

PERIOPERATIVE EVALUATION



Brenda Shinar, MD

Case 1

Your 75 year-old mother calls in a panic to tell you that she has hurt her knee and cannot bear weight due to excruciating pain. She was doing some stretches, lying on her back and flexing her knee when she heard a loud “pop” and experienced severe knee pain. She is now unable to stand, and her knee is swollen. You refer her to the ED where she is evaluated with an x-ray, which does not reveal a fracture. A subsequent MRI, however, reveals a large “bucket handle” meniscal tear and a joint effusion. She is referred for orthopedic surgery consultation, and the surgeon recommends surgical intervention.

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According to the most recent literature, which of the following is the most appropriate cardiovascular perioperative evaluation prior to surgery?

- A. EKG
- B. Lexiscan stress test
- C. Dobutamine echocardiogram
- D. Proceed to surgery with no intervention required

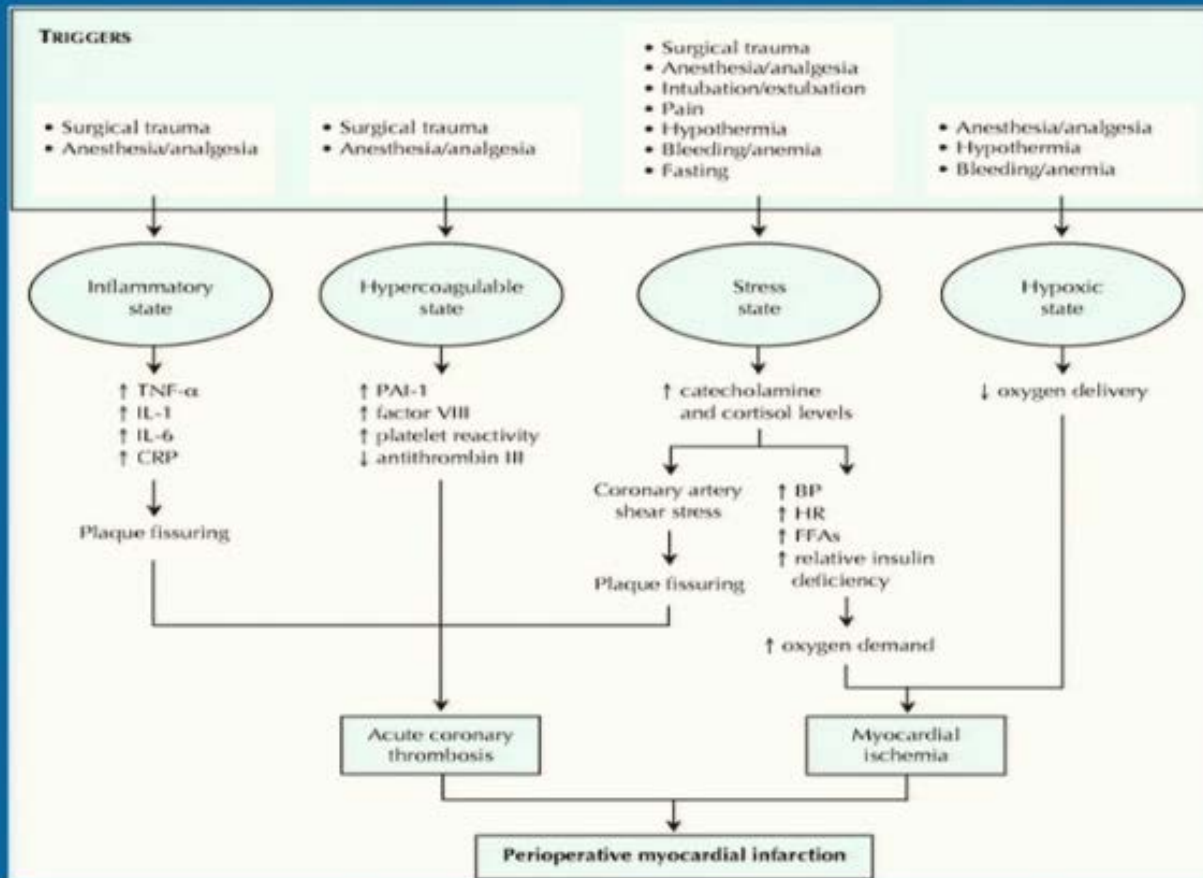
The statistics....

- There are more than 50 million surgeries/ year in USA
- American College of Surgeons (ACS): National Surgical Quality Improvement Program (NSQIP) database: 2007; 200,000 surgeries; Myocardial Infarction Cardiac Arrest (MICA) rate: 0.65%
- ACS: NSQIP 2009-2012; 1.4 million surgeries; MICA rate: 0.89%

The morbidity...

- Patients who have a **perioperative cardiac arrest** at the time of noncardiac surgery have a **hospital mortality rate of 65%**.
- Patients experiencing an **perioperative MI** with noncardiac surgery have a **30 day mortality rate of 11%**.
- Nonfatal **perioperative MI** is an independent risk factor for **cardiovascular death and nonfatal MI** during the **6 months** following surgery.
- **Perioperative MI** prolongs a hospital stay by mean of **11 days...**

What Causes / Triggers Perioperative Cardiovascular Events ?



- Inflammation
- Hypercoagulable state
- Elevated catecholamines, cortisol
- Blood loss
- Anemia
- Fluid shifts
- Fixed CAD

Objectives

- How can we identify the patients who are most at risk for a perioperative cardiac event?
- Does prophylactic revascularization lower the perioperative cardiac morbidity and mortality?
- Does medical therapy lower the perioperative risk?
- What is the optimal medical therapy and who should get it?

What are the goals of a preoperative evaluation?

- 1) To assess the patient's current medical status
- 2) Make recommendations concerning the management and risk of cardiac problems over the entire perioperative period
- 3) Provide a clinical risk profile that can be used to make treatment decisions that may affect both short-term and long-term cardiac outcomes

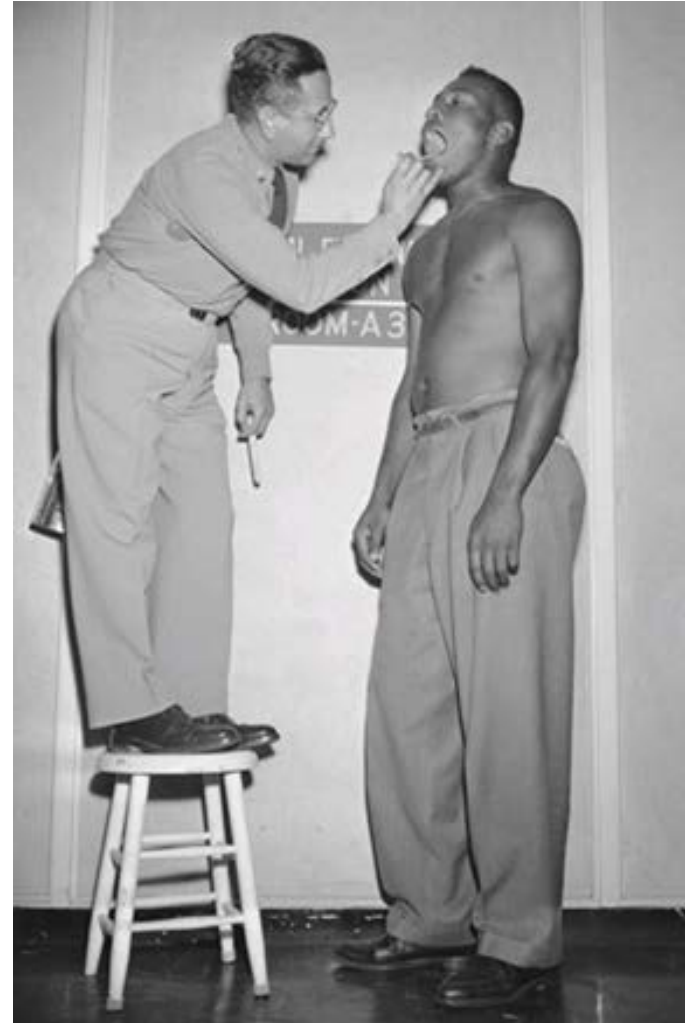
The History is the Key!

