



Pre-Operative Services Teaching Rounds 3 Jan 2011

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- **Coronary Artery Disease(CAD/IHD)**

- Pathophysiology

- History

- Physical

- Labs

- Preoperative work up using AHA guidelines¹

- Medications

- **Breast surgery**

- anesthesia

- positioning



Case: 57 yr old male for left total mastectomy/ALND for breast cancer

- HPI – bloody discharge from nipple
- PMH –
 - CAD: MI age 44 treated with 1 stent
 - Current symptoms – chest pressure on exertion, monthly, relieved by rest.
 - Hypertension
 - DM for 15 years
 - Effort tolerance – 4 METs
- PSH –
 - Lap chole 15 years ago
 - Elbow surgery 18 years ago



Case (cont)

- Current smoker
- Meds:
 - Aspirin
 - Metformin
 - Sitagliptin(januvia)
 - Glipizide
 - Nifedipine
 - Metoprolol
 - Isosorbide mononitrate
 - Rosuvastatin



Case (cont)

- Exam:
 - BMI 29
 - BPI 20/70 HR 72
 - No signs of heart failure
- ECG: SR 70, inferior Q's, poor R wave progression
- Followed by PMD only for 10 years.



CAD Pathophysiology

- Starts in adolescence
- **Fatty streak** (containing atherogenic lipoproteins, macrophage foam cells, Ca^{2+}) **between endothelium and internal elastic lamina**
- **Attempted healing** – fibrous layer with lipid core/smooth muscle and connective tissue
- **Plaque rupture leads** to exposure of thrombogenic scar/necrotic material : **platelet aggregation and clot.**



Pathophysiology (cont)

- Leading cause of death worldwide
- Accumulation of atheromatous plaques in blood vessels supplying the heart
- Slow occlusion – development of collaterals
- Plaque rupture – acute event
- Ischemia – limitation of blood flow
- Infarction – no flow with myocyte death
- Scarring and remodelling



Risk factors

- Male
- Cigarette smoking
- High cholesterol
- Hypertension
- Diabetes
- Obesity
- Sedentary lifestyle
- Family history



To ask on History:

- Myocardial infarct
- Heart failure
- Peripheral vascular disease
- Cerebrovascular disease
- Arrhythmias



Specifically on History

Current symptoms

- Chest pain or pressure
 - Jaw / arm/face/ neck discomfort
 - Indigestion
 - Nausea
 - What brings it on?
 - What relieves it?
- Dyspnoea on exertion
 - Sudden shortness of breath – acute pulmonary edema is a sign of ischemia
- Syncope or dizziness
- Palpitations
- Fatigue



Physical

- General
- HR and BP
- (Xanthomata)
- (Signs of cardiac failure.)
- CAD has no specific findings



Labs

- ECG?

- Low risk procedure, stable patient,
- AHA: Class 3 evidence (could be harmful)

Class I: evidence and/or general agreement that a given procedure/ therapy is useful and effective.

Class II: conflicting evidence and/or a divergence of opinion about the usefulness/efficacy

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.

Class IIb: Usefulness/efficacy is less well established by evidence/opinion.

Class III: evidence and/or general agreement that a procedure/ therapy is not useful/effective and in some cases may be harmful.

“Size of Treatment Effect”

“Estimate of Certainty (Precision) of Treatment Effect”

