



# Pre-Operative Services Teaching Rounds 6 Feb 2011

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# Pre-operative Lab Testing

## Current Status

- Introducing new SBUMC lab guidelines
- A few cases
- Evidence, or lack thereof, for testing



History and Physical is key

## **Delay case for unstable symptoms**

Pre-operative testing is done to:

- predict risk
  - alter management
- optimize medical condition
- improve outcomes

Consider each test with these 3 aims in mind.

- 
- Today's discussion: Common lab tests

Not discussing:

- Advanced tests
  - Stress
  - Pulmonary functions
  - Polysomnography etc
- And indications for consults



## Possible interventions resulting from a test result

- Medical or other optimization
- Change or decide not to do procedure
- Modify location of care
- Plan intra-operative monitoring
- Modification of postoperative monitoring



## Results of abnormal tests can lead to:

**Harm: New risk**

In 2000 - Apfelbaum J. Anesthesiol Rev 1990 17(Suppl 2):4-12.

**Cost: Costly to pursue**

**Medico-legal: not looking into abnormal result**

**Better not to order test**

*Less is more*

## Stony Brook Anesthesia – lab guidelines

<u>AGE</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR
0 - 49								
50 - 74	X						X(men>40)	
75 - 99	X		X	X	X		X	

<u>DISEASE</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR
Hypertension			X				X	
Card - Mod	X		X	X			X	
Card - Severe	X		X	X			X	X
Pulm - Mild								
Pulm - Severe	X						X	X
Smoke > 20yr	X							
Malignancy	X							
Lymphoma								X
Hepatic	X	X	X			X		
Renal	X	X	X	X				
Bleeding	X	X						
Diabetes			X	X	X		X	

<u>MEDICATION</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR
Diuretic			X	X				
BP Meds			X	X			X	
Cardiac Meds			X	X			X	
Steroids			X		X			
Anticoagulants	X	X						



These guidelines are very liberal

Retrospective audit in July 2009:  
Over-ordering was significant

**\$3.5million/yr**

Katz R. (ASA 2008):

60% of patients have at least one unnecessary lab



# Specific tests

▶ **HB indicated if (CBC - \$30/\$36 with diff)**

- History of anemia or symptoms
- Anticipated blood loss
- Cardiac disease/renal failure/severe pulmonary disease

(WBC and Platelets never indicated in healthy patient.)

▶ **UA is indicated for (\$20)**

- Screening for renal disease – better done by serum Cr
- Infection –

4.58 knee surgery wound infections from UTI would be prevented/yr. At a cost of \$1.5 million / wound infection prevented (possibly would have found on history, possibly prevented by pre-op prophylactic antibiotics)

(Lawrence 1989 J Clinical Epidem.)



# Specific tests

- PT/PTT is only indicated:  
(\$27/\$35)
  - If personal or family history of bleeding
  - Heparin or coumadin therapy
  - Liver disease
- CXR:
  - **Severe** pulmonary or cardiac disease
  - Lymphoma
  - Surgical indications
  - Acute signs and symptoms



# Specific tests

- **Chem 8** (\$151)
  - Disease (HTN/renal etc)
  - Meds
    - major surgery
    - nephrotoxic agents
    - hypotension

## Reasons for over-ordering:

- **“Anesthesia will cancel if we don’t...”**
  - **“Patient will sue if I operate on their knee, hand, eye and they have lung cancer...”**
    - Disseminating the evidence
    - Medico-legal concerns
  - Evidence is not new - Kaplan et al. JAMA 1985;253:3576-81.
    - 2000 patients
    - 60% of tests not indicated.
    - 0.22% of abnormalities led to management change.
- ( Normal range is up to 2 std deviations: 5% of normal patients will have ‘abnormal’ results.)




## “Anesthesia will cancel if we don’t...”

Starsnic (Philadelphia JCA 1997)

- Ordering by surgeon or anesthesia
  - less ordering
  - no extra cancellations

Power (Anaesth Intensive Care 1999) showed more than 30% reduction in order and cost reduction of similar magnitude with anesthesia staff input into testing.



“I could not agree more with you that we order way more tests than necessary.

However, the problem is that I have had multiple instances when case is delayed by anesthesia because we have not had a lab result.

Patients are not seen by the same anesthesiologist preop and on the day of surgery.

Hence our tendency to "overcompensate".”

