Pre-operative Testing: What is Really Needed?

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Disclosures

• No financial disclosures
• No discussion of “off label” use of drugs
Objectives

• To understand the rationale for evidence based preoperative testing

• To understand when preoperative testing is not indicated…Most of the time!
Today’s Outline

• Background
• Cases
• Discussion/rationale
• Back to our cases
• Questions
Is Preoperative Testing a Problem

• Yes, and a big one
  • It wastes valuable resources
  • It exposes patients to needless blood work and procedures
  • It can create anxiety for patients
  • It is costly…$30 billion/year (1987 $)
  • It is still a problem—surgeons>anesthesiologists>preoperative directors
  • It requires follow up of meaningless abnormalities

• Katz, Anesth Analg 2011
• Roizen, Anesthesiol Clin North Am 1987
Why Should we Test?

- To identify or verify a condition which could affect anesthetic care
- To help formulate or modify anesthetic care of the patient
- Can the identified risk be mitigated?
  - Cardiac
  - Pulmonary
  - Drugs
  - Bleeding, clotting, and bridging
  - DM
  - Other (liver, kidneys, endocrine)

Anesthesiology 2012 (ASA Practice Advisory for Preanesthesia Evaluation)
How Do You Decide?

- My last case (that went south…)
- What my chief resident told me to do
- EBM
- Guidelines…which ones?
- Hospital policies…who develops?
Case 1

• You are asked to see a 43 year old male for a preoperative medical evaluation. He is scheduled for an inguinal hernia repair next week

• His past medical history is notable only for obesity (BMI 32) and an uncomplicated ORIF of a tib-fib fracture at age 14

• He has never used tobacco and has 1-2 oz of EtOH/week
Case 1

• He does construction work and can easily exceed > 4 METS of activity
• He takes only a men’s multivitamin daily
• His exam is noteworthy for his weight and an easily reducible R inguinal hernia.
Case 1

• For preoperative testing you order:
  • A) An ECG and CBC
  • B) An ECG and creatinine
  • C) A CBC and creatinine
  • D) A CBC and INR
  • E) No tests
Case 2

• You are asked to see a 78 year old female for a preoperative medical evaluation. She is scheduled for an elective R TKA tomorrow.

• Her past medical history is noteworthy for hypertension, hyperlipidemia, obesity, DJD, and coronary artery disease for which she received 2 drug eluting stents 4 years ago.
Case 2

- She has had a hysterectomy and carpel tunnel repair in the past without complication.
- Her medications include lisinopril/HCTZ, simvastatin, metoprolol, aspirin.
- She is limited in her activity due to her knee, but was able to do >4METS of activity within the past several months.
Case 2

• Her exam reveals a BP of 143/80, P 60, BMI of 37, and a moderate effusion on the R knee. Cardiovascular and pulmonary exams are normal.

• You have an ECG available (NSR, non-specific lateral ST changes) from 3 months ago.

• You have no other laboratory data available.
Case 2

- Preoperatively you order:
  - A) An ECG, electrolytes, creatinine
  - B) Electrolytes, creatinine
  - C) An ECG, electrolytes, creatinine, and INR
  - D) Electrolytes, creatinine, ECG, and a dobutamine stress Echo
  - E) No testing
Case 3

• You are asked to see a 58 year old male for a preoperative medical evaluation. He is scheduled for a R TSA next week.

• His past medical history is significant for hepatitis C but no history of cirrhosis. He had an inguinal hernia repaired as a child without complication. He has had no recent follow up regarding his liver.

• Medications include a multivitamin
Case 3

- His functional capacity is excellent, exceeding 4 METS
- His exam is normal except for a decreased range of motion of his R shoulder
Case 3

- Preoperatively you order:
  - A) An ECG, electrolytes, creatinine
  - B) Electrolytes, LFT, creatinine
  - C) LFT, INR, creatinine
  - D) INR and aPTT
  - E) No studies
Case 4

- You are asked to do a pre-operative evaluation for a 23 year old female college basketball point guard for repair of a torn L ACL
- She reports herself to be in excellent health, no prior surgery, having irregular menstrual periods felt secondary to her level of physical activity
- She is taking no medicines and her physical exam is normal except for her L knee
Case 4: You order pre-operatively

- CBC
- EKG
- PT/PTT
- Pregnancy testing
- No testing
The Usefulness of Preoperative Laboratory Screening

Eric B. Kaplan, MD; Lewis B. Sheiner, MD; Alison J. Boeckmann, MS; Michael F. Roizen, MD; Stuart L. Beal, PhD; Stephen N. Cohen, MD; C. Diana Nicoll, MD, PhD

We assessed the usefulness of routine laboratory screening of preoperative patients. Computer-readable laboratory, demographic, and discharge diagnostic data were assembled for 2,000 patients undergoing elective surgery over a four-month period, and randomly selected samples of patients were studied. Several tests ordered by protocol and performed by the laboratory at the time of admission were examined in these samples, including complete blood cell count, differential cell count, prothrombin time, partial thromboplastin time, platelet count, six-factor automated multiple analysis, and glucose level.

Sixty percent of these routinely ordered tests would not have been performed if testing had only been done for recognizable indications, and only 0.22% of these revealed abnormalities that might influence perioperative management. Chart review indicated that these few abnormalities were not acted on nor did they have adverse surgical or anesthetic consequences. In the absence of specific indications, routine preoperative laboratory tests contribute little to patient care and could reasonably be eliminated. (JAMA 1985;253:3576-3581)
Preoperative testing: Should we do anything?