- Complete review of systems INCLUDING:
- ***Functional status >4 METS***
- Medications including OTC/herbs
- Allergies including foods that may cross-react with latex
- Surgical and anesthesia history

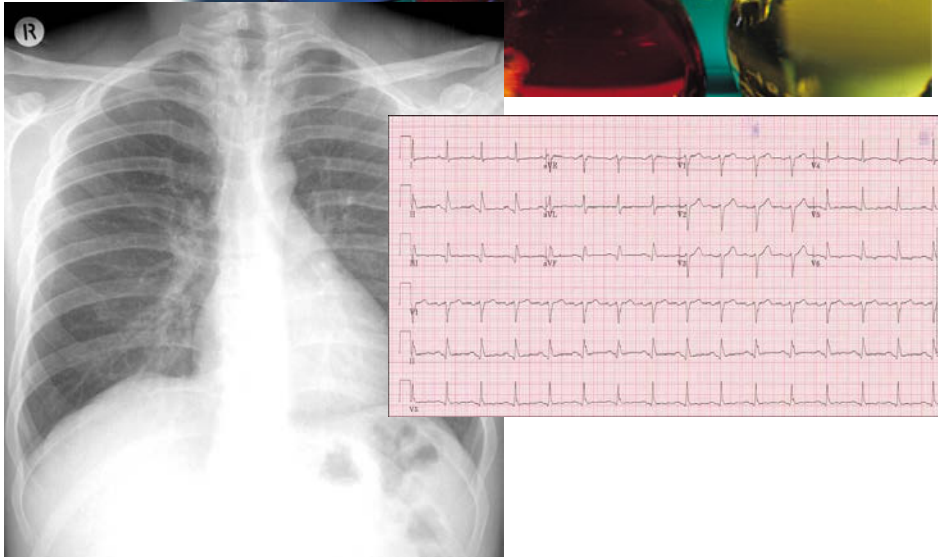


Detailed Physical Exam

- Decompensated CHF or COPD
- Stigmata of liver disease
- Evaluate for potential alcohol withdrawal in heavy alcohol users
- Follow up on positive review of systems



Selective Laboratories



- EKGs are not indicated for patients who are asymptomatic and undergoing low risk surgical procedures
- Can consider baseline EKG for asymptomatic patient without CAD undergoing elevated risk procedure (IIb, LOE B)
- ECHOs should not be ordered routinely on asymptomatic patients
- PFTs are not necessary except for lung-reduction surgery, (but it may be helpful to have a baseline ABG...)

Procedure Risk of Major Adverse Cardiac Event (MACE)

Low Risk (< 1%)

- Ambulatory surgery
 - Endoscopy
 - Cataract surgery
- Mohs surgery/skin biopsy
 - Breast surgery

Newest guidelines break down surgical risk to **LOW < 1%** and **ELEVATED ≥1%**

Intermediate Risk (1-5%)

- Carotid endarterectomy
- Head and neck surgery
 - Intraperitoneal and intrathoracic surgery
- Orthopedic surgery
 - Prostate surgery

High Risk (>5%)

- Aortic and other major vascular surgery
- Peripheral artery surgery

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What are the tools we have to assess perioperative cardiac risk?

1. Revised Cardiac Risk Index (RCRI)
2. ACC/AHA 2014 Guidelines
3. ACS: NSQIP risk calculator (Gupta score)

Revised Cardiac Risk Index

Lee, et al. Circulation 1999

- Prospective Study
- 4315 patients \geq to 50 years old
- 2/3 (2893) assigned to derivation cohort
1/3 (1422) assigned to validation cohort
- Rates of major complications were 2% and 2.5%, respectively.
- ***Statistically verified 6 independent risk factors for perioperative cardiac morbidity and mortality...***

Revised Cardiac Risk Index (RCRI)

SIX INDEPENDENT PREDICTORS:

- 1) High risk surgery
- 2) CAD
- 3) CHF
- 4) CVA
- 5) DM treated with insulin
- 6) Preop creatinine > 2



The 6 Risks Defined...

- 1) **High Risk Procedure**
 - Thoracic vascular
 - Abdominal vascular
 - Pelvic vascular
 - Peripheral vascular
 - Prolonged surgery with large fluid shifts
- 2) **Coronary Artery Disease**
 - History of MI
 - History of positive stress test
 - Use of nitroglycerin
 - Current complaints of anginal pain
 - EKG with abnormal Q waves
- 3) **Congestive Heart Failure**
 - History of heart failure
 - Pulmonary edema
 - Paroxysmal Nocturnal Dyspnea
 - Peripheral edema
 - Bilateral Rales, S3
- 4) **Cerebral Vascular Disease**
 - TIA or Stroke
- 5) **Diabetes on Insulin**
- 6) **Renal Insufficiency Cr > 2 mg/dL.**

Revised Cardiac Risk Index

Predictors:

- Ischemic heart disease
- Congestive heart failure
- Diabetes requiring insulin
- Creatinine > 2 mg/dL
- Stroke or TIA
- “High Risk” operation
(intraperitoneal, intrathoracic,
or suprainguinal vascular)

# of RCRI	Complications	
Predictors	Any	Serious
0	0.5%	0.4%
1	1.3%	1%
2	4%	2.4%
≥ 3	9%	5.4%

Any: MI, cardiac arrest, complete heart block, *pulmonary edema*

Serious: MI & cardiac arrest

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What is this patient’s RCRI score?

- A. 0
- B. 1
- C. 2
- D. Cannot be determined with the above information

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Case 2

A 68 year old man is seen for a preoperative evaluation for a total left knee arthroplasty. He engages in no exercise and does minimal walking due to his knee pain. He reports no other symptoms. Medical history is notable for hypertension for which he takes losartan and diabetes mellitus type 2 for which he takes metformin and glargine insulin. His serum creatinine is 1.8 mg/dL.

What is this patient's RCRI score?

- A. 0
- B. 1
- C. 2
- D. 3

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A 68 year old man is seen for a preoperative evaluation for a total left knee arthroplasty. He engages in no exercise and does minimal walking due to his knee pain. He reports no other symptoms. Medical history is notable for hypertension for which he takes losartan and diabetes mellitus type 2 for which he takes metformin and glargine insulin. His serum creatinine is 1.8 mg/dL.

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3. ACS: NSQIP risk calculator (Gupta score)

ACC/AHA 2014 Guidelines Asks 4 Questions...

1. What is the urgency of the surgery?
2. Is there an active cardiac condition requiring treatment?
3. What is the combined surgical and clinical risk to the patient (LOW or ELEVATED)?
4. What is the functional status of the patient in metabolic equivalents (METs)?

1. What is the urgency of the surgery?

Emergent:

Life or limb is threatened without procedure in **< 6 hours**

Time Sensitive:

A delay of **>1-6 weeks** will negatively affect outcomes

Urgent:

Time for limited evaluation, but need for OR between **6 hours to one day (24 hours)** to avoid loss of life or limb

Elective surgery:

Can be delayed for up to **1 year**



AND



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What is the urgency of this surgery?

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- B. Urgent
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A 72 year old man comes to the hospital for complaints of hemoptysis. He has a 55 pack-year history of smoking (currently smoking) and worked in construction for many years. On CT scan in the ED, he is found to have a 2.5 cm non-calcified spiculated mass in the left upper lobe. He is admitted to the hospital for evaluation due to persistent hemoptysis and is seen by the pulmonary service. A biopsy of the mass is performed and results in a diagnosis of non-small cell lung cancer, squamous type. A PET/CT scan reveals no lymphadenopathy or metastatic disease. The hemoptysis resolves. CT surgery is consulted and asks you to perform a perioperative consultation for evaluation of cardiac risk.

What is the urgency of this surgery?

