

Mills Peninsula Hospital Cardiovascular Co-management Metric

New Onset Postoperative Atrial Fibrillation Prevention Protocol for Cardiac Surgery Patients

Background:

New onset postoperative atrial fibrillation (POAF) affects approximately 11-40% of post cardiac surgery patients. It is the single most common postoperative “complication” observed. Numerous studies have linked POAF to increased perioperative mortality, length of stay, hospital readmission, as well as hospital cost.

A diverse regimen of prophylactic strategies have been trialed, with varying degrees of success.

Both beta blockers and amiodarone have been identified to be effective and relatively safe choices, and have been shown to decrease the incidence of POAF by up to 50%. Additionally, the ventricular rate in those patients who do experience POAF were better controlled.

The current protocol will focus on the prophylaxis and prevention of new onset POAF, and not on the treatment of POAF.

Objective:

To implement an effective protocol to decrease the incidence of POAF in cardiac surgery patients and positively impact perioperative outcomes.

This protocol is not meant to be a clinical trial, nor is it mandatory. The surgical/medical team will always have the discretion to implement and/or withdraw from the protocol based on the clinical situation.

Method:

There are three environments where there is an opportunity to initiate the protocol. Those environments are the preoperative, intraoperative, and immediate postoperative phases generally corresponding to outpatient, operating room, and inpatient settings.

The causes of POAF are likely multi-factorial. A variety of patient factors as well as surgical technical factors have been implicated.

Factors Implicated in Postoperative Atrial Arrhythmias

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| Atrial trauma/inflammation Atrial stretch Atrial ischemia Epicardial/Pericardial inflammation | Hypoxia Acidosis Electrolyte imbalances Sympathetic autonomous discharge Circulating catecholamines |
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Target Population and Inclusion Criteria:

All patients undergoing cardiac surgery at Mills Peninsula hospital are potential candidates for the protocol. Each patient must be approached individually and verbally consent to the protocol. A handout with general information will be made available to facilitate enrollment.

Patients with pre-existing atrial fibrillation (paroxysmal or persistent) or other atrial tachycardias are also eligible for this protocol, however will not be included in the outcomes assessment. A thorough history of pre-existing atrial fibrillation or other atrial tachycardias should be documented.

While POAF is observed in patients undergoing all types of cardiac surgery both emergent and elective, a high risk cohort can be identified.

High Risk Population for Development of POAF

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| Elderly (age >70) Valvular operations or combined valve /CABG Multiple pre-existing comorbidities: (HTN, renal failure, CVA, CHF) Enlarged atrial chambers >6cm High calculated STS PROM score |
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Patients with these characteristics should be identified as high risk and implementing prophylactic measures should be considered.

Exclusion criteria

Patients with pre-existing atrial arrhythmias are not excluded but will not be included in the outcomes assessment.

Patients already receiving either or both protocol medications should continue them until the time of the operation.

1. Exclusion guidelines for starting beta blockers
 - a. Bradycardia <50,
 - b. Pre-existing 2nd or 3rd degree heart block

- c. Poorly controlled CHF (NYHA class III or IV) or severe LV dysfunction prohibiting usage of beta blocker
 - d. History of asthma/obstructive lung disease,
 - e. Allergies to beta blockers
2. Exclusion guidelines for starting Amiodarone
- a. Bradycardia <50,
 - b. Pre-existing 2nd or 3rd degree heart block,
 - c. Prolonged QTc >480 msec if QRS <120msec or Qtc>530msec if QRS>120msec
 - d. Untreated/unstable hypo/hyperthyroidism,
 - e. Interstitial lung disease/pulmonary fibrosis,
 - f. Allergies to iodine/amiodarone
 - g. Women of child-bearing age/pregnancy
 - h. Liver transaminases twice normal limit

Patients taking other AV nodal blocking agents, other antihypertensive medications are at risk for developing heart block or symptomatic hypotension. A clinical decision should be made as whether or not to start these patients on the protocol.

Although coumadin will typically be discontinued prior to surgery, patient on coumadin and amiodarone should have their coumadin dose decreased by 50%.

Pregnant or lactating patients should not receive amiodarone.

Atrial Fibrillation Prophylaxis Protocol

The medical/surgical team will identify a patient scheduled to undergo cardiac surgery and make a clinical decision as to whether the protocol should be implemented.

