Perioperative Considerations

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Gadsden, AL
ACFAS Clinical Concensus Statement
PERIOPERATIVE MANAGEMENT

J Foot Ankle Surg 2017:56:336
The PreOperative Encounter

Goals & Objectives

- Anticipate & prevent complications
- Identify “difficult” or “at risk” patients
- Manage preoperative medications
- Plan appropriate anesthesia
- “Informed Consent”: Explain surgery (risks & benefits), anesthesia, postoperative limitations and potential complications
Risk Assessment: Avoiding Problems in the Surgical Patient

Patient History

- History Screening Forms
- Systems Review
- Follow-up Questions
- Elaborate on comorbidities
PreOperative Screening

- Current Medications
- Allergies
- Adverse Drug Reactions (ADRs)
Current Medications
- Patient knowledge or list
- Call Pharmacy or PCP
- On-line services “escribe”

- New patients are instructed to bring in current list of medications
- Perform or complete new patient forms prior to IOV
- Question patient at interval visits
Risk Assessment: Trying to Avoid Problems

Allergies

- **Antibiotics:** PCN, sulfa, all “cillins”
- **Narcotics:** allergy vs adverse rxn pruritus, N/V, hallucinations
- **Topicals:** iodine, neomycin
- **Latex, tape**

- Hx anaphylaxis, angioneurotic edema
- Obtain details on adverse reaction
Hypersensitivity reactions (HSRs) during the perioperative period are unpredictable and can be life threatening.

- Perioperative HSRs (est) 1:350 to 1:20,000 procedures with a mortality rate of up to 9%
- Cefazolin was the most common identified cause of a perioperative HSR in the study population
- The most frequently observed HSR systems were cutaneous (68%), cardiovascular (64%), and pulmonary (24%).

Kuhlen et al (Mass Gen) 2016 J ALLERGY CLIN IMMUNOL PRACT 4:939
Drug, alcohol or substance abuse history

- Do you regularly use pain medication?
- Do you have any substance abuse problems including alcohol or drugs?
- Are you under the care of a pain clinic?
- Question Pts on SSI Disability – chronic pain
- Cautious of Pts who request Percocet 10?
Difficult Characteristics & Behaviors

- 10 out of 10 pain
- Chronic back pain
- Multiple pain complaints
- Fibromyalgia, “Fibro”
- Migraine Headaches
- Non-narcotic allergies
- Lost or stolen medication
Self-reporting of PSYCHIATIC Medications in patients scheduled for elective surgery.

- 300 surveys distributed / 169 completed
- 43% of all patients who completed the survey admitted to taking one or more of the psychotropic medications
- 35% were taking antidepressants, 34% were taking benzodiazepines, 19% combination therapies, and 11% took antipsychotics, lithium, or OTC drugs such as melatonin

COMORBIDITIES

- Diabetes mellitus
- CAD, CHF, Hx CABG, angioplasty
- Peripheral vascular disease
- Systemic arthritis / Connective tissue disorders
- Renal insufficiency, ESRD, dialysis
- Hx TED, PE, anti-coagulation therapy
- Neurological disease, past CVA, paresis
- Smokers, COPD, Sleep apnea
- Age
- Obesity
PreOperative Evaluation: Comorbidities

Diabetes

Are you diabetic? ... duration
Control? ... today's FBS,
When was your last Hb A1C?

- Comorbidities: CVD, PAD, obesity, neuropathy,
  nephropathy, gout, smoking/COPD

- PAD 20% in DM > 40 yo * & 29% > 50 yo

* Elhadd et al 1999 Practical Diabetes Int 16:163
* ADA Consensus Statement 2003 Diabetes Care
PreOperative Evaluation: Comorbidities

Diabetes

- TJA & Infection (22% DM vs 9%)*
- PO Day 1 BG > 200 = 2x risk of infection*
- Hb A1c ≥ 7.0% simple linear ↑infection (NO surge) ♠
- Perioperative glucose > 194 mg/dL *
- Risk DM, Hyperglycemia (NOT HbA1C) ↑PJIs * ♦

♥ Chrastil 2013 J Arthroplasty
♣ Harris et al (2013) J Arthroplasty
♦ Kremers 2015 J Arthroplasty
Diabetes

HbA1c & Elective Foot & Ankle Surgery

- VA Database (2008-2013) 21,854 diabetic patients who underwent elective foot & ankle surgery
- 30-day PO complication rate 3.2%
- Avg Hb A1c 6.29% (6.11% - Non complication Group)
- Infection 42%, Mechanical Failure 33%, CV/pulmonary 18%, Wound Healing 6%
- Each 1% increase HbA1c, ↑complication rate 5%
- Complication rate ↑1.78x for Pts with neuropathy

Cardiovascular Disease

Cardiovascular risk

- The 30-day mortality is more than 2% for patients undergoing moderate to high-risk non-cardiac surgery but less than 1% in patients undergoing low risk procedures (minor orthopedic surgery)

Cardiovascular Disease

Risk Factors

Cardiac Clearance

Utilize your cardiologist

A preoperative cardiac evaluation report should describe a patient’s risk for cardiac complications, whether further preoperative cardiac tests are indicated, and what strategies for optimization should be implemented to reduce risk.