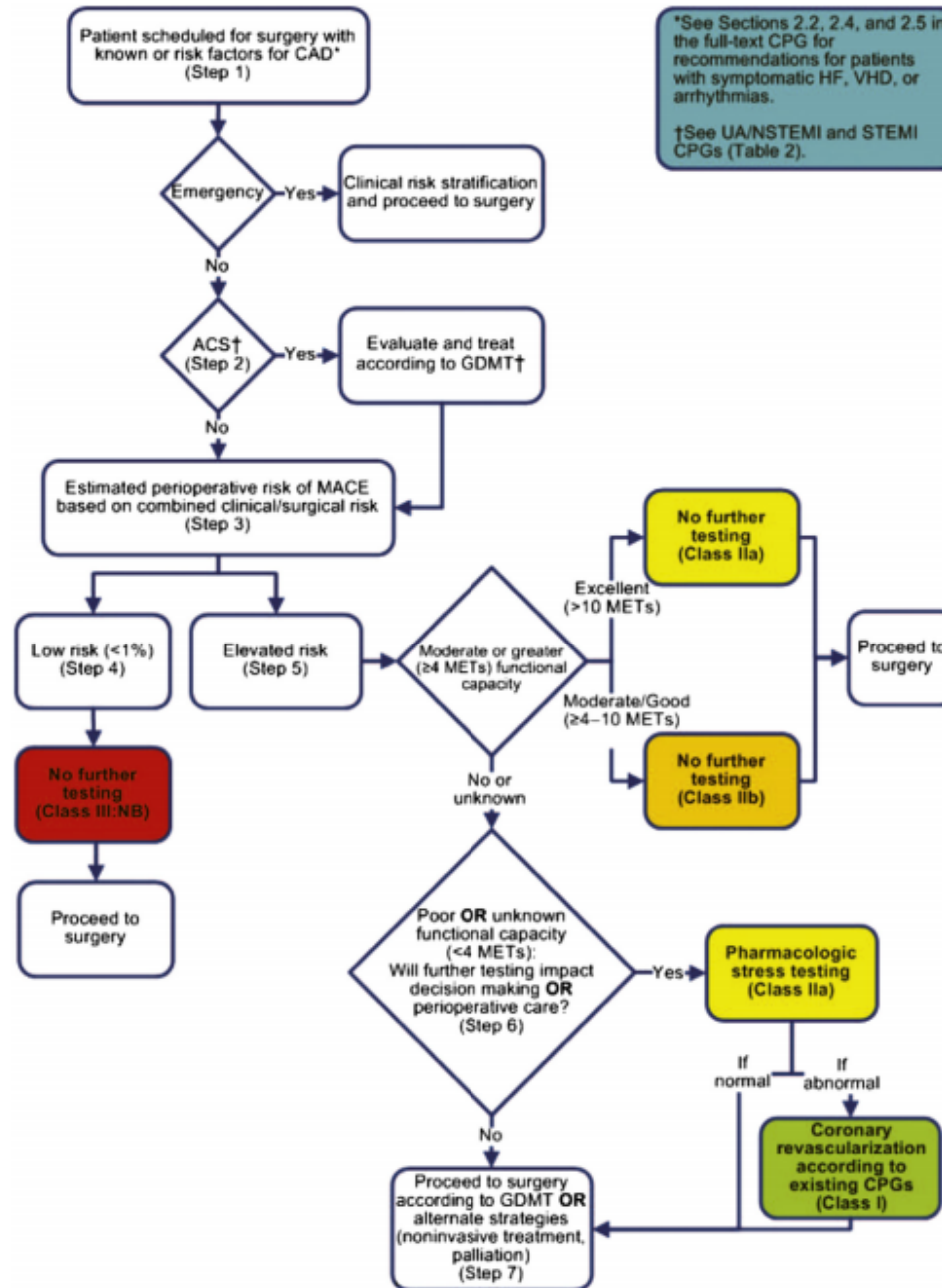
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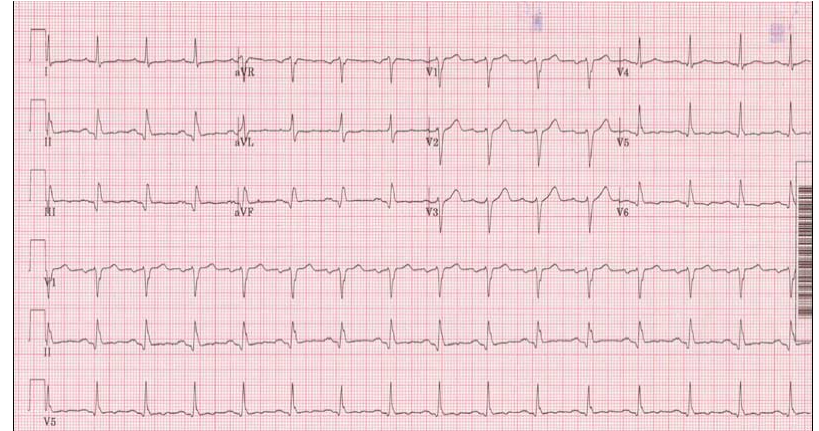
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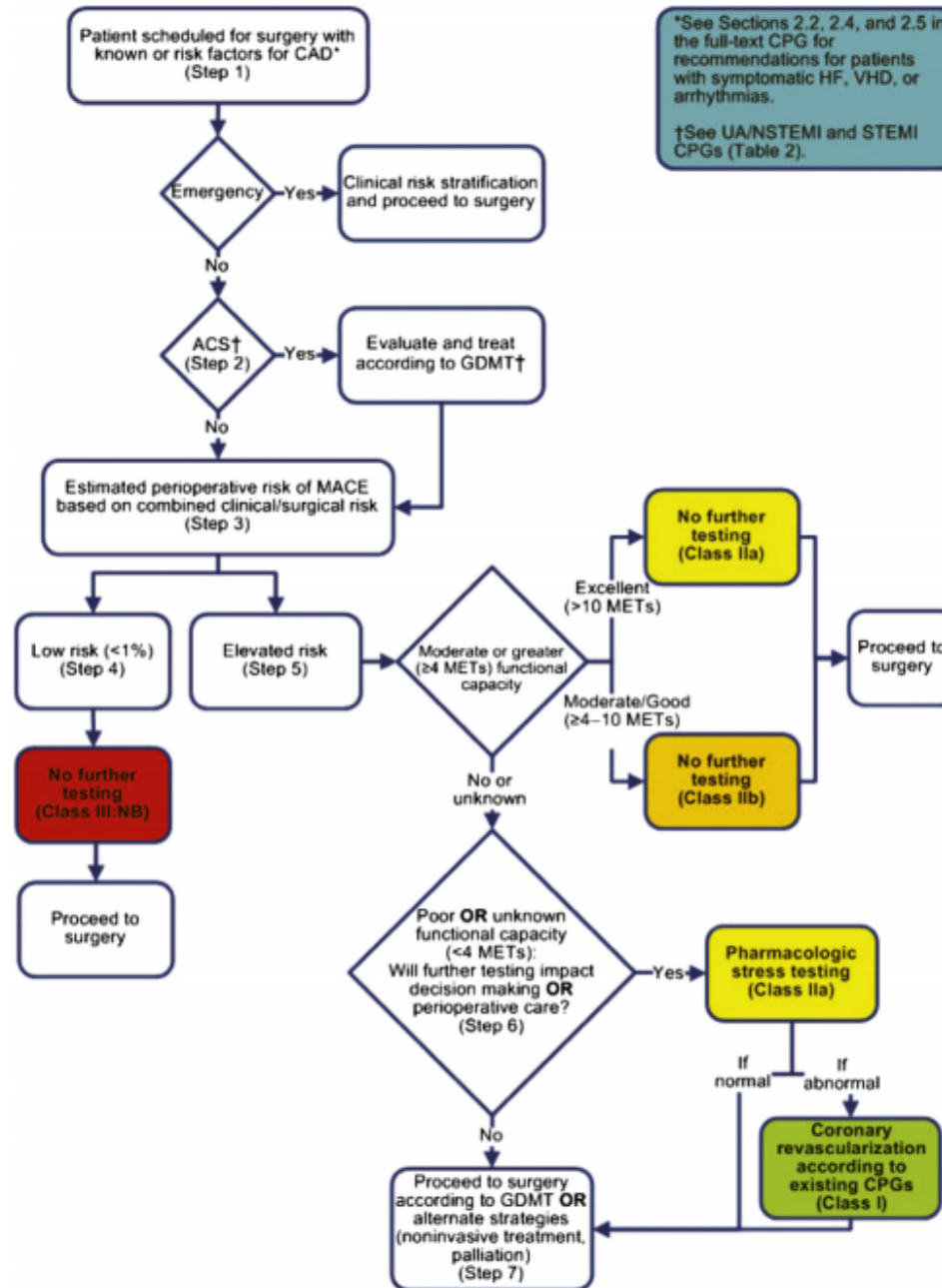
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1. If there is need for emergency surgery...





