Preparing patients for out of hospital anesthesia

BobbieJean Sweitzer, M.D.
Director, Anesthesia Perioperative Medicine Clinic
Professor of Anesthesia and Critical Care
Professor of Medicine
University of Chicago
Chicago IL

I have no disclosures
Table 1. Rate of Adverse Events per Day (per 100,000 Procedures) by Site of Care for 16 Procedures Performed in Medicare Beneficiaries From 1994 Through 1999.

<table>
<thead>
<tr>
<th>Site of Care</th>
<th>0-7 Days</th>
<th>8-30 Days</th>
<th>Death, 0-7 Days</th>
<th>Death, 8-30 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient Hospital</td>
<td>2.5</td>
<td>0.6</td>
<td>6.2</td>
<td>0.0</td>
</tr>
<tr>
<td>ASC</td>
<td>3.1</td>
<td>0.0</td>
<td>6.6</td>
<td>0.0</td>
</tr>
<tr>
<td>Physician's Office</td>
<td>0.0</td>
<td>0.0</td>
<td>4.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 4. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 2. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 3. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 5. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 6. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 7. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 8. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 9. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 10. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 11. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 12. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 13. Incidence of Adverse Events at a Given Visit for a Given Procedure.


Table 15. Incidence of Adverse Events at a Given Visit for a Given Procedure.

Table 16. Incidence of Adverse Events at a Given Visit for a Given Procedure.
Although the majority of older patients tolerated ERCP well, 8% of procedures, especially if prolonged (>30 minutes), resulted in silent or symptomatic myocardial injury as defined by the release of cardiac troponin I. Occurrence of myocardial injury could not be predicted on the basis of comorbid status, cardiac risk factors, ECG, or arterial oxygen saturation changes during ERCP;
11% due to inadequate preoperative evaluation
“clearly related to problems with preoperative assessment or preparation”

Preventable in 57% of cases
70 year old male for umbilical hernia repair

PMH: ↑ cholesterol, 50 pk-yrs of smoking

ROS: No chest pain or dyspnea

Meds: aspirin, lisinopril, simvastatin

BP: 150/80, HR 80

Does this patient need an ECG?
1. Will accept one done within last 3 months
2. Will accept one done within last 6 months
3. No, I don’t need an ECG
### Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery

The Task Force for Preoperative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-cardiac Surgery of the European Society of Cardiology (ESC) and endorsed by the European Society of Anaesthesiology (ESA)

#### Recommendations on ECG

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-operative ECG is recommended for patients who have risk factor(s) and are scheduled for intermediate- or high-risk surgery</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Pre-operative ECG should be considered for patients who have risk factor(s) and are scheduled for low-risk surgery</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Pre-operative ECG may be considered for patients who have no risk factor and are scheduled for intermediate-risk surgery</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Pre-operative ECG is not recommended for patients who have no risk factor and are scheduled for low-risk surgery</td>
<td>III</td>
<td>B</td>
</tr>
</tbody>
</table>
2967 noncardiac surgery patients >50 yrs
Preoperative ECG in 80% of patients
At least one abnormality on 45% ECGs

Bundle branch blocks (RBBB & LBBB) on ECG were related to postop MI & death

Did not improve prediction beyond risk factors identified on patient history!
Recommendations for Preoperative 12-Lead ECG

ACC/AHA Guidelines

J Am Coll Cardiol 2007; www.acc.org

Class I: Benefit >>> Risk
- > 1 risk factor and major vascular surgery
- Known cardiovascular, cerebrovascular, or peripheral arterial disease and intermediate-risk surgery

Class IIa: Benefit >> Risk
- No risk factors and vascular procedures

Class IIb: Benefit > Risk
- >1 risk factor and intermediate-risk procedures

Class III: Risk > Benefit
- Asymptomatic person for low-risk surgery
  “Procedure should not be performed since it is not helpful and it may be harmful”

GOOD

BAD

Table 4. Cardiac Risk* Stratification for Noncardiac Surgical Procedures

- Low† (reported cardiac risk generally less than 1%)
- Endoscopic procedures
- Superficial procedure
- Cataract surgery
- Breast surgery
- Ambulatory surgery
Clinical trials have shown no additional benefit of cardiac testing in patients at low to moderate risk for perioperative cardiovascular events.

