Approach to Surgical Patient with Medical Risk Factors)Cardiac ، Respiratory(

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Preoperative Evaluation and Care:

- **Is a process done before surgery that aims to:**

1. Detect unrecognized disease
2. Evaluate factors that increase risk of surgery)Patient factors &Surgery factors)
3. Propose strategies to reduce this risk

- **Adverse outcomes of surgery:**

1. Death
2. MI
3. Respiratory failure
4. Heart failure
5. Arrythmias
6. Bleeding

Patient Assessment

HISTORY

PHYSICAL EXAMINATION

INVESTIGATIONS

- Full blood count
- Urea and electrolytes
- ECG
- Chest radiograph
- Clotting screen
- Urinalysis
- B-HCG
- Blood glucose and HbA1C
- Arterial blood gases
- Liver function test
- Other investigations

Initial preoperative evaluation can be done by a GP. Once a high risk is identified, patient must be referred to a specialist for more detailed evaluation.

World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

☐ **PATIENT HAS CONFIRMED**
- IDENTITY
- SITE
- PROCEDURE
- CONSENT

☐ **SITE MARKED/NOT APPLICABLE**

☐ **ANAESTHESIA SAFETY CHECK COMPLETED**

☐ **PULSE OXIMETER ON PATIENT AND FUNCTIONING**

DOES PATIENT HAVE A:

KNOWN ALLERGY?
☐ NO
☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
☐ NO
☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
☐ NO
☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

☐ **CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE**

☐ **SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM**
- PATIENT
- SITE
- PROCEDURE

ANTICIPATED CRITICAL EVENTS

☐ **SURGEON REVIEWS:** WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?

☐ **ANAESTHESIA TEAM REVIEWS**: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?

☐ **NURSING TEAM REVIEWS:** HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
☐ YES
☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
☐ YES
☐ NOT APPLICABLE

SIGN OUT

NURSE VERBALLY CONFIRMS WITH THE TEAM:

☐ **THE NAME OF THE PROCEDURE RECORDED**

☐ **THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT** (OR NOT APPLICABLE)

☐ **HOW THE SPECIMEN IS LABELLED** (INCLUDING PATIENT NAME)

☐ **WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED**

☐ **SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT**

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

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CARDIAC EVALUATION

Adverse Events

- Many patients undergoing major noncardiac surgery are at risk for a cardiovascular event.
- Cardiovascular disease is one of the leading causes of death after noncardiac surgery.