2. Is there a Current Active Cardiac Condition?

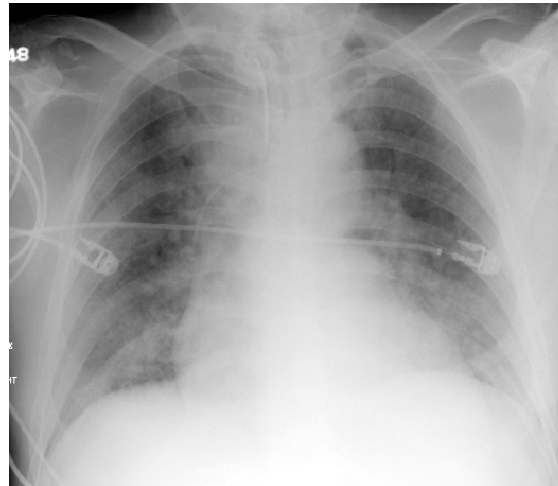
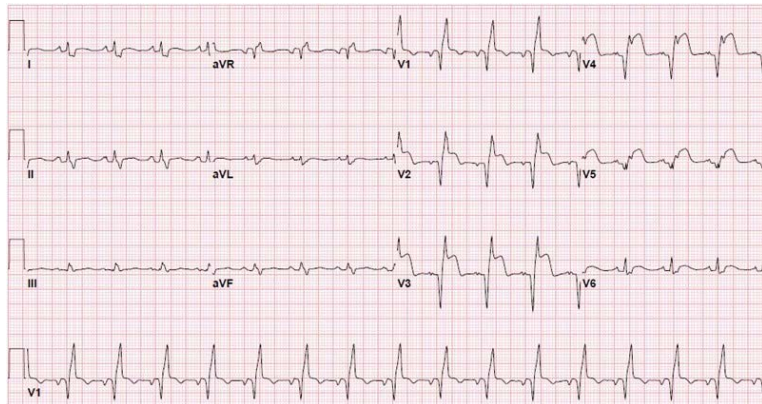
Unstable coronary syndromes

Recent MI (<60 days in the absence of coronary intervention)

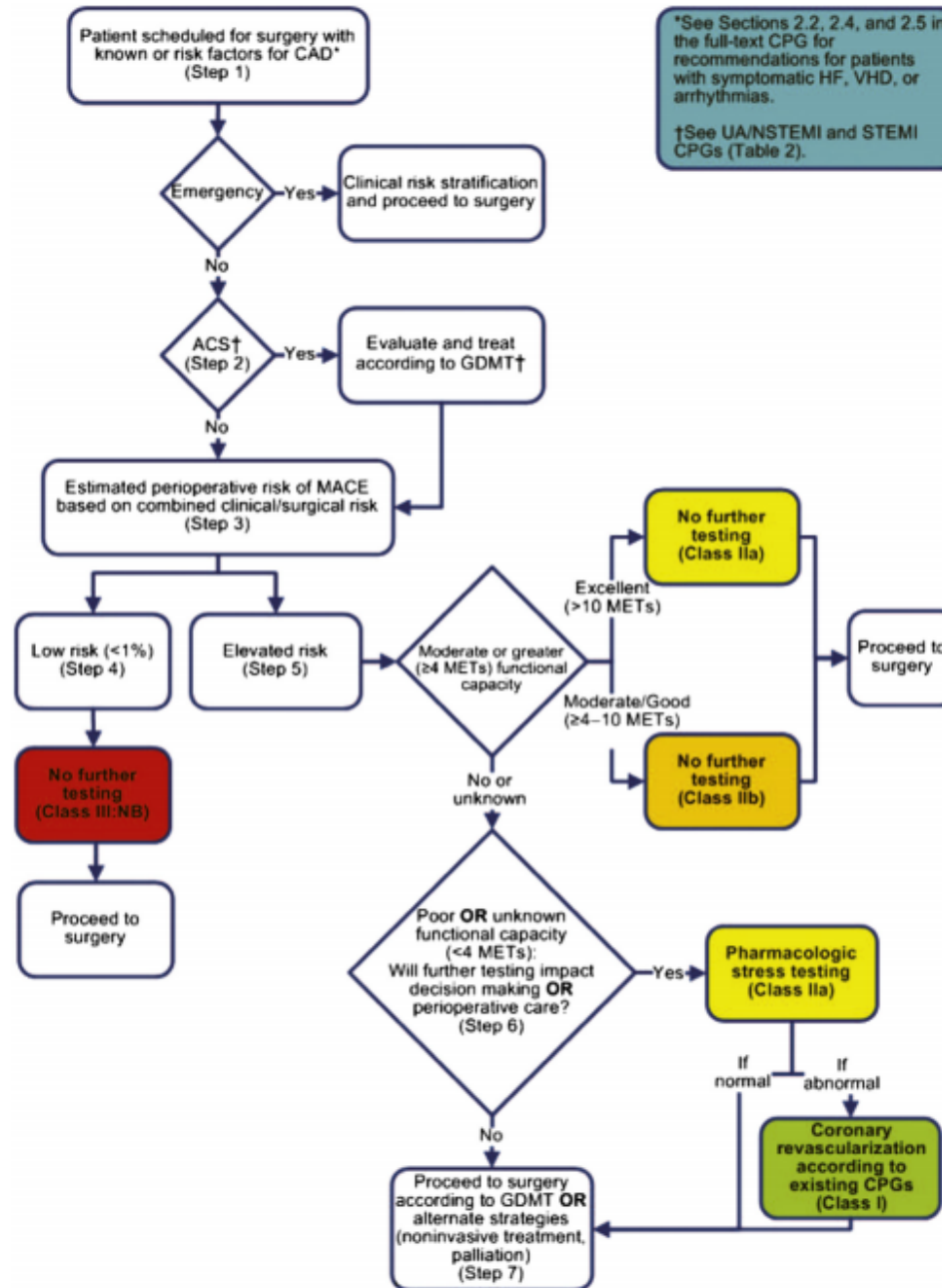
Decompensated heart failure

Significant arrhythmias

Severe symptomatic valvular disease



Stenotic Valve



Case 2

A 72 year old man comes to the hospital for complaints of hemoptysis. He has a 55 pack-year history of smoking (currently smoking) and worked in construction for many years. He is also a heavy alcohol drinker, drinking several hard liquor drinks/night. On CT scan in the ED, he is found to have a 2.5 cm non-calcified spiculated mass in the left upper lobe. He is admitted to the hospital for evaluation due to persistent hemoptysis and is seen by the pulmonary service. A biopsy of the mass is performed and results in a diagnosis of non-small cell lung cancer, squamous type. A PET/CT scan reveals no lymphadenopathy or metastatic disease. The hemoptysis resolves. CT surgery is consulted and asks you to perform a perioperative consultation for evaluation of cardiac risk.

On physical examination, the BP is 170/90 mm Hg, HR is 75/min, RR is 14/min, and the patient is afebrile. O2 saturation is 95% on RA and BMI is 22. The examination is normal including the lung exam and the heart exam. Laboratory results reveal a fasting blood glucose of 90 mg/dL and a creatinine of 1.6 mg/dL. The patient is able to do most of his ADLs on his own but needs some help (partially dependent).

What is the patient's predicted cardiovascular risk according to the NSQIP risk calculator?

- A. Low risk
- B. Elevated risk
- C. Unable to determine with the above information

Galen eCalcs - Calculator: Gupta Perioperative Risk

Contents [\[hide\]](#)

- 1 Description
 - 1.1 Limitations
- 2 Calculator Search/Filter Keywords
 - 2.1 Specialties
 - 2.2 Systems
- 3 Calculator Inputs
- 4 Calculator Outputs
- 5 References



Description


The Gupta Perioperative Calculator is designed to estimate perioperative cardiac risk for patients. This test model is based on a large sample of 400,000 patients.

Limitations

The following limitations indicate that these variations were not taken into account while conducting the study for this test. However, even with these limitations, the predictability of risk is at the 88th percentile.