Perioperative coronary revascularization can cause harm and does not improve clinical outcomes, even in high-risk patients.
Contrasting Mechanisms of Obstruction of Bare-Metal Stents and Drug-Eluting Stents

“Interventional cardiology is doing cosmetic surgery on the coronaries, making them look pretty, but it’s not treating the underlying biology of these arteries,” said Dr. Ozner, 2008 AHA Humanitarian Award winner and author of “The Great American Heart Hoax”

“In patients with stable CAD, PCI did not reduce the risk of death, MI, or other major cardiovascular events when added to optimal medical therapy”
Management of Patients on Antiplatelet Therapy who Require a Surgical or other Invasive Procedure

1. Patients who are receiving ASA and undergoing a diagnostic test associated with a low risk for bleeding may continue ASA without interruption, whereas patients undergoing a noncardiac procedure associated with a high risk for bleeding should discontinue ASA 7-10 days before the procedure (Class IIa, Level C). Patients who are receiving ASA and clopidogrel should discontinue clopidogrel 7-10 days before the procedure if it can be done so safely (Class IIb, Level C); ASA should also be discontinued before diagnostic tests associated with a high risk for bleeding (Class IIa, Level C).

2. Whenever possible, elective surgery in patients receiving ASA and clopidogrel secondary to coronary stent implantation should be deferred for at least 6 weeks after BMS placement and at least 12 months after DES placement (Class I, Level B).
Preoperative tests are beneficial if:

1) There is a high likelihood of an abnormality
2) AND, the abnormality actually increases the risk of anesthesia and/or surgery
3) AND, the treatment of the abnormality LOWERS the risk
4) AND, waiting to treat the abnormality will not increase risk
It’s the rare test that meets these criteria

Especially...
- in healthy patients
- for low-intermediate risk procedures
- in patients with well-managed, chronic, stable disease states

Generally... you shouldn’t do tests “just because the patient is having surgery”...
CONCLUSIONS: There was no increase in the perioperative adverse events as a result of no preoperative testing.


### Table 3. Diagnoses Associated with Intraoperative and Postoperative Adverse Events

<table>
<thead>
<tr>
<th></th>
<th>Intraoperative event</th>
<th></th>
<th>Postoperative event&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No testing (499)</td>
<td>Testing (527)</td>
<td>No testing (499)</td>
<td>Testing (527)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysrhythmia</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Hypotension</td>
<td></td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Respiratory/Airway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypoxemia</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Laryngospasm</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Bronchospasm</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Difficult Intubation/Intubated on arrival</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate pain control</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Urinary retention</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dizziness</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Drowsiness</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1</td>
<td>1</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Chest x-rays do not predict postoperative pulmonary complications (PPC)
- Preop chest x-ray only for acute problems
- PFTs and ABGs in non-lung resection surgeries not predictive of complications
- Age, heart failure, poor general health DO predict PPC

### Summary of key recommendations

1. Indiscriminate coagulation screening prior to surgery or other invasive procedures to predict postoperative bleeding in unselected patients is not recommended. (Grade B, Level III).

2. A bleeding history including detail of family history, previous excessive post-traumatic or postsurgical bleeding and use of anti-thrombotic drugs should be taken in all patients preoperatively and prior to invasive procedures. (Grade C, Level IV).