	Class I <i>Benefit >>> Risk</i>	Class IIa <i>Benefit >> Risk</i> <i>Additional studies with focused objectives needed</i>	Class IIb <i>Benefit ≥ Risk</i> <i>Additional studies with broad objectives needed; Additional registry data would be helpful</i>	Class III <i>Risk ≥ Benefit</i> <i>No additional studies needed</i>
	Procedure/Treatment SHOULD be performed/administered	IT IS REASONABLE to perform procedure/administer treatment	Procedure/Treatment MAY BE CONSIDERED	Procedure/Treatment should NOT be performed/administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL.
Level A <i>Multiple (3-5) population risk strata evaluated*</i> <i>General consistency of direction and magnitude of effect</i>	<ul style="list-style-type: none"> • Recommendation that procedure or treatment is useful/effective • Sufficient evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> • Recommendation in favor of treatment or procedure being useful/effective • Some conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> • Recommendation's usefulness/efficacy less well established • Greater conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> • Recommendation that procedure or treatment not useful/effective and may be harmful • Sufficient evidence from multiple randomized trials or meta-analyses
Level B <i>Limited (2-3) population risk strata evaluated*</i>	<ul style="list-style-type: none"> • Recommendation that procedure or treatment is useful/effective • Limited evidence from single randomized trial or non-randomized studies 	<ul style="list-style-type: none"> • Recommendation in favor of treatment or procedure being useful/effective • Some conflicting evidence from single randomized trial or non-randomized studies 	<ul style="list-style-type: none"> • Recommendation's usefulness/efficacy less well established • Greater conflicting evidence from single randomized trial or non-randomized studies 	<ul style="list-style-type: none"> • Recommendation that procedure or treatment not useful/effective and may be harmful • Limited evidence from single randomized trial or non-randomized studies
Level C <i>Very limited (1-2) population risk strata evaluated*</i>	<ul style="list-style-type: none"> • Recommendation that procedure or treatment is useful/effective • Only expert opinion, case studies, or standard-of-care 	<ul style="list-style-type: none"> • Recommendation in favor of treatment or procedure being useful/effective • Only diverging expert opinion, case studies, or standard-of-care 	<ul style="list-style-type: none"> • Recommendation's usefulness/efficacy less well established • Only diverging expert opinion, case studies, or standard-of-care 	<ul style="list-style-type: none"> • Recommendation that procedure or treatment not useful/effective and may be harmful • Only expert opinion, case studies, or standard-of-care

Suggested phrases for writing recommendations †

should
is recommended
is indicated
is useful/effective/beneficial

is reasonable
can be useful/effective/ beneficial
is probably recommended or indicated

may/might be considered
may/might be reasonable
usefulness/effectiveness is unknown /unclear/uncertain or not well established

is not recommended
is not indicated
should not
is not useful/effective/beneficial
may be harmful

*Data available from clinical trials or registries about the usefulness/efficacy in different sub-populations, such as gender, age, history of diabetes, history of prior MI, history of heart failure, and prior aspirin use. A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Even though randomized trials are not available, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

†In 2003, the ACC/AHA Task Force on Practice Guidelines developed a list of suggested phrases to use when writing recommendations. All recommendations in this guideline have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document (including headings above sets of recommendations), would still convey the full intent of the recommendation. It is hoped that this will increase readers' comprehension of the guidelines and will allow queries at the individual recommendation level.



Labs (cont)

- CBC?
 - History of blood loss/new or increasing DOE or palpitations
- Chem?
 - No (for diabetes – likely yes.)
- Other?



Is he optimized?

- Proceed with surgery?
- See cardiologist?
- What should cardiologist do?



Cardiology consults

AHA:

'Of the cardiology consultations, 40% contained no recommendations other than "proceed with case," "cleared for surgery," or "continue current medications."' ¹



Risk factor management

- Weight loss
- Smoking
- Exercise
- Cholesterol management
- BP control
- Diabetes control



