Evaluation and Management of the Patient with Cardiac Disease for Non-Cardiac Surgery

WINTER CONFERENCE 2016
RONY GORGES, MD
67 yo man

- Asymptomatic carotid stenosis, CEA planned
- Golfs regularly, walks and carries golf clubs 9 holes
- Hypertension
- Hyperlipidemia
- On ASA, metoprolol 50 mg BID for HTN, and statin
- HR 62, regular; BP 118/82, JVP not elevated
- Clear lungs
- No edema
- Cr 1.1
- Resting ECG normal
What is the next best step?

1. Add clopidogrel 75 mg per day
2. Cancel surgery
3. Discontinue beta blocker therapy
4. Perform dobutamine echo
5. Proceed with CEA
75 yo man

- Suspicious lung mass, surgery planned
- Substernal chest pressure brought on by light to moderate activity, lasts 10-15 minutes
- Hypertension
- Smoker
- OA left knee
- On ASA, HCTZ, and metoprolol 25 mg BID for HTN
- HR 72, regular; BP 126/86, JVP not elevated
- Scattered expiratory wheezes
- No edema
- Resting ECG: >1 mm STT abnormalities, PVCs
What is the next best step?

1. Perform adenosine nuclear perfusion study
2. Perform dobutamine nuclear perfusion study
3. Perform exercise echo
4. Perform exercise treadmill test
5. Perform lung surgery
Learning Objectives

• Identify patients with known or suspected CAD who are at risk of cardiac complications during non-cardiac surgery

• Select appropriate non-invasive testing to evaluate patients with known or suspected CAD prior to non-cardiac surgery

• Select and adjust appropriate adjunctive medical therapies for the perioperative period to reduce the risk of cardiac complications during and after non-cardiac surgery

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine, and Society for Vascular Surgery

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Learning Objective #1

- Identify patients with known or suspected CAD who are at risk of cardiac complications during non-cardiac surgery
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
Active Cardiac Conditions with Major Clinical Risk

• Unstable coronary syndromes
  • Unstable or severe angina (CCS III or IV)
  • May include “stable” angina in unusually sedentary patients
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
  - Unstable or severe angina (CCS III or IV)
  - May include “stable” angina in unusually sedentary patients
- Acute MI (≤7 d)
- Recent MI (>7 d, ≤1 mo)
Active Cardiac Conditions with Major Clinical Risk

• Unstable coronary syndromes
  • Unstable or severe angina (CCS III or IV)
  • May include “stable” angina in unusually sedentary patients
• Acute MI (≤7 d)
• Recent MI (>7 d, ≤1 mo)
  • Wait 4-6 wks before elective surgery
Active Cardiac Conditions with Major Clinical Risk

• Unstable coronary syndromes
• Decompensated HF
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
  - NYHA IV or new-onset HF
Active Cardiac Conditions with Major Clinical Risk

• Unstable coronary syndromes
• Decompensated HF
• Significant arrhythmia
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
- Significant arrhythmia
  - High-grade AV block
  - Symptomatic or new VT
  - SVT/AF with resting HR>100 bpm
  - Symptomatic bradycardia
Active Cardiac Conditions with Major Clinical Risk

• Unstable coronary syndromes
• Decompensated HF
• Significant arrhythmia
• Severe valvular disease
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
- Significant arrhythmia
- Severe valvular disease
  - Severe AS (mean gradient >40 mmHg, AVA <1cm² or symptomatic)
  - Symptomatic MS
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
- Significant arrhythmia
- Severe valvular disease

≥1 condition(s) mandates Eval and Rx per ACC/AHA Guidelines
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
- Significant arrhythmia
- Severe valvular disease

≥1 condition(s) mandates Eval and Rx per ACC/AHA Guidelines

May delay or cancel surgery until treated - then consider OR
Active Cardiac Conditions with Major Clinical Risk

- Unstable coronary syndromes
- Decompensated HF
- Significant arrhythmia
- Severe valvular disease

≥1 condition(s) mandates Eval and Rx per ACC/AHA Guidelines

May delay or cancel surgery until treated - then consider OR

Unless surgery is emergent
Emergency Noncardiac Surgery

- Proceed to surgery regardless of risk (class I)
- Perform perioperative surveillance
- Perform postoperative risk stratification and management
Noninvasive Testing Before Noncardiac Surgery

Who Needs or Could Undergo Testing?

