PERI-OPERATIVE CONSIDERATIONS AND MANAGEMENT
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DISCLOSURES
• Speaker for Mimedx
• No conflicts involving this lecture

OBJECTIVES
• Diabetes/glucose management
• Pre-op Anticoagulants
• DVT Prophylaxis
• Smoking
• Supplementation (Vitamins C/D)
DIABETES/GlUCOSE MANAGEMENT

• Current guidelines of HbA1c of 7% or below

• JFAS 2016
  • 21,854 diabetic patients with HbA1c performed within 1 year prior to surgery.
  • Overall complication rate of 12%
  • Patients with complication HbA1c: 6.29% without: 6.11%
  • For every 1% increase in HbA1c: odds of complication increase by 3%
  • DM WITH neuropathy: 1.78x increase risk
  • DM WITH 3 additional comorbidities: 3.08x increase risk
  • JFAS 2016: Uterine artery (POS, CCP, CBO)
  • Results: Increasing complications with increasing HbA1c.

• Complications are multi-factorial. Increasing complications with additional comorbidities.


• 165 Diabetic patients with either arthrodesis, osteotomy or ORIF
  • Complications: Nonunion, Delayed Union, Malunion
  • HbA1c above 7% had a 3x greater risk of complications
  • Having at least 1 additional comorbidity was consistent with increased bone healing complications
  • Neuropathy #1. History of ulcer.
  • 44% of Neuropathic patients had bone healing complications
  • 50% of patients with a bone complication had neuropathy

• JFAS 52 (2013) 207-211: Factors Associated with Nonunion, Delayed Union, and Malunion in Foot and Ankle Surgery in Diabetic Patients

• Personal Protocol:
  • Non-Elective Surgery: Counsel patient and document increased risk
  • Elective Bone Surgery: Counsel patient and document increased risk
    • Proceed with surgery if HbA1c is <7% and all other comorbidities are well controlled/optimized.
  • Elective Soft Tissue Surgery: Counsel patient and document increased risk
    • Proceed with surgery if HbA1c is below 7.5%
PRE-OP DIABETES/GLUCOSE MANAGEMENT

• Typically long acting insulin should be discontinued 2-3 days prior to surgery
• Intermediate and short acting insulin should be continued up to the day before surgery

• Lantus can be continued up to the day before surgery in a tightly/well controlled diabetic patient.

• Metformin:
  - Some controversy over its use and when to hold.
  - Potential risk of lactic acidosis
  - Current recommendation is to discontinue 24-48h prior to surgery, Concern of renal function complications

• Sulfonylureas: (Glipizide, Glimepiride)
  - May induce hypoglycemia
  - Do not take the day of surgery

• Alpha glucosidase Inhibitors: (Acarbose, Miglitol)
  - No effect on a fasting patient. Do not resume until patient has resumed eating.
  - Do not take the day of surgery.

• Thiazolidinediones: (Actos, Avandia)
  - Do not take the day of surgery

• Glucagon-like peptide-1 agonists: (Byetta, Victoza)
  - Do not take the day of surgery

• Dipeptidyl Peptidase-4 Inhibitors (Januvia, Tradjenta)
  - May be continued if necessary. Work by reducing glycemic levels after meals and much less effective on an NPO patient.

• Type 1 Diabetics should continue a basal rate of insulin pre-op of 0.2-0.3U/kg/day of long acting insulin.

Personal Protocol and Recommendation:
• Defer to anesthesia and PCP/Endocrinologist
ASA PRIOR TO SURGERY

- Should we discontinue ASA prior to surgery or continue?
- Limited literature
- 1841 patients undergoing inguinal hernia repair
  - 143 patients on ASA
  - 1708 patients had no ASA
  - 231 laparoscopic stopped ASA
  - 1598 open stopped ASA
- No differences in the groups
  - Intraoperative bleeding, immediate post-op bleeding, follow up wound complications
- Recommended that the continuation of ASA is safe and should be preferred in patients with high cardiovascular risk


ASA PRIOR TO SURGERY

- 200 patients undergoing spine surgery with cardiac stents
  - 100 stayed on ASA
  - 100 stopped ASA 5 days pre-op.
- Looked at bleeding related complications
  - Spinal subdural hematoma, operative time, EBL, hospital length of stay, transfusion, 30-day readmission rates
- Those continuing ASA:
  - Shorter hospital LOS
  - Reduced operative time
- No difference in blood loss, transfusions, overall complication rates
- Conclusion: Peri-operative ASA is relatively safe in patients undergoing spinal surgery.


ASA PRIOR TO SURGERY

- Continued ASA prior to spinal fusion
  - No increased bleeding.
  - No increased operative time.

ASA PRIOR TO SURGERY

- Personal Protocol
- Continue ASA
- All surgeries

Any anesthesis

If patient has stopped ASA at the instruction of PCP or Cardiology:
- If no cardiac stents.
  - Proceed with surgery. Patient to resume ASA immediately after surgery.
- In patients with history of MI, cardiac stents, CABG
  - Patient to take/chew 81mg ASA prior to leaving pre-op.