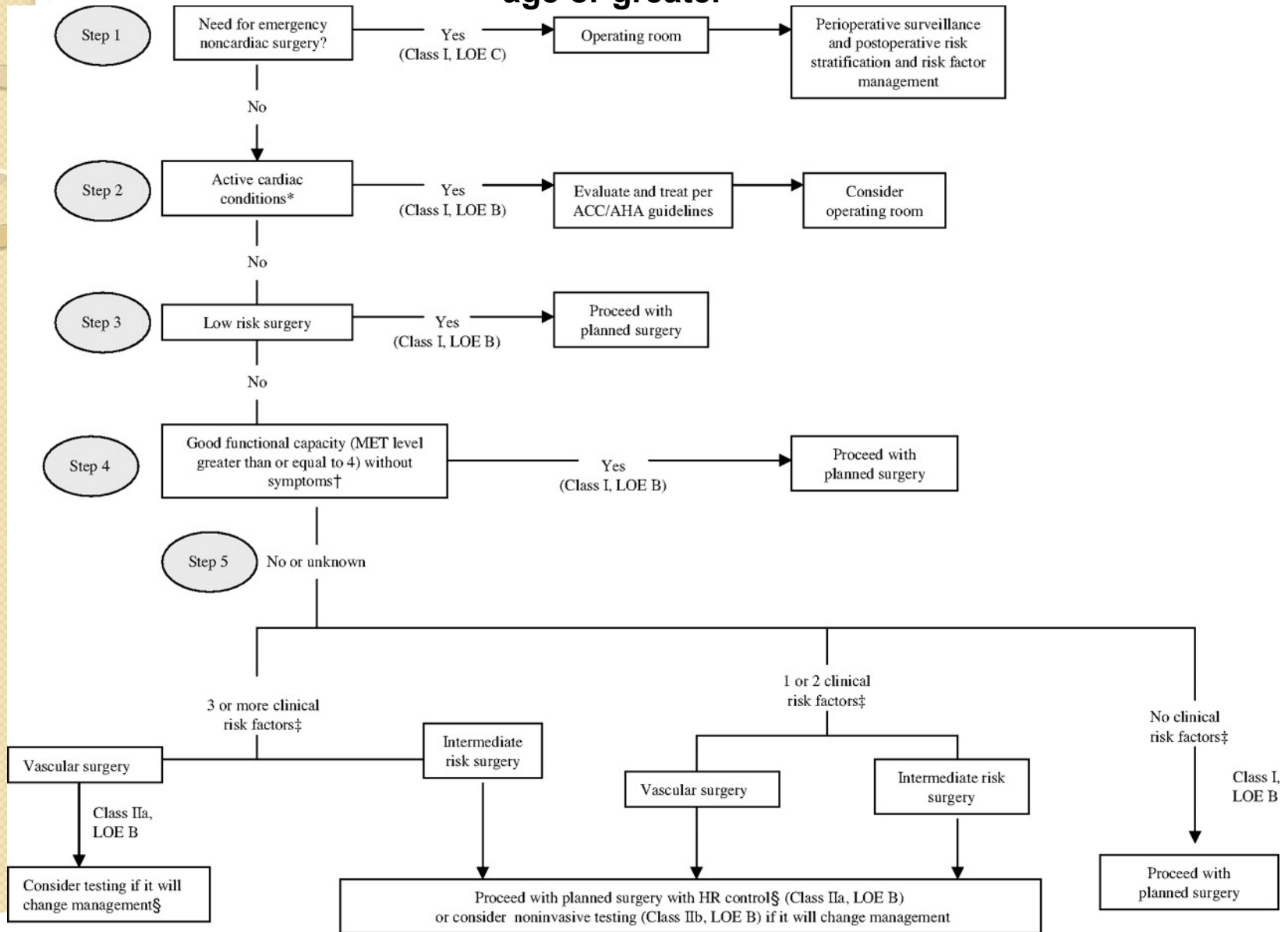
Medical Management

- Beta blocker
- Nitroglycerin
- Calcium channel blocker
- Aspirin
- Statin

Revascularization

- CABG
- PCI +/- stent

Cardiac evaluation and care algorithm for noncardiac surgery based on active clinical conditions, known cardiovascular disease, or cardiac risk factors for patients 50 years of age or greater



***Active Cardiac Conditions for Which the Patient Should Undergo Evaluation and Treatment Before Noncardiac Surgery (Class I, Level of Evidence: B)**