• Active cardiac conditions - eval per ACC/AHA guidelines (class I)
• If testing for CAD will change management
  • Unknown or poor function (<4 METs) with
    • ≥3 clinical risk factors + vascular surgery (class IIa)
    • ≥3 clinical risk factors + intermediate-risk surgery (class IIb)
  • 1-2 clinical risk factors + vascular or intermediate-risk surgery (class IIb)
Noninvasive Testing Before Noncardiac Surgery

3 Things You Need to Know

• Estimated functional status
• Clinical risk factors
• Cardiac risk of noncardiac surgery
Functional Status

Energy Requirements for Common Activities

1 MET
- Take care of self Perform own ADLs
- Walk indoors around house
- Walk 1-2 block(s) on level ground at 2-3 mph

4 METS
- Light house work (dusting/dishes)
- Climb 1 flight of stairs/walk uphill
- Walk on level ground at 4 mph Run short distance
- Do heavy house work (scrubbing floors, moving heavy furniture)
- Moderate recreational activities (golfing, bowling, dancing, doubles tennis, throwing baseball/ or football)

>10 METS
- Strenuous sports (swimming, singles tennis, football, basketball, skiing)
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
- Diabetes mellitus
- Renal insufficiency
Clinical Risk Factors

- History of ischemic HD
  - History of MI
  - History of (+) TMET
  - NTG use
  - Current CP c/w ischemia
  - ECG abnormal Q waves
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
Clinical Risk Factors

• History of ischemic HD
• Compensated or prior HF
  • History of HF
  • Pulmonary edema
  • PND
  • Peripheral edema
  • Bilateral rales
  • $S_3$
  • CXR with pulmonary vascular redistribution
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
  - History of TIA or CVA
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
- Diabetes mellitus
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
- Diabetes mellitus
  - Pre-operative insulin use
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
- Diabetes mellitus
- Renal insufficiency
Clinical Risk Factors

- History of ischemic HD
- Compensated or prior HF
- History of CVA
- Diabetes mellitus
- Renal insufficiency
  - Pre-operative Cr >2 mg/dL
# Noncardiac Procedures

## Cardiac Risk Stratification

<table>
<thead>
<tr>
<th>Risk* Stratification</th>
<th>Procedure Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular (&gt;5% cardiac risk)</td>
<td>Aortic and other major vascular surgery</td>
</tr>
<tr>
<td></td>
<td>Peripheral vascular surgery</td>
</tr>
<tr>
<td>Intermediate (1-5% cardiac risk)</td>
<td>Intraperitoneal and intrathoracic surgery</td>
</tr>
<tr>
<td></td>
<td>CEA</td>
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<tr>
<td></td>
<td>Head and neck surgery</td>
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<tr>
<td></td>
<td>Orthopedic surgery</td>
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<tr>
<td></td>
<td>Prostate surgery</td>
</tr>
<tr>
<td>Low &lt;1% cardiac risk)</td>
<td>Endoscopic procedures</td>
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<tr>
<td></td>
<td>Superficial procedure</td>
</tr>
<tr>
<td></td>
<td>Cataract surgery</td>
</tr>
<tr>
<td></td>
<td>Breast surgery</td>
</tr>
<tr>
<td></td>
<td>Ambulatory surgery</td>
</tr>
</tbody>
</table>

*Combined incidence of cardiac death and nonfatal MI
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I

- Active cardiac conditions - evaluation per Guidelines
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I
• Active cardiac conditions - evaluation per Guidelines

Who Could Undergo Testing? Class IIa
• If testing for CAD will change management in those with unknown/poor function (<4 METs) with ≥3 clinical risk factors + vascular surgery
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I
• Active cardiac conditions - evaluation per Guidelines

Who Could Undergo Testing? Class IIa
• If testing for CAD will change management in those with unknown/poor function (<4 METs) with ≥3 clinical risk factors + vascular surgery

Uncertainties - Class IIb
• If testing for CAD will change management in those with unknown or poor function with
  • ≥3 clinical risk factors + intermediate-risk surgery
  • 1-2 clinical risk factors + vascular or intermediate-risk surgery
Noninvasive Testing Before Noncardiac Surgery

Who Does Not Need Testing?