Cardiovascular Disease

Lee Revised Cardiac Risk Index

Risk Factors (each scores 1 point)

- Ischemic heart disease
- Congestive heart failure
- Cerebrovascular disease
- Diabetes requiring insulin
- High-risk surgery
- Pre-op creatinine > 1.9 mg/dL

<table>
<thead>
<tr>
<th>Points</th>
<th>CVS morbidity (%)</th>
<th>CVS mortality(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>1</td>
<td>1.3</td>
<td>0.7</td>
</tr>
<tr>
<td>2</td>
<td>3.6</td>
<td>1.7</td>
</tr>
<tr>
<td>&gt;3</td>
<td>9.1</td>
<td>3.6</td>
</tr>
</tbody>
</table>

PreOperative Evaluation: Comorbidities

The Anticoagulated Patient

- Pathology: CAD, Afib, Post Cardiac Procedure, Mechanical Heart Valves, DVT, PE
- Drugs: Coumadin, Lovenox, Eliquis, Xarelto, Plavix, ASA
- Monitoring, Last lab values
- PreOP management
- Reversal (FFP, Vit K)
- Bridge therapy (heparin)
New Generation of oral anticoagulation has emerged (NOACs):

- Dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis) and edoxaban (Savaysa) have been approved for prophylaxis of venous thrombosis and pulmonary embolism in elective hip and knee surgery, as well as for the prophylaxis of stroke and systematic embolism in patients with non-valvular atrial fibrillation.

- Interruption of anticoagulant drugs requires careful consideration of risks of thromboembolism.

- For minor surgical procedures and where bleeding is easily controllable, oral anticoagulation could be continued. Other techniques of hemostasis should be used to minimize bleeding.

- Perioperative aspirin did not reduce myocardial infarction or death in the Perioperative Ischemia Evaluation Study (POISE-2) trial but was associated with increased bleeding. Some caution rebound phenomenon

Mayo Clinic Clinical Update 2016 Novel Oral Anticoagulants (NOACs)
VTE Risk Factors
Prophylaxis

- 1/3 of 150-200K DEATHS/yr occur Secondary to surgery
- Prophylaxis (10-14 days) based on RISK ASSESSMENT.

<table>
<thead>
<tr>
<th>Patient Specific</th>
<th>Treatment Specific</th>
<th>Surgery/Injury Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal history of VTED</td>
<td>Immobilization &gt;4 wk</td>
<td></td>
</tr>
<tr>
<td>Hypercoagulability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active/recent (&lt;6 mo) cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced age (&gt;60)*</td>
<td>Non-weightbearing</td>
<td>Achilles tendon rupture</td>
</tr>
<tr>
<td>Obesity (BMI &gt;30)</td>
<td>Hospitalization</td>
<td>Ankle fracture</td>
</tr>
<tr>
<td>Family history of VTED</td>
<td>Bed rest</td>
<td>Total ankle replacement</td>
</tr>
<tr>
<td>OCP or HRT use†</td>
<td></td>
<td>Hindfoot arthrodesis</td>
</tr>
<tr>
<td>Varicose veins</td>
<td></td>
<td>General anesthesia</td>
</tr>
<tr>
<td>Diabetes mellitus or &gt;1 comorbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe foot/ankle injury</td>
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</tbody>
</table>

ACFAS Clinical Consensus Statement: Risk, Prevention and Diagnosis of Venous Thromboembolism Disease in Foot and Ankle Surgery and Injuries Requiring Immobilization. JFAS (2015) 54:497
VTE Risk Factors
Prophylaxis

If carefully assessed, many of our patients are “at risk”