Condition

Examples

- | | |
|---|--|
| <ul style="list-style-type: none">• Unstable coronary syndromes | <ul style="list-style-type: none">– Unstable or severe angina* (CCS class III or IV) †– Recent MI‡ |
| <ul style="list-style-type: none">• Decompensated HF | <ul style="list-style-type: none">– (NYHA functional class IV; worsening or new-onset HF) |
| <ul style="list-style-type: none">• Significant arrhythmias | <ul style="list-style-type: none">– High-grade atrioventricular block– Mobitz II atrioventricular block– Third-degree atrioventricular heart block– Symptomatic ventricular arrhythmias– Supraventricular arrhythmias (including atrial fibrillation) with uncontrolled ventricular rate (HR greater than 100 beats per minute at rest)– Symptomatic bradycardia– Newly recognized ventricular tachycardia |
| <ul style="list-style-type: none">• Severe valvular disease (progressive dyspnea on exertion, exertional presyncope, or HF) | <ul style="list-style-type: none">– Severe aortic stenosis (mean pressure gradient greater than 40 mm Hg, aortic valve area less than 1.0 cm², or symptomatic)– Symptomatic mitral stenosis |

*According to Campeau.⁹

†May include "stable" angina in patients who are unusually sedentary.

‡The American College of Cardiology National Database Library defines recent MI as more than 7 days but less than or equal to 1 month (within 30 days).

•CCS indicates Canadian Cardiovascular Society.



Canadian angina classification

- **Classification**
- Class 0: Asymptomatic
- Class 1: Angina with strenuous Exercise
- Class 2: Angina with moderate exertion
- Class 3: Angina with mild exertion
 - Walking 1-2 level blocks at normal pace
 - Climbing 1 flight of stairs at normal pace
- Class 4: Angina at any level of physical exertion

Surgical procedure

- **High risk**(>5% cardiac risk)
 - Emergent major especially elderly
 - Aortic and major vascular
 - Peripheral vascular
 - Prolonged with large fluid shifts/blood loss
- **Intermediate** (<5%)
 - Carotid
 - Head & neck
 - Intraperitoneal and intrathoracic
 - Orthopedic
 - Prostate
- **Low** (<1%)
 - Endoscopic surgery
 - Breast
 - Superficial
 - Cataract

Functional capacity

METS (metabolic equivalents)

1 MET is defined as 3.5 ml O₂ uptake/kg per min, which is the resting oxygen uptake in a sitting position

1 - 4 : walking around the house to dishwashing

4 – 10: climbing stairs to playing golf

>10: swimming/skiing/singles tennis

Good functional capacity \geq 4 METs

2 blocks on the flat at normal pace

1 flight of stairs / or up a hill.



‡Clinical risk factors include:

- history of heart disease,
- history of compensated or prior heart failure,
- history of cerebrovascular disease,
- diabetes mellitus, and
- renal insufficiency.

