

involvement ($p = 0.001$), non-white race ($p = 0.037$), and prior cardiac surgery ($p = 0.023$).

Although post-operative survival of TAAAD has improved, surgical mortality remains significant, and there persists a subset of high-risk patients who are poor surgical candidates. Thus, understanding which high-risk patients might survive with MM may prove helpful to clinicians counseling patients and families regarding treatment options and allow a more informed decision in situations in which surgery is deemed to carry excessive risk.

Of the predictors of survival with MM by multi-variable analysis, presenting hypertension and normal chest x-ray suggest a hemodynamically stable patient without aortic rupture. Worse outcomes with root involvement may reflect the potential for coronary artery malperfusion and AI, as well as a greater risk of aortic rupture. Thus, the specific extent of dissection may influence outcome more than traditional anatomic classifications capture, and this factor should be considered when balancing risks of MM versus surgical management in a high-risk patient. Non-white race was a predictor of survival with MM, and the possibility of a genetic component linking race to outcomes with MM requires further investigation. Another possible explanation is IMH is more common in non-whites, and Asians in particular (2), and the superior outcomes with MM in this population compared with other races may be due to the higher prevalence of IMH, rather than true dissection, in this cohort. The protective mechanism of prior cardiac surgery is thought to be due to adhesions that protect against rupture and tamponade. Further, when the prior surgery involved aortic valve replacement, the surgically replaced valve may prevent the development of AI after TAAAD, which can also positively impact survival (3).

Determining eligibility for emergent repair of TAAAD is based on patient preference and relative risk of post-operative versus nonoperative death. Although outcomes in MM patients are likely influenced by a variety of patient- and hospital-level factors not captured within the IRAD, we were able to identify independent predictors of survival within this cohort. Discussions on pursuing MM should be considered in patients with the protective characteristics listed previously for whom surgery is deemed prohibitively high risk. As surgical outcomes further improve, patients previously deemed ineligible for repair due to prohibitive risk may be able to feasibly undergo TAAAD surgery. As such, selection of optimal therapy remains a moving target, and should continue to involve evidence-based risk models and honest discussion with patients and families.

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<https://doi.org/10.1016/j.jacc.2020.01.015>

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Please note: This research was generously supported by W.L. Gore & Associates, Medtronic, Varbeidan Aortic Research Fund, the Hewlett Foundation, the Mardigian Foundation, UM Faculty Group Practice, Terumo, and Ann and Bob Aikens. Dr. Gleason has received financial support from Medtronic, Abbott/St. Jude Medical, and Boston Scientific; and has served on the Advisory Board for Abbott; and served on the steering committee for Medtronic and Boston Scientific. Dr. Eagle has received grant support from W.L. Gore & Associates and Medtronic. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

