

Pre-operative Evaluation and Management of cardiac patients going for non-cardiac surgery

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Agenda

- Assess Risk of the pre-operative patient and address peri and postoperative recommendations
- Review Pre-op medications with recommendations for how to handle those meds in the peri and postoperative period

The Evaluation of the patient with cardiovascular disease is the same whether the patient is pre-op for surgery or about to undergo treatment of a non-surgical nature that will pose an increased risk of a cardiovascular event.

So what is expected.....

- Assess current severity and stability of the cardiovascular status
- Optimize current treatments
- Institute measures to lower cardiovascular risk when able

Sometimes the risk of Surgery is so low or the risk of not doing surgery is so high that it just doesn't matter!!

Assessment of Risk involves the assessment both of the risk of the procedure and the overall risk of the patient.

Surgical Risk of Procedure

- Looks at the risk of cardiac death and nonfatal MI
 - Low risk (<1%)
 - Intermediate risk (1-5%)
 - High Risk (>5%)

Surgical Risk of Procedure: Low Risk (< 1%)

- Endoscopic Procedures
- Superficial Procedures
- Cataract Surgery
- Breast Surgery

Pre-op testing rarely needed!

Surgical Risk of Procedure: Intermediate Risk (1-5%)

- CEA
- Head and Neck
- Intraperitoneal
- Intrathoracic
- Orthopedic
- Prostate

Surgical Risk of Procedure: High Risk (>5%)

- Emergent major operations, especially elderly
- Aortic and major vascular
- Peripheral Vascular
- Long Surgeries with anticipated major fluid shifts and blood loss

So for patients undergoing low risk procedures, generally NO further preoperative evaluation is needed.

For intermediate or high risk procedures it's not so simple.

Patient Risk

So we started with an assessment of the risk of the procedure, now we look at the risk of the patient.

Risk of the patient involves:

- Patient clinical predictors of risk
- Functional capacity

Patient Risk

- Perform careful H&P
- Recent change in condition or medications
- Medication list
- ETOH/Drugs
- Allergy
- Pacemaker or ICD

Clinical Predictors of increased Peri-operative Cardiovascular Risk

There are 3 levels of severity in the clinical predictors

- Minor
- Intermediate
- Major

Clinical Predictors: Minor

- Advanced Age
- Abnormal ECG
 - LVH/LBBB/NSST and T wave changes
- Rhythm other than Sinus
- Low Functional Capacity
- History of Stroke
- Uncontrolled Hypertension

Generally the occurrence of minor clinical predictors does not preclude going forward with surgery

Clinical Predictors: Intermediate (AKA: Clinical risk factors)

- Mild Angina
- Prior MI
- Compensated or prior CHF
- Diabetes (especially Insulin Dependent)
- Renal Insufficiency

Clinical Predictors: Major (aka: active cardiac conditions)

- Unstable coronary syndromes
 - Acute (<7days) or recent (7-30days) MI with ongoing ischemic symptoms or abnormal noninvasive testing.
 - Unstable angina
- Decompensated Heart Failure

Clinical Predictors: Major

(aka: active cardiac conditions)

- Significant arrhythmias:
 - High grade AVB
 - Symptomatic ventricular arrhythmias in setting of underlying heart disease
 - SVT with poorly controlled ventricular rates
- Severe valvular disease

So 1 or more Major Clinical Predictors/active cardiac conditions

- Cancel or delay surgery unless urgent
- Preop testing

When possible wait 4-6 weeks post MI

Energy Requirements

1 MET: Take care of self

4 MET: Light work around house like dishes and dusting. Climb flight of stairs or walk up a hill

10 MET: Participate in strenuous sport.

Non-invasive stress testing for pre-evaluation.

Class I: Active cardiac condition before surgery.

Class IIa: 3 or more RF and poor functional capacity before vasc. Surgery.

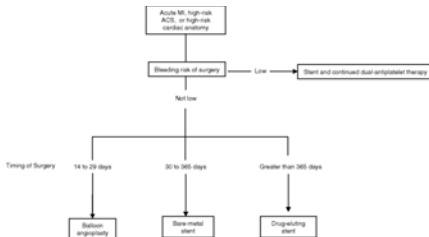
Class IIb: 1-2 RF and poor functional capacity before intermediate or vascular surgery.

