Update in Perioperative Medicine

Linda A. Russell MD
Director of Perioperative Medicine
Hospital for Special Surgery, NY, NY
Associate Professor of Clinical Medicine
Weill Cornell College of Medicine

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- Disclosure: **I DO NOT** have a financial interest in any commercial products or service.

The Basics

- Worldwide, over 300 million people undergo surgery every year
- It is estimated that 1-4% of these patients will die
- Up to 15% will have serious postop morbidity
- 5-15 % will be readmitted within 30 days

WHO Fact sheets-Patient Safety. Sept 2023.

The Basics

- Although patients are unlikely to die from anesthesia, the burden of postop complications falls more on exacerbations of underlying medical conditions
- In general, patients are older and sicker
- Goal is to minimize risk as much as possible, with a focus on preop optimization
- No longer “clear” patients for surgery, we optimize them
- Shared decision making ensuring the patient understands the general risks of the procedure and the specific risks for that patient

The Basics

- Testing is probably not indicated if done fairly recently and within normal limits
- Testing is indicated when done selectively or for higher risk procedures in higher risk patients
- Do not order preop testing if the results will not influence management

The Basics

- Understand if the patient will need GET vs. Regional anesthesia
- Understand if the surgery is planned at a hospital vs. ambulatory surgery center

The Basics

- Continue meds with potential for rebound or withdrawal effects i.e. B blockers, clonidine, benzos, opioids, glucocorticoids
- Continue meds considered essential including cardiopulm meds
- Withhold drugs with potential for adverse effects, such as anticoagulants and oral hypoglycemics
- Daily doses of prednisone ≤ 5mg/day do not require stress dose steroids; can individualize if on higher doses
- Stop vitamins, supplements and herbals 1-2 weeks prior to surgery

SPAQI (Society for Perioperative Assessment and Quality)-Mayo Clinic Proceedings

VTE Prophylaxis

- Caprini or Rogers score to assess risk of VTE
- At moderate to high risk, pharmacologic over mechanical is favored, unless the bleeding risk is elevated
- At high risk, pharmacologic + mechanical is favored
- Delay LMWH until 4 hrs. after epidural catheter has been removed (Anesthesia Society Regional Anesthesia ASRA)
- Consider extended duration prophylaxis after THA/TKA, hip fracture, abdominal/pelvic surgery for cancer

Prevention Surgical Site Infections

- Preop risk assessment
- Due to antibacterial spectrum and safety, cephalosporins are first line options for surgical prophylaxis
- Clarify PCN allergy; many patients can safely receive cephalosporins
- CDC: shower night prior to surgery with soap and water; sleep in clean clothes, clean sheets and wear clean clothes to the procedure
- Decolonization

Cardiac Risk Calculators

- Revised Cardiac Risk Index (RCRI) is the most widely used (surgery, CAD, HF, CVA, CKD, IDDM), but do not use for ambulatory or low risk procedures, with LOS < 2 days (overestimates risk)
- Machine learning calculators based on institution-specific EMR data are the wave of the future
- Ultimate risk is determined by MD using good judgement

Cardiac Biomarkers

- Preop BNP, NT-proBNP may help identify which patients may benefit from additional cardiac testing
- Preop NT-proBNP can be added to RCRI to provide better risk estimates of periop cardiac events
- BNP ≥ 92 ng/l and NT proBNP ≥ 200 ng/l can be used as cutoffs to define elevated periop risk (Cochrane Database Syst Rev 2021)
- Preop troponin levels can help assess chronic elevation vs. myocardial injury

Ischemic Heart Disease

- Assess cardio-pulm reserve

  ≥ 4 METS (metabolic equivalents): 4 blocks, 2 flights of stairs

  Duke Activity Status Index: >34 (max 58.2) assoc. with decreased risk of cardiac complications
- No stress testing, if it will not change management
- Continue B Blockers
- ACE/ARB- hold day of surgery if prescribed for HTN; restart within 48 hrs.
- Prescribe statin preop for intermediate and high-risk procedures, it otherwise indicated

Ischemic Heart Disease

- 2024 ACC/AHA guideline for dual antiplatelet therapy (DAPT) in the setting of DES (drug eluting stent)-to reduce risk of stenosis, MI, death
- DES for CAD DAPT ≥ 6 months
- DES for acute coronary syndrome ≥ 12 months
- If surgery is required sooner, it may be considered at 3 months, if the risk of delaying surgery is thought to be greater than the risk of stent thrombosis, and aspirin should be continued when possible
- Elective surgery within the first month after stent placement is not recommended

Heart Failure

- Preexisting heart failure (HF), often underestimated, can portend a worse perioperative outcome than CAD or afib.
- SGLT2 inhibitors should be stopped 3 days before to elective, noncardiac surgery, to reduce the risk of diabetic ketoacidosis, which may be precipitated by these agents in the fasting state
- BNP/NT proBNP are highly predictive of postop events and mortality

