Updates & Controversies in Perioperative Medicine

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Updates in Perioperative Medicine

• Estimating mortality in surgical patients
• Managing aspirin during surgery
• Screening & treatment for postoperative myocardial injury
• Risk assessment and management for surgical patients with cirrhosis
• Opiate use & misuse after surgery
Predicting Surgical Mortality

You admit an 88-y.o. man with acute cholecystitis. He is septic, but not in shock and has no organ failure. He is on usual meds for h/o remote stroke, CAD, IDDM & HTN. He needs help for some ADLs. His BMI is 28. His history is otherwise unremarkable.

You consult surgery to consider a laparoscopic cholecystectomy.

What is this patient’s estimated mortality for laparoscopic chole?

1. < 5%
2. 5-10%
3. 10-20%
4. > 20%

Predicting Surgical Mortality

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The surgeon recommends percutaneous drainage because mortality from lap chole is “high…very high.”

Are internists or surgeons better at predicting surgical mortality?

1. Internists (of course)
2. Surgeons
3. Equally good
4. Equally bad
Surgical Risk Calculator

Derived from American College of Surgeons’ National Surgical Quality Improvement Program (NSQIP):

riskcalculator.facs.org/RiskCalculator/

- > 1.4 million patients in derivation & validation cohorts
- > 1500 unique CPT codes from nearly 400 hospitals
- Predicts 30-day risk of death, complications (cardiac, VTE, pneumonia, UTI, SSI, ARF), return to OR, readmission, and discharge to SNF or rehab
- Good-to-excellent predictive accuracy

Surgical Risk Calculator

Utility & Limitations:
- Most generally applicable (vs. population or procedure specific calculators)
- Estimates both absolute risk and relative risk compared to average patient undergoing same operation
- Availability and “ease” of use
- Useful in patients with higher risk, noncardiac risk factors
- Need to select specific procedure
- Accuracy for some types of surgery questioned

Predicting Risk: Medicine vs Surgery

Study design:
- Online, anonymous questionnaire given to internal medicine and general surgery residents
- Seven complex clinical scenarios in surgical patients (cholecystectomy, colectomy, DU repair, perforated viscus, small bowel resection, mastectomy, herniorrphy)
- Asked to predict mortality & complications
- Gold standard = ACS/NSQIP prediction tool


Predicting Risk: Medicine vs Surgery

- Both IM & Gen Surg residents overestimated risk
- Estimates were all over the place
- Internists were more likely to use prediction models
- Surgeons were more confident in their estimates
- Surgeons were more comfortable not offering surgery and recommending palliative care

Managing Aspirin in Surgical Patients

You do a preoperative evaluation on a patient with stable coronary disease and diabetes undergoing major head & neck surgery. She takes aspirin daily. The surgeon is “iffy” about continuing it.

Do you advocate continuing the aspirin perioperatively?

1. No – it’s not worth the argument
2. Only if the patient has a coronary stent
3. Yes – whether or not there is a stent

Managing Antiplatelet Agents

Yeah? Well, you know, that’s just like, your OPINION, man.
Trial of Perioperative Aspirin (POISE 2)

Before surgery:
- 10,100 patients with cardiac disease or risk factors undergoing major noncardiac surgery
- Included “continuation” (chronic) & “initiation” cohorts
- Aspirin 200 mg or placebo started right before surgery

After surgery:
- Aspirin or placebo given daily x 30 days
- Study drug stopped if major or life-threatening bleed

POISE 2: Aspirin Results

<table>
<thead>
<tr>
<th></th>
<th>Aspirin</th>
<th>Placebo</th>
<th>Hazard Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death or MI</td>
<td>7.0%</td>
<td>7.1%</td>
<td>0.99 (NS)</td>
</tr>
<tr>
<td>Non-fatal MI</td>
<td>6.2%</td>
<td>6.3%</td>
<td>0.98 (NS)</td>
</tr>
<tr>
<td>Major Bleeding</td>
<td>4.6%</td>
<td>3.8%</td>
<td>1.23 (p = 0.04)</td>
</tr>
</tbody>
</table>

Similar outcomes in chronic ASA users and new users
Less than 5% of patient in POISE 2 had stents
2014 ACC / AHA Guidelines

Aspirin (for patients without stent)

- Not unreasonable to continue ASA in elective surgery if benefits outweigh risks from bleeding (Class 2b)

- Initiation of ASA does not benefit patients undergoing elective noncardiac surgery (Class 3)


POISE 2 – Patients with PCI

Non-prespecified analysis of subgroup of the 470 patients with history of prior PCI:

<table>
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<th>Aspirin</th>
<th>Placebo</th>
<th>Hazard Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death or MI</td>
<td>6.0%</td>
<td>11.5%</td>
<td>0.50 (p = 0.036)</td>
</tr>
<tr>
<td>Non-fatal MI</td>
<td>5.1%</td>
<td>11.0%</td>
<td>0.44 (p = 0.02)</td>
</tr>
<tr>
<td>Major Bleeding</td>
<td>5.6%</td>
<td>4.2%</td>
<td>1.26 (p = 0.04)</td>
</tr>
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</table>

2016 ACC/AHA Guidelines for PCI

Delay elective surgery after elective PCI:
- Bare metal stent: 30 days
- Drug eluting stent: 6 months (optimal)
  3 months (if harm in delay)

Management of dual anti-platelet therapy:
- If P2Y$_{12}$ inhibitor must be stopped, then ASA should be continued if possible, and the P2Y$_{12}$ inhibitor resumed postoperatively as soon as possible


Screening for Myocardial Injury

You are comanaging a 75-y.o. man with CAD and HFpEF who had a colectomy yesterday for cancer. He denies cardiac symptoms and looks great. However, you note that his RCRI score is 3, indicating high risk for cardiac complications.

Would you order a troponin to detect silent myocardial injury in high-risk patients?

1. No – it’s clinical findings (not lab tests) that matter
2. Maybe – troponin leak is bad, but I’m not sure what I’d do
3. Yes – I’d start statin & beta-blocker for elevated troponin
4. Yes – I’d recommend long-term anticoagulation
Perioperative Myocardial Injury

Findings from POISE (beta-blocker) trial:
- 5% of these “elevated risk” patients had postop MI, defined as elevated biomarker + ECG changes
- Most MI occurred by POD #3 (74% within 48 hr)
- Postoperative MI predicted 5-fold mortality
- Majority of postoperative MI were asymptomatic
- Silent MI had similar mortality as symptomatic MI

Postop Biomarkers Predicts Mortality

<table>
<thead>
<tr>
<th>Study</th>
<th>Biomarker</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>POISE (2011)</td>
<td>Troponin or CK-MB</td>
<td>2.5x mortality with isolated biomarker elevation</td>
</tr>
<tr>
<td>VISION (2012)</td>
<td>Troponin-T</td>
<td>4x mortality with any Tn-T elevation</td>
</tr>
<tr>
<td>Meta-analysis of 14 earlier studies (2011)</td>
<td>Troponin</td>
<td>3x mortality with elevation</td>
</tr>
</tbody>
</table>

Arguments Against Screening

**Insufficient Sensitivity:**
- Screening only identified 21% of patients who died in POISE

**Too late to do anything:**
- Nearly 2/3 of deaths in patients with MI occurred by POD 3
- Many deaths in MI patients are not cardiac-related
- Elevated troponin just identifies obviously crashing patients

**No known effective intervention:**
- Don’t order the test unless it will change management

**MANAGE Trial**

**Question:** Does the direct thrombin inhibitor dabigatran improve outcomes in patients with elevated postop troponin?

**Patients:** 1754 patients who evidence of myocardial injury after noncardiac surgery (MINS), defined as elevated postop troponin either with clinical, ECG or imaging evidence of new ischemia or no other explanation (e.g., PE, sepsis, atrial fib)

**Intervention:** Dabigatran 110 mg bid vs. placebo for up to 2 yrs

**Outcome:** CV mortality, nonfatal MI, stroke, peripheral arterial thrombosis, and symptomatic PE
- Amputation and symptomatic proximal DVT added post hoc
MANAGE Trial Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Dabigatran</th>
<th>Placebo</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary cardiac or vascular outcome</td>
<td>11%</td>
<td>15%</td>
<td>25 (p = .012)</td>
</tr>
<tr>
<td>Mortality – CV</td>
<td>6%</td>
<td>7%</td>
<td>NS</td>
</tr>
<tr>
<td>Mortality – All cause</td>
<td>11%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>4%</td>
<td>5%</td>
<td>NS</td>
</tr>
<tr>
<td>Bleeding complications</td>
<td>3%</td>
<td>4%</td>
<td>NS</td>
</tr>
</tbody>
</table>

https://doi.org/10.1016/S0140-6736(18)30832-8

Screening for Myocardial Injury

Limitations of MANAGE trial:
- Design problems (changing sample size & outcomes)
- Outcomes too broad and individually no significant effect
- More of an outpatient, long-term intervention
- Just too weird -- very different from conventional care

So now what?

**ACC/AHA guideline:** Checking postop troponin in high-risk patients (in absence of clinical findings) of uncertain benefit

**Personal practice:** I don’t order screening troponin
Postoperative Atrial Fibrillation

You see a 67-y.o. man who developed atrial fibrillation with RVR one day after a total knee arthroplasty. You slow him down with metoprolol, and he converts back to NSR the next day. The patient denies prior AF. He has HTN and OSA but is otherwise healthy.