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



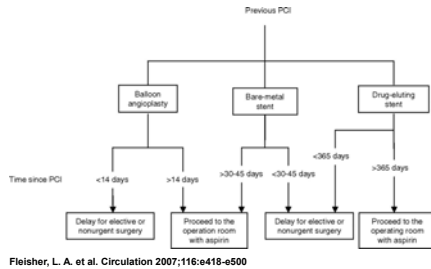
Fleisher, L. A. et al. Circulation 2007;116:e418-e500

Proposed treatment for patients requiring percutaneous coronary intervention (PCI) who need subsequent surgery



Fleisher, L. A. et al. Circulation 2007;116:e418-e500

Proposed approach to the management of patients with previous percutaneous coronary intervention (PCI) who require noncardiac surgery, based on expert opinion



Fleisher, L. A. et al. Circulation 2007;116:e418-e500

Circulation
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Antiplatelet therapy after stenting

- ASA should be continued at a minimum
- BMS: at least 1 month
- DES: 6-12 months

After DES the goal is 12 months ASA and Plavix

Perioperative Coronary Revascularization with CABG/PTCA

Class I indications

- Stable angina and significant LM disease
- Stable angina and 3 vessel disease. Especially with EF <50%.
- Stable angina, 2 vessel disease and significant proximal LAD and EF < 50% OR ischemia on ETT.
- High risk unstable angina or NSTEMI
- Acute STEMI

CABG within 5 years if patient has stable symptoms or negative or normal ETT if target workload achieved conveys low perioperative risk. No further testing is needed.

There is little to no data that stenting lowers the risk of MI or death preop.

Perioperative PA catheter measurement NOT recommended.

Antibiotic Prophylaxis

- Prosthetic cardiac valve or prosthetic material used for cardiac valve repair
- Previous IE
- Congenital heart disease (CHD)*
 - Unrepaired cyanotic CHD, including palliative shunts and conduits
 - Completely repaired congenital heart defect with prosthetic material or device during the first 6 months after the procedure
 - Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplantation recipients who develop cardiac valvulopathy

Antibiotic Prophylaxis Drug Recommendations

- Oral: Amox 2GM po
- IV: Ampicillin 2 GM im/iv
Cefazolin/Ceftriaxone 1GM im/iv

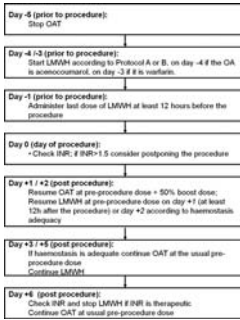
PCN or Ampicillin allergic

- Oral: Cephalexin 2 GM/Clinda 600mg/Zithromax 500mg
- IV: Cefazolin/Ceftriaxone 1GM im/iv
Clinda 600mg im/iv

Anticoagulation

There is little data in randomized trials to guide decision making with regards to when to stop coumadin and whether bridging is required. Look to your institutions for guidance.

Periprocedural bridging protocol with LMWH



Pengo, V. et al. Circulation 2009;119:2920-2927

Other Drug Therapy Considerations

- Beta blockers
- Statins
- Alpha 2 agonists (no clear recommendations)
- Calcium channel blockers (no clear recommendations)

Beta Blockers

If patient is on a beta blocker it should be continued.

If patient is not on a beta blocker than the decision to start preop is based on the risk of the surgery and the clinical predictors in the patient

Beta Blockers

- Low Risk Surgery → None
- Intermediate → MajorPredictor(2A)
- High Risk → All

Statins

- Class I: Patient on a statin, continue.
- Class IIa: High risk surgery (vascular) start statin.

Post Op Troponins

- The postop measurement of troponins in a patient without postop chest pain or abnormal ECG is not recommended. This is for all risks of surgery.

ECG Pre-op Recommendations

Class I: * 1 RF in patients going for vasc. Surg.
* Patients with CHD, PAD, CVD undergoing intermediate risk surgery

Class IIa: * No RF going for vascular surg

ECG Post-op Recommendations

In Patients with known cardiovascular disease a post-op ECG and daily for 2 days is recommended.

Valvular Abnormalities and preop management

- Severe or critical Aortic or Mitral stenosis are poorly tolerated. Consider valvuloplasty preop to lower risk of surgery

Liquids are cleared from the stomach within 2 hours of ingestion. No difference found in the volume or pH of gastric fluid 9 versus 2 hours before surgery.