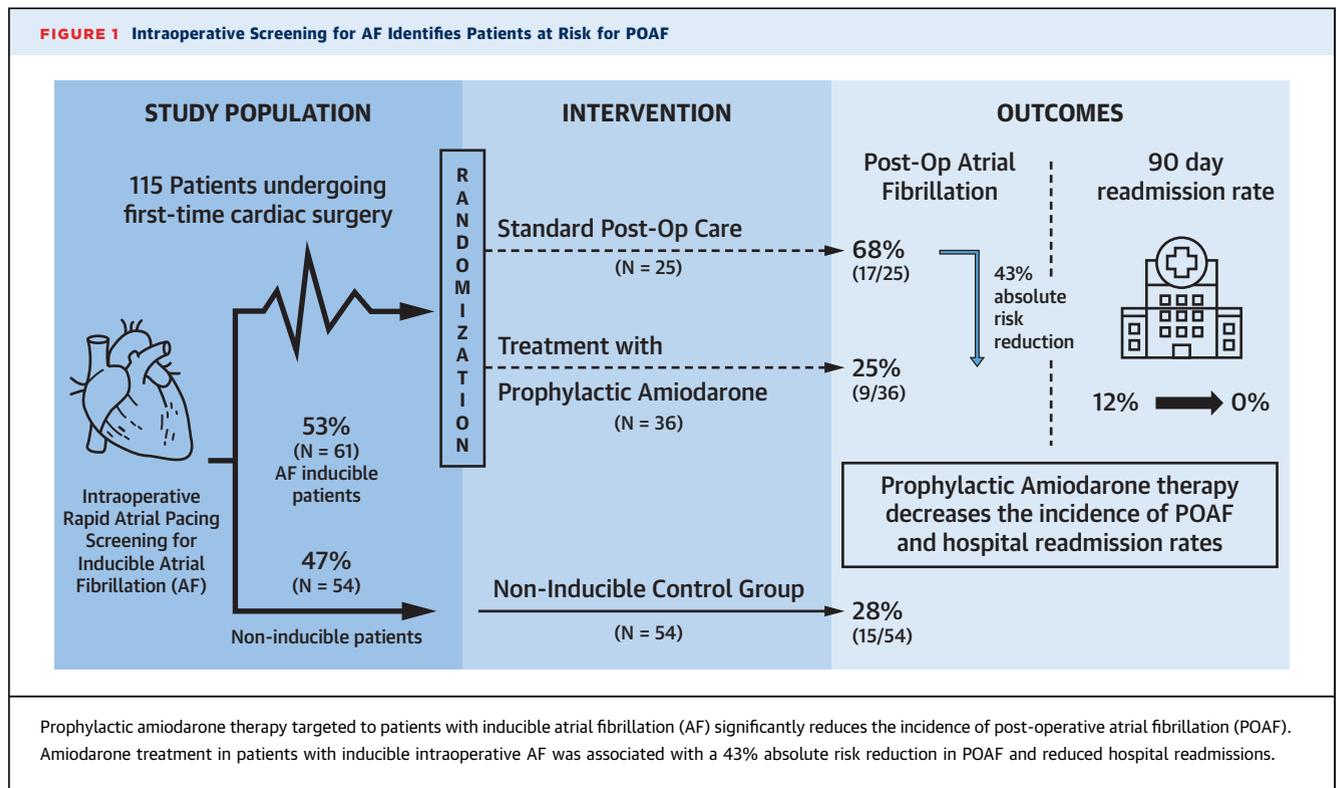
REFERENCES

1. Pape LA, Awais M, Woznicki EM, et al. Presentation, diagnosis, and outcomes of acute aortic dissection: 17-year trends from the international registry of acute aortic dissection. *J Am Coll Cardiol* 2015;66:350-8.
2. Song JK. Aortic intramural hematoma: aspects of pathogenesis 2011. *Herz* 2011;36:488-97.
3. Estrera AL, Miller CC, Kaneko T, et al. Outcomes of acute type A aortic dissection after previous cardiac surgery. *Ann Thorac Surg* 2010;89:1467-74.

Screening and Prophylactic Amiodarone Reduces Post-Operative Atrial Fibrillation in At-Risk Patients



Post-operative atrial fibrillation (POAF) is the most common complication after cardiac surgery. Patients with POAF are at increased risk of morbidity, mortality, hospital length of stay, and cost of care (1). Despite the success of small randomized trials of pharmacologic prophylaxis, overall rates of POAF have persisted over decades of attempted interventions (2). Previous studies have demonstrated that intraoperative atrial pacing is a simple and effective way to identify patients at high risk for

FIGURE 1 Intraoperative Screening for AF Identifies Patients at Risk for POAF

developing POAF after coronary artery bypass grafting (CABG), but attempts to validate its utility in larger populations have so far been unsuccessful (3). We hypothesized that intraoperative atrial fibrillation (AF) screening identifies an at-risk group of patients who may benefit from prophylactic therapy when given amiodarone, and can reduce rates of POAF after cardiac surgery.

We report on a single-center, prospective randomized controlled trial (NCT03868150), approved by the institutional ethics committee, comparing prophylactic amiodarone treatment versus no treatment in patients with inducible AF undergoing first-time cardiac surgery. The primary outcome assessed was the development of POAF. In total, 115 patients with no prior history of AF underwent rapid atrial pacing (800 beats per min for 30 s, pulse width: 1.0 ms, output: 20 mA) before cardiopulmonary bypass. AF inducibility and POAF were defined as at least 30 s of sustained AF. Fisher exact and Mann-Whitney *U* testing was used for comparison of categorical and nonparametric data respectively, using a 2-sided alpha of 0.05.

AF was induced in 61 (53%) patients (mean age 65 ± 11 years) versus 54 (47%) patients who were non-inducible (62 ± 11 years). The patients had a mean

CHA₂DS₂-VASC score of 2.5 ± 1.3 and mildly enlarged left atrial volume index of 33.8 ± 16.3 ml/mm², with no differences between groups. Patients with inducible AF underwent simple randomization to amiodarone treatment ($n = 36$) or no treatment ($n = 25$), and amiodarone treatment began intraoperatively with 150 mg intravenously, followed by 1 mg/min for 6 h, and 0.5 mg/min for 18 h. Patients were then transitioned to 400 mg oral amiodarone twice a day until discharge.

