and reducing the profound stress response following surgery.

Refers to patient-centered evidence-based multi-disciplinary team developed pathways for a surgery specialty and facility culture to reduce the patients surgical stress response, optimize their physiologic function, and facilitate recovery.
Elements of ERAS Protocols

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<tr>
<th>Preoperative</th>
<th>Intraoperative</th>
<th>Postoperative</th>
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<tbody>
<tr>
<td>Targeted patient education</td>
<td>Epidural</td>
<td>Regular analgesia</td>
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<tr>
<td>Carbohydrate loading</td>
<td>Warming</td>
<td>Tylenol &amp; NSAIDS</td>
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<tr>
<td>Less fasting time</td>
<td>No NG tubes or drains</td>
<td>Pre-emptive pain &amp; nausea management</td>
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<tr>
<td>Warming</td>
<td>Minimally invasive surgery</td>
<td>Early Feeding</td>
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<tr>
<td>Selective bowel prep</td>
<td>Short-acting anesthetics</td>
<td>Nutrition Supplements</td>
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Key Points

- National practice patterns vary significantly
- Optimizing the anesthesia management of the patient undergoing non-cardiac surgery is becoming increasingly important
- Use of the ACC/AHA guidelines can lead to more efficient evaluation of the non-cardiac patient which can decrease morbidity, mortality, and costs while increasing patient satisfaction and maximizing outcomes

References


References


