

## Editorial



# Atrial Fibrillation as a Risk Factor for Major Adverse Cardiac and Cerebrovascular Events after Non-cardiac Surgery

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► See the article “Clinical Implications of Preoperative Nonvalvular Atrial Fibrillation with Respect to Postoperative Cardiovascular Outcomes in Patients Undergoing Non-Cardiac Surgery” in volume 50 on page 148.

**Received:** Nov 28, 2019  
**Accepted:** Dec 5, 2019

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### Conflict of Interest

The authors have no financial conflicts of interest.

### Author Contributions

Writing - original draft: Shin DG; Writing - review & editing: Lim HE.

Atrial fibrillation (AF) represents an incrementing public health burden with a great social and economic significance in an aging and aged societies<sup>1)</sup> because AF increases cardiovascular (CV) events in association with itself and/or other factors.<sup>2)</sup> Since the relationship between AF and stroke appears more complex than a simple causal-effect mechanism, atrial cardiomyopathy has emerged as a possible pathophysiologic concept in ischemic stroke.<sup>3)</sup> The pathohistological changes result in dilation and dysfunction of the atrium, determining not only a substrate for AF, but also an atrial pro-thrombotic milieu that, by itself, represents a possible pathogenic mechanism of cardio-embolic ischemic stroke.<sup>4)</sup> Therefore, AF may be a prominent marker for atrial cardiomyopathy.

AF can preexist or occur in a substantial number of patients undergoing a non-cardiac surgery. In this population, preoperative risk stratification as well as proper perioperative management should be crucial if AF affects major adverse cardiac and cerebrovascular events (MACCE) during perioperative period. Current guidelines recommend the use of the revised cardiac risk index (RCRI)<sup>5)</sup> or the American College of Surgeons National Surgical Quality Improvement Program<sup>6)</sup> for CV risk stratification in non-cardiac surgery. These risk schemes can provide a generalized guideline for the perioperative management to prevent MACCE, but have some limitations, especially in patients with a history of AF because AF was not included in these cardiac risk indices. Previous reports have demonstrated that AF is associated with increased CV risk in non-cardiac surgery.<sup>7,8)</sup> A retrospective database analysis revealed that the CV risk associated with AF was more higher than that related to coronary artery disease.<sup>7)</sup> The VISION study also showed that preoperative AF was associated with an increased risk of major adverse cardiovascular event (adjusted odds ratio, 1.58).<sup>8)</sup> Therefore, a refined or novel perioperative risk prediction scheme should be needed in patients with AF who are undergoing non-cardiac surgery.

In a recent article in the *Korean Circulation Journal*, Cho et al.<sup>9)</sup> retrospectively recruited patients who underwent comprehensive cardiac evaluations before non-cardiac surgery and assessed the association between preoperative AF and perioperative CV outcomes. Their results

The contents of the report are the author's own views and do not necessarily reflect the views of the *Korean Circulation Journal*.

showed that preoperative AF was an independent risk factor for MACCE and ischemic stroke developed during the immediate postoperative period (before discharge or  $\leq 30$  days after the index surgery). Furthermore, they suggested the adding AF parameter to RCRI in order to improve the performance for predicting MACCE after non-cardiac surgery. As large prospective data regarding preexisting AF as a risk predictor for MACCE or ischemic stroke after non-cardiac surgery is absent, these results offer the opportunity to address this undetermined issue in a timely manner.

However, only a relatively high-risk population was included in this study because they enrolled patients who conducted comprehensive preoperative cardiac evaluations including echocardiography and myocardial perfusion scan. Therefore, their conclusion should not be generalized in all patients undergoing non-cardiac surgery. Also, a majority (81%) of AF patients in this study had a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of  $\geq 2$ . However, oral anticoagulant (OAC) was prescribed in  $< 1/3$  (31.9%) of AF patients before non-cardiac surgery. As a consequence, 11 (73.3%) of 15 patients who newly developed ischemic stroke did not take OAC at all before non-cardiac surgery, even though they were at high-risk of stroke based on CHA<sub>2</sub>DS<sub>2</sub>-VASc score. Unfortunately, Cho et al.<sup>9)</sup> did not analyze whether or not long-term use of OAC before non-cardiac surgery influenced MACCE or ischemic stroke during postoperative period. Therefore, we could not conclude that AF itself was an independent risk factor for MACCE or ischemic stroke, irrespective of long-term use of OAC.

Interestingly, 389 (35.4%) of AF patients (n = 1,098) had paroxysmal AF (PAF) before non-cardiac surgery. If PAF frequently occurred or progressed to persistent/permanent AF (non-PAF) after non-cardiac surgery, increased AF burden could affect MACCE or ischemic stroke maybe due to the decrease in cardiac output and loss of atrial contraction.<sup>10)</sup> In postoperative period, rate control as well as rhythm control remains challenging because of high sympathetic tone, electrolyte or fluid imbalance, drug interaction, and changes in nutritional and metabolic status. Unfortunately, Cho et al.<sup>9)</sup> did not report data regarding how frequent PAF episode occurred during the immediate postoperative period in PAF patients, how many PAF progressed to non-PAF after non-cardiac surgery, how many new onset postoperative AF was developed, and whether or not the type of AF (PAF vs. non-PAF) influenced MACCE or ischemic stroke after non-cardiac surgery.

In conclusion, the prognostic value of preoperative AF as an independent risk factor for MACCE or ischemic stroke developed after non-cardiac surgery remains uncertain. Since evidences regarding the influence of preoperative long-term use of OAC in AF patients who were at high-risk of stroke and postoperative AF burden have been limited, further large prospective studies are needed to verify the potential role of preoperative AF as a valuable predictor in perioperative cardiac risk stratification.

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