Fifty-two patients (45.2%) underwent valve surgery, 47 (40.9%) CABG surgery, and 16 (13.9%) combined valve + CABG surgery. We observed a higher number of valve procedures among those who were inducible: 33 (54%) versus 19 (35%) ($p < 0.05$), with mitral valve surgery carrying the greatest risk for inducible AF. Overall, a total of 41 (35.7%) patients developed POAF, with prophylactic treatment significantly reducing the rate of POAF (Figure 1). Among those with inducible AF, 17 (68%) developed POAF in the no-treatment group, compared with 9 (25%) in the prophylactic treatment group, an absolute risk reduction of 43% ($p = 0.003$). Fifteen patients (28%) developed POAF within the non-inducible, no-treatment group. Patients randomized to prophylactic amiodarone trended toward lower rates of hospital readmission for arrhythmia (0% vs.

12%, $p = 0.06$), and shorter lengths of stay (6.97 ± 2.5 vs. 8.20 ± 8.9 , $p = 0.08$).

Limitations of this study include that a significant number of patients ($n = 15$) did not receive the total allocated amiodarone intervention because of development of bradycardia or junctional rhythm. The adverse beta-blockage effects of amiodarone are well documented and remain one of the major limitations of this pharmacological intervention (4). Of these 15 patients, 7 (46.7%) developed POAF as compared with 2 (9.5%) of the 19 patients who received the full dose. Future studies investigating the clinical efficacy of lower dose amiodarone in patients with inducible AF are in development.

In conclusion, combining a diagnostic test with a prophylactic treatment targeted at patients at high-risk for POAF resulted in 2 key findings. First, intraoperative rapid atrial pacing was effective at identifying patients at high-risk for POAF. Second, prophylactic amiodarone therapy significantly reduced the incidence of POAF in this at-risk population. This study identifies a subset of patients undergoing cardiac surgery who derive maximal benefit from prophylactic amiodarone treatment, resulting in reduced rates of POAF and likely hospital readmissions.

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<https://doi.org/10.1016/j.jacc.2020.01.016>

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Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. LaPar DJ, Speir AM, Crosby IK, et al. Postoperative atrial fibrillation significantly increases mortality, hospital readmission, and hospital costs. *Ann Thorac Surg* 2014;98:527-33.

2. Arsenault KA, Yusuf AM, Crystal E, et al. Interventions for preventing postoperative atrial fibrillation in patients undergoing heart surgery. *Cochrane Database Syst Rev* 2013 (1):CD003611.

3. Lanters EAH, Teuwen CP, Yaksh A, et al. Intraoperative inducibility of atrial fibrillation does not predict early postoperative atrial fibrillation. *J Am Heart Assoc* 2018;7:e007879.

4. Echahidi N, Pibarot P, O'Hara G, Mathieu P. Mechanisms, prevention, and treatment of atrial fibrillation after cardiac surgery. *J Am Coll Cardiol* 2008;51:793-801.

Watch Carefully



Interpreting Positive Predictive Values With Wearable Devices

We were pleased to read the study by Guo et al. (1) regarding the use of a smart device to detect atrial fibrillation (AF). The authors used devices with a photoplethysmography (PPG) algorithm to identify 424 cases of suspected AF among 187,912 individuals and confirmed the AF diagnosis in 227 individuals. Almost two-thirds were diagnosed within 7 days, suggesting that prevalent, rather than incident, AF was being detected. The authors reported a positive predictive value (PPV) of 92%, with sensitivities and specificities approaching 99% to 100%.

Notably, the authors enrolled a predominantly male (87%) cohort with a mean age of 34.7 ± 11.5 years (only 1.8% of participants were older than 65 years). On this basis alone, the PPV was higher than expected, given the low prevalence of AF in this demographic (2). In general, a lower population prevalence will reduce PPV, given the smaller proportion of true positives relative to false positives ($PPV = \frac{\text{true positives}}{\text{true positives} + \text{false positives}}$) (3). There are 2 potential explanations for why the PPV was reported to be as high as 92%.

First, the PPV was reported for PPG signals, not by notifications or individuals. This can be misleading, because AF diagnostic algorithms often perform periodic recordings and increase recording frequency after an abnormal episode is detected. In this study, the device required ≥ 10 abnormal PPG recordings before issuing a notification. The increased sampling during AF episodes would inflate the number of AF recordings and PPV, particularly if individuals had more prevalent types of AF (persistent or permanent AF). When calculated by individuals rather than signals, the PPV is only 87% (227 true positives out of 262 overall positives).

Second, the study was limited by its poor follow-up. Of 424 individuals with suspected AF, only 262 individuals completed assessment with the health team (38% loss to follow-up). This raises a strong selection bias, because healthier individuals may have self-selected to avoid further evaluation, whereas those with true or symptomatic AF may have been more likely to follow up. If we conservatively