The patient should be informed of the protocol, and consent obtained.

1. Preoperative testing
 - a. Review of history to identify allergies or pre-existing arrhythmias
 - b. Physical examination to rule out active CHF
 - c. Baseline EKG
 - d. Thyroid function panel
 - e. Bedside spirometry
 - f. Standard blood work for surgery including coagulation studies and LFTs

Timing and Dosage

A new prescription will be given to the patient in the outpatient setting.

Amiodarone

1. Preoperative: May start any time prior to surgery, however ideally 5 days prior to operation.
 - a. Dosage:
 - i. Patient weight >70kg, 400 mg BID
 - ii. Patient weight <70kg, 200 mg BID
 - iii. If unable to take PO medication, Amiodarone drip (150mg IV bolus followed by drip) can be administered, alternatively Amiodarone via an NGT/OGT can be considered
2. Intraoperative:
 - a. If the patient did not have the opportunity to receive a proper preoperative dose , intraoperative amiodarone 150 -300mg IV can be given as a bolus in the operating room.
 - b. All patients on the protocol should have temporary ventricular pacing wires placed or other means of reliable pacing.
3. Postoperative: if stable hemodynamics (cardiac output and rhythm) medications should continue until postop day 5
 - a. Dosage:
 - i. Patient weight> 70kg, continue Amiodarone 400mg bid until POD# 5
 - ii. Patient weight<70kg, continue Amiodarone 200 mg bid until POD#5
 - iii. If unable to take PO medication, Amiodarone drip (150mg IV bolus followed by drip), alternatively Amiodarone via an NGT/OGT can be considered
4. Beyond POD #5 and following discharge: It is reasonable to continue Amiodarone beyond the initial 5 postoperative days at the surgeon's discretion
5. If continued post-discharge, Amiodarone therapy should be stopped one month post-surgery.

Beta blockers

1. Preoperative: May start any time prior to surgery, however ideally 5 days prior to operation
 - a. Dosage:
 - i. If already on beta blocker, continue dose until time of surgery
 - ii. Lopressor 25 mg bid (can reduce dose if borderline bradycardic or hypotensive)
 - iii. If unable to take PO, then Lopressor 5 mg IV q6 hours
2. Intraoperative: no recommendations
3. Postoperative: if the patient has stable hemodynamics (stable cardiac output and rhythm)
 - a. Dosage:
 - i. Start Lopressor 25 mg PO bid
 - ii. If unable to take PO, then Lopressor 5 mg IV q6 hours

4. Beyond POD #5: It is reasonable to continue Lopressor beyond the initial 5 postoperative days at the surgeon's discretion. Alternatively, the patient's outpatient beta blockade can be substituted.
5. If the patient has a cardiomyopathy, convert Lopressor to Toprol-XL or Coreg prior to discharge.
6. Avoid other QT prolonging agents while on amiodarone.

Outcomes:

The incidence of new onset POAF will be tracked. The definition of POAF will be congruent with STS guidelines.

Potential side effects and complications

The short duration of therapy for the protocol (10 days) was chosen to minimize potential side effects and complications.

In the literature, use of amiodarone was associated with an increased incidence of bradycardia, hypotension, and need for temporary pacing. Pulmonary toxicity from short term exposure to amiodarone seems to be extremely rare but has been reported. The incidence of permanent pacemaker implantation was not increased.

The incidence of intraoperative complications and major adverse outcomes following surgery do not appear to increase with this dosing regimen.

There is no published consensus from the professional surgical societies in regards to implementing such a protocol. (Recent guidelines were published by the STS for General Thoracic Surgery). Therefore, acceptance and implementation of this and similar protocols is at best, sporadic across the country.

With any prophylactic treatment, avoidance of major adverse outcomes related to the regimen is imperative, as this would defeat the entire purpose of the strategy.

The clinical team must therefore accept that there will inevitably be an increase in certain adverse events (bradycardia, hypotension, need for temporary pacing), however the benefits that will ultimately be gained by the prevention of POAF will outweigh these complications. A longer hospital stay is anticipated under certain circumstances to avoid pacemaker placement in the event of bradycardia thought to result with the elimination of AVN blocking agents.

References:

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