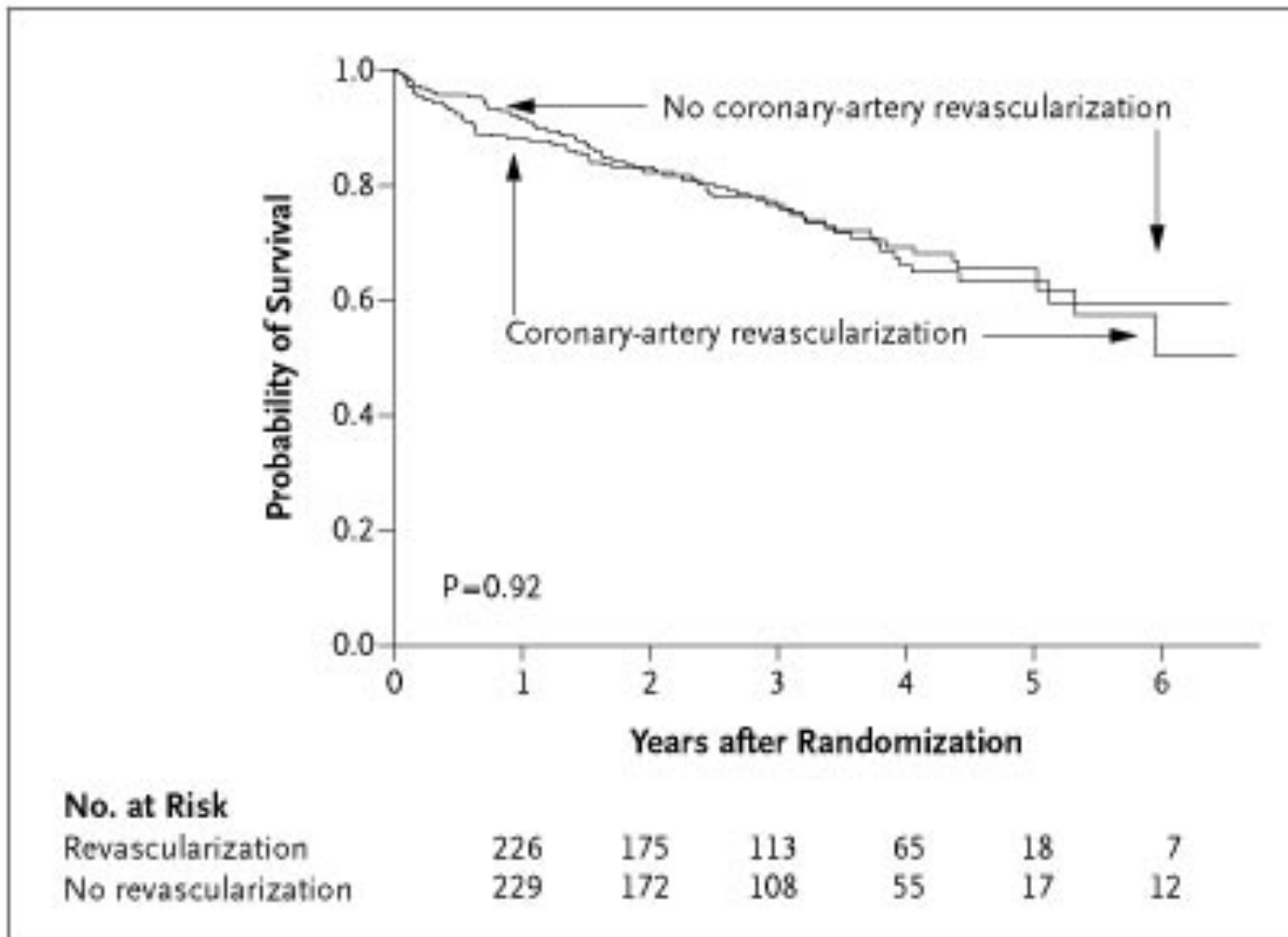
Why no testing?

CARP trial


510 patients for major vascular surgery

- Cardiac cath
- randomized to:
 - coronary artery revascularization (n=258) before vascular surgery
 - no coronary intervention before vascular surgery (n=252).

McFalls et al. NEJM 351 (27): 2795, 2004



Conclusions : Coronary-artery revascularization before elective vascular surgery does not significantly alter the long-term outcome. Cannot be recommended in patients with stable cardiac symptoms for vasc surgery.

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- Reanalysis of the CARP results type of revascularization—CABG or percutaneous coronary intervention (PCI)— CABG was better

Ward HB. Ann Thorac Surg 2006; 82:795–801.

- Further analysis of CARP patients: one subgroup—patients with left main disease—did experience an improved survival with pre-operative coronary revascularization.

Garcia S. Am J Cardiol 2008; 102:809–813.



Breast surgery

- Low risk
 - for cardiovascular /respiratory complications
- Supine
- Local anesthesia
- GA for mastectomy and /or ALND
- Role of epidural and intrapleural blocks in cancer management.

Summary: Focused H&P for low risk surgery.

- **Known CAD – MI etc.**
- **Symptoms (looking for active cardiac conditions)**
- **Stable?**
- **Appropriate medical management**
 - Continue peri-operatively
 - Review of risk factors: (FH) (Cholesterol)
 - Smoking
- **Cardiologist's name and no**
(Last stress – no) (Last ECHO – no)



To be continued.... Next week



References

1. Fleisher, L. A. et al. *Circulation* 2007;116:1971-1996