Beyond “Cardiac Clearance”: Surgical Risk and Evaluation in our Changing Medical Environment

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Goals and objectives

• Review best practice for pre-operative assessment and optimization
• Review of effects of smoking, diabetes, nutrition, and obesity on surgical risk and complications
• How will these risks and their management affect decision making with new payment paradigms and quality measures
“Clearance for surgery”

• Is there such a thing?
• Eliminate word clearance from your notes/thoughts
• Clearance can imply legal liability
  ◦ Cases where primary care have been sued for postoperative complications such as blood clots or heart attack
• Not clearing the patient for surgery-discussing risks and chances of problems based on each patient and planned procedure
• Patient education and risk factor modification is key
  ◦ This is a new idea for many patients and providers

What is changing and why?

• Old (and current) paradigm: patient needs surgery- do it
  ◦ No penalties for bad outcomes
  ◦ No penalties for readmissions
  ◦ Financial incentives to do as many procedures or see as many patients as possible for both provider and facility
  ◦ Data public regarding many of these factors and only becoming more so
  ◦ Quality metrics and risk data are becoming more common measures for bonuses and reimbursement
Changes

- Value based purchasing
- Financial penalties
  - Re-admissions
  - Surgical complications
  - Medical complications (UTI, MI, DVT and PE)
- Changing reimbursement structure
  - Quality and risk based payments
  - Shared savings plans

Value-Based Purchasing Weights
FY 2013 – FY 2016
What is the best process for our patients to have good outcomes?

- Goal for all patients to have standard H and P performed
  - Templates can help with this
  - Can add additional measures that help primary care as well such as ensuring all patients get flu and pneumonia vaccines at preop visit
- Every patient will get a functional status, cardiac risk and pulmonary risk evaluation prior to surgery
- Risk factors identified and improved whenever possible
Functional status

- Excellent
  - Can jog, be very active, exercises daily
- Moderate
  - Can climb a flight of stairs without stopping or being winded, can do yard work without resting, can walk at moderate pace and does so regularly, can walk further than 1 block without stopping
- Poor
  - Little activity, no regular exercise, independent in ADL's, would have difficulty walking a block

Pulmonary risk evaluation

- Sleep apnea questions and treatment before elective surgery to prevent post operative complications
- STOP/BANG questions
• STOP
• Snore (do you snore loudly enough to hear through a door)
• Tired (daytime tiredness or falling asleep)
• Observed to stop breathing
• Pressure (do you have high blood pressure)

• BANG
• BMI >35
• Age >50
• Neck circumference > 16 inches or 40 cm
• Gender (male)

• One point for each factor
  ◦ High risk sleep apnea 5-8 points
  ◦ Intermediate risk 3-4
  ◦ Low risk 0-2 points

• If high risk of sleep apnea, consider sleep study prior to surgery
• If known sleep apnea, bring CPAP/BiPAP for any procedure
  ◦ If have at home, will be charged if use hospital machine so encourage not to forget
• If history of moderate or severe COPD or asthma, regular bronchodilators 1 week before surgery
• If significant shortness of breath or activity limitations, consider pulmonology consultation and PFT’s prior to procedure to optimize medications and risk
• Abdominal surgeries, especially in obese patients, have a higher risk of pulmonary complications
Cardiac evaluation

- Important risk factor for heart attack or other complications

Cardiac risk evaluation protocol

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<tr>
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Cardiac risks

- History of heart disease
- History of arrhythmia
- History of CHF
- History of stroke or TIA
- Diabetes mellitus (any type)
- Renal insufficiency with creatinine > 2
- History of peripheral vascular disease or procedures

Categories of anesthesia risk

- ASA categories
  - Class I - a patient in normal health
  - Class II - a patient with mild systemic disease
  - Class III - a patient with severe systemic disease that limits activity but is not incapacitating
  - Class IV - patient with severe systemic disease that is a constant threat to life
  - Class V - a moribund patient not likely to survive 24 hours
Current recommendations

- Continue baby aspirin through the procedure period for any patient with coronary risks or equivalents unless risk of bleeding precludes (primary prophylaxis)
  - Switch from full dose to baby aspirin
- Patient’s on preventative dosing, should be joint decision between surgeon and primary care
- Any patient with a drug eluting stent needs cardiology evaluation prior to surgery due to risk of acute thrombosis especially in year after placement
- Other anticoagulants, stop based on risk of bleeding during procedure and in consultation with prescribing physician
  - Many newer agents have no reversal if bleeding, which makes surgical risk much higher

What are additional risk factors that are going to affect postoperative outcomes?

