



Editorial

Postoperative Atrial Fibrillation After Noncardiac Surgery: Maybe Not So Benign After All

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See article by Higuchi et al., pages 1449–1456 of this issue.

Postoperative atrial fibrillation (POAF) is defined as new-onset atrial fibrillation (AF) after surgery in patients without preexisting AF. The majority of the published studies on POAF have been in patients undergoing cardiac surgery.¹ In the postcardiac surgery population, POAF is a common problem, occurring in up to one-third of patients, and is associated with increased cost and longer hospital stays.¹ Conversely, there is a paucity of literature characterizing the clinical course of POAF after noncardiac surgery, for which most studies have been small. The reported incidence of POAF after noncardiac surgery varies widely, likely reflecting inclusion of heterogeneous patient populations and non-standardized electrocardiographic monitoring protocols. The pathophysiology of POAF is incompletely understood but thought to be largely mediated by acute perioperative stressors superimposed on a subclinical atrial proarrhythmic substrate.¹ Recent studies point to a critical role of cardiomyocyte inflammatory signaling in POAF after cardiac surgery.² As it stands, POAF after noncardiac surgery is often considered to be a transient and reversible postoperative phenomenon of minor clinical significance. However, there is mounting evidence challenging this viewpoint. Butt et al.³ recently reported that patients with POAF after noncardiac surgery have a similar stroke risk to patients with nonvalvular AF (31.7 vs 29.9 events per 1000 person-years, respectively; hazard ratio [HR], 0.95; 95% confidence interval [CI], 0.85–1.07). The same study found that anticoagulation was effective at reducing the risk of stroke in patients with AF after noncardiac surgery (HR, 0.52; 95% CI, 0.40–0.67). Thus, the identification of POAF after noncardiac surgery and initiation

of anticoagulant treatment appear to be clinically relevant. Clearly, the number of patients undergoing noncardiac surgery is orders of magnitudes larger than that of patients requiring cardiac surgery. Thus, characterizing the incidence, course, and long-term implications of POAF after noncardiac surgery is of major clinical importance.

In an article in the present issue of the *Canadian Journal of Cardiology*, Higuchi et al.⁴ report on a prospective, single-centre, observational study of patients undergoing noncardiac surgery for oncological indications monitored for POAF and recurrent AF at up to 1 year. The authors enrolled 752 consecutive patients scheduled for cancer surgery at their centre. Patients with a history of AF were excluded. POAF was detected in 77 patients (10.2% of the population). Patients with POAF were then monitored for recurrent AF with an event-triggered recorder set to detect AF episodes longer than 30 seconds.⁵ AF recurrence was detected in 24 patients with POAF (31.1%) vs 4 patients (0.6%) without POAF. Ischemic stroke occurred in 2 patients (2.6%) with POAF and 3 patients (0.4%) without POAF. The majority of patients with POAF (87%) received long-term prophylactic oral anticoagulation. Most episodes of recurrent AF were asymptomatic, and recurrent AF was strongly associated with both stroke and mortality.

This study has several interesting findings that add to the existing literature and challenge the current view on POAF, providing clinically relevant important new insights. First, this study is one of only a handful of studies systematically monitoring patients for AF after noncardiac surgery,^{6–12} which arguably goes beyond the current standard of care. The incidence of POAF after a wide range of noncardiac surgeries was as high as 10%, making POAF a relatively common occurrence in this patient population. Second, the authors are the first to report a strong association between incident POAF and recurrent AF at 1 year, with 31% of patients with POAF developing recurrent AF at follow-up vs less than 3% of those without POAF ($P < 0.001$). The clinical significance of these findings is made even more acute by the observation that

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recurrent AF was associated with stroke (HR, 18.97; 95% CI, 3.14-113.76; $P = 0.001$) and increased mortality (HR, 4.78; 95% CI, 1.85-12.32; $P = 0.001$). These findings support the emerging notion that POAF after noncardiac surgery should not be viewed as a benign postoperative phenomenon but managed as a potentially significant clinical entity. Last, and perhaps most striking, is the observation that up to 92% of patients with recurrent AF were completely asymptomatic and would not have been diagnosed with or treated for AF had they not been monitored.

