

Prophylactic Amiodarone Treatment for Atrial Fibrillation After Coronary Artery Bypass Surgery

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ABSTRACT

In this study we performed a retrospective chart review to evaluate the efficacy of short-term postoperative oral amiodarone therapy on postoperative atrial fibrillation (POAF) after coronary artery bypass surgery. The incidence of POAF in 372 patients (60.6%) without prophylactic amiodarone therapy was compared with that in 240 patients (39.4%) receiving the medication immediately after the surgery. Patients who received prophylactic amiodarone developed significantly less POAF than those without prophylactic treatment (17.0% versus 25.9%, $P = .01$), with relative and absolute risk reductions of 0.7% and 8.9%, respectively. Postoperative oral amiodarone therapy is simple to administer and may be a valuable adjunct therapy for patients after coronary artery bypass surgery.

Keywords: beta-blockers, coronary artery bypass surgery, postoperative atrial fibrillation, prophylactic amiodarone

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LITERATURE REVIEW

Postoperative atrial fibrillation (POAF) is the most common complication after cardiac surgery and its incidence varies from 20% to 65%, depending on patients' characteristics, type of surgery, method of detection, and definition of atrial fibrillation (AF).¹⁻³ POAF commonly occurs on the second or the third postoperative day and 94% of episodes occur within the first week.^{1,4} The incidence of POAF is higher among those with advanced age and valvular surgery alone or in combination with coronary artery bypass surgery (CABS).^{1,5} POAF incidence is expected to rise in the future as the number of cardiac surgery procedures performed in the aging population increases.¹ POAF increases the incidence of postoperative complications, including hemodynamic deterioration, thromboembolic events, heart failure, and exposure to risks of antiarrhythmic agents.^{1-3,6} POAF also increases intensive care unit and hospital stays, thus contributing to escalating health care costs.^{1-3,6}

POAF is typically transient and reversible and, because of the potential adverse outcomes associated

with POAF treatment, prophylactic therapy for this arrhythmia is more advantageous.³ Prophylactic measures may be initiated with nonpharmacologic or pharmacologic strategies. Beta-blockers, amiodarone, and sotalol are effective pharmacologic treatments, mostly targeting sympathetic neurohormonal activation and atrial refractory periods and conduction.² The net benefit of beta-blockers in preventing POAF is substantial, and withdrawal of preoperative beta-blockers places patients at risk for POAF; these drugs should be continued postoperatively.^{2,4} Both amiodarone and sotalol can lead to QT prolongation and ventricular proarrhythmias.⁷ However, amiodarone carries a lower risk for proarrhythmias and may be considered for patients at risk of developing POAF or when beta-blockers are contraindicated.^{4,7}

Several randomized, controlled trials (RCTs) of amiodarone prophylaxis in preventing POAF have been reported.^{1,2,8-11} In one study, oral amiodarone given 7 days before surgery and continued until the day of hospital discharge reduced the incidence of POAF, length of hospital stay, and total

hospitalization costs.⁹ Postoperative oral amiodarone alone was also found to be significantly effective in decreasing POAF.¹⁰ A meta-analysis of RTCs with prophylactic amiodarone initiated before or after surgery, which stratified amiodarone doses into low (< 3,000 mg), intermediate (3,000–5,000 mg), and high (> 5,000 mg) total cumulative dose during the treatment period, reported a significantly lower incidence of POAF with both intermediate and high doses, regardless of the time of treatment initiation.¹² Amiodarone is now recommended as monotherapy for patients unable to take beta-blockers or as add-on therapy for the prevention of POAF.^{1,2}

Even with ample evidence of positive outcomes of prophylactic treatment, the use of preventive strategies for POAF remains controversial and is not universally accepted. It may take > 10 years for research findings to be implemented in clinical practice, and this research-practice gap impedes the progress of safe and effective patient care outcomes.¹³ In a recent survey of surgeons in Scandinavian countries, only 62% routinely used oral beta-blockers and 18% used amiodarone for POAF prophylaxis.¹⁴ The reasons given for nonuse included inconclusive evidence of prophylactic drug efficacy, potential side effects, difficult administration procedures, and the availability of other alternative prophylactic measures. Possible factors affecting successful implementation of evidence-based practices include mandated clinician education, leadership, safety culture, organizational learning, teamwork and communication, physician and staff engagement, as well as evidence of previous successful application.¹⁵

The purpose of this study was to determine whether applying knowledge gained from RTCs would translate into positive patient outcomes. Specifically, our study was undertaken to evaluate the feasibility and efficacy of short-term oral amiodarone therapy (400 mg, twice daily for 5 days) after CABS, in addition to a routine postoperative beta-blocker administration with oral metoprolol 12.5 mg, twice daily.

METHODS

This study was a retrospective chart review study of patients who had cardiothoracic surgery between January 2009 and December 2013 at a community

hospital of a large health care system that consisted of 3 community hospitals. All 3 hospitals administered postoperative beta-blocker on a routine basis, but only 1 also concurrently administered short-term prophylactic amiodarone 400 mg orally for 5 days since 2008. It was observed that the POAF rate was twice as high at hospitals not using prophylactic oral amiodarone therapy (unpublished data, SSM Health–St. Louis). Given this observation, 1 of the 2 hospitals not using prophylactic oral amiodarone adopted this practice. The present study was undertaken at this facility, which relocated in January 2009 (the chosen start date). Prophylactic amiodarone treatment was not routinely given to post-CABS patients until July 2011. The end date of December 2013 was chosen to provide a matched interval of 18 months for patients not receiving (January 2009 to June 30, 2011) and receiving (July 2011 to December 2013) prophylactic amiodarone treatment.

The study was approved by the relevant institutional review boards and human rights review committees. Postoperative metoprolol 12.5 mg was normally administered 2 times daily if patients tolerated oral intake, had a heart rate of > 60 beats per minute (bpm) and a blood pressure > 100 mm Hg systolic, or did not require intravenous or cardiac pacing. Only post-CABS patients were chosen for the study to avoid any variability in surgical procedures between study samples; all patients were scheduled to have off-pump CABS, but 6.7% ultimately required a combined procedure. Only patients without known preoperative AF were included in the investigation. The study population consisted of 624 patients; 357 underwent surgery between January 2009 and June 30, 2011, when prophylactic amiodarone was not given, and served as a historic control cohort (group 1). The other 267 patients underwent surgery between July 2011 and December 2013, when prophylactic amiodarone therapy was administered, and they served as the treatment cohort (group 2).

All group 2 patients were scheduled to receive prophylactic oral amiodarone therapy, 400 mg twice daily, for 5 days postoperatively, unless they had any of the following contraindications: heart rate < 45 bpm; advanced heart block; an implantable defibrillator; untreated thyroid disease; elevated serum

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