- Obesity
- Diabetes
- Tobacco abuse
- Nutritional status
Growing expectations for consumer engagement and personal responsibility

“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”

Obesity

Prevalence of Obesity Among U.S. Adults Aged 20-74

Derived from NHANES data (http://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.htm#Table1)
Disparity by race and gender

Costs of obesity

- Medical care solely attributable to obesity and related conditions estimated to be around $160 billion dollars by CDC and increasing every year
- Equipment and care costs are increasing on both the hospital and skilled nursing level
  - Increased risk of injury of providers
  - Significant physical plant changes needed
    - Beds
    - Lifts
    - Toilet mounting
    - Shower facilities
    - OR beds and equipment
Definitions of obesity

Normal weight      BMI 19-25
Overweight         BMI 26-30
Grade I obesity    BMI 31-35
Grade II obesity   BMI 36-40
Grade III obesity  BMI > 41

Need to document in problem list consistently for risk factor monitoring

Obesity increases risk of

- Hernia
- Skin infections
- Gallbladder problems
- Liver problems
- Diverticulitis and diverticular bleeding
- Cancers (endometrial, breast, colon)
- Coronary disease
- Diabetes
- Sleep apnea
- Fertility problems

"My doctor says I'm a type 2 diabetic...that's a Type 2 with four times more exercise for one overweight."
Increased surgical risks from obesity

- Hernia
  - Studies starting to extrapolate from this that baseline hernia risk also higher, especially for ventral hernia
  - Study Sauerland et al showed incisional hernia risk greatly increased by obesity
  - Gr I obesity had 2.6 x higher risk
  - Gr II obesity had 4.2 x higher risk
  - This goes up linearly in study models 1.10 x for every increased BMI point
- New hernia complications
  - Unable to reliably examine or sometimes image patients (Many facilities have weight limits for CT scan or MRI)
  - Issue of chronic incarceration- clinically unable to determine if reduced in many patients
  - Loss of abdominal domain

- Diverticulitis complications
  - Strate et al found approximately 2 x higher risk of diverticulitis and 3.19 x higher risk of diverticular bleeding in patients with BMI > 30
- Surgical site infection
  - Wick et al found SSI rate for obese patients was 14.5% versus 9.5% non obese
    - Probability of readmission 27.8% vs 6.8%
    - Increased risk of infection 60% and cost by over $17000 per case
  - Yuan at al found 2 x increased rate of infection for obese patients undergoing orthopedic procedures
Should surgery be postponed?

- For many elective procedures, probably yes, if can work on realistic weight loss
  - Multiple studies show much better outcomes and success for hernia repair if BMI <35
  - Weight loss likely to have multiple health benefits and in some patients, goal of surgery can help to motivate
- For emergency procedures, counsel about increased risks

Diabetes mellitus

Key group is the 45-64 “baby boomer” generation—just as their risk for other chronic medical conditions and cancers starts to increase, their diabetes rate is spiking—this is the incoming new Medicare population in the next 10-15 years.
Diabetes

- If hemoglobin A1C is >7.0%, ideally postpone elective procedures until better control
- Chen et al found that is spinal arthrodesis, SSI rate 4.1 x relative risk of infection in diabetics
- Hikata et al with 1 year follow up after thoracic or lumbar spine instrumentation surgery
  - Infection 16.7% diabetics vs 3.2% non diabetic
  - Immediate postop sugars had no significant effect on outcome
  - 0 pts with preop HgbA1C <7.0% had infection
  - 35.3% rate of infection if 7.0% or greater
- Latham et al identified large population of new diabetics in cardiac surgery population
  - Odds ratio of infection 2.76 greater for diabetics and poor sugar control immediately postop conferred 2.02 risk additionally
- Halkos et al found for deep sternal wound infections 5% rate of infection for >7.0% and 1.4% if less than 7.0%
  - For each increase in HgbA1C %, 31% increase in sternal wound infection rate and 2.88 times the relative risk of infection

Tobacco

- "So if I need to stop smoking and lose weight, what are you going to do about it?"