- Absence of information on perioperative test stress test
- Echocardiography
- arrhythmia
- Aortic Valve Diseases

Gupta Perioperative Cardiac Risk 

Age:

Creatinine:

ASA Class:

Perioperative Functional Status:

Procedure Type:

NSQIP MICA risk score (Gupta score)

- Age
- ASA classification
- Creatinine
- Functional Status
- Procedure

ASA Classification

ASA PS Classification	Definition	Examples, including, but not limited to:
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use
ASA II	A Patient with mild system disease	Mild diseases only without substantive functional limitations. Examples include (but not limited to): current smoker, social alcohol drinker, pregnancy, obesity ($30 < \text{BMI} < 40$), well-controlled DM/HTN, mild lung disease
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases. Examples include (but not limited to): poorly controlled DM or HTN, COPD, morbid obesity ($\text{BMI} \geq 40$), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, premature infant PCA < 60 weeks, history (>3 months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Examples include (but not limited to): recent (<3 months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is not expected to survive without the operation	Examples include (but not limited to): ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction
ASA VI	A declared brain-dead patient whose organs are begin removed for donor purposes	

Functional Status

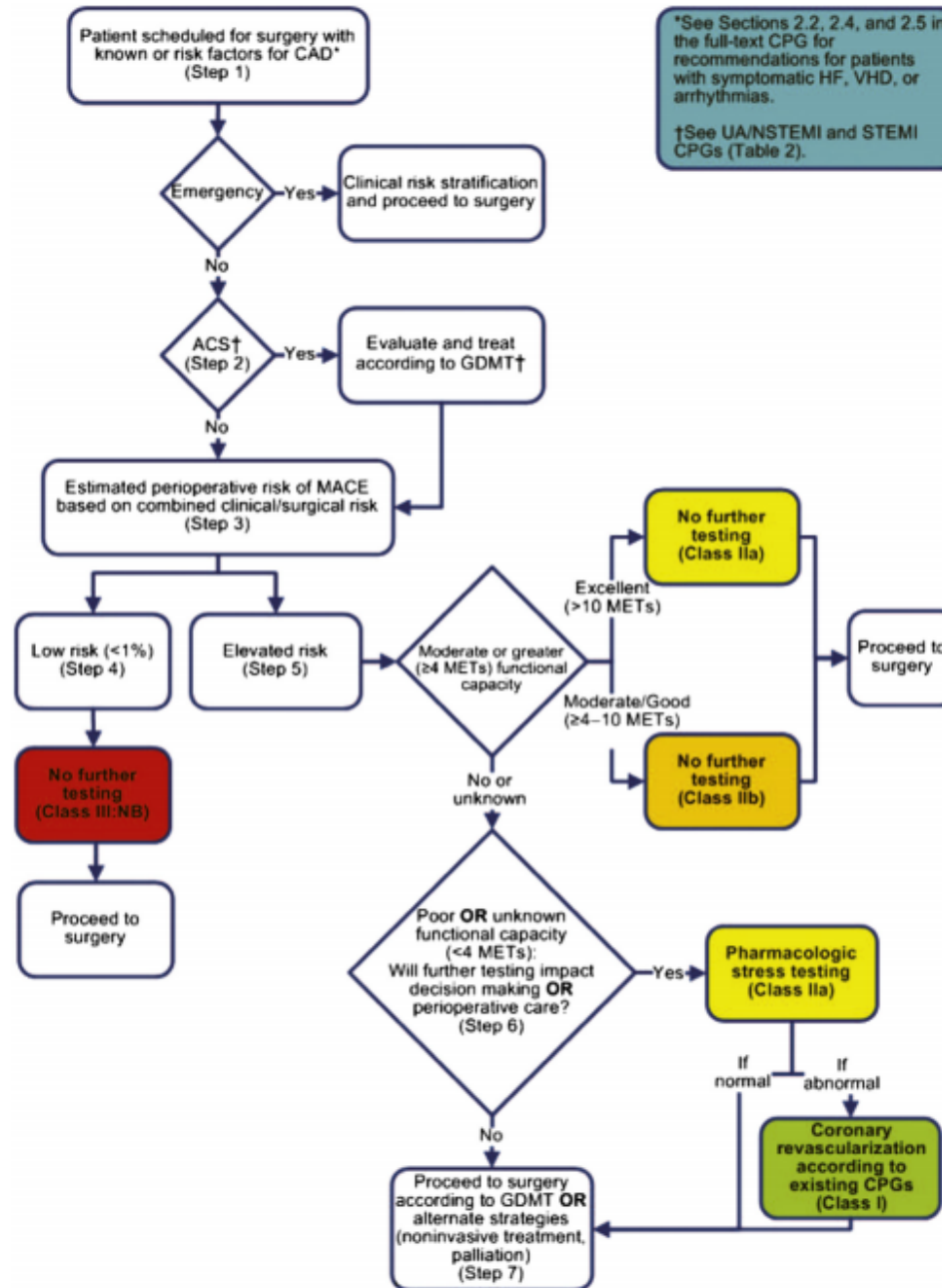
TABLE 4 Duke Activity Status Index

Activity	Weight
Can you...	
1. take care of yourself, that is, eating, dressing, bathing, or using the toilet?	2.75
2. walk indoors, such as around your house?	1.75
3. walk a block or 2 on level ground?	2.75
4. climb a flight of stairs or walk up a hill?	5.50
5. run a short distance?	8.00
6. do light work around the house like dusting or washing dishes?	2.70
7. do moderate work around the house like vacuuming, sweeping floors, or carrying in groceries?	3.50
8. do heavy work around the house like scrubbing floors or lifting or moving heavy furniture?	8.00
9. do yardwork like raking leaves, weeding, or pushing a power mower?	4.50
10. have sexual relations?	5.25
11. participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football?	6.00
12. participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing?	7.50

Reproduced with permission from Hlatky et al. (133).

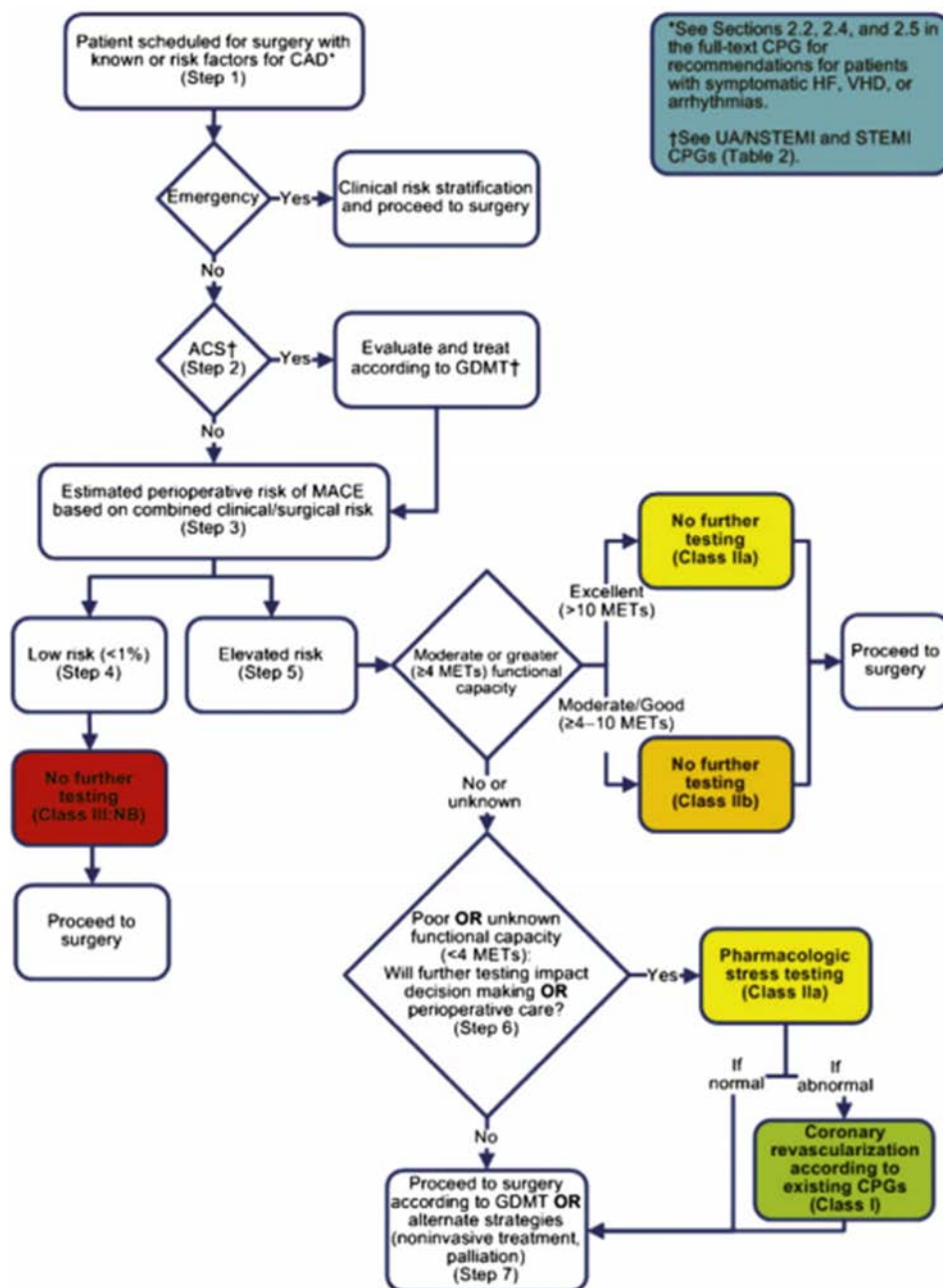
Perioperative Myocardial Infarction or Cardiac Arrest Risk Calculator