- Emergency surgery
- Functional capacity $\geq 4$ METs without symptoms
- Low-risk surgery
- No clinical risk factors + intermediate-risk surgery
Algorithm for Patients Age ≥50 years

Step 1: Need for emergency noncardiac surgery?
- Yes (Class I, LOE C) → Operating room → Perioperative surveillance and postoperative risk stratification and risk factor management
- No

Step 2: Active cardiac conditions
- Yes (Class I, LOE B) → Evaluate and treat per ACC/AHA guidelines → Consider operating room
- No

Step 3: Low risk surgery
- Yes (Class I, LOE B) → Proceed with planned surgery
- No

Step 4: Functional capacity ≥4 METs without symptoms
- Yes (Class IIa, LOE B) → Proceed with planned surgery
- No or unknown

Step 5: No or unknown
- ≥3 clinical risk factors
  - Vascular surgery (Class IIa, LOE B)
  - Consider testing if it will change management
- 1-2 clinical risk factors
  - Intermediate risk surgery
  - Proceed with planned surgery with HR control (Class IIa, LOE B) or consider noninvasive testing (Class IIb LOE B) if it will change management
- No clinical risk factors
  - Vascular surgery
  - Intermediate risk surgery
  - Proceed with planned surgery

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Learning Objective #2

• Select appropriate non-invasive testing to evaluate patients with known or suspected CAD prior to non-cardiac surgery
Preoperative Resting ECG

Who Needs It? Class I

• ≥1 clinical risk factor(s) + vascular surgery
• Known CHD, PAD, or CVA + intermediate-risk surgery
Preoperative Resting ECG

Who Needs It? Class I
• ≥1 clinical risk factor(s) + vascular surgery
• Known CHD, PAD, or CVA + intermediate-risk surgery

Reasonable - Class Ila
• No clinical risk factor + vascular surgery
Preoperative Resting ECG

Who Needs It? Class I
• ≥1 clinical risk factor(s) + vascular surgery
• Known CHD, PAD, or CVA + intermediate-risk surgery

Reasonable - Class IIa
• No clinical risk factor + vascular surgery

May be considered - Class IIb
• ≥1 clinical risk factor(s) + intermediate-risk surgery
Preoperative Resting ECG

Who Needs It? Class I
- ≥1 clinical risk factor(s) + vascular surgery
- Known CHD, PAD, or CVA + intermediate-risk surgery

Reasonable - Class IIa
- No clinical risk factor + vascular surgery

May be considered - Class IIb
- ≥1 clinical risk factor(s) + intermediate-risk surgery

Who Should Not Undergo? Class III
- Asymptomatic + low-risk procedures
Preoperative Resting LV Function

Who Could Undergo Assessment?

• Dyspnea of unknown origin (class IIa)
• Current or prior HF with dyspnea or clinical change if not assessed in last 2 months (class IIa)
• Clinically stable cardiomyopathy (class IIb)
Preoperative Resting LV Function

Who Could Undergo Assessment?

• Dyspnea of unknown origin (class IIa)
• Current or prior HF with dyspnea or clinical change if not assessed in last 2 months (class IIa)
• Clinically stable cardiomyopathy (class IIb)

Who Should Not Undergo Assessment?

• Routine peri-operative evaluation (class III)
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I

- Active cardiac conditions - evaluation per Guidelines
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I
• Active cardiac conditions - evaluation per Guidelines

Who Could Undergo Testing? Class IIa
• If testing for CAD will change management in those with unknown/poor function (<4 METs) with ≥3 clinical risk factors + vascular surgery
Noninvasive Testing Before Noncardiac Surgery

Who Should Undergo Testing? Class I
• Active cardiac conditions - evaluation per Guidelines

Who Could Undergo Testing? Class IIa
• If testing for CAD will change management in those with unknown/poor function (<4 METs) with ≥3 clinical risk factors + vascular surgery

Uncertainties - Class IIb
• If testing for CAD will change management in those with unknown or poor function with
  • ≥3 clinical risk factors + intermediate-risk surgery
  • 1-2 clinical risk factors + vascular or intermediate-risk surgery
Noninvasive Testing Before Noncardiac Surgery

Test Indicated – Which Test?

