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Commentary: Beyond rhythm control: The increasing appeal of surgical treatment of atrial fibrillation

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Four decades ago, early work started on surgical treatment of atrial fibrillation (AF) with procedures such as left atrial isolation. This paved the way to one of the most comprehensive and arguably the best treatment for AF, the Cox maze procedure.¹ Since 1990s, catheter ablations, mostly related to the appeal of the less-invasive approach, have slowly taken over the treatment of majority of these patients but with subpar outcomes. Nevertheless, in more recent years, minimally invasive surgical AF ablation has gained momentum with increased use of thoracoscopic and hybrid techniques, supported by clinical trials showing greater rate of success than with catheter ablation.² In this issue of the *Journal*, Kim and colleagues³ reported their results of bilateral total thoracoscopic ablation (TTA) in 31 patients with drug-refractory or failed previous catheter ablation AF with low left ventricular ejection fraction (LVEF, <50%) performed between 2012 and 2018. The authors showed that the rate of arrhythmia-free off antiarrhythmia drugs with a single procedure of TTA was 61.3% at a median follow-up of 32 months. The authors defined freedom from AF by 12-lead electrocardiogram or 24-hour Holter monitoring at each follow-up visits. Their results are comparable with the rate of long-term success of TTA in the published literature ranging from 38% to 83% for up to 5 years. More importantly, the authors reported a sustained and significant improvement in LVEF between baseline and long-term follow-up (from $39.7 \pm 6.1\%$ to $58.1 \pm 7.5\%$;

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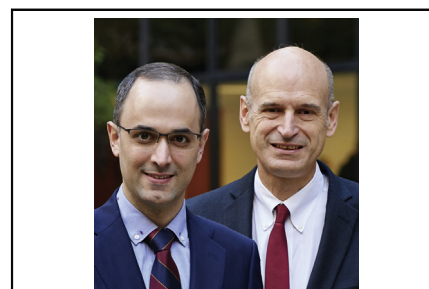
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CENTRAL MESSAGE

In patient with atrial fibrillation (AF) and low left ventricular ejection fraction (LVEF), thoracoscopic ablation achieves significant freedom from AF and more importantly improvement in LVEF.

$P < .001$). While the focus of most investigators on the field of surgical AF ablation has been on lesion type, energy sources, access, and success rate measured by the absence of AF at follow-up, the remarkable and sustainable effect of AF ablation on ventricular function has not had the same degree of attention. More than 10 years ago, Stulak and colleagues⁴ demonstrated an early and sustained improvement in LVEF after the Cox maze procedure. While the freedom from AF is a “soft end-point” mostly related to the temporary and variable nature of the screening for AF, improvements in LVEF is a “hard end point,” likely long-lasting that may result on substantial long-term benefits such as freedom from congestive heart failure hospitalizations and death, as recently demonstrated by randomized clinical trials evaluating catheter ablation versus medical therapy.^{5,6} While the current study has the limitations of most surgical series (small, retrospective, and inconsistent ablation lesion sets), it demonstrates that thoracoscopic AF ablation (1) can be performed safely in patients with low EF and (2) beyond the restoration of sinus rhythm, the improvement in LVEF, likely by avoidance of tachycardia-induced cardiomyopathy, is likely the greatest benefit of this procedure. It also provides the foundation for additional studies to evaluate the effect of surgical AF ablations on congestive heart failure, ventricular function, and long-term survival. Until the results of such trials are available, it may

be reasonable to assume that the most effective AF ablation, the Cox maze procedure, will also have the greatest effect on left ventricular dysfunction and AF-related congestive heart failure.

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