Age	<input type="text" value="72"/>	Enter actual age in years	Estimated risk probability for perioperative MICA:	1.65%														
ASA Class	<input type="text" value="3"/>	Enter 1 - 5 for American Society of Anesthesiologists' Class	<table border="1"> <thead> <tr> <th>Percentile</th> <th>Percent Risk</th> </tr> </thead> <tbody> <tr> <td>25th percentile</td> <td>0.05%</td> </tr> <tr> <td>50th percentile</td> <td>0.14%</td> </tr> <tr> <td>75th percentile</td> <td>0.61%</td> </tr> <tr> <td>90th percentile</td> <td>1.47%</td> </tr> <tr> <td>95th percentile</td> <td>2.60%</td> </tr> <tr> <td>99th percentile</td> <td>7.69%</td> </tr> </tbody> </table>		Percentile	Percent Risk	25th percentile	0.05%	50th percentile	0.14%	75th percentile	0.61%	90th percentile	1.47%	95th percentile	2.60%	99th percentile	7.69%
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Creatinine (preoperative)	<input type="text" value="1"/>	Enter 2 for missing value 1 for ≥ 1.5 mg/dL 0 for < 1.5 mg/dL																
Functional Status (preoperative)	<input type="text" value="1"/>	Enter 2 for patients with totally dependent functional status 1 for patients who have partially dependent functional status 0 for those who are totally independent																
Procedure:	<input type="text" value="19"/>	Enter 1 for Anorectal 2 for Aortic 3 for Bariatric 4 for Brain 5 for Breast 6 for Cardiac 7 for ENT (except thyroid/parathyroid) 8 for Foregut/Hepatopancreatobiliary 9 for Gallbladder, appendix, adrenal and spleen 10 for Hernia (ventral, inguinal, femoral) 11 for Intestinal 12 for Neck (Thyroid and Parathyroid) 13 for Obstetric/Gynecologic 14 for Orthopedic and non-vascular Extremity 15 for Other abdominal 16 for Peripheral Vascular 17 for Skin 18 for Spine 19 for non-esophageal Thoracic 20 for Vein 21 for Urology																
Authors:	Prateek K Gupta, MD Himani Gupta, MD	Methodology in: Circulation. 2011 Jul 26;124(4):381-7. Epub 2011 Jul 5.																



4. What are the patient's metabolic equivalents?

<i>Metabolic equivalents</i>	<i>Examples</i>
1	Watching television
	Eating, dressing, cooking, using the toilet
	Walking one or two blocks on level ground at 2 to 3 miles per hour
	Doing light housework (e.g., dusting)
4	Climbing a flight of stairs
	Walking on level ground at 4 miles per hour
	Running a short distance
	Doing heavy chores around the house (e.g., scrubbing floors, lifting furniture)
	Playing moderately strenuous sports (e.g., golf, dance, bowling)
> 10	Playing strenuous sports (e.g., tennis, basketball)



Evidence for Revascularization?

Coronary Artery Revascularization Prophylaxis (CARP) Trial (NEJM Dec.30, 2004)



- Random Controlled Prospective trial
- 5859 patients scheduled for vascular surgery
- 510 patients with significant CAD randomly selected to be revascularized prior to surgery
- **Conclusion:** Routine coronary revascularization in patients with stable cardiac symptoms before elective vascular procedure does NOT significantly alter risk of MI or death.

What's a Doc to Do?

- BEFORE you stress a patient preoperatively, decide what you are going to do with the information.
- IF a stress test is positive, a coronary catheterization should be the next step.
- A catheterization might result in a stent...which may require minimum 4-6 weeks of DAPT
- **CAN YOUR PATIENT WAIT that LONG??**

6.2.6. Antiplatelet Agents: Recommendations

Please see [Figure 2](#) for an algorithm for antiplatelet management in patients with PCI and noncardiac surgery.

CLASS I

1. In patients undergoing urgent noncardiac surgery during the first 4 to 6 weeks after BMS or DES implantation, DAPT should be continued unless the relative risk of bleeding outweighs the benefit of the prevention of stent thrombosis. *(Level of Evidence: C)*
2. In patients who have received coronary stents and must undergo surgical procedures that mandate the discontinuation of P2Y₁₂ platelet receptor-inhibitor therapy, it is recommended that aspirin be continued if possible and the P2Y₁₂ platelet receptor-inhibitor be restarted as soon as possible after surgery. *(Level of Evidence: C)*
3. Management of the perioperative antiplatelet therapy should be determined by a consensus of the surgeon, anesthesiologist, cardiologist, and patient, who should weigh the relative risk of bleeding with that of stent thrombosis. *(Level of Evidence: C)*

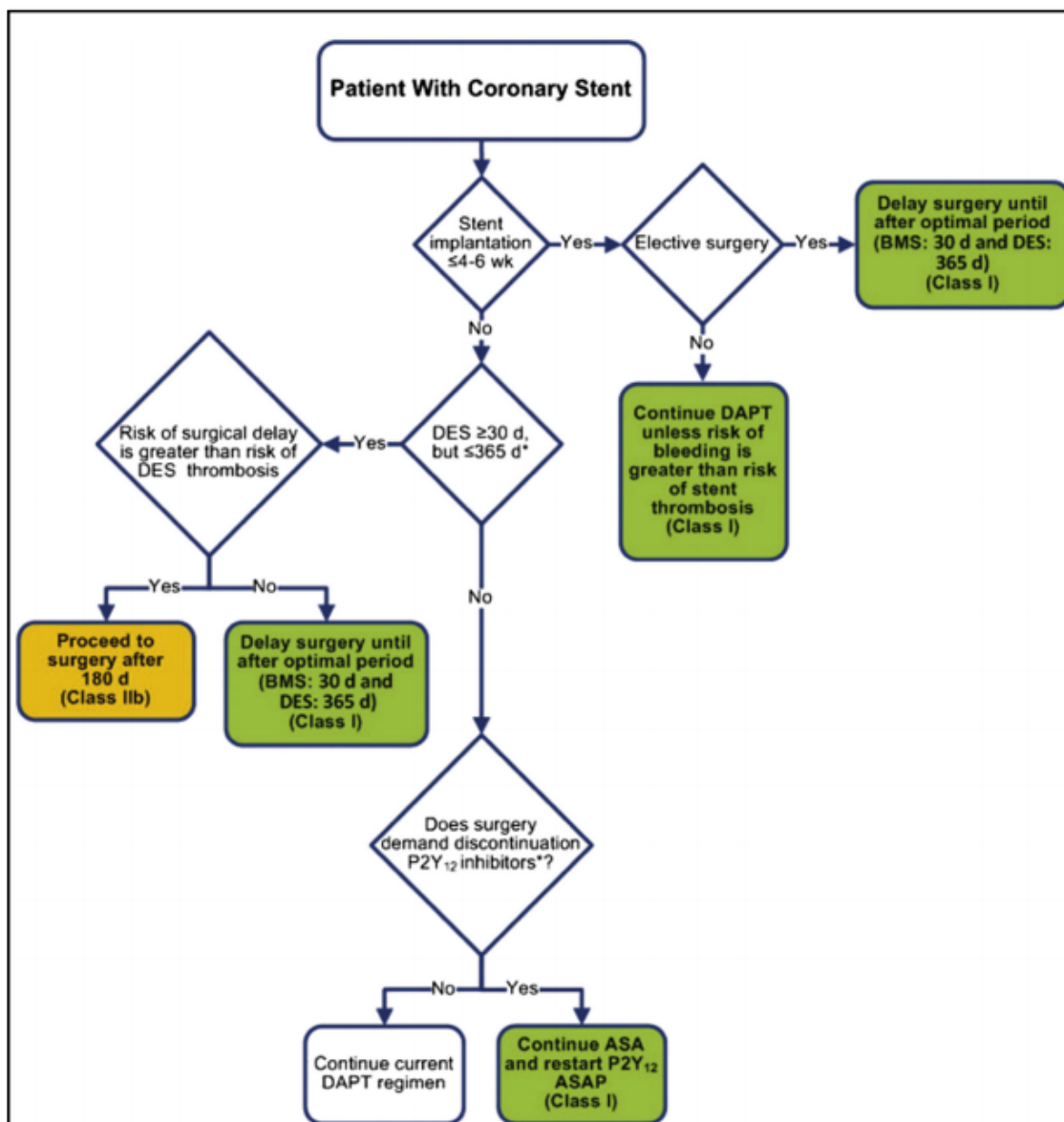


FIGURE 2 Algorithm for Antiplatelet Management in Patients With PCI and Noncardiac Surgery

Colors correspond to the Classes of Recommendations in Table 1. *Assuming patient is currently on DAPT. ASA indicates aspirin; ASAP, as soon as possible; BMS, bare-metal stent; DAPT, dual antiplatelet therapy; DES, drug-eluting stent; and PCI, percutaneous coronary intervention.