ABLE TO EXERCISE ADEQUATELY

- Normal resting ECG
  - Perform exercise ECG
- Resting ST-T (no ST elevations), LVH with strain, or digoxin use
  - Perform exercise imaging (nuclear or echo)
- LBBB or ventricular pacing
  - Perform vasodilator stress nuclear MPI or dobutamine echo
Noninvasive Testing Before Noncardiac Surgery

Test Indicated – Which Test?

UNABLE TO EXERCISE ADEQUATELY

• Perform pharmacologic stress imaging
  • Nuclear
    • Adenosine, dipyridamole, or regadenoson
    • Dobutamine if significant bronchospasm, 2nd or 3rd degree AV block, critical carotid disease, severe hypotension, theophylline (withhold 48 hrs), or oral dipyridamole use (can use IV dipyridamole)
Noninvasive Testing Before Noncardiac Surgery

Test Indicated – Which Test?

UNABLE TO EXERCISE ADEQUATELY

• Perform pharmacologic stress imaging
  • Nuclear
    • Adenosine, dipyridamole, or regadenoson
    • Dobutamine if significant bronchospasm, 2nd or 3rd degree AV block, critical carotid disease, severe hypotension, theophylline (withhold 48 hrs), or oral dipyridamole use (can use IV dipyridamole)
  • Echo
    • Avoid dobutamine with serious ventricular arrhythmias, severe hypertension, or hypotension
Noninvasive Testing Before Noncardiac Surgery

**Test Interpretation**

**Risk Level**

- High
- Intermediate
- Low
- Inadequate test
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Exercise ECG

Risk Level

• High
  • Ischemia at <4 METs, HR<100 bpm or <70% age-predicted
    • Horizontal or downsloping ST depression >0.1 mV
    • ST elevation >0.1 mV in leads without Q waves
    • ≥5 abnormal leads
    • Ischemic response >3 min after exertion
    • Typical angina
    • SBP drop >10mmHg
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Exercise ECG

Risk Level

• Intermediate
  • Ischemia at 4-6 METs, HR 100-130 bpm or 70-85% age-predicted
    • Horizontal or downsloping ST depression >0.1 mV
    • Ischemic response >1-3 min after exertion
    • 3-4 abnormal leads
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Exercise ECG

Risk Level

• Low
  • No ischemia or ischemia at >7 METs or HR >130 bpm or >85% age-predicted
    • Horizontal or downsloping ST depression >0.1 mV
    • 1-2 abnormal leads
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Exercise ECG

Duke Treadmill Score

= exercise time – (5 x ST deviation) – (4 x angina index)

Angina index
0 = no angina
1 = angina occurred during test
2 = angina stopped test
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation — Exercise ECG

Duke Treadmill Score

\[
= \text{exercise time} - (5 \times \text{ST deviation}) - (4 \times \text{angina index})
\]

Angina index
0 = no angina
1 = angina occurred during test
2 = angina stopped test

Bruce minutes
## Duke Treadmill Score

### Prognosis*

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<tr>
<th>Risk</th>
<th>Duke Score</th>
<th>4-yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>≥5</td>
<td>99</td>
</tr>
<tr>
<td>Intermediate</td>
<td>-10 to +4</td>
<td>95</td>
</tr>
<tr>
<td>High</td>
<td>&lt; -10</td>
<td>79</td>
</tr>
</tbody>
</table>

*Outpatient population

NEJM 325:849, 1991
Normal or Near-normal Stress SPECT MPI

Cardiac Survival

- Iskander 1998: n>12,000
- Gibbons 1999: n=4,649
- Shaw 2000: n=8,411
- Shaw 2003: n=4,728
- Meta-analysis
Normal or Near-normal Stress Echo

Cardiac Survival

- Picano 1989, n=539
- Krivokapich 1993, n=360
- Marcovitz 1996, n=291
- Heupler 1997, n=508w
- Chuah 1998, n=860
- Cortigiani 1998, n=456
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Stress Nuclear MPI

High-risk Features (>3% annual mortality)

• Severe resting or stress ↓LVEF (<35%)
• Stress-induced large perfusion defect (esp. if anterior)
• Stress-induced multiple perfusion defects of moderate size
• Large, fixed perfusion defect with LV dilatation
• Transient (poststress) LV dilatation (TID)
• Increased lung uptake (thallium-201)
Noninvasive Testing Before Noncardiac Surgery