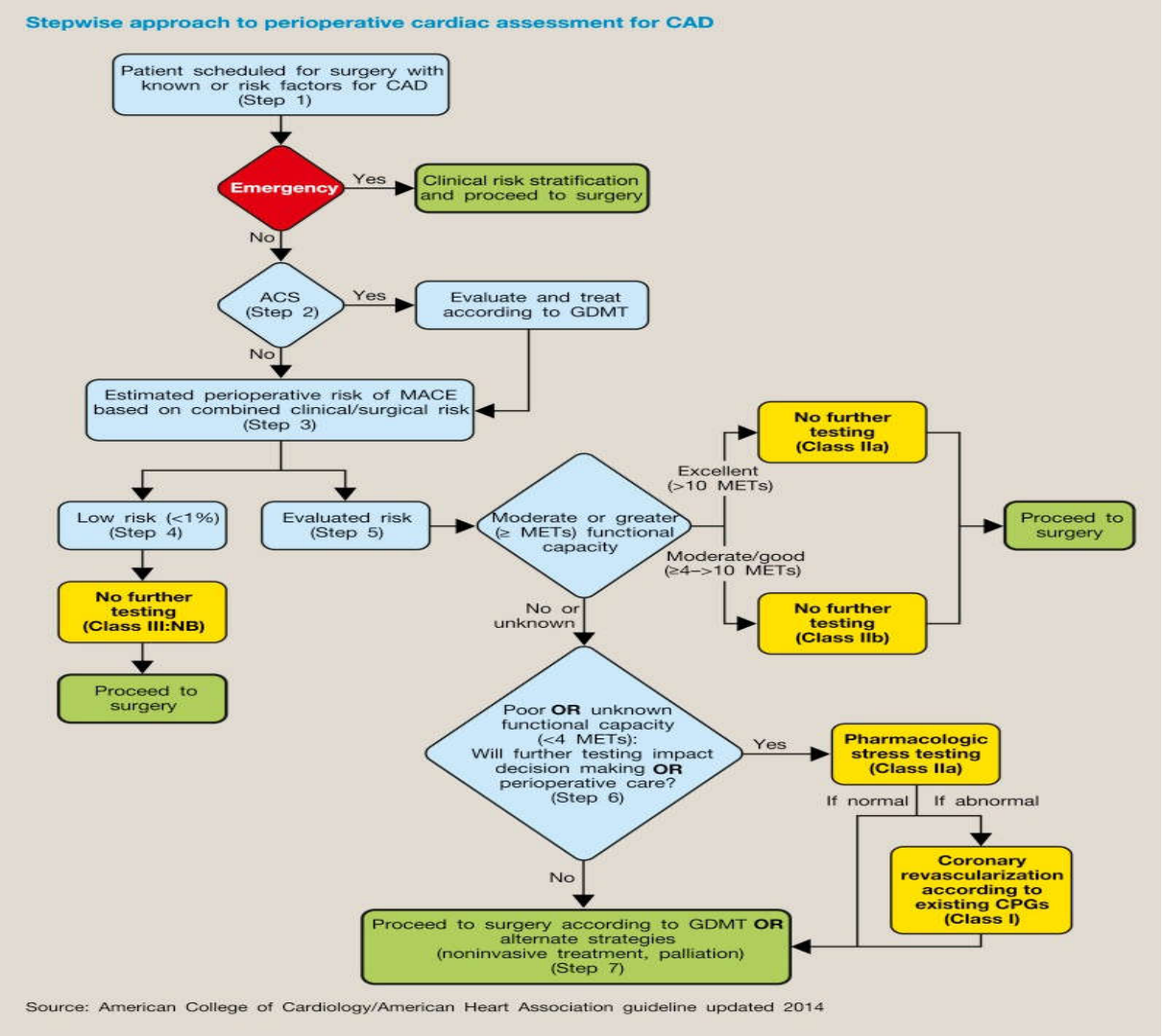
- Major adverse cardiac events (MACE:(
  1. Death
  2. Q-wave MI
  3. Hospitalization due to HF
  4. Stroke
  5. Need for revascularization

Risk Factors

The risk for MACE is related to patient- and surgery-specific characteristics.

1. Surgery specific risks: intrathoracic, intraperitoneal, major vascular.
2. Patient specific risks:
   - Ischemic heart disease
   - History of CHF
   - History of cerebrovascular disease
   - Preoperative insulin therapy for DM
   - Preoperative serum creatinine >2 mg/dL
   - Age > 70 and obesity (not included in RCRI)

Identification of increased risk provides the patient (and surgeon) with information that helps them better understand the benefit-to-risk ratio of a procedure and may lead to interventions that decrease risk.