- Prophylaxis – Lovenox, Eliquis

<table>
<thead>
<tr>
<th>RISK FACTOR ASSESSMENT TOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 points</strong></td>
</tr>
<tr>
<td>TKA, THA</td>
</tr>
<tr>
<td>Hip, Pelvis or leg fracture within 1 month</td>
</tr>
<tr>
<td>Stroke within 1 month</td>
</tr>
<tr>
<td>Multiple trauma within 1 month</td>
</tr>
<tr>
<td>Spinal Cord injury with paralysis</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Caprini JA, Arcehus JJ, Reyna JJ. Effective risk stratification of surgical and nonsurgical patients for venous thromboembolic disease. Semin Hematol 2001;2:12–19. TKA = total knee arthroplasty, THA = total hip arthroplasty, VTE = venous thrombotic event; MI = myocardial infarction; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; BMI = body mass index.*
PreOperative Evaluation: Comorbidities

Rheumatoid Disease

- Actual Diagnosis – notes from Rheumatologist
- Medication History – DMARCs, corticosteroids
- Disability, Home Support after surgery

Recommendations for continuation/interruption in the perioperative period.
- Methotrexate, hydroxychloroquine, corticosteroids, DMARDs, TNFIs.
Rheumatoid arthritis (RA) has become milder, and fewer patients develop erosive, destructive disease than described in historical cohorts.

Although the more widespread use of DMARDs has contributed to the improved outcome and a less severe course for RA, the risks and benefits of DMARD use in the perioperative period have not been well defined.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Impact on Immune System</th>
<th>Recommended Perioperative Actions</th>
<th>Pharmacologic Half-Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corticosteroids</td>
<td>Immunosuppressive via innate and adaptive immune system</td>
<td>Minimize exposure with lowest possible dose necessary to maintain hemodynamic stability</td>
<td>Variable</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>Inhibits lymphocyte proliferation, increases adenosine release, anti-inflammatory</td>
<td>Maintain usual dose if under 20 mg/wk; consider lower dose if high-risk</td>
<td>3–15 h</td>
</tr>
<tr>
<td>Leflunomide</td>
<td>Inhibits pyrimidine synthesis, immunosuppressive</td>
<td>If high-risk, stop 2 wk before surgery</td>
<td>&gt;14 d</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Binds B-cell surface antigen CD20</td>
<td>If high-risk, consider checking immunoglobulin levels</td>
<td>&gt;76 h, effect lasts &gt;6 mo</td>
</tr>
<tr>
<td>Abatacept</td>
<td>Modulates T-cell activation; costimulatory blocker</td>
<td>Last dose 4 wk before surgery</td>
<td>13.1–14.3 d</td>
</tr>
<tr>
<td>Tocilizumab</td>
<td>Binds IL-6 receptor, reduces inflammation, and alters immune response</td>
<td>Last dose 4 wk before surgery</td>
<td>11–13 d</td>
</tr>
<tr>
<td>TNF inhibitors</td>
<td>Bind and inhibit TNF-α, alter immune response, anti-inflammatory</td>
<td>Last dose: double half-life</td>
<td>Infliximab: 8–9.5 d Adalimumab: 14 d Etanercept: 102 h Golimumab: 14 d Certolizumab pegol: 14 d</td>
</tr>
</tbody>
</table>

AGE

- Large percentage of elderly patients undergo elective surgical procedures
- 1/3 adults aged 60-69 suffer 1 chronic disease & large proportion 2 or more
- Age – independent risk factor for perioperative mortality
- Assess individual frailty
- The elderly have low functional physiologic reserve and high levels of co-morbidities

Patient walking with walker and crutches immediately after surgery
Obesity

- Associated Co-morbidities: diabetes, hypertension, obstructive sleep apnea, CHF
Associated Co-morbidities: diabetes, hypertension, obstructive sleep apnea, CHF

- Impaired wound healing, infection*
- Impaired bone healing and cigarette smoking* (major fusions)
- Cessation or Refuse to perform surgery

AAOS OrthoInfo - aaos.org
ACFAS 2017 Perioperative Consensus Statement
### TABLE 50-2. Clinical Studies on the Effect of Smoking on Bone Healing