Would you recommend anticoagulation to prevent stroke?

1. Yes
2. No
3. Tough call – turf it to the PCP

Surgery in Cirrhotic Patients

You evaluate a 65-y.o. man with cirrhosis from HCV prior to hip arthroplasty. He feels well and has no current signs of ascites or encephalopathy on examination.

Notable lab results include creatinine = 1.6, total bilirubin = 1.9, albumin = 3.5 & INR = 1.6

How would you assess this patient's surgical risk?

1. Determine Childs-Pugh class
2. Calculate MELD score
3. Use a MELD-based risk calculator
4. Use both Childs-Pugh & MELD
Surgical Risk in Cirrhotic Patients

Question: How does his cirrhosis affect mortality risk?

Background:
- Risk traditionally assessed by Childs-Pugh classification
  (http://www.mdcalc.com/child-pugh-score-for-cirrhosis-mortality)
- Mortality after GI surgery: Class A = 10% - usually OK
  Class B = 30% - with caution
  Class C = 70% - no way!
- Limitations: single time point; less known about non-GI surgery; sensitive to minor laboratory result differences and subjective assessment

MELD Score as Risk Predictor

MELD Score (Model for Endstage Liver Disease):
- Main use in organ allocation
- Variables: INR, bilirubin, creatinine

Retrospective multivariate analysis of 772 cirrhotic patients undergoing GI, orthopedic, and CV surgery
- Independent predictors of mortality: Age & MELD Score
- Predicts mortality @ 1 wk, 1 mo, 3 mo, 1 yr, 5 yr


Teh et al. Gastroenterology, 2007
65 y.o. man with stable HCV-related cirrhosis. He has no current signs of encephalopathy or ascites.

Labs: Creatinine = 1.6  
Total Bilirubin = 1.9  
Albumin = 3.5  
INR = 1.6  

Childs-Pugh Class A  
MELD Score = 19

Mortality Prediction:
• Childs-Pugh: 10% in-hospital mortality
• MELD Score: 6.5% 1 week mortality  
24% 1 month mortality  
36% 3 month mortality  
50% 1 year mortality

2018 AGA Clinical Practice Update: Surgical Risk Assessment and Perioperative Management in Cirrhosis

Preoperative Recommendations:
• Use more than one risk prediction tool (CPT, MELD, Mayo)
• Avoid all but most urgent surgery if Childs-Pugh class C or MELD > 20; consider transplant evaluation
• Control of ascites, variceal bleeding risk, and hepatic encephalopathy prior to surgery, if possible.
• Avoid abdominal surgery in patients with ascites

Opiate Use after Surgery

Background:
- Growing concern about overuse of opiates, especially for chronic, non-cancer pain
- Less concern about opiate use for acute pain
- Little attention to opiate use to treat postoperative pain
- ~100 million operations per year (inpatient & ambulatory) means a large risk pool

New Chronic Postop Opiate Use

Question: What is the risk of new persistent opiate use after surgery?

Study design:
- 36,177 surgical patients having one of 13 common operations (80% minor surgery, no ortho/spine cases)
- Only studied opiate naïve patients (no opiate rx for 12 months prior to perioperative period)
- Determine incidence and risk factors for persistent opiate use more than 90 days after surgery

Published online April 12, 2017
Chronic Opiate Use after Surgery

Findings:
- Overall 6% incidence of new persistent opiate use
  - Similar for major & minor surgery
- Risk factors for developing chronic use:
  - Alcohol, tobacco, drug use
  - Higher baseline comorbidity
  - Anxiety & mood disorder
  - Other pain (back, neck, arthritis)

Opiate Misuse after Surgery

Question: How does the duration of postoperative opiate prescription relate to opiate misuse?

Study design:
- Over 500,000 opiate-naïve patients who were prescribed opiates after surgery (administrative database)
- Looked at association between opiate refills and subsequent diagnosis of opiate use disorder
Opiate Misuse after Surgery

Findings:
• In follow-up period, 0.6% of patient received a new opiate misuse disorder diagnosis
• Single refill increased the potential of misuse by more than 40%
• Duration of prescription (rather than dose) was most predictive of opiate misuse

BMJ 2018;360:j5790

Take Home Points

1. We’re bad at predicting surgical risk – so use a prediction tool (NSQIP) to discuss risk with patients and surgeons
2. Benefit of continuing aspirin perioperatively appears limited to patients with stents
3. Silent myocardial injury predicts mortality – unfortunately effective management remains uncertain
4. Beware the cirrhotic surgical patient; use both MELD and Childs-Pugh to assess risk
5. Prescribe opiates after surgery with caution, especially in presence of substance abuse and chronic pain
Thank You

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