3. If the bleeding history is negative, no further coagulation testing is indicated. (Grade C, Level IV).

4. If the bleeding history is positive or there is a clear clinical indication (e.g. liver disease), a comprehensive assessment, guided by the clinical features is required. (Grade C, Level IV).
- **Class A**: minimally invasive, ambulatory
  - **NO routine tests**
- **Class B**: moderately invasive; rarely major blood loss or marked hemodynamic changes
  - **NO tests for healthy patients**
  - Tests may be needed for medical problems
- **Class C**: typically disrupt normal physiology; commonly require transfusion
  - **CBC, T&S**
  - Tests may be needed for medical problems

**Exceptions:**
- **Creatinine**: if injection of contrast dye is planned
- **Pregnancy test**: if patient capable of child-bearing and consents for the test
A reference range is the set of values 95% of the normal population falls within (that is, 95% prediction interval), or two standard deviations from the mean. It is determined by collecting data from vast numbers of laboratory tests.

Have you ever wondered why a K of 3.7 is “normal” and 3.3 is “abnormal”?

It’s due to the “standard deviation” rule.

Labeled “abnormal” but occur in people without disease

~64% of population 1 S.D.

~95% 2 S.D.

Labeled “abnormal” but occur in people without disease

2.5%
FIVE hemoglobin levels measured in 100 healthy individuals are expected to be “abnormal”

If two tests are ordered on a healthy individual, the chance of both being normal is 0.95 X 0.95 = 0.90

There is a 10% probability that at least one result (NOT the patient) will be abnormal

Chances of abnormal results increase with the number of tests ordered

If 10 tests are ordered: 40% probability of at least one result being abnormal

Basic metabolic panel consists of 7-8 “tests”
When should repair of an inguinal hernia be postponed for further evaluation and/or management?

1. Acute MI 6 wks ago; no stents, no angina
2. Pt who had DES 13 months ago
3. Pt with stable, chronic angina
4. Pt with atrial fibrillation with HR 102
Postpone surgery pending evaluation or stabilization

**Active conditions:**
- Acute MI (<7 days)
- Recent MI (8-30 day w/myocardium at risk)
- Severe (rest), or unstable angina
- Decompensated heart failure
- Critical valvular disease
  - Severe aortic stenosis,
  - Symptomatic mitral stenosis
- Significant arrhythmias
  - Atrial fibrillation, new onset or with HR > 100
  - Ventricular tachycardia
  - Mobitz II or 3rd degree AV block
  - Symptomatic bradycardia
65 yo female with oropharyngeal cancer for panendoscopy and biopsy.

3/6 systolic murmur heard in preop
Patient unaware of murmur

Should you order an echocardiogram?

1. Yes
2. No
3. I’ll just get a cardiology consult
1-2% > 65 yr have significant aortic stenosis
9% of nursing home residents
20% of patients with systolic murmurs
25% of > 65 yo (50% > 84 yr) have aortic sclerosis
Sclerosis → stenosis
Same risk factors as CAD
MOST COMMON symptoms: Dyspnea & decrease in exercise tolerance
Syncope, heart failure, angina = SEVERE disease
Occurs at 40-50 yr of age w/bicuspid valves
Aortic stenosis: an underestimated risk factor for perioperative complications in patients undergoing noncardiac surgery

Kertai MD Am J Med 2004;116:8

8.5 fold increased risk
True or False

A ring-shaped ferrous magnet is sufficient to temporarily deactivate tachy therapy (cardioversion/defibrillation) of all commercially available ICDs.

1. True
2. False
ASA Practice Advisory – CIEDs

• For most ICDs, there is no reliable means to detect appropriate magnet placement.

• Some ICDs may have no magnet response.

• Some ICDs can be permanently disabled by magnet application.

“ICDs and pacemakers should be evaluated before and after surgical procedures.”