So patients can take their meds with a sip of water 2 hours before the procedure.

PATIENTS WITH CORONARY ARTERY DISEASE

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE
Nitroglycerin	Usual dose	Usual dose	IV infusion if frank ischemia	Continue IV dose if need or until med can be taken PO
Beta-blockers	Usual dose	Usual dose PLUS beta-blocker protocol	Usual dose PLUS beta-blocker protocol	Usual doses PLUS beta-blocker protocol
Calcium channel-blockers	Usual dose	Usual dose morning of surgery	Usual dose morning of surgery	Continue IV dose until medication can be taken PO
Aspirin	Discontinue 1 week before surgery			Re-start post-operatively at discretion of surgery
Ticlopidine	Discontinue 1 week before surgery			Re-start post-operatively at discretion of surgery

PATIENTS WITH HYPERTENSION

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE
Beta-blockers	Usual dose	Usual dose on morning of surgery with sip of water	IV bolus or infusion (usually not required)	Continue IV dose until medication can be taken PO
Calcium channel blockers	Usual dose	Usual dose on morning of surgery with sip of water	IV bolus or infusion (usually not required)	Continue IV dose until medication can be taken PO
ACE inhibitors	Usual dose	Usual dose on morning of surgery with sip of water	IV formulations (usually not required)	Continue IV dose until medication can be taken PO
Diuretics	Stop day before		IV beta-blockers/IV calcium channel blockers	Restart when patient is on oral liquids

PATIENTS WITH HYPERTENSION

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE
Potassium supplements	Stop day before; consider checking potassium level			Restart when patient is on oral liquids
Central-acting sympatholytics	Usual dose	Usual dose on morning of surgery with sip of water	Transdermal clonidine/IV methyldopa	Restart when patient is on oral liquids
Peripheral sympatholytics	Usual dose	Usual dose on morning of surgery with sip of water	IV formulation (usually not required)	Restart when patient is on oral liquids
Alpha-blockers	Usual dose	Usual dose on morning of surgery with sip of water	IV formulation (usually not required)	Restart when patient is on oral liquids
Vasodilators	Usual dose	Usual dose on morning of surgery with sip of water	IV formulation (usually not required)	Continue IV does until medication can be taken PO

PATIENTS WITH DIABETES AND HYPOTHYROIDISM

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE
Oral hypoglycemics	Usual Dose	Omit dose	Insulin (SC or IV)	Insulin until patient is no longer NPO
Insulin	Usual Dose	Omit dose	Insulin (SC or IV)	Usual dose
Thyroxine	Usual Dose	Usual dose on morning of surgery with sip of water		Restart the dose when patient is no longer NPO

PATIENTS WITH EPILEPSY

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE	SUBSTITUTE DRUG IF NEEDED
Phenytoin	Usual dose	Usual dose on morning of surgery with sip of water	IV phenytoin	Continue IV dose until medication can be taken PO	
Phenobarbital	Usual dose	Usual dose on morning of surgery with sip of water	IV phenobarbital	Continue IV dose until medication can be taken PO	
Carbamazepine	PO loading dose of phenytoin or phenobarbital	PO phenytoin or phenobarbital	IV phenytoin or IV phenobarbital	Continue IV dose until medication can be taken PO	Phenytoin / phenobarbital
Valproic acid	PO loading dose of phenytoin or phenobarbital	PO phenytoin or phenobarbital	IV phenytoin or IV phenobarbital	Continue IV dose until medication can be taken PO	PO phenytoin or phenobarbital

PERIOPERATIVE MEDICATION MANAGEMENT of NSAIDs

DRUG	DAY BEFORE SURGERY	DAY OF SURGERY	DURING SURGERY	AFTER PROCEDURE	SUBSTITUTE DRUG IF NEEDED
NSAIDs with long half-life	Discontinue 1 week before surgery			IM preparation until patient is on oral liquids	
NSAIDs with short half-life	Discontinue 2-3 days before surgery			IM preparation until patient is on oral liquids	
NSAIDs in patients with arthritis					Low-dose steroids

Post-op

- Resume oral medications to pre-admission levels when appropriate.
- Monitor anticoagulation and DVT proph.
- PT/OT/Speech/Nutrition
- Discharge planning and follow-up