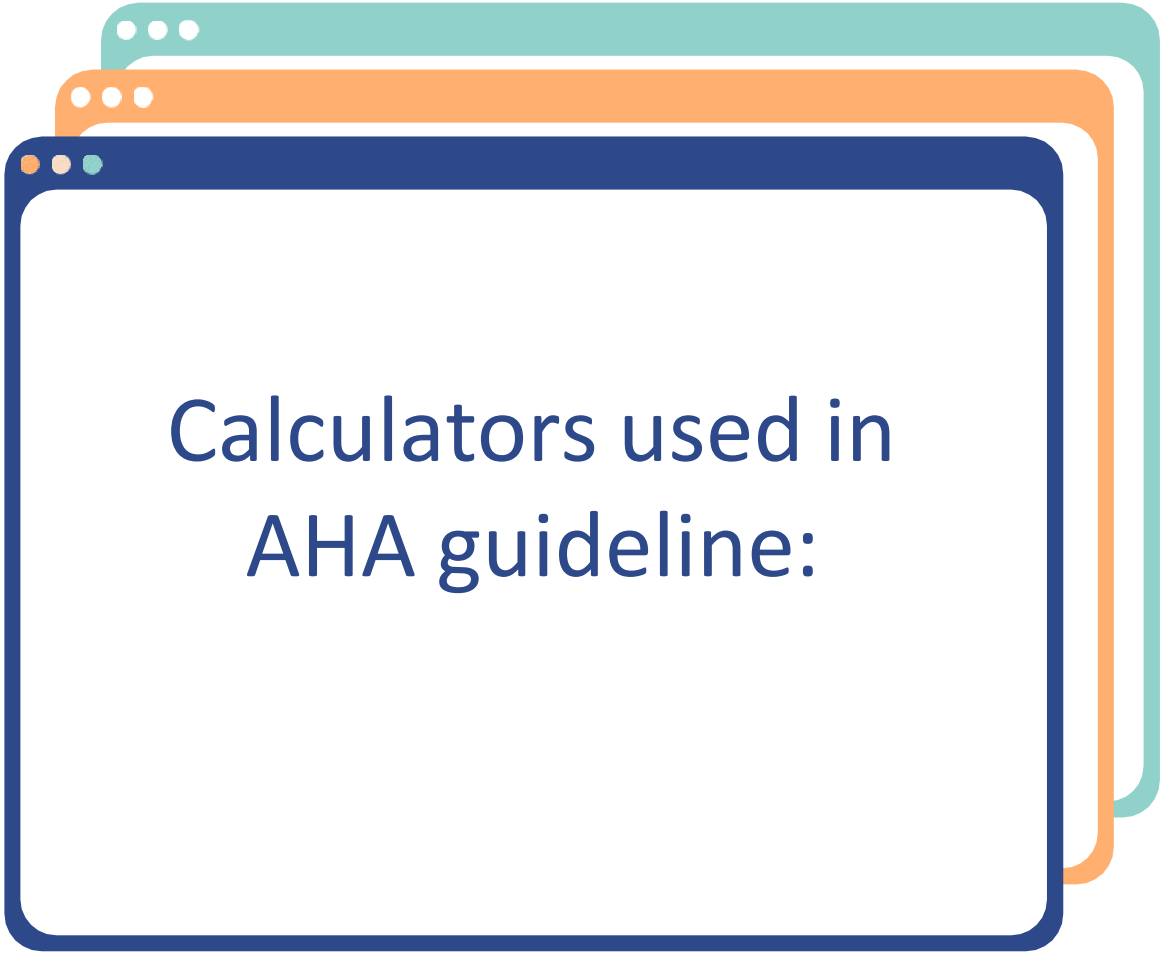
Source: American College of Cardiology/American Heart Association guideline updated 2014

2014**ACC/AHA guideline** on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery.

Goal is to guide testing and workup required to evaluate patients according to their specific conditions.

2014AHA guideline on perioperative cardiovascular evaluation:

- History and physical exam >> presence of ACS or HF
- Revised Cardiac Risk Index >> high vs. low risk of developing MACE
- Functional Status >> indication for stress test
- Stress test >> need for revascularization


Calculators used in
AHA guideline:

-1 Revised Cardiac Risk Index:

- Assess risk based on patient and surgical related factors
- Classifies patients into

.1 Low risk of developing MACE: <1%

.2 High risk of developing MACE: >1%

Revised cardiac risk index (RCRI)
6 independent predictors of major cardiac complications[1]
High-risk type of surgery (examples include vascular surgery and any open intraperitoneal or intrathoracic procedures)
History of ischemic heart disease (history of myocardial infarction or a positive exercise test, current complaint of chest pain considered to be secondary to myocardial ischemia, use of nitrate therapy, or ECG with pathological Q waves; do not count prior coronary revascularization procedure unless one of the other criteria for ischemic heart disease is present)
History of heart failure
History of cerebrovascular disease
Diabetes mellitus requiring treatment with insulin
Preoperative serum creatinine >2.0 mg/dL (177 micromol/L)
Rate of cardiac death, nonfatal myocardial infarction, and nonfatal cardiac arrest according to the number of predictors[2]
No risk factors – 0.4% (95% CI 0.1-0.8)
1 risk factor – 1.0% (95% CI 0.5-1.4)
2 risk factors – 2.4% (95% CI 1.3-3.5)
3 or more risk factors – 5.4% (95% CI 2.8-7.9)
Rate of myocardial infarction, pulmonary edema, ventricular fibrillation, primary cardiac arrest, and complete heart block[1]
No risk factors – 0.5% (95% CI 0.2-1.1)
1 risk factor – 1.3% (95% CI 0.7-2.1)
2 risk factors – 3.6% (95% CI 2.1-5.6)
3 or more risk factors – 9.1% (95% CI 5.5-13.8)

-2 Functional status:

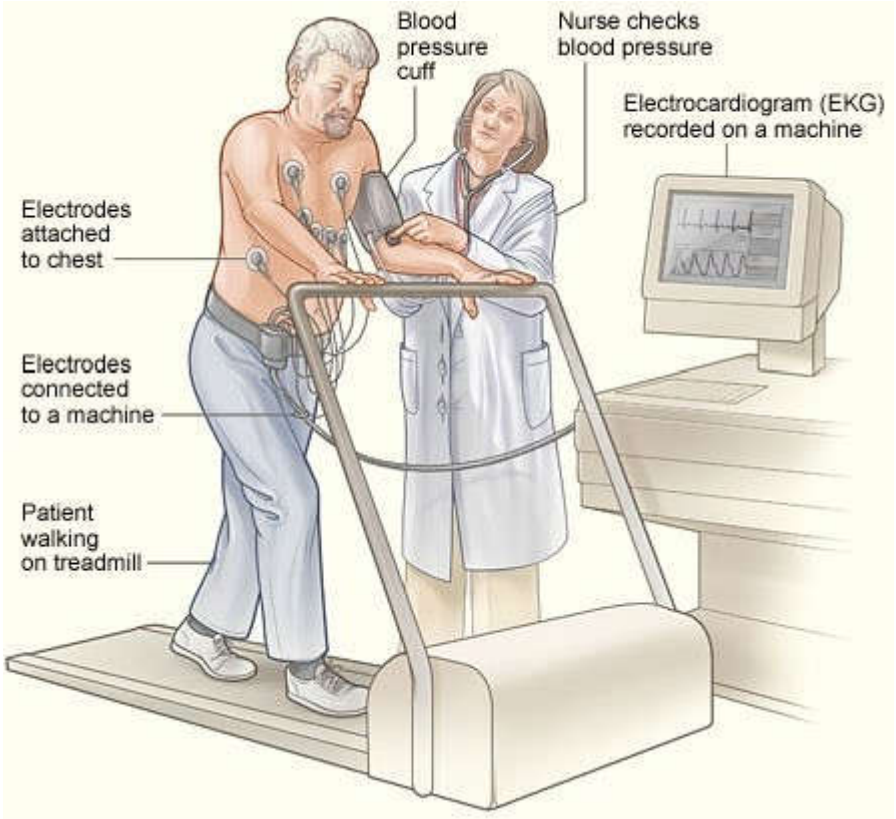
- Assess risk based on patient's activities of daily living
- Expressed in METs)metabolic equivalents, 1MET =oxygen consumption of a 40year-old male)
- Moderate, Good, Excellent 4<METs: low risk
- Poor :4>high risk

Duke activity status index questionnaire to determine functional capacity[1]

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

-3Stress test:

- A stress test involves walking on a treadmill or riding a stationary bike while hearth rhythm, blood pressure and breathing are monitored. Or by receiving a drug that mimics the effects of exercise)adenosine, dobutamine, regadenoson or dipyridamole.(



