# Anticoagulation Strategies for the Management of Postoperative Atrial Fibrillation

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**KEYWORDS**

• Postoperative atrial fibrillation • Anticoagulation • Antiplatelet therapy • Rate control • Risk factors

**KEY POINTS**

- Risk factors for postoperative atrial fibrillation (POAF) include increasing age, male gender, European ancestry, hypertension, prior myocardial infarction, heart failure, increasing grade of diastolic dysfunction, left atrial enlargement, general thoracic and cardiac procedures.
- POAF usually occurs within 5 days of surgery, with a peak onset on postoperative day 2, and is usually self-limited.
- POAF is associated with a 2- fold to 3-fold increased risk of postoperative stroke, higher 30-day mortalities, longer intensive care unit and hospital stays, higher costs, and higher complication rates compared with non-POAF patients.
- POAF is associated with an 8-fold increased risk of developing late atrial fibrillation (AF), a 2-fold increased risk of cardiovascular mortality, and is an independent risk factor for late stroke and mortality after isolated coronary artery bypass grafting.
- Rhythm control is not superior to rate control and is associated with higher adverse drug reactions and rehospitalization rates.
- Patients with persistent or paroxysmal POAF for greater than 48 hours should be anticoagulated owing to the increased risk of postoperative stroke and should be anticoagulated for at least 4 weeks after restoration of normal sinus rhythm.
- Oral anticoagulation with warfarin has been the standard of care for patients requiring anticoagulation for AF after cardiac surgery, including POAF. Newer oral factor II and factor X antagonists are indicated and available for the management of nonvalvular AF, although there is limited evidence regarding their use in the postoperative setting. Head-to-head trials between these new oral anticoagulants in a perioperative setting are needed.

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## INTRODUCTION

### *Incidence of Atrial Fibrillation*

In the general population, chronic atrial fibrillation (AF) is a disease that most often occurs in the elderly. The prevalence of AF is approximately 1% to 3% in the adult population, with a doubling in the incidence of AF for each decade of life after age 50.[1–4] Risk factors for developing chronic AF include advancing age, male gender, European ancestry, diabetes mellitus, hypertension, heart failure, valvular heart disease, and history of myocardial infarction (MI).[3–5] With an aging population in the United States and around the world, the prevalence of AF is expected to increase rapidly over the next several decades. In the United States, the number of patients living with AF is expected to increase from approximately 6 million people currently to more than 10 million by 2025.[5]

Postoperative atrial fibrillation (POAF) is defined as the development of new-onset AF in the immediate postoperative period. POAF may occur in any surgical population, but is more common in patients undergoing cardiac or thoracic surgical procedures. In cardiac surgical or thoracic surgical patients, POAF usually occurs within the first 5 postoperative days, with a peak onset on postoperative day 2.[6–10] The incidence of POAF following general thoracic surgery procedures ranges from 10% to 20% of patients, compared with 20% to 40% in patients undergoing cardiac surgery.[11–25] In a study evaluating 13,696 noncardiac, nonthoracic surgical patients, the incidence of POAF was only 0.37%.[26] Similarly, in a large database analysis of more than 370,000 noncardiac surgical patients undergoing surgery (including thoracic procedures), the rate of POAF was 1%.[27] In this study, patients undergoing thoracic, intracranial, or intraabdominal procedures were at increased risk of developing POAF when compared with patients undergoing orthopedic, spine, genitourinary, vascular, and otolaryngologic procedures. Patients who developed POAF were generally older (median age 74), had at least one cardiac risk factor, and had a positive fluid balance.[26,27]

Patients undergoing cardiac procedures have the highest incidence of POAF. Procedures associated with the highest risk (in increasing order) include isolated coronary artery bypass graft (CABG), isolated valvular procedures, combined CABG and valve procedures, and combined valve procedures. Isolated CABG surgery using traditional sternotomy and on-pump techniques is associated with a POAF rate of approximately 20% to 30%, whereas isolated valve procedures carry a higher risk of 30% to 40%; the rate is even higher in patients undergoing combined CABG and valve procedures, with a rate of 40% to 55%.[8,9,16,17,20,23] Rates of POAF as high as 80% have been reported in patients undergoing combined valvular procedures.[20]

### *Risk Factors for the Development of POAF*

Elderly patients undergoing noncardiac surgery have been reported to have postoperative atrial arrhythmia rates as high as 6.1%.[28] Age greater than 70, history of congestive heart failure, significant valvular disease, and premature atrial contractions on preoperative electrocardiography were patient characteristics found to be independent predictors of developing POAF, with adjusted odds ratios ranging from 1.3 to 2.1. Certain noncardiac procedures have also been associated with an independent risk of developing POAF, including thoracic aortic aneurysm procedures, abdominal aortic aneurysm procedures, abdominal procedures, and vascular procedures.[28]

In thoracic, noncardiac surgical patients, increasing age (each decade after age 50), male gender, European ancestry, and history of heart failure are independently associated with the development of POAF.[6,7,11–13] Furthermore, the rate of POAF increases with increasing levels of lung resection. Wedge resection or segmental lung resection