The Heart Rhythm Society Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: Facilities and patient management

"is expected in the July edition of HeartRhythm, www.heartrhythmjournal.com. You will be able to download the article from HRS' website at www.hrsonline.org/ClinicalGuidance/cieds_consen sus-statement.cfm on or after July 1."
Association of Sleep-Disordered Breathing with Postoperative Complications

Hwang D. Chest 2008;133:1128

Types of Complications

- Respiratory: OSA 1, Normal 1
- Cardiovascular: OSA 4, Normal 1
- GI: OSA 1, Normal 1
- Postop Bleeding: OSA 2, Normal 0
STOP-Bang Questionnaire

1. **S**noring
   Do you snore loudly (loud enough to be heard through closed doors)?
2. **T**ired
   Do you often feel **tired**, fatigued, or sleepy during daytime?
3. **O**bserved
   Has anyone observed you stop breathing during your sleep?
4. **B**lood pressure
   Do you have or are you being treated for high blood pressure?
5. **B**MI more than 35 kg/m^2^?
6. **A**ge over 50 yr old?
7. **N**eck circumference greater than 40 cm?
8. **G**ender male?

*High risk of OSA: YES to ≥ 3 items*
*Low risk of OSA: YES to < 3 items*

OSA patients referred for PSG from University of Chicago Preoperative Clinic

- No OSA (n=1)
- Mild OSA (n=10)
- Moderate OSA (n=9)
- Severe OSA (n=14)

71% received CPAP
Perioperative antiplatelet therapy: the case for continuing therapy in patients at risk of myocardial infarction

Patients with aspirin (75–150 mg day\(^{-1}\))

Primary prevention

Secondary prevention after MI, ACS, stent, stroke, PAD

Intracranial neurosurgery

Stop 7 days before operation as needed

Patients with aspirin (75–150 mg day\(^{-1}\)) + clopidogrel (75 mg day\(^{-1}\))

High-risk situations:
<6 weeks after MI, PCI, BMS, stroke
<12 months after DES
High-risk stents*

Risk of bleeding in closed space***

Low-risk situations**

All surgery

Operation under continuous treatment

All surgery

Stop clopidogrel
Maintain aspirin

Only vital surgery

Reviewed 41 studies/ 50,000 patients

ASA withdrawal precedes 10.2% of acute CV events

Rebound effect w/aspirin withdrawal (increased platelet activity)
8-12 days after stopping

Surgery and pathologies (e.g., carcinoma and diabetes) are hyper-coagulable states (Increased platelet adhesiveness, inflammation; decreased fibrinolysis)
“How NOT to give β-blockers to surgical patients” (the POISE trial) 

Lancet 2008;371:1839

Metoprolol- 400 mg within 18-24 hrs
Max recommended dose: 200 mg/day

PI of study (Cardiologist) didn’t AVOID hypotension!

Association of the Pattern of Use of Perioperative β-Blockade and Postoperative Mortality

Arthur W. Wallace, M.D., Ph.D.,* Selwyn Au, M.S.,† Brian A. Cason, M.D.‡

What This Article Tells Us That Is New

- Withdrawal of β-blockers in the perioperative period is associated with an increase in mortality, in both the short (30 days) and long (1 yr) terms.
- In actual clinical use, perioperative β-blockade reduces perioperative mortality.

Anesthesiology, V 113 • No 4 • October 2010
Impact of Medication Therapy Discontinuation on Mortality After Myocardial Infarction

P. Michael Ho, MD, PhD; John A. Spertus, MD, MPH; Frederick A. Masoudi, MD, MSPH; Kimberly J. Reid,

Arch Intern Med. 2006;166:1842-1847

- 0 vs. Any 1 Medication: 3.81 (1.88-7.72)
- 0 vs. 3 Medications: 3.33 (1.52-7.14)
- 0 vs. 1 or 2 Medications: 5.00 (1.85-13.50)

- Aspirin Discontinuation: 1.82 (1.09-3.03)
- β-Blocker Discontinuation: 1.96 (1.10-3.45)
- Statin Discontinuation: 2.86 (1.47-5.55)
✓ The history and physical exam is superior to “routine preoperative testing”

✓ Age matters!

✓ Do a test only if it leads to a lower risk

✓ Focus on INTERVENTIONS to lower risk

✓ Stay tuned for evolving practices

bsweitzer@dacc.uchicago.edu