*Signed:A. Surgeon MD*



## Medico-legal concerns

### Testing:

- Routine screening labs lack utility
- No evidence routine labs improve outcome
- Missed follow up of abnormal results: bigger risk

# Role of routine testing

Low risk surgical procedures with minimal hemodynamic changes

- 19,557 Cataract operations

Randomized into 2 groups

No testing(n=9408) and Routine testing(n=9411)

- 3% overall rate of complications (bradycardia and hypertension most common)
- Similar rate in both groups
- Eliminating testing does NOT increase adverse outcome – testing does NOT improve safety

*Schein OD. N Engl J Med 2000;342:168-75*





# Role of routine testing

1061 ambulatory surgery patients

No testing(n= 499) or indicated testing(n=527)

Majority ASA1 and ASA2

Exclusion criteria (No cataracts)

Results:

- No difference in complications
- No difference in delays or cancellations
- No change in peri-operative care as a result of an abnormal lab result
- No association between complication and abnormal test result

Pilot study — *“larger study is needed to demonstrate that indicated testing may be safely eliminated in selected patients undergoing ambulatory surgery without increasing perioperative complications.”*

*Chung F. Anesth Analg 2009;108:467-75*

## Case

- **62-year-old male with osteoarthritis.**
- **Planned left inguinal hernia repair.**
- **Plays singles tennis 4 times/week.**
- **No allergies, no meds, no past surgical Hx**

**Which of the following laboratory tests do you want to order?**



Which of the following laboratory tests do you want to order?

- 1. CBC**
- 2. Chem 8**
- 3. ECG**
- 4. All of the above**
- 5. None of the above**

# AHA Current Guidelines

## **Preoperative 12-Lead resting ECG:**

### **Class I (Level of Evidence: B)**

*Patients with at least 1 clinical risk factor who are undergoing vascular surgical procedures.*

### **Class I (Level of Evidence: C)**

*Patients with known coronary heart disease, peripheral arterial disease, or cerebrovascular disease who are undergoing intermediate-risk surgical procedures.*

## AHA (cont)

### **Class IIa (Level of Evidence: B)**

*Persons with no clinical risk factors who are undergoing vascular surgical procedures.*

### **Class IIb (Level of Evidence: B)**

*May be reasonable in patients with at least 1 clinical risk factor who are undergoing intermediate-risk operative procedures.*

### **Class III (Level of Evidence: B)**

*Not indicated in asymptomatic persons undergoing low-risk surgical procedures*




## ASA Practice advisory

“The Task Force agrees with the consultants and ASA members that preoperative tests should not be ordered routinely.”

“test results obtained from the medical record within 6 months of surgery are generally acceptable if the patient’s medical history has not changed substantially”

**Practice advisory** for preanesthesia evaluation: a report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. *Anesthesiology* 2002;96:485-96.



Joint Commission on Accreditation of  
Healthcare Organizations (JCAHO)

**No requirement for diagnostic testing**

**Only if necessary for determining  
patient's health care need.**

**Performed in a timely manner as  
defined by hospital.**

**Relevant information required for  
interpretation.**

*Comprehensive Accreditation Manual for Hospitals: The Official  
Handbook*



# Medicare


- **Does not pay for routine screening tests**
- **Does not pay for aged based coverage**
- **Coding analysis for re-evaluation 06/04**

**ICD-9-CM Codes Covered by Medicare Code V72.84 is not included**

**A test is covered (e.g. ECG)**

- **Documented signs and symptoms**
- **Other clinical indications**
- **Includes review/interpretation by MD**
- 
- ***<http://www.cms.hhs.gov/center/coverage.asp>***





U.S. Preventive services task force (USPSTF) :  
screening for coronary heart disease

**No evidence for routine ECG or exercise treadmill test.**

- Lack of improved health outcomes
- False positive tests
- Unnecessary invasive procedures
- Overtreatment
- Labeling
- Potential harm exceed potential benefit

**Rating: D Recommendation**

<http://www.ahrq.gov/clinic/3rduspstf/chd/chdrs.htm>



## ECG - evidence

### **Observational study of 513 patients aged >70 y/o**

- **75% had abnormal ECG**
- **not predictive of post-op adverse outcomes**

### **Adverse outcomes predictors**

- **ASA physical status**
- **Surgical risk**
- **Congestive heart failure**

*Liu LL, Dzankic SJ et al . Am Geriatr Soc 2002;50:1186-91*



## ECG - evidence

**4,315 patients undergoing major non-cardiac surgery.**

**Preoperative ECG ST-T-wave changes were not associated with worse outcomes.**

*Lee et al. Circulation 1999;100:1043-1049*

**In 172 CAD patients, the preoperative ECG contains important prognostic information and is predictive of long-term outcome independent of clinical findings and peri-operative ischemia.**