The results of the present study need to be interpreted in the context of its limitations. First, these findings were derived from a single-centre experience in the selected population of patients undergoing oncological surgery. Patients with malignancies requiring surgery are arguably a sicker patient population than the general population of patients undergoing elective noncardiac surgeries. An observation supporting this notion is that 35 patients (5%) died during the 1-year follow-up period, most with oncological diagnoses, a higher mortality rate than otherwise expected. Moreover, thoracic surgeries, which are known to be associated with a higher risk of POAF than nonthoracic surgery, represented a large fraction (65%) of cases, potentially artificially enhancing the occurrence of POAF. A useful analysis would have been to explicitly report the incidence of POAF in patients undergoing thoracic vs nonthoracic surgeries. In addition, cancer is known to promote a procoagulant state,¹³ further limiting generalization of the present observations to other forms of noncardiac surgery. Second, given the observational nature of the study, the exclusion of preexisting AF was based on the patients' recorded medical history and not on systematic preoperative electrocardiographic monitoring; this likely also enriched the reported incidence of POAF and recurrent AF because patients with undiagnosed prior paroxysmal AF were de facto included. Third, monitoring for AF recurrence at follow-up was only done in patients with a diagnosis of POAF; in other words, patients without POAF were not systematically monitored for AF. This introduces an important bias, because the incidence of AF at 1 year in patients without POAF (2.6%) is certainly underestimated, exaggerating the differences in rate of AF recurrence in patients with vs without POAF. Finally, although the initial study population was relatively large (752 patients), the outcome analysis after POAF was based on a smaller number of patients (77 patients who developed POAF). Although recurrent AF was a strong predictor of stroke occurrence, the total number of strokes was small and only 2 of the 5 strokes were judged to be due to AF-related emboli,⁴ raising the question of whether recurrent AF was more of a risk marker (eg, indicating underlying cardiovascular disease) than causally related to stroke events. Further work in larger populations, ideally prospective multicenter randomized trials of anticoagulation vs placebo in patients with POAF after noncardiac surgery, would be important.

Overall, this study provides important and clinically useful data on the incidence and clinical course of POAF after noncardiac surgery and paves the road for future investigations. First, the relatively high incidence of POAF in this cohort raises the question of whether patients should be routinely monitored for POAF after noncardiac surgery, particularly cancer surgery. Given the association among POAF, recurrent AF at follow-up, stroke, and death, POAF

after noncardiac surgery is not a benign entity, and its detection might permit initiation of treatment and possibly reduce the morbidity associated with untreated AF. This is even more relevant because the postoperative period may be an opportunity to screen patients for AF, because most (92%) with recurrent AF at follow-up were asymptomatic and would not be diagnosed on clinical grounds. Second, the rate of stroke in patients with POAF and recurrent AF was low, possibly because most patients with POAF were initiated on anticoagulation therapy. However, anticoagulation for brief episodes of POAF after noncardiac surgery is not necessarily the standard of care at many institutions, especially in the postoperative period when the risk of major bleeding may be increased. Whether anticoagulation should be routinely or selectively initiated in patients with POAF after noncardiac surgery deserves additional investigation. Finally, POAF prophylaxis is generally indicated in patients undergoing cardiac surgery. However, there are no data to support prophylaxis in patients undergoing noncardiac surgery. The high incidence of POAF and the association between POAF and adverse outcomes reported in this study bring up the question of whether AF prophylaxis should be offered in selected patients undergoing noncardiac surgery. Additional investigation, perhaps in selected populations at higher risk of POAF, such as patients undergoing thoracic surgery, is required to address this question.

We congratulate the authors for an interesting study contributing novel findings to our understanding of POAF after noncardiac surgery. The results reported by Higuchi et al.⁴ challenge the often held belief that POAF is a benign postoperative phenomenon of minor clinical significance. Additional investigations motivated by this study are likely to have an important impact on the management of POAF.

Disclosures

The authors have no conflicts of interest to disclose.

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