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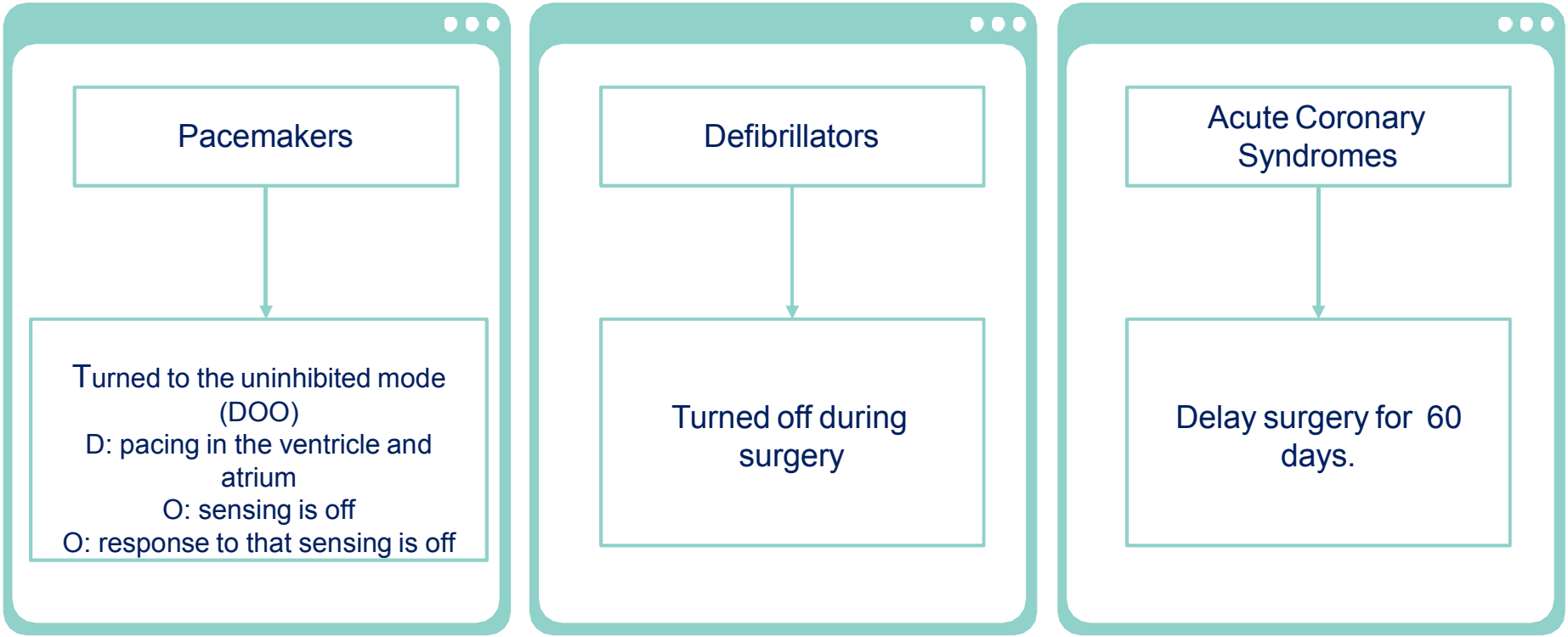
CARDIAC MANAGEMENT

Preoperative Cardiac Management



Preoperative Cardiac Management

Patients with Recent Angioplasty or Stenting

Several studies have shown a high incidence of cardiovascular complications when non-cardiac surgery is performed shortly after coronary angioplasty or stenting so its recommended to delay non cardiac surgeries especially considering the medications the patient would have started after the procedure.

These patients are started on Dual Antiplatelet Therapy)DAPT) after implantation to reduce the risk of stent thrombosis for 12-6months duration

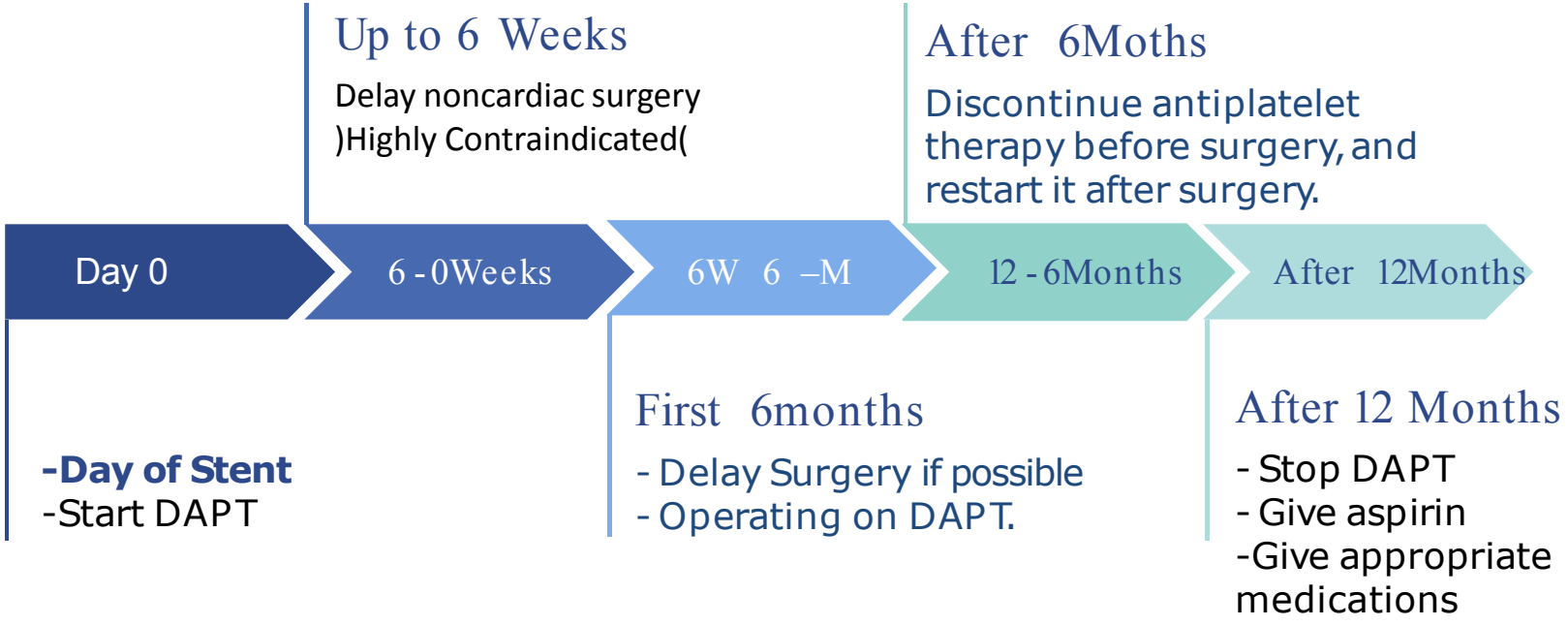
-DAPT: Aspirin + Clopidogrel/Ticagrelor/Prasugrel

