Preoperative Cardiac Evaluation
Prior to Noncardiac Surgery

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Overview

- Learning objectives
- Introduction
- Procedure risk categorization
- Preoperative estimation of cardiac risk
- Stepwise approach to preoperative evaluation
- Preoperative cardiac testing
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- Summary
### Preoperative Cardiac Evaluation

#### Abbreviations

- **ACC**: American College of Cardiology
- **AHA**: American Heart Association
- **ASA**: American Society of Anesthesiologists
- **NICE**: National Institute for Health and Care Excellence
- **MACE**: Major adverse cardiac event(s)

#### Abbreviations (cont.)

- **RCRI**: Revised Cardiac Risk Index
- **ACS NSQIP**: American College of Surgeons National Surgical Quality Improvement Program
- **ACS**: Acute coronary syndrome
- **PCI**: Percutaneous coronary intervention
- **DAPT**: Dual antiplatelet therapy
Learning Objectives

1. List patient characteristics that increase risk of perioperative MACE.
2. Categorize procedures into low-risk or elevated-risk.
3. Estimate individual patients’ cardiac risk using the RCRI.
4. Estimate individual patients’ cardiac risk using the ACS NSQIP online risk calculator.

Learning Objectives (cont.)

5. Discuss optimal timing of elective noncardiac surgery after ACS or PCI.
Preoperative Cardiac Evaluation

Introduction

- > 50 million surgeries in the US annually
- 1.4 – 3.9% of surgeries in the US are complicated by a major perioperative cardiac event
- Cardiac complications are the most common cause of postoperative morbidity and mortality
- Two major determinants of surgical outcomes:
  - Procedure type
  - Patient characteristics

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Procedure risk

2014 ACC/AHA Guidelines divide procedures into only two categories:

- Low:
  - Procedure wherein the combined surgical and patient characteristics predict a risk of MACE < 1%
  - e.g. cataract surgery, plastic surgery, endoscopy
- Elevated:
  - Procedure wherein the combined surgical and patient characteristics predict a risk of MACE ≥ 1%
  - e.g. open and vascular procedures
Preoperative Cardiac Evaluation

Preoperative cardiac risk estimation

ACC/AHA recommends use of one of the following cardiac risk estimation tools:

- Revised Cardiac Risk Index (RCRI)
- ACS NSQIP Surgical Risk Calculator

Revised Cardiac Risk Index

Two or more of the following risk factors make a patient “high risk.”

- High-risk surgery (intraperitoneal, intrathoracic, or supra-inguinal vascular procedures)
- History of ischemic heart disease
- History of congestive heart failure
- History of cerebrovascular disease
- Preoperative treatment with insulin
- Preoperative serum creatinine >2.0 mg/dL
Preoperative Cardiac Evaluation

Preoperative risk estimation (cont.)

ACS NSQPI Surgical Risk Calculator:

- 22 questions (about patient (including ASA class) and planned procedure)
- Online: [http://riskcalculator.facs.org/](http://riskcalculator.facs.org/)

ASA Classification:

1: Healthy patient
2: Mild systemic disease
3: Severe systemic disease
4: Severe systemic disease / constant threat to life
5: Moribund / not expected to survive surgery
Welcome to the ACS NSQIP Surgical Risk Calculator

With this tool you can enter preoperative information about your patient to provide estimates regarding your patient's risk of postoperative complications.

The Risk Calculator is using updated parameters effective July 18, 2017.

Disclaimer: The ACS Surgical Risk Calculator estimates the chance of an unfavorable outcome (such as a complication or death) after surgery. The risk is estimated based upon information the patient gives to the healthcare provider about prior health history. The estimates are calculated using data from a large number of patients who had a surgical procedure similar to the one the patient may have.

Please note the risk percentages provided to you by the Surgical Risk Calculator are only estimates. The risk estimate only takes certain information into account. There may be other factors that are not included in the estimate which may increase or decrease the risk of a complication or death. These estimates are not a guarantee of results. A complication after surgery may happen even if the risk is low. This information is not intended to replace the advice of a doctor or healthcare provider about the diagnosis, treatment, or potential outcomes. ACS is not responsible for medical decisions that may be made based on the risk calculator estimates, since these estimates are provided for informational purposes. Patients should always consult their doctor or other health care provider before deciding on a treatment plan.

Risk Calculator Permitted Use: An external platform (e.g., an electronic health record) may open the web address of the ACS NSQIP surgical risk calculator in a new browser window. However, we do not permit the calculator to appear as an integrated feature of any external platform, nor do we permit the functionality of the calculator to be automated in any way. The calculator must be presented in its original, unaltered form, maintaining all ACS branding and copyright information.
### Enter Patient and Surgical Information

**Procedure:**
47805 - Cholecystectomy, with cholangiography

Begin by entering the procedure name or CPT code. One or more procedures will appear below the procedure box. You will need to click on the desired procedure to properly select it. You may also search using two words or two partial words by placing a "*" in between, for example: "cholecystectomy * cholangiography".