ASA FOR VTE PROPHYLAXIS

- ACPA Clinical Practice Guidelines
  - 2015
  - No high level evidence to support ASA

- American College of Chest Physicians (CHEST Guidelines) 2016
- THA or TKA patients
  - Recommended 30 days of treatment
  - LMWH, Andro, Elquis, Padaxa, Xareto, UDTH, Dose adjusted Warfarin, and ASA all given grade B evidence to support their use.
  - Compression therapy recommended (IPCD)
  - Dual therapy recommended while in the hospital
  - Start 12 hours post-op
  - Lovenox was then recommended over all other treatments.
ASA FOR VTE PROPHYLAXIS

- American College of Chest Physicians (CHEST Guidelines) 2016
- Knee Arthroscopy patients without history of VTE
  - No thromboprophylaxis recommended
- Lower extremity trauma below the knee requiring immobilization
  - No thromboprophylaxis recommended

There is convincing evidence that, taking all factors into account, aspirin is an effective, inexpensive, and safe form of VTE prophylaxis following total joint arthroplasty in patients without a major risk factor for VTE, such as previous VTE.

Aspirin and the Prevention of Venous Thromboembolism Following Total Joint Arthroplasty, the Bone & Joint Journal 2017 Nov; 99-B(11): 1420-1430

81mg vs 325mg Which is better?????

Cleveland Clinic, October 2017, Consult QD. Review of 10,000 patients.
ASA FOR VTE PROPHYLAXIS

81mg vs 325mg Which is better?????

81mg PO, BID for 4 weeks post TKA and THA in low risk patients is recommended in multiple sources.

• Currently used by Cleveland Clinic Orthopedics system wide.

This is also my personal protocol as well as my orthopedic partners.

SMOKING

• Well known risk factor for complications in surgical patients.
• Systematic review of 177 articles
• Smoking:
  • Decreases tissue oxygenation and aerobic metabolism
  • Reduces inflammatory response
  • Decreases oxidative bactericidal mechanisms
  • Impairs proliferative response
  • Downregulates collagen synthesis and deposition
• After smoking cessation:
  • Tissue oxygenation and metabolism rapidly restore
  • Inflammatory response reverses in 4 weeks
  • Proliferative response remains impaired
• Nicotine and nicotine replacement, marginal effects


Are there surgeries that should be avoided in smokers?

• Negative outcomes were found:
  • ORIF
  • Arthrodesis
• No change in outcomes:
  • Non-osseous procedures
  • TAR, amputations
• The lack of negative effect on amputations was felt to be related to the significant comorbidities effectively making smoking a much lower relative risk in these patients.


* * *
SMOKING

Personal Protocol:
• Every smoker is given a handout on smoking cessation.
• If any surgery (elective or not) is to be done on smokers, they are informed that smoking increases the risk of complications.
• If no other significant risk factors, continue with soft tissue or “low risk” surgeries.
• No elective osseous surgeries on smokers.
• Check nicotine pre-op.
• No “high risk” surgeries (Achilles, TAR, Plastics, Tendon Transfers).
• Check nicotine pre-op.

VITAMIN C POST-OP

Effect of Perioperative Vitamin C Supplementation on Postoperative Pain and the Incidence of Chronic Regional Pain Syndrome: A Systematic Review and Meta-Analysis

• 7 studies on post-operative pain
• 6 studies on CRPS
• High level evidence supporting the use of 1g per day of Vitamin C for 50 days to prevent CRPS.
• Moderate level evidence supporting 2g of Vitamin C pre-op for reducing post-op morphine consumption.

Personal Protocol:
1000mg Vitamin C PO daily starting the day of surgery x 6 weeks
**VITAMIN D POST-OP**

- We know that vitamin D plays an important role in bone health.
- Vitamin D deficiency is very common, even in Florida.
- Toxicity threshold is estimated to be 10,000-40,000 IU/day.
- Avoid serum levels above 125-150 nmol/L.
- Tolerable upper limits of intake for adults is 4,000 IU/day (100 mcg).
- RDA for adults:
  - Age 18-70: 600 IU/day
  - Age >70: 800 IU/day
- NIH Office of Dietary Supplements, nih.gov

**218 consecutive patients undergoing shoulder arthroplasty**

- 43% were Vitamin D insufficient (<30 ng/mL)
- 11% were Vitamin D deficient (<20 ng/mL)
- Risk factors for Hypovitaminosis D:
  - Lack of prior supplementation
  - BMI greater than 30
  - "Routine pre-op evaluation is merited"


**Arthrodesis non-union risk**

- 29 patients with non-union compared to 29 patients with union.
- No differences in regards to outcome based on:
  - Age
  - Sex
  - Tobacco use
  - BMI
  - Procedure selection
- Vitamin D deficient patients were 8.1x more likely to have a non-union.

VITAMIN D POST-OP

Personal Protocol:
• All major surgeries (osseous and soft tissue) have a pre-op vitamin D level
• If normal, no supplementation
• If low normal, add 400-600 IU/day until "healed" from surgery
• If low (<30), ask PCP to Rx supplementation

THANK YOU

Questions????

Comments, issues, complaints, suggestions, please email me
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