![Cartoon Image](https://i.imgur.com/3Q7.png)
Tobacco abuse

- Inhibits wound healing
  - Decreased circulation to the skin due to chronic micro-vascular obstruction from platelet aggregation and nonfunctional hemoglobin in blood stream
  - This is a functional problem that can be reversed to some extent
- Increases risk of infection and hernia formation
- SSI increased 9.6% by smoking, hernia recurrent by up to 15.1% over baseline rate for that hernia type
  - Higher than the affect of premorbid illness or case time
Tobacco abuse

- Quitting for 2 weeks will greatly improve wound healing
- Quitting for 6-8 weeks will decrease the problems with coughing and reactive airways after anesthesia
  - Decreased chance of hernia recurrence related to severe coughing in initial quit period
- Decreased postoperative pain as well, both from coughing after surgery being decreased and based on studies
- Ongoing tobacco or other substance abuse is an independent risk factor for opioid medication issues developing
- The sooner the better for every reason
**Nutrition**

- Too much (obesity) or too little (malnutrition or hypoalbuminemia) can increase infection risk and healing problems
- Many obese patients actually have protein calorie malnutrition and low albumin so comprehensive evaluation needed of status

And sometimes all this makes us feel like this…

At least my patients are compliant with their noncompliance.
What can we do going forward?

- Continued and streamlined teamwork between the primary care and specialist providers
- Teamwork between medical team and the patient
  - Find ways to coordinate care across the system and hospital
- We may need to postpone elective cases until patient better optimized in their health
- Tests and labs when appropriate

Current testing grid for labs or adjunct studies

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- Major blood loss potential (See list below)
- Known urgency
- Known use
- Lung or thoracic tumor
- Obesity
- Bleeding disorder
- Left Ventricle disease or Dilatation
- Cardiopulmonary
- Coagulation, Protein, Tends (Day of OR)
- Antiparallels, Proparel, Place or Frailty
- Opiate
- Liver Disease
- Renal Use
- Rheumatoid Arthritis or Crescent Syndrome

*High or Intermediate Risk surgery with at least One Cardiac Risk Factor (See list below)*

- Procedures with potential for major blood loss: Intracranial surgery, head/neck tumor resection, intradural tumor resection, Spinal surgery, Bowel resection, Appendiceal surgery, Vascular surgery, Cardiac surgery, Trauma/Reconstruction, Medial/Medial Repair, Prostatectomy, Nephrectomy, Cardiopulmonary, Total Joint Replacement, Bone Instrumentation/Fracture, Bifurcation procedures, Pelvic Fracture repair, Multiple fracture repair

Consider Cardiologist Consult for HIGH Risk Surgeries OR if the patient has any of the following cardiac conditions:

1. Unstable coronary syndromes: Unstable or severe angina, Recent MI (> 7 days <= 1 month)
2. Decompensated HF (Worsening or new-onset Heart Failure)
3. Significant arrhythmias: Heart block, Supraventricular arrhythmia, Other with ventricular rate > 100 bpm at rest (old or new), Symptomatic bradyarrhythmias, Symptomatic ventricular arrhythmias, Newly recognized Ventricular tachycardia
• We may elect that some patients who are unable to achieve basic goals of health are not going to have non-urgent procedures scheduled
  ◦ We all need to have “skin in the game,” especially if it is only our financial risk
  ◦ This is a huge paradigm shift from individual medicine to population based medical care
• We need to accurately chart and code risk factors to achieve correct risk adjusted measures of our outcomes
  ◦ This requires significant time and personnel resources
  ◦ Find ways to automate more of this data collection

• Following these protocols, our facility cut postoperative MI rate in half in less than one year
  ◦ Use template for all preop examinations
  ◦ Document risk factors and adjust if able to prior to elective procedures
  ◦ Coordinated plan between primary care, surgeon and pre-anesthesia team
Proposed preoperative evaluations

- Functional status
- Pulmonary risk
- Cardiac risk
- Diabetes control
- Obesity status
- Tobacco abuse
- Nutrition
- Preventative care (flu, pneumonia, TdAP or other vaccines)

Let’s hope not!

Or Zika or the many other things patients worry about other than their own potentially correctable health conditions....
Thank you for your time and attention and I welcome any feedback or questions.