**Reselect All Selections**

- Are there other potential appropriate treatment options?
  - [ ] Other Surgical Options
  - [ ] Other Non-surgical options
  - [x] None

---

**Please enter as much of the following information as you can to receive the best risk estimates. A rough estimate will still be generated if you cannot provide all of the information below.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
</tr>
<tr>
<td>Under 55 years</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Functional Status</strong></td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Emergency Case</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Diet</strong></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Hypertension requiring medication</strong></td>
<td>✓</td>
</tr>
<tr>
<td>Yes</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Congestive Heart Failure in 30 days prior to surgery</strong></td>
<td>✓</td>
</tr>
<tr>
<td>No</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Dyspnea</strong></td>
<td></td>
</tr>
<tr>
<td>With Moderate exertion</td>
<td>✓</td>
</tr>
</tbody>
</table>

**ASA Class**
- Severe systemic disease
- No
- Acute pain within 30 days prior to surgery
- No
- Systemic sepsis within 48 hours prior to surgery
- None
- Ventilator Dependent
- No
- Disseminated Cancer
- No

**Current Smoker within 1 Year**
- Yes

**History of Severe COPD**
- No

**Dialysis**
- No

**Acute Renal Failure**
- No

**BMI Calculation**
- Weight: 62 kg / 157 cm
- Weight: 175 lb / 70 kg
Create a report to keep: Select how you would like to get the report.

I would like my report:

- E-mailed to me
- Save or Print Report (PDF)
- Patient Name (Optional)

The report will take a few seconds to create.
Please be patient.

Finish

Disclaimer:
The information contained in this report is privileged patient health information and may be subject to protection under the law including the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The ACS is not responsible for ensuring that this information is transmitted or stored in a secure environment.

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### Preoperative Cardiac Evaluation

#### Stepwise preoperative evaluation

Once the patient’s perioperative risk for MACE has been estimated using one of the preceding methods, this information can be used in one of the following algorithms:

<table>
<thead>
<tr>
<th>How to Interpret the Graph Above:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Your Risk</strong></td>
</tr>
<tr>
<td><strong>Average Patient Risk</strong></td>
</tr>
<tr>
<td><strong>Your % Risk</strong></td>
</tr>
</tbody>
</table>

#### Definitions

**Serious Complication** includes important problems that occur after surgery including:
- Death (any cause)
- Heart attack
- Kidney failure: Kidneys no longer function in making urine and/or clearing the blood of toxins
- Blood clot: Clot in the legs or lungs
- Kidney failure: Kidneys no longer function in making urine and/or clearing the blood of toxins
- Pneumonia: Infection in the lungs
- Wound infection: Infection of the bladder and kidneys
- Wound dehiscence: Separation of the layers of a surgical wound

**Any Complication** also includes:
- Urinary tract infection: Infection of the bladder and kidneys
- Wound infection: Infection of the bladder and kidneys
- Wound dehiscence: Separation of the layers of a surgical wound
- Blood clot: Clot in the legs or lungs
- Pulmonary embolism (PE): Blood clot in the lungs
- Blood clot: Clot in the legs or lungs

**Discharge** to another facility includes:
- Discharge to a nursing or rehab facility
- Discharge to a facility other than home

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STOP-Bang screening tool for obstructive sleep apnea

<table>
<thead>
<tr>
<th>S</th>
<th>Snoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Tiredness</td>
</tr>
<tr>
<td>O</td>
<td>Observed apnea</td>
</tr>
<tr>
<td>P</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>B</td>
<td>Body mass index &gt;35 kg/m²</td>
</tr>
<tr>
<td>A</td>
<td>Age &gt;50 years</td>
</tr>
<tr>
<td>N</td>
<td>Neck circumference &gt;40 cm</td>
</tr>
<tr>
<td>G</td>
<td>Male gender</td>
</tr>
</tbody>
</table>

Scoring:
- 0-3: Low risk
- 4+: High risk
Assess functional status. Can patient complete >4 METS?

- Sexual relations
- Climbing a flight of stairs
- Moderate recreational activities (golf, bowling, dancing)
- Yard work (raking leaves, weeding, pushing power mower)
- Throwing a baseball or football
- Walking up a hill
- Doubles tennis
Preoperative Cardiac Evaluation

Preoperative cardiac testing

ACC/AHA recommends *against* using the following cardiac tests in the following situations (class III):

- 12-lead EKG
  - Routine preoperative EKG is *not* useful for asymptomatic patients undergoing low risk procedures.

- Assessment of left ventricular (LV) function
  - Routine preoperative evaluation of LV function is *not* recommended.

(continues)
Preoperative Cardiac Evaluation

Preoperative cardiac testing (cont.)

ACC/AHA recommends against using the following cardiac tests in the following situations (class III):

• Exercise or pharmacologic stress testing
  • Routine stress testing is not useful for patients at low perioperative risk for MACE
  • Routine stress testing is not useful for patients undergoing low-risk procedures

• Preoperative coronary angiography
  • Routine preoperative coronary angiography is not recommended

Procedure timing

Elective noncardiac surgery should be delayed following:

• ACS
  • 2014 ACC/AHA Guidelines: minimum 60 day interval between ACS and elective noncardiac surgery.

• PCI
  • Recommended time delay depends on presence and type of stent implanted.
Summary

- Estimation of patients’ cardiac risk is a key component of preoperative evaluation prior to elective noncardiac surgery.

- Patients undergoing low-risk procedures usually do not require preoperative cardiac testing.

- Patients at low-risk for MACE (as determined by the RCRI or the ACS NSQIP Surgical Risk Calculator) may proceed with surgery without further cardiac testing.

- Elective noncardiac surgery should be delayed following ACS and/or PCI.
Preoperative Cardiac Evaluation

References


(cont.)

Preoperative Cardiac Evaluation

References (cont.)


(cont.)
References (cont.)


