Postoperative Atrial Fibrillation

Preoperative

- *Screen for preoperative paroxysmal/chronic atrial fibrillation (Questions/Exam: any history of atrial fibrillation or palpitations, pulse check, ECG, etc)*
- *If beta-blocker naïve, administer metoprolol 12.5-25 mg PO x1 preoperatively morning of surgery (hold for HR <60, SBP <100). If currently on beta-blocker, then continue the current regimen. Last dose, morning of surgery*
- *Patients at high risk of developing POAF (Age> 65, Valve surgery, higher CHA_2DS_2-VASc score) consider Amiodarone 10mg/kg PO (400mg to 800mg) daily for 6 days before and after surgery*

Intraoperative

- *Consider concomitant surgical ablation and left atrial appendage occlusion for patients with preexisting atrial fibrillation*
- *Consider posterior pericardiotomy at the time of surgery*

Postoperative (first 24-48 hours)

- *Prophylaxis:*
  - *Diligent electrolyte normalization (K+ >4, Mg^{2+})*
  - *Administer metoprolol 12.5-25 mg PO BID starting on POD 1 (hold for HR <60, SBP <100) in patients not on vasoactive medications*
  - *Amiodarone should be considered in patients not on beta blockers*
    Amiodarone 400 mg PO TID for 5 days, then Amiodarone 200 mg PO BID for 5 days, then 200 g PO daily. Hold if bradycardic (HR <60, hold for QTc >450)
- *Rate Control Options:*
  - *Metoprolol 5 mg IV every 3-5 minutes (total 15 mg) and/or titrate PO beta blockade*
  - *Diltiazem 0.25 mg/kg IV bolus x1, followed by diltiazem infusion 10 mg/hr titrate to HR <100, hold for HR <60 or SBP <100*
  - *Digoxin 500 mcg IV x1, followed by 250 mcg IV every 8 hours x2 doses*
- *Rhythm Control:*
  - *Administer IV Amiodarone 150 mg IV loading dose followed by 1 mg/min for 6 hours, then 0.5 mg/min for 18 hours. Transition to Amiodarone 200 mg PO BID x5 day, then 200 mg PO daily. Hold if bradycardic (HR <60). Total Amiodarone load of 10 g*
  - *Direct current cardioversion (for hemodynamic instability or elective)*
- *Surgical Ablation for Atrial Fibrillation: If surgical ablation has been performed:*
  - *Administer Amiodarone 150 mg IV load followed by 1 mg/min for 6 hours, then 0.5 mg/min for 18 hours.*
  - *Transition to Amiodarone 200 mg PO BID for 5 days, then 200 mg PO daily. Hold if bradycardic (HR <60). Hold for QTc >450*
  - *Consider direct current cardioversion to restore sinus rhythm as needed*
- *Anticoagulation Options:*
  - *Routine after ablation, consider if atrial fibrillation predominant rhythm after weighing benefit of thromboembolism prevention vs risk of postoperative bleeding*
  - *Unfractionated heparin infusion with titration to goal aPTT (2-3x normal)*
  - *If on DAPT, would strongly consider if triple therapy bleeding risk exceeds benefit*
- *Apixaban 5 mg BID for non-valvular atrial fibrillation patients*
  - *If meets 2/3 criteria, may need to reduce dose to 2.5 mg*
  - *Age ≥80, weight ≤60 kg, Creatinine ≥1.5 g/dL*
- *Warfarin (consider the interaction with Amiodarone)*
  - *Consider heparin drip to bridge in appropriate patients*
  - *Goal INR 2-3*

Abbreviations: DAPT- dual antiplatelet therapy, INR- international normalized ratio POAF- postoperative atrial fibrillation,
Legend: Orders in Bold are Class I or IIA or equivalent. Orders in italics were inconsistently Class I or IIA, Class IIB, or supported by evidence published in peer-reviewed journals

.

Table 1: Comparison of I/IIa or Equivalent Recommendations for Cardiac Surgery-Postoperative Atrial Fibrillation Consensus and Guideline Publications				
Recommendations	ACC/AHA/ HRS (2014, 2019)	ESC/EACTS (2020)	SCA/EACTA (2018)	Canadian Cardiovascular Society/Canadian Heart Rhythm Society (2020)
Preoperative beta blocker				□
Preoperative amiodarone to prevent POAF	□	□	□	□
Concomitant surgical ablation in patients with pre-existing atrial fibrillation at the time of cardiac surgery	□	□		
Beta blocker to prevent POAF	□	□	□	□
Perioperative amiodarone to POAF	□	□	□	□
Nondihydropyridine calcium channel blocker when a beta blocker is unable to achieve rate control	□		□	□
Amiodarone (antiarrhythmics) to treat POAF	□		□	□
Antithrombotic medication for POAF to reduce thromboembolism	□	□	□	
Ibutilide/elective direct-current cardioversion	□		□	
Direct-current cardioversion for hemodynamic instability			□	

References:

1 Eikelboom R, Sanjanwala R, Le ML, Yamashita MH, Arora RC. Postoperative Atrial Fibrillation After Cardiac Surgery: A Systematic Review and Meta-Analysis. Ann Thorac Surg. 2021 Feb;111(2):544-554. PMID: 32687821.