<table>
<thead>
<tr>
<th>Author (Year of Publication)</th>
<th>Study Type</th>
<th>Outcome</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen et al. (2001)</td>
<td>Retrospective comparative study</td>
<td>Patients who smoked took longer to heal ulnar osteotomy (4.1 vs. 7.1 weeks)</td>
<td>III</td>
</tr>
<tr>
<td>Harvey et al. (2002)</td>
<td>Retrospective review of prospective data</td>
<td>Smoking increased time to union and complication rate in open tibial fractures</td>
<td>II-III</td>
</tr>
<tr>
<td>Castillo and the LEAP Study Group (2005)</td>
<td>Prospective study</td>
<td>Smokers less likely to unite open tibia fractures ($P = 0.01$), much more likely (3.7 times) to experience development of osteomyelitis</td>
<td>II</td>
</tr>
<tr>
<td>Little et al. (2006)</td>
<td>Retrospective cohort</td>
<td>Smokers 3.7 times ($P = 0.005$) more likely to have nonunion after scaphoid repair</td>
<td>III</td>
</tr>
<tr>
<td>McKee et al. (2003)</td>
<td>Retrospective study of prospective data</td>
<td>Smokers risk for poor outcome is 38% compared with nonsmokers (10%) after Ilizarov reconstruction ($P = 0.003$)</td>
<td>III</td>
</tr>
<tr>
<td>Adams et al. (2001)</td>
<td>Retrospective comparative study</td>
<td>Smoking increased time to union ($P &lt; 0.05$), flap failure, and requirement for grafting (26% vs. 18%) compared with nonsmokers with open tibial shaft fractures</td>
<td>III</td>
</tr>
<tr>
<td>Cobb et al. (1994)</td>
<td>Retrospective comparative study</td>
<td>Smokers had a 3.75 times greater rate of nonunion after ankle arthrodesis</td>
<td>III</td>
</tr>
<tr>
<td>Hak et al. (2000)</td>
<td>Case series</td>
<td>8/8 nonsmokers healed after femoral exchange nailing versus 10/15 smokers</td>
<td>II</td>
</tr>
<tr>
<td>Schmitz et al. (1999)</td>
<td>Retrospective comparative study</td>
<td>Patients with fractured tibia who smoke took 62% longer to achieve union compared with nonsmokers</td>
<td>III</td>
</tr>
</tbody>
</table>
Risk Assessment: Trying to Avoid Problems

PreOp Discussion

- The “Procedures”
- Type of anesthesia (preference, length of surgery, ease of block, comorbidities, restless legs)
- Use of implants: metals (internal/external)
- Antibiotic prophylaxis (DM, prior ulcer, TJR)
- Adverse Reactions to anesthesia, medications
History of Metal allergy: jewelry, braces

Do you have any implanted metals?
- joints: hip, knee, shoulder
- plates, screws
- heart: pacemaker, stents, heart valves
Infection or Allergy?  
**Patch Testing?**

- Cutaneous metal sensitivity 10-15%
- Questionable correlation to hypersensitivity to orthopedic implants
- Patch testing is reliable for investigation of contact dermatitis ...
- ... but NOT so useful in evaluation of deep tissue metal allergy

Biant et al: J Arthroplasty 2010

Dime (1964-2005) 25% Ni plating
No Ni in a nickel
Metal Allergy

Hypersensitivity Reactions

- Any implanted metal may increase metal sensitivity or..
- Metal sensitivity may lead to TJA failure.
- Patch testing may be flawed because it may have no bearing on what is occurring happening in deep tissues.

AAOS 2012 Annual Meeting  Metal Allergy in Joint Replacement.
Joshua Jacobs, MD
The PreOperative Encounter

Know Your Patient

Identifying Problems
- Allergies
- Adverse Reactions
- Pain medications
- Diabetes
- Restless legs
- Bleeding Dyscrasias
- DVT / TED
Complications

- All surgical procedures have complications & morbidities
- Most complications are preventable by awareness and planning
- If you never do surgery, you never get surgical complications
- If you do enough surgery you will have complications
- The aim is to minimize incidence of morbidity & mortality
PreOP

Screening Questions

1. Do you have any allergies?
   - antibiotics: penicillin, sulfa, other:
   - topical: iodine, Neosporin, Bactroban
   - latex
   - tape
   - metals: braces, dental implants, jewelry
   - narcotics: codeine, morphine, hydrocodone

2. Have you experienced any adverse reaction to any medications?

3. Do you have any implanted metals?
   - joints: hip, knee, shoulder, other:
   - plates or screws
   - heart: pacemaker, stents

4. Do you have a bleeding disorder?
   - sickle cell or known coagulation deficit
   - take blood thinners: ASA, warfarin, Plavix, Eliquis

5. Have you ever had a blood clot, thrombophlebitis or pulmonary embolus?

6. Do you regularly use pain medication?

7. Do you have any substance abuse problems, alcohol or drugs or under care of pain clinic?

8. Have you ever developed a skin rash to topical antibiotics or iodine based antisepsics?

9. Do you get nausea, vomit or sick with anesthesia or pain medication?

10. Do you form thick scars or keloids in areas of cuts or surgery?

Patient Signature

Date

INSTRUCTIONS:
Learning Objectives

At the end of the program, participants will be able to:
1) Be able to recognize and evaluate risk factors for complications in their surgical patients.
2) Recognize difficult or problem patients & take appropriate action prior to invasive procedures
3) Reassess their practice narrative guidelines