since the risk of stent thrombosis is highest immediately after the implantation, NEVER STOP DAPT IN THE FIRST 6MONTHS

After 12-6months: Lifelong Aspirin 81)mg/day(

Preoperative Cardiac Management

Patients with Recent Angioplasty or Stenting



Preoperative Cardiac Management

Patients on Cardiovascular Drugs

In general, patients should continue their medications in the immediate preoperative period. Exceptions to this rule include **anticoagulants**, and **antiplatelet agents**.

Preoperative Cardiac Management

Patients on Cardiovascular Drugs

ARBs /ACEi

Discontinued on the morning of surgery.

β- Blocker

Continue Medication

Statins

Continue Medication.

Preoperative Cardiac Management

Perioperative Beta-Blockade

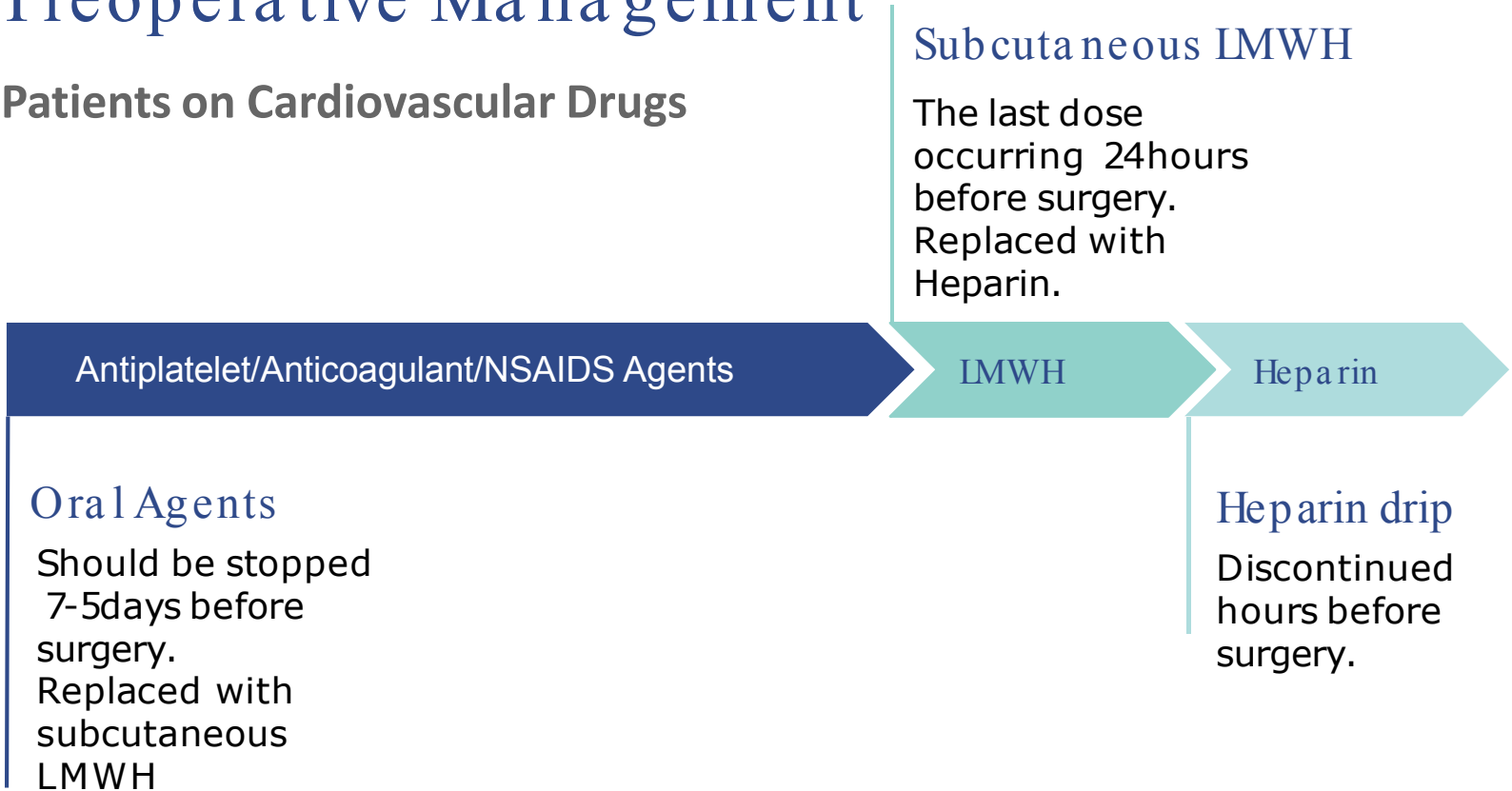
Over the past 15years, there has been conflicting and poorly supported evidence regarding the efficacy of beta-blockers in reducing perioperative cardiac events. Ideally, in appropriate patients, beta-blockers should be started days to weeks before elective surgery)if indicted to give B-Blocker.(