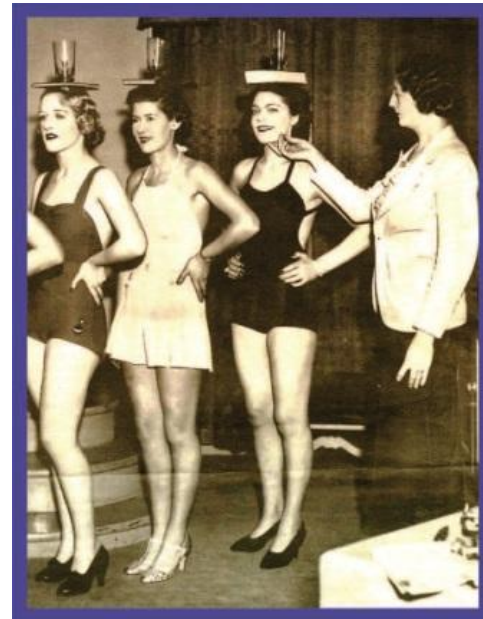
Medical Therapy: The Evidence for B-Blockers!

- Multicenter Study of Perioperative Ischemia Research Group (NEJM 1996)
- Atenolol started in surgery holding and continued throughout hospital stay vs. placebo
- 200 patients with CAD or risk factors undergoing non-cardiac surgery
- No difference in periop MI or death but decreased ischemic episodes (24% vs. 39%) and decreased mortality and cardiac events **for 2 years thereafter.**



Medical Therapy: The Evidence for B-Blockers?

- **Perioperative Ischemic Evaluation Study (POISE) trial:** (Lancet May, 2008)
8351 patients age > 45 scheduled for non-cardiac surgery
- Randomized to metoprolol ER or placebo 2-4 hours before surgery and postop metoprolol vs. placebo for 30 days titrated to BP and HR
- At least one of following: history of CAD, stroke, or PAD, recent hospitalization for CHF, undergoing major vascular surgery, or any three of 7 risk criteria



Medical Therapy: The Evidence for B-Blockers??

- In **POISE**, metoprolol seemed to prevent MI (3.6% in metop, 5.1% in placebo; $p=.0008$).
- However, more B-blocked patients had a *severe stroke* (1.0% metop, 0.5% placebo; $p=.0053$).
- This ***drove overall mortality higher in the beta blocked patients***: 3.1% metop to 2.3% placebo; $p=.0317$.

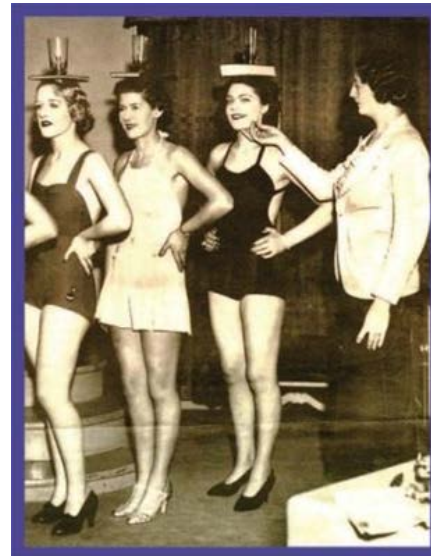


"What's the opposite of 'Eureka!'?"

Medical Therapy:

The Evidence for B-Blockers???

- The POISE trial, with an n=8351 represented a total of studied patients ***larger than all other studies that have found benefit of perioperative beta blockade combined.***
- It also represented the first evidence that ***perioperative beta blockade can harm patients.***
- Differences in patient inclusion criteria, type of surgery (vascular or general), outcomes measured (ischemia, MI, or death), and how the B-blockers were used (dose titration to heart rate) muddled the waters...



So, what are the official recommendations?

ACC/AHA guidelines 2014

- Class I
 - BB should be continued in patients on them chronically
- Class IIb
 - In pts with intermediate or high risk ischemia noted on preop testing reasonable to begin BB
 - In pts with RCRI ≥ 3 reasonable to begin BB
 - Begin more than 1 day prior to surgery
- Class III (Harm)
 - BB should not be started on day of surgery

Medical Therapy:

What about statins?

- A retrospective cohort of 752 patients undergoing intermediate-risk, noncardiac, nonvascular surgery was evaluated for all-cause mortality rate. Compared with nonusers, patients on statin therapy had a 5-fold reduced risk of 30-day all-cause death.
 - Raju MG, Pachika A, Punnam SR, et al. Clin Cardiol. 2013;36:456–61.
- Another observational trial of 577 patients revealed that patients undergoing noncardiac vascular surgery treated with statins had a 57% lower chance of having perioperative MI or death at 2-year follow-up, after controlling for other variables(286).
 - Desai H, Aronow WS, Ahn C, et al Arch Gerontol Geriatr. 2010;51:149–51.

6.2.2. Perioperative Statin Therapy: Recommendations

CLASS I

1. Statins should be continued in patients currently taking statins and scheduled for noncardiac surgery (283–286).
(Level of Evidence: B)

CLASS IIa

1. Perioperative initiation of statin use is reasonable in patients undergoing vascular surgery (287). (Level of Evidence: B)

CLASS IIb

1. Perioperative initiation of statins may be considered in patients with clinical indications according to GDMT who are undergoing elevated-risk procedures. (Level of Evidence: C)

Case:

A 75 yo man with a h/o DM type 2, HTN, and CAD s/p CABG 14 years ago is seen in the ED for abdominal pain. He is diagnosed with acute cholecystitis. He is admitted to you with general surgery consulting. You assess the patient's cardiac risk for the procedure.

The patient had an inferior MI at age 61 (14 years ago) and had a 3 vessel CABG after that. He has never had congestive heart failure symptoms. He denies chest pain or shortness of breath with exertion. He states that he is retired and does some basic chores around the house but does not climb stairs or run due to osteoarthritis of the knees.

Medications include metoprolol XL 50 mg q day, simvastatin 40 mg q day, aspirin 81 mg q day, glyburide 5 mg po q day, and vicodin prn knee pain. The patient quit smoking 14 years ago at the time of his MI. He drinks one glass of red wine every night with dinner. He is married and has three grown children, one of whom is a lawyer.

Case

On PE, the patient's blood pressure is 145/80 and it is symmetric in both arms. His HR is 65, RR 16, temp 100.5, O2 sat 96% on RA. He has a well-healed sternal incision from prior bypass. Heart and lung exam is normal. Abdominal exam reveals RUQ tenderness and a + Murphy's sign. He has slightly diminished right pedal pulses when compared to the left, but his feet are warm and well-perfused. He has no peripheral edema.

His EKG reveals normal sinus rhythm with a heart rate of 90. There is evidence of an old inferior MI with Q waves seen in II, III, and AVF. There is no acute ST or T wave changes. Hemoglobin is 13.5 gm/dL and creatinine is 1.05 mg/dL, fasting blood sugar 105 mg/dL.

Case

Which of the following is the most appropriate perioperative management in this patient?

- A. Continue metoprolol and simvastatin and go to surgery
 - B. Treadmill exercise stress testing
 - C. Lexiscan myoview stress test
 - D. Left heart catheterization
- 1. What is the patient risk of MACE according to RCRI?
 - 2. Describe the thought process of the ACC/AHA 2014 guidelines...
 - 3. What is the risk of MACE according to the NSQUIP MICA calculator?
 - 4. What is the appropriate perioperative management?



"Mr. Osborne, may I be excused? My brain is full."