• Narr et al.
  • Randomized 1044 patients who had NO preoperative testing, age 0-95, median 21
  • Deaths: 0.0%
  • 17 intraoperative lab tests; 3 abnormal
  • No testing done intraoperatively or postoperatively changed management
Should we Test?

• Preoperative testing should be dictated by the patient’s clinical condition and abnormal findings on history or exam.

• Preoperative testing is NOT INDICATED unless there is a specific reason to perform the test and the result will change management, or mitigate perioperative risk.
The Preoperative ECG

- No prospective, randomized clinical controlled trials
- No good, prospective outcome data for or against
- Lots of retrospective reviews, case series, cohort studies
- Lots of complicated, conflicting consensus statements regarding pre-operative ECG
- Main cardiovascular risk assessment guidelines use ECG to risk stratify
Pre-op ECG

• The prevalence of an abnormal ECG increases with age with up to 75% of people older than 75 having an abnormal ECG

• There is evidence suggesting poorer outcomes in patients with abnormal ECGs
  • RR 4.5 (3.3-6.0) of death
  • However, absolute risk reduction only 0.5% with low and intermediate risk surgery

Noordzij. Am J Cardiol 97(7): 1103-1106
ECGs? 2014 ACC/AHA Guideline:

- “Preoperative ECG is reasonable for patients with known coronary heart disease, significant arrhythmia, peripheral arterial disease, cerebrovascular disease, or other significant structural heart disease except for those undergoing low risk surgery”

- “Consider for asymptomatic patients with known CAD except low risk surgery”

- “Routine ECG not useful for asymptomatic patients undergoing low risk procedures”
ECGs?

ECG YES

- CV symptoms/signs
- Known stable cardiac disease
  - If clinically stable, can rely on old ECG in our practice up to a year
- Risk factors and intermediate or high risk surgery
  - RCRI $\geq 1$
  - CAD equivalent
ECGs?

ECG NO

• Low risk surgery and low risk patient
• Cataract surgery

ECG MAYBE

• Low risk patient and intermediate risk surgery
• Risk factors and low risk surgery
Coagulation Studies?

• Coagulation studies only as indicated by H&P

• What about high risk surgery e.g. neurosurgery: “Patient history was as predictive as lab testing for all outcomes (and had) higher sensitivity”

  Seicean, J Neurosurg 2012

  • Known h/o bleeding disorder or previous bleeding complications
  • On current anticoagulation
  • H&P suggests bleeding or coagulation problems
CBC?

- H&P findings suggestive of abnormality
  - Known cytopenia
  - Recent chemo
  - h/o bleeding
  - pallor

- ? Anticipated large surgical blood loss

- ? Situation where even mild anemia could be significant
Electrolytes, Creatinine?

- Lytes, creatinine
  - Patients on diuretics
  - Patients with known renal failure
  - ? Patients on digoxin
  - Consider creatinine for majority of elderly patients due to likely exposure to medications cleared by the kidneys e.g. low molecular weight heparin
CXR?

- Frequent abnormalities --- 10-23.1%
- Rarely influence management --- < 0.1-3%
- Predictable from H&P
- Who follows up on the abnormality? --- source for missed opportunity, “falling through the cracks”
Albumin?

• Powerful predictor of perioperative complications
  • Pulmonary complications increased
  • Infectious complications increased
  • Wound healing issues
  • In some settings the strongest predictor of morbidity and mortality

Albumin?

- Consider serum albumin
  - If modifiable risk factor present
  - AND it would change your perioperative management
Glucose?

• No good evidence for or against
• Will it change my management?
  • Would I delay surgery if it was high?
  • Would my perioperative management change?
LFTs?

• Play it again Sam...only if there is suspicion of liver disease on the basis of history, exam, or previous liver function abnormality
  • www.nature.com/clinicalpractice/gasthep

• If there are indications to perform LFTs, include INR, bilirubin, creatinine in order to calculate MELD score which predicts post operative mortality due to liver disease
  • Gastroenterology 2007;132:1261-1269
Pregnancy Testing

- 2056 women of child bearing age tested before elective ambulatory surgery
  - 7 had + pregnancy testing (0.3%)
  - Cost of pregnancy discovered: $2879
  - All cancelled their surgery

- 2558 women of child bearing age tested before elective orthopaedic surgery
  - 5 had + pregnancy testing (0.2%)
  - Cost of discovered pregnancy: $3273

Anesthesiology 1995
Anesth Analg 2008
Pregnancy Testing

• “…the literature is inadequate to inform patients or physicians on whether anesthesia causes harmful effects on early pregnancy. Pregnancy testing may be offered to female patients of childbearing age and for whom the result would alter the patient’s management.”

Anesthesia 2012 (ASA Practice Advisory for Preanesthesia Evaluation)
Pregnancy Testing

• British National Patient Safety Agency (NPSA) recommends “consensual blanket testing of all menstruating women for pregnancy prior to surgical procedures”
  • Much debate regarding adolescents-Britain has the highest teen pregnancy rate in Western Europe and information from adolescents is not always reliable
  • Surveys indicate pregnancy testing not uniformly done
    • Arch Dis Child 2012
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Take Home Points

• **ALL** PREOPERATIVE TESTING SHOULD BE **DICA**TATED BY YOUR HISTORY AND EXAM
Thank You

• QUESTIONS