Test Interpretation – Stress Echo

High-risk Features

• Severe resting or stress ↓LVEF
• Wall motion abnormality in >5 segments
• Wall motion abnormality in >2 segments at low dose dobutamine (≤10 mg/kg/min) or at low heart rate (<120 beats/min)
# Exercise or Imaging Test Results

## Management

<table>
<thead>
<tr>
<th>Group</th>
<th>Predicted Mortality</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>&lt;1%/year</td>
<td>Medical</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1-3%/year</td>
<td>Medical or further testing</td>
</tr>
<tr>
<td>High</td>
<td>&gt;3%/year</td>
<td>Consider invasive angiography</td>
</tr>
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Learning Objective #3

• Select and adjust appropriate adjunctive medical therapies for the perioperative period to reduce the risk of cardiac complications during and after non-cardiac surgery
Preoperative Coronary Revascularization

Who Should Undergo CABG? FOLLOW ACC/AHA CABG Guidelines Class I

• Stable angina + severe left main
• Stable angina + 3v CAD esp LVEF<50%
• Stable angina + 2v CAD w/ severe pLAD,+ either
  • LVEF<50%, or
  • Ischemia on noninvasive testing
• High-risk unstable angina or NSTEMI
• STEMI
Class IIa

- When PCI is appropriate for cardiac symptoms and elective noncardiac surgery is needed in the next 12 months, perform PTCA without stent placement or perform BMS placement followed by 4-6 wks of DTP
- If DES was already placed and urgent noncardiac surgery is needed, ASA should be continued if at all possible when DTP must be discontinued
Preoperative Coronary Revascularization

Uncertainties

Class IIb

- Usefulness of preoperative revascularization is not well established in high-risk ischemic testing results (everyone gets revascularized, limited data available)

- Usefulness of preoperative revascularization is not well established in low-risk ischemic testing results (selection bias against revascularization in low risk patients)
Previous PCI Requiring Noncardiac Surgery

Proposed Approach (Based on Expert Opinion)

- **Previous PCI**
  - **PTCA**
    - Time since PCI < 14 d: Delay for elective or nonurgent procedure
    - Time since PCI > 14 d: Proceed to OR with ASA
  - **BMS**
    - Time since PCI > 30-45 d: Delay for elective or nonurgent procedure
    - Time since PCI < 30-45 d: Proceed to OR with ASA
  - **DES**
    - Time since PCI < 365 d: Delay for elective or nonurgent procedure
    - Time since PCI > 365 d: Proceed to OR with ASA
Pts Requiring PCI Who Need Surgery

Proposed Approach

Acute MI, high-risk ACS, or high-risk anatomy

Bleeding risk of surgery

- TIMING OF SURGERY
  - 14 to 29 d: Balloon angioplasty
  - 30 to 365 d: BMS
  - >365 d: DES*

- BLEEDING RISK
  - Low: Stent and continue DTP
  - Not low:

*Second generation DES may only need 6 mo of DTP
Perioperative Beta Blocker Therapy

Who Should Receive It? Class I

• Those already on it for appropriate indications
Perioperative Beta Blocker Therapy

Who Should Receive It? Class I
• Those already on it for appropriate indications

Who Could Receive It? Class Ila
• Titrated to HR and BP in
  • High cardiac risk (CAD or cardiac ischemia on testing) + vascular surgery
  • >1 clinical risk factor + vascular surgery
  • >1 clinical risk + intermediate-risk surgery
Perioperative Beta Blocker Therapy

Uncertainties - Class IIb

- 1 clinical risk factor (no known CAD) + intermediate-risk or vascular surgery
- No clinical risk factors and not already on BB + vascular surgery
Perioperative Beta Blocker Therapy

Uncertainties - Class IIb

• 1 clinical risk factor (no known CAD) + intermediate-risk or vascular surgery
• No clinical risk factors and not already on BB + vascular surgery

Do Not Give - Class III

• Absolute contraindications to BB
Perioperative Beta Blocker Therapy

Dose Titration

ACC/AHA USA/NSTEMI and STEMI Guidelines
• Goal resting HR 50-60 bpm

Poldermans Study
• Goal resting HR 60-65 bpm

Other
• Start several weeks before planned noncardiac surgery
• Avoid perioperative withdrawal unless necessary
Perioperative Statin Therapy

