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Key Words: atrial fibrillation, atrial function, Cox-Maze

EDITORIAL COMMENTARY

Atrial fibrillation in cardiac surgery: No loitering

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In their article in this issue of the *Journal*, Kazui and colleagues¹ from Washington University in St Louis explore the cardiac impact of 6 weeks of persistent atrial fibrillation (AF) in a porcine model of pacing-induced AF. By means of elegant and sophisticated techniques, they demonstrate that 6 weeks of persistent AF causes important and pronounced changes in left atrial structure and function. Specifically, they note that this relatively short duration of AF causes left atrial fibrosis that is accompanied by increased left atrial volume and reduced left atrial contractility and booster pump function. These findings have important implications for the practicing cardiac surgeon, informing strategies for the management of (1) patients with preexisting AF and (2) patients in whom AF develops postoperatively.

PREEXISTING AF

As Kazui and colleagues¹ note, 11% of cardiac surgical patients are seen with *preexisting* AF. Recent work by Ad and colleagues² demonstrates that only a minority of these patients undergo surgical ablation as a concomitant

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Central Message

Atrial fibrillation causes rapid changes in left atrial structure and function, suggesting a mandate for early treatment.

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procedure, even though studies confirm that the addition of surgical ablation increases freedom from AF without increasing mortality or major morbidity.³ The article by Kazui and colleagues¹ adds an important dimension to decision making in surgical ablation; specifically, this work makes us consider the timing of surgical intervention in the patient in whom AF develops preoperatively.

In this porcine model, left atrial structure and function changed substantially in only 6 weeks' time. In fact, it is

possible that important changes occurred even earlier, because the experimental design included data only at 6 weeks. In practice, we often see patients with mitral valve disease who are referred for surgery because of new-onset AF. Although the occurrence of AF in the symptom-free patient with chronic, severe, nonrheumatic primary mitral regurgitation constitutes a class IIa indication for surgery, recent guidelines do not comment on the timing of surgery.⁴ These experimental results suggest that relatively expeditious surgery may be in our patients' best interest. Every additional day of AF could contribute to deleterious alterations in left atrial structure and function.

POSTOPERATIVE AF

This experimental work also has implications for our management of *postoperative* AF. Postoperative AF remains our most common complication after cardiac surgery. Depending on patient characteristics and the operation performed, postoperative AF occurs in 30% to 50% of cardiac surgical patients⁵ and is associated with prolonged hospital stay and excess morbidity.⁵ The management strategies for postoperative AF—rate control versus rhythm control, anticoagulation versus no anticoagulation—remain controversial. A recently completed study from the Cardiothoracic Surgical Trials Network will address the issue of rate control versus rhythm control. At present, recognizing that most patients in whom AF develops postoperatively have a return to normal sinus rhythm within 6 weeks regardless of the management strategy, many surgeons feel no sense of urgency to restore sinus rhythm. This study suggests that a more rapid and more aggressive approach to rhythm control may be warranted.

The fibrosis and reduced left atrial contractility caused by 6 weeks of AF may be particularly troublesome in patients with preexisting heart failure and reduced cardiac function. In addition, these changes, if they persist, may help to explain the observation that patients who have postoperative AF also have reduced long-term survival, even though they generally achieve normal sinus rhythm within weeks. Postoperative AF, often viewed more as a nuisance than as a clinically important problem, may be a complication

with long-ranging impact, and this study helps to explain this observation.

LIMITATIONS

Although these data highlight the rapid development of changes in left atrial structure and function after the onset of persistent AF, the experiment does not define the precise timing of these changes. Changes are present by 6 weeks, but we do not know when they begin.

We also do not know whether restoration of sinus rhythm causes normalization of atrial structure and function. Specifically, these data do not answer the question of whether a successful maze procedure restores atrial function.

IMPLICATIONS FOR CARDIAC SURGICAL PRACTICE

This elegant study of persistent AF in a porcine model highlights the importance of AF in the cardiac surgical patient, whether present preoperatively or occurring postoperatively. These new data suggest the need for a sense of urgency concerning the management of AF. AF of relatively short duration causes undesirable changes in left atrial structure and function. These observations support an aggressive approach to AF in the cardiac surgical patient. When cardiac surgeons encounter AF, they should act expeditiously, as deleterious changes occur early.

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