

Postoperative atrial fibrillation as an independent predictor of 90-day complications in geriatric patients undergoing coronary artery bypass grafting

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Postoperative atrial fibrillation (POAF) affects up to 40% of coronary artery bypass grafting (CABG) surgeries and remains one of the most common complications occurring after cardiac surgery.^[1–3] Advanced age is the strongest and most consistently recognized predictor of POAF, attributable to age-related atrial remodeling, autonomic imbalance, and elevated inflammation.^[1–3] Although previous research has demonstrated a link between POAF and increased hospitalization duration, stroke, and mortality, geriatric populations are often considered a single entity.^[4–6] Such an approach fails to recognize the physiological differences between younger older patients (aged 65–79 years) and the very elderly (≥ 80 years). We conducted a retrospective cohort study to assess the independent relationship between POAF and 90-day postoperative complications across stratified geriatric age groups in a large contemporary CABG population.

The study comprised 2,625 patients aged ≥ 65 years who underwent isolated CABG surgery in Florida from January 2021 to June 2024. Patients with preoperative atrial fibrillation were excluded. The analytic cohort was stratified into 65–79 years ($n=2,308$) and ≥ 80 years ($n=317$). The primary outcome was a composite of 90-day postoperative complications, including ischemic stroke, infection, gastrointestinal bleeding, and acute coronary syndrome (ACS). Binary logistic regression was utilized for dichotomous outcomes, adjusting for sex, race, body mass index (BMI), diabetes, peripheral arterial disease, chronic obstructive pulmonary disease (COPD), chronic heart failure, chronic kidney disease, and smoking status.

Length of stay (LOS) was assessed through negative binomial regression.

POAF was detected in 10.1% of patients aged 65–79 years and 13.9% of patients aged ≥ 80 years old. Patients ≥ 80 years had higher prevalence of chronic kidney disease (30.6% vs. 19.1%) and longer median LOS (9 vs. 8 days). Overall, 31.9% ($n=838$) of patients experienced at least one complication within 90 days. Complication rates were 31.5% in the 65–79 group and 35.0% in the ≥ 80 group. When stratified by POAF status, complications occurred in 37.3% of POAF patients versus 30.8% without POAF in the 65–79 group, and in 40.9% versus 34.1% in the ≥ 80 group. ACS was the most common complication across all subgroups, occurring in 30.0%–40.9% of patients depending on age and POAF status (Table 1). POAF was also independently associated with longer LOS (IRR = 1.30, 95% CI: 1.23–1.36; $P < 0.001$) and higher odds of discharge to a facility (OR = 1.33, 95% CI: 1.03–1.72; $P = 0.030$), but was not an independent risk factor for 90-day readmission (OR = 1.25, 95% CI: 0.99–1.59).

In multivariable logistic regression, POAF remained a significant independent predictor of the composite 90-day complication outcome (OR = 1.32, 95% CI: 1.02–1.72, $P = 0.037$). Chronic heart failure (OR = 1.51, 95% CI: 1.27–1.81, $P < 0.001$) and diabetes (OR = 1.23, 95% CI: 1.04–1.46, $P = 0.019$) were also significant independent predictors. Notably, age ≥ 80 was not independently associated with complications (OR = 1.19, 95% CI: 0.93–1.53, $P = 0.174$) after controlling comorbidities (Table 2).

Table 1 90-day complications according to POAF status.

Complication	65–79 No POAF	65–79 POAF	≥80 No POAF	≥80 POAF
Ischemic Stroke	40 (1.9%)	6 (2.6%)	6 (2.2%)	0 (0.0%)
Infection	147 (7.1%)	18 (7.7%)	23 (8.4%)	3 (6.8%)
Acute Coronary Syndrome	621 (30.0%)	81 (34.8%)	90 (33.0%)	18 (40.9%)
Any Complication	640 (30.8%)	87 (37.3%)	93 (34.1%)	18 (40.9%)

POAF: postoperative atrial fibrillation.

Table 2 Multivariable logistic regression for 90-day complications.