Who Should Receive It? Class I

• Those already on it
Perioperative Statin Therapy

Who Should Receive It? Class I
• Those already on it

Who Could Receive It? Class IIa
• Those undergoing vascular surgery with or without clinical risk factors
Perioperative Statin Therapy

Who Should Receive It? Class I

- Those already on it

Who Could Receive It? Class IIa

- Those undergoing vascular surgery with or without clinical risk factors

Uncertainties - Class IIb

- At least 1 clinical risk factor + intermediate-risk surgery
Perioperative Use of Pulmonary Artery Catheters

Uncertainties - Class IIb

• Reasonable to use in pts at risk for major hemodynamic disturbances easily detected by PACs and 3 parameters:
  • Pt disease,
  • Surgical procedures w/ fluid shifts, and
  • Experience with use and interpretation

• Incorrect interpretation may cause harm
Perioperative Use of PACs

Not recommended - Class III

- Routine use, esp in low-risk pts
Surveillance for Perioperative MI

Who Should Have Postop Troponin? Class I

• Pts with ECG changes or CP typical of ACS
Surveillance for Perioperative MI

Who Should Have Postop Troponin? Class I

- Pts with ECG changes or CP typical of ACS

Not well established - Class IIb

- Clinically stable pts who have undergone vascular and intermediate risk surgery
Surveillance for Perioperative MI

Who Should Have Postop Troponin? Class I

- Pts with ECG changes or CP typical of ACS

Not well established - Class IIb

- Clinically stable pts who have undergone vascular and intermediate risk surgery

Not recommended - Class III

- Asymptomatic stable pts who have undergone low-risk surgery
Learning Objectives

• Identify patients with known or suspected CAD who are at risk of cardiac complications during non-cardiac surgery
• Select appropriate non-invasive testing to evaluate patients with known or suspected CAD prior to non-cardiac surgery
• Select and adjust appropriate adjunctive medical therapies for the perioperative period to reduce the risk of cardiac complications during and after non-cardiac surgery
67 yo man

- Asymptomatic carotid stenosis, CEA planned
- Golfs regularly, walks and carries golf clubs 9 holes
- Hypertension
- Hyperlipidemia
- On ASA, metoprolol 50 mg BID for HTN, and statin
- HR 62, regular; BP 118/82, JVP not elevated
- Clear lungs
- No edema
- Cr 1.1
- Resting ECG normal
What is the next best step?

1. Add clopidogrel 75 mg per day
2. Cancel surgery
3. Discontinue beta blocker therapy
4. Perform dobutamine echo
5. Proceed with CEA
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75 yo man

- Suspicious lung mass, surgery planned
- Substernal chest pressure brought on by light to moderate activity, lasts 10-15 minutes
- Hypertension
- Smoker
- OA left knee
- On ASA, HCTZ, and metoprolol 25 mg BID for HTN
- HR 72, regular; BP 126/86, JVP not elevated
- Scattered expiratory wheezes
- No edema
- Resting ECG: >1 mm STT abnormalities, PVCs
What is the next best step?

1. Perform adenosine nuclear perfusion study
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4. Perform exercise treadmill test
5. Perform lung surgery
What is the next best step?

1. Perform adenosine nuclear perfusion study
2. Perform dobutamine nuclear perfusion study
3. Perform exercise echo
4. Perform exercise treadmill test
5. Perform lung surgery
Board Pearls

• Active cardiac conditions: Eval and Treat according to ACC/AHA Guidelines

• Reasonable candidates for stress testing prior to noncardiac surgery: If testing will change management in those with unknown/poor function (<4 METs) with ≥3 clinical risk factors + vascular surgery (IIa)

• CABG/PCI generally should not be performed to “get patients through surgery” only

• Continue peri-op beta blockade in those already on it

• Statins are reasonable in those undergoing major vascular surgery, if not already on it

• Do not routinely use PACs peri-operatively, esp in low-risk patients
Learning Objectives

• Identify patients with known or suspected CAD who are at risk of cardiac complications during non-cardiac surgery

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2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American College of Surgeons, American Society of Anesthesiologists, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, and Society of Cardiovascular Anesthesiologists,

Endorsed by the Society of Hospital Medicine

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