Postoperative Pulmonary Complications

Top 4 postoperative complications:

- 1) Urinary tract infection
- 2) Pneumonia
- 3) Respiratory failure
- 4) Wound infection

- **1/4 of all deaths occurring within 6 days of surgery are due to Postoperative Pulmonary Complications!**

Postoperative Pulmonary Complications

- **Patient risk**

- General Health:**

- Age, obesity, functional status, albumin < 3 g/dL

- Immune and Neurologic Status:**

- Chronic steroids, Alcohol use, Diabetes Mellitus, Stroke with deficit, Impaired sensorium

- Fluid status:**

- Renal failure/ BUN/ hx of CHF, transfusions > 4 units, Elevated BUN

- Respiratory Status**

- COPD, Smoker, Pneumonia, Dyspnea at rest or with exertion

- **Procedure risk**

- Type of surgery

- Incision site

- Emergency Surgery

- General Anesthesia

Which of the following is the most appropriate perioperative management in this patient?

1. Continue Metoprolol and Simvastatin and go to surgery
2. Treadmill exercise stress testing
3. Lexiscan myoview stress test
4. Left heart catheterization

Case 2:

A 76 yo woman presents to the ER with acute cholecystitis. She has COPD and is dependent on continuous O2 at 2 liters. You are consulted by General Surgery for perioperative medical evaluation.

PMH: HTN, DM, s/p CVA with residual right-sided weakness and COPD O2 dependent

SH: current tobacco abuse 75pk year hx.

Exam: Afebrile, RR 20, O2 sat 94% on 2L, 140/90, HR 95, BMI 18

Gen: In moderate pain, speaking in short sentences

Lungs: diffuse prolonged expiratory phase with occasional expiratory wheeze

Heart: no murmurs regular

ALL of the following choices are indicated to decrease her risk of PPC's EXCEPT:

1. Educate her on the use of incentive spirometer prior to surgery
2. Recommend the surgery be laparoscopic if at all possible
3. Preoperative spirometry
4. Use post-op epidural anesthesia or PCA pumps to control pain for deep breathing/ambulation

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A Few Words about Diabetes...

- Type 1 or Type 2?
- Assess baseline control with A1c
- Assess hypoglycemia severity and awareness
- Understand duration of NPO status and timing of insulin or other meds
- Goals:
 - Fasting goal <140 mg/dL
 - Random goal <180 mg/dL



Oral Agents



- All oral agents should be stopped on day of surgery
- All agents can be resumed when pt is eating well
- If concern for renal failure, do not restart metformin

Insulin Therapy



- Do NOT stop long-acting insulin in type 1 diabetes due to risk of DKA
- Give full dose of long-acting insulin (glargine) at bedtime if dose is $<$ or $=$ to 50% of the total daily dose
- Hold all short acting insulin on the day of surgery/ while the patient is NPO
- Start D5 drip in patients who are type 1 diabetics to avoid hypoglycemia

TABLE 1**ACCP's suggested risk stratification for perioperative thromboembolism***

Risk category	Mechanical heart valve	Atrial fibrillation	Venous thromboembolism
High (>10%/yr risk of ATE or >10%/mo risk of VTE)	Any mechanical mitral valve Older aortic valve Recent (< 6 mo) stroke or TIA	CHADS ₂ score of 5 or 6 Recent (< 3 mo) stroke or TIA Rheumatic valvular heart disease	Recent (< 3 mo) VTE Severe thrombophilia
Moderate (4%–10%/yr risk of ATE or 4%–10%/mo risk of VTE)	Bileaflet aortic valve and one of the following: atrial fibrillation, prior stroke/TIA, hypertension, diabetes, heart failure, age > 75 yr	CHADS ₂ score of 3 or 4	VTE within past 3–12 mo Recurrent VTE Nonsevere thrombophilic conditions Active cancer
Low (<4%/yr risk of ATE or <2%/mo risk of VTE)	Bileaflet aortic valve without atrial fibrillation and no other risk factors for stroke	CHADS ₂ score of 0–2 (and no prior stroke or TIA)	Single VTE within past 12 mo and no other risk factors

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ACCP = American College of Chest Physicians; ATE = arterial thromboembolism; VTE = venous thromboembolism; TIA = transient ischemic attack

Case 3:

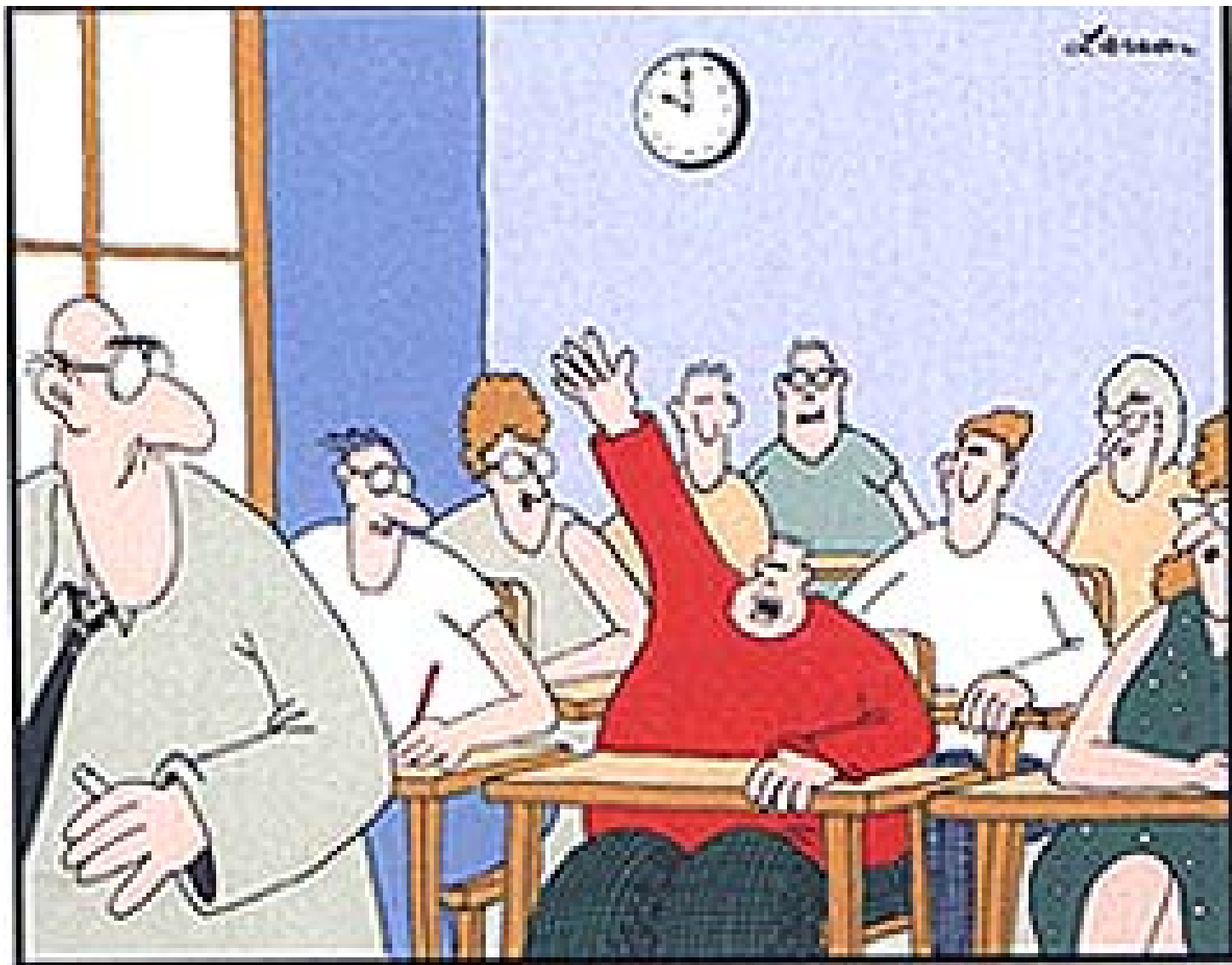
- A 70-year-old woman undergoes preoperative evaluation before cataract surgery and excision of a 0.75-cm basal cell carcinoma on the right lateral thigh. Her history includes coronary artery disease, with no angina since she has been adhering to her current medical regimen, and chronic nonvalvular atrial fibrillation for which she takes chronic anticoagulation therapy. She has not had a stroke or transient ischemic attack. Her functional capacity is good.

Which of the following is the best management approach to anticoagulation for these procedures?

1. Continue warfarin at usual dose and target INR for both procedures
2. Reduce warfarin dose to achieve a lower target INR of 1.3 to 1.5
3. Stop the warfarin and perform surgery when the INR is normal for both procedures
4. Stop warfarin and use therapeutic enoxaparin until 12 hours before surgery

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