If the patient is already taking Beta-Blockers: Continue the medication.

In the naïve patient: Beta-Blockers will not reduce the cardiovascular risk of surgery by a significant amount, so it's better avoided.

Preoperative Management

Patients on Cardiovascular Drugs



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RESPIRATORY EVALUATION

Preoperative Evaluation and Screening

1 History)Risk Factors(
2 Physical Examination
3 Diagnostic Evaluation

Risk Factors

The risk for pulmonary complications is related to mainly patient-specific characteristics.

- Chronic obstructive pulmonary disease)COPD): Most common risk factor
- Smoking.
- Advanced age)above (60
- Obesity)BMI >(30
- Type of surgery
- Acute respiratory infections
- Functional status

Physical Examination

Physical examination should be performed carefully, with attention paid to signs of lung disease, like:

- Wheezing
- Prolonged expiratory-inspiratory ratio
- Clubbing
- Use of accessory muscles

Diagnostic Evaluation

Chest X-Ray (CXR:(

Should only be performed for acute symptoms related to pulmonary disease, unless it is indicated for the specific procedure under consideration.

Diagnostic Evaluation

Arterial Blood Gas (ABG:(

Can be considered in patients with a history of lung disease or smoking to provide a baseline for comparison with postoperative studies, but is not reliable to accurately predict postoperative pulmonary complications.

Diagnostic Evaluation

Preoperative Pulmonary Function Testing

Controversial and probably unnecessary in stable patients with previously characterized pulmonary disease undergoing nonthoracic procedures.

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RESPIRATORY MANAGEMENT

Preoperative Pulmonary Management

Pulmonary Toilet

Increasing lung volume by the use of preoperative incentive spirometry is potentially effective in reducing pulmonary complications.

Antibiotics

DO NOT reduce pulmonary infectious complications in the absence of preoperative infection. Elective operations should be postponed in patients with respiratory infections. If emergent surgery is required, patients with acute pulmonary infections should receive intravenous (IV) antibiotic therapy.

Preoperative Pulmonary Management

Smoking Cessation

Most copd patient share a common risk factor of smoking. All patient should be encouraged and assisted in smoking cessation because stopping this habit 2 month prior to surgery has been proven to be a beneficial intervention before elective surgery.

Stopping smoking reduce carbon monoxide levels and offers a better ability to clear sputum.

Preoperative Pulmonary Management

Bronchodilators

Bronchodilators may be required in preoperative period for a patient with obstructive airway disease It would prevent reduction of pulmonary function after surgical resection.

Preoperative Pulmonary Management

Regional anesthetic techniques and less invasive surgical options should be considered in severe cases.

Elective surgery should be postponed until acute exacerbations are treated.

Thank you

RESOURCES

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