Valvular Heart Disease

- Severe AS and MR/AR are associated with worse periop outcomes.
- Hypertrophic cardiomyopathy can increase the risk of periop CV events
- Decisions on corrective valve surgery should follow standard guidelines independent of upcoming noncardiac surgery

Pulmonary

- ARISCAT Index for prediction of postoperative pulmonary complications (Anesthesiology 2010)
- Procedure related factors are more important than patient related factors i.e. surgical site, GET vs. Regional
- Smoking cessation before surgery reduces postop pulm complications, optimal duration 4-6 weeks preop

Ariscat Index for Prediction of Postoperative Pulmonary Complications

Risk Factor	Risk Score
Emergency procedure	**8**
51-80 yrs	3
> 80	16
91-95% (preop O2 sat)	8
≤ 90% (preop O2 sat)	24
Respiratory infection within past month	17
Preop hgb < 10 g/dl	11
Upper abdominal site	15
Intrathoracic site	24
Surgery 2-3 hrs.	16
Surgery > 3 hrs.	23

Risk Stratification

Risk Stratification	Risk Score	Rate PPC
Low	< 26	1.6-3.4%
Intermediate	26-44	13-13.3%
High	≥ 46	38-42.1%

Obstructive Sleep Apnea (OSA)

- Screen all patients as OSA is associated with increased periop risk
- Sleep study is gold standard
- STOPBANG score ≥ 5, especially with CO2 ≥ 28 is concerning for OSA
- Take into account:
  - If OSA, device compliant?
  - Will surgery require postop opioid therapy?
  - Will overnight monitoring be necessary?

Pulmonary Hypertension

- Associated with significant periop morbidity and mortality
- Severe pulmonary hypertension-reconsider elective surgery and if planned, consider postop ICU, with care by pulmonary hypertension experts

Diabetes

- Elective surgery- hemoglobin A1c < 8.0%
- Insulin pumps-in general, continue for shorter surgeries and make a plan with endocrine for longer surgeries.

Anemia

- Preop CBC for procedures with expected blood loss
- Tranexamic acid (TXA) has reduced periop blood loss
- Iron deficiency anemia corrects more rapidly with IV over po iron
- Restrictive strategy for transfusion with threshold 7g/dl is appropriate for most patients.

Coagulation Disorders

- History and physical and not labs are best screening for coagulation defects
- Thrombotic disorders should weigh into postoperative VTE prophylaxis considerations

Renal Disease

- Hemodialysis should be as close to surgery as possible
- Avoid AKI

Renal Disease

Risk Reduction Strategies-KDIGO Guidelines (Decision Making in Periop Medicine 2025)
Maintain volume status
Maintain perfusion pressure-BP control
Avoid/discontinue nephrotoxins (meds, IV contrast)
Maintain normoglycemia
Monitor creatinine and urine output

Liver Disease

- Patients in Child-Turcotte-Pugh(CTP) Class A or Model of End-Stage Liver Disease (MELD) < 10 without evidence of portal hypertension can safely proceed to surgery.
- CTP B may be able to proceed to surgery after further assessing cirrhosis severity, comorbidities and procedure specific risk.
- CTP C or MELD > 15 should be counseled about nonsurgical options and avoid/delay surgery until after liver transplant unless potentially life-threatening
- Patients with chronic liver disease should be monitored closely for postop complications such as: decompensated liver function, AKI, hepatic encephalopathy and infection.

Cerebrovascular disease

- Most important risk factors for perioperative stroke are type of surgery (highest in cardiac, carotid and neurological surgery) and prior h/o stroke or TIA
- Carotid bruits are not a reliable indicator of the presence or severity of carotid stenosis and do not predict ipsilateral stroke
- Elective surgery should probably be delayed for at least 3 months after an acute stroke (ideally 6-9 months)

Obesity BMI ≥ 40

- In general, as BMI increases, the risk of comorbid medical conditions increases: specific concerns
  - Deconditioning
  - Malnutrition
  - OSA/Hypoventilation
  - Pulmonary hypertension
  - Difficult intubation
  - Longer surgical time
  - Injury to staff with mobilization
  - Increased risk VTE

Genitourinary

- International Prostate Screening Score (IPSS)-may indicate patients with BPH who may be at risk for postop urinary retention. Can consider preop treatment i.e. tamsulosin.

Cognitive Risk Assessment

- AWOL-S: Age, orientation to spelling world backwards, oriented to 3 points, ASA level and surgery specific risk
- If positive, consider a change in anesthesia medications intraoperatively, limited opioid set, nursing confusion precautions, family involvement, discharge planning

Final thoughts

- Elective surgery is elective, and patient’s health should be optimized prior to surgery.
- Patients need to be educated about the risks of surgery; shared decision making should be documented.
- A through preop medical assessment, health optimization and risk stratification is crucial.

Thank You