*Jeger RV. Am Heart J 2006;151:508-13*



## Electrocardiograms ?

- **Most institutions use age based lab testing**
- **Significant cost to institution**
- **CMS no longer pays for pre-op ECG**
- **Stony Brook - over 5,000 pre-op ECGs/year**
- **Approximate \$200 lost revenue/ECG**


***Patients with good functional capacity and low surgical risk need no pre-operative cardiac testing.***



## Case

- 32 yr old female for reduction mammoplasty
- No past medical history
- Does spinning class 5 times/week
- No meds. No allergies.
- Past surgery: T's and A's as a child.

**Which of the following laboratory tests do you want to order?**



Which of the following laboratory tests do you want to order?

1.HB

2.PT/PTT

3.Pregnancy test

4.All of the above

5.None of the above

## Abnormal PTT with normal PT/INR

Repeat (insufficient blood in tube)

### Mixing studies

- ▶ Corrected – factor deficiency (XII, XI, IX, VIII)
  - Prekallikrein and other factors defic. without clinical significance
  - Factor XII deficiency – doesn't bleed
  - Factor XI deficiency only bleed with surgery

Consider FFP for major surgery, treatment not usually required for minor procedures.

- ▶ Uncorrected – circ anticoagulant

# Pregnancy test

## Evidence Based Testing<sup>1</sup>

1. **Diagnostic efficacy** – does your test identify the abnormalities? **Beta HCG**
2. **Diagnostic effectiveness** – does the test make/change the diagnosis? **Pregnant**
3. **Therapeutic efficacy** – does the test change management? **100% of the time**
4. **Therapeutic effectiveness**- does the test change the patient's outcome? **Risk to fetus/pregnancy is established.**<sup>2</sup>

1. Silverstein MD. *Clin Chem* 1994;40:1621-7

2. Mazze RI, *Am J Obstet Gynecol* 1989;161:1178-85.





# New guidelines

- Process
- Not fully evidence based
- Need to respect comfort zone for our surgical and anesthesia colleagues
- Education is slow, need patience

## Stony Brook Anesthesia – lab guidelines 2011

<u>AGE</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR
0 - 59	No routine testing needed in this age group.							
>60							X	
75 - 99	X		X	X	X		X	

<u>DISEASE</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR	T&S
Hypertension			X				X		
Card - Mod	X		X	X			X		
Card - Severe	X		X	X			X	X	
Pulm - Mild									
Pulm - Severe	X						X	X	
Smoke > 20yr	X								
Malignancy	X								
Lymphoma								X	
Hepatic	X	X	X			X			
Renal	X	X	X	X					
Bleeding	X(cbc)	X							
Diabetes			X	X	X		X		
Expected blood loss	X								X

<u>MEDICATION</u>	Hb/Hct	Coags	Lytes	Bun/Cr	Gluc	LFTs	EKG	CXR
Diuretic			X	X				
BP Meds			X	X			X	
Cardiac Meds			X	X			X	
Steroids			X		X			
Anticoagulants	X	X						



Also:

- **Pregnancy test** should be considered on all women of child bearing age.
- **Creatinine** is indicated before contrast studies.
- Flexion and extension lateral **C-spine** X Rays should be considered in patients with Rheumatoid arthritis and Down's syndrome.
- **Type and screen** – anticipated blood loss or Rhogam® use. Blood/blood products are not transfused in the ASC, so T&S not indicated for blood loss in ASC patients.
- Stable patients for **low risk procedures** in ASC probably don't need any testing.

# Summary

1. Do a good history and physical
2. Evidence based / Indicated testing
3. Removing a lot of age based testing at SBUMC
4. Ask surgeons to let anesthesia order labs
5. Repeat testing for postponed surgery is mostly unnecessary
6. Need consistency amongst anesthesia personnel

Normal range is up to 2 std deviations:  
5% of normal patients will have 'abnormal' results.

**Will the result of the test improve the outcome?**

**Please use new guidelines from today onwards**