Variable	Odds Ratio	95% CI	P-Value
Postoperative AF	1.32	1.02–1.72	0.037
Age ≥ 80 yrs vs. 65–79 yrs	1.19	0.93–1.53	0.174
Diabetes	1.23	1.04–1.46	0.019
Chronic Heart Failure	1.51	1.27–1.81	0.001

AF: atrial fibrillation.

The central finding of this analysis is that POAF is a statistically significant independent predictor of 90-day complications in geriatric CABG patients. This challenges the “innocent bystander” hypothesis, which posits that POAF is merely a marker of baseline physiological vulnerability rather than a contributor to postoperative morbidity. Even after adjusting for comorbidities such as chronic heart failure and diabetes, POAF contributed to a 32% increase in the odds of morbidity. The mechanisms by which POAF may independently drive complications include hemodynamic compromise from loss of atrial contraction, thromboembolic risk, and the systemic inflammatory response associated with the arrhythmia itself. These pathways are well described in the literature and provide biological plausibility for the observed association.^[7–8] The high incidence of ACS (about 30%–40%) across all subgroups suggests that the 90-day post-CABG window remains a period of high cardiovascular vulnerability, and POAF may further amplify this risk.

An equally important finding is that chronological age ≥80 was not independently associated with 90-day complications once comorbidities were controlled. Although patients with ≥80 years had higher unadjusted complication rates, this relationship was attenuated in multivariable analysis. This supports the growing consensus that physiological reserve and comorbidity burden, rather than birth year, should serve as the primary metrics for perioperative risk stratification. The importance of frailty, multimorbidity, and lower physiological re-

serves is well recognized among geriatric surgical patients.^[9,10] Our data reinforce that age alone should not preclude consideration for CABG when comorbidities are optimized.

It is widely acknowledged that POAF is the most frequent arrhythmic complication occurring after cardiac surgery, with prevalence varying within the range of 20%–40%.^[11–12] The 10.6% incidence observed in our cohort is lower than typically reported, which may reflect the exclusion of patients with preoperative atrial fibrillation and the use of diagnostic codes rather than continuous telemetry monitoring for case identification. Previous research has demonstrated that POAF is significantly associated with increased hospital stay, higher healthcare costs, and adverse cardiovascular outcomes.^[12–13] Data from the SWEDEHEART Registry have shown that new-onset atrial fibrillation after CABG is associated with long-term morbidity and mortality in older adults.^[14–15] Our findings extend this body of evidence by demonstrating that the independent prognostic significance of POAF is maintained even within a geriatric-specific cohort stratified by age.

Of all factors assessed, chronic heart failure stood out as the most potent predictor of postoperative complications, with an increased risk of approximately 50%. Diabetes was also identified as a significant predictor, potentially through impaired wound healing and susceptibility to infection. These findings are consistent with previous research in which cardiometabolic disease has been identified as an important factor leading to postoperative morbidity after cardiac surgery.

There are several clinical implications for these findings. First, the identification of POAF as an independent predictor of 90-day morbidity underscores the need for aggressive perioperative arrhythmia management, including prophylactic strategies and closer postoperative monitoring for patients who develop POAF. Second, accurate perioperative risk assessment should incorporate evaluation of both physiological reserves and comorbidity burden rather than relying on chronological age

alone. Third, while complication rates tended to be higher in very elderly subjects, the finding that age ≥ 80 was not independently predictive of complications implies that CABG can be a viable revascularization strategy in carefully selected elderly patients.

This study had several limitations. It was retrospective and observational, and therefore no causal relationship could be determined. The definition of POAF was based on diagnostic codes and may have led to misclassification. The dataset lacked information on geriatric syndromes such as frailty and functional status, and the sample was collected from a single healthcare system.

In conclusion, among geriatric patients undergoing CABG, POAF carries independent prognostic weight for 90-day morbidity. Nonetheless, contrary to our original hypothesis, chronological age ≥ 80 was not independently associated with complications after adjustment for comorbidities. Chronic heart failure and diabetes remain the most potent predictors of poor outcomes. These data highlight the importance of comprehensive comorbidity assessment and aggressive arrhythmia management to improve the safety of cardiac surgery in the elderly.

DISCLOSURE

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