2 Woldendorp K, Farag J, Khadra S, Black D, Robinson B, Bannon P. Postoperative Atrial Fibrillation After Cardiac Surgery: A Meta-Analysis. Ann Thorac Surg. 2021 Dec;112(6):2084-2093. PMID: 33340521.

3 January CT, Wann LS, Alpert JS, Calkins H, Cigarroa JE, Cleveland JC Jr, et al; ACC/AHA Task Force Members. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. Circulation. 2014 Dec 2;130(23):2071-104. PMID: 24682348.

4 January CT, Wann LS, Calkins H, Chen LY, Cigarroa JE, Cleveland JC Jr, et al. 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol. 2019 Jul 9;74(1):104-132. PMID: 30703431.

5 Kirchhof P, Benussi S, Kotecha D, Ahlsson A, Atar D, Casadei B, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. Eur J Cardiothorac Surg. 2016 Nov;50(5):e1-e88. PMID: 27663299.

6 Sousa-Uva M, Neumann FJ, Ahlsson A, Alfonso F, Banning AP, Benedetto U, et al.; ESC Scientific Document Group. 2018 ESC/EACTS Guidelines on myocardial revascularization. Eur J Cardiothorac Surg. 2019 Jan 1;55(1):4-90. PMID: 30165632.

7 Muehlschlegel JD, Burrage PS, Ngai JY, Prutkin JM, Huang CC, Xu X, et al. Society of Cardiovascular Anesthesiologists/European Association of Cardiothoracic Anaesthetists Practice Advisory for the Management of Perioperative Atrial Fibrillation in Patients Undergoing Cardiac Surgery. Anesth Analg. 2019 Jan;128(1):33-42. PMID: 30550473.

8Andrade JG, Aguilar M, Atzema C, Bell A, Cairns JA, Cheung CC, et al. The 2020 Canadian Cardiovascular Society/Canadian Heart Rhythm Society Comprehensive Guidelines for the Management of Atrial Fibrillation. Can J Cardiol. 2020;36(12):1847-1948. PMID: 33191198.

9Ad N, Damiano RJ Jr, Badhwar V, Calkins H, La Meir M, Nitta T, et al. Expert consensus guidelines: Examining surgical ablation for atrial fibrillation. J Thorac Cardiovasc Surg. 2017;153(6):1330-1354. PMID: 28390766.

10Mitchell LB, Exner DV, Wyse DG, Connolly CJ, Prystai GD, Bayes AJ, et al. Prophylactic Oral Amiodarone for the Prevention of Arrhythmias that Begin Early After Revascularization, Valve Replacement, or Repair: PAPABEAR: a randomized controlled trial. JAMA. 2005;294(24):3093-100. PMID: 16380589.

11 Whitlock RP, Belley-Cote EP, Paparella D, Healey JS, Brady K, Sharma M, et al; LAAOS III Investigators. Left Atrial Appendage Occlusion during Cardiac Surgery to Prevent Stroke. N Engl J Med. 2021;384(22):2081-2091. doi: 10.1056/NEJMoa2101897. PMID: 33999547.

12Soletti GJ, Perezgrovas-Olaria R, Harik L, Rahouma M, Dimagli A, Alzghari T, et al. Effect of posterior pericardiotomy in cardiac surgery: A systematic review and meta-analysis of randomized controlled trials. Front Cardiovasc Med. 2022;9:1090102. doi: 10.3389/fcvm.2022.1090102. PMID: 36620644.

13Mitchell LB, Exner DV, Wyse DG, Connolly CJ, Prystai GD, Bayes AJ, et al. Prophylactic Oral Amiodarone for the Prevention of Arrhythmias that Begin Early After Revascularization, Valve Replacement, or Repair: PAPABEAR: a randomized controlled trial. JAMA. 2005;294(24):3093-100. doi: 10.1001/jama.294.24.3093. PMID: 16380589.

14 Gillinov AM, Bagiella E, Moskowitz AJ, Raiten JM, Groh MA, Bowdish ME, et al; CTSN. Rate Control versus Rhythm Control for Atrial Fibrillation after Cardiac Surgery. N Engl J Med. 2016;374(20):1911-21. doi: 10.1056/NEJMoa1602002. PMID: 27043047.

15 Chatterjee S, Ad N, Badhwar V, Gillinov AM, Alexander JH, Moon MR. Anticoagulation for atrial fibrillation after cardiac surgery: Do guidelines reflect the evidence? J Thorac Cardiovasc Surg. 2023:S0022-5223(23)00275-1. doi: 10.1016/j.jtcvs.2023.03.026. PMID: 37037415.