about 10% of patients having only left-sided lesions (an increase in proportion compared with their 2015 paper). However, this did allow study of the impact on permanent pacemaker needs, with biatrial lesions having a 3.61 odds ratio of pacemaker placement. Also of note is the 38% loss to follow-up at 10 years. Only 42 patients had complete follow-up in years 1-10, and only 31% to 39% had prolonged monitoring in post-ablation years 8-10. Thus, long-term data remain limited. Third, reintervention is often considered a factor in defining procedural failure. Unlike aortic or valve surgery, patients who undergo surgical ablation are rarely treated with repeat surgery for AF recurrence. In the current study, data on postsurgical catheter-based therapies for recurrence were not collected. Thus, to attribute ablation success solely to the surgical CM-IV may be an overreach. This would be especially important in counseling patients on the efficacy of the procedure.

Finally, whether this study will impact the nonsurgical world is in question, despite the excellent results. Head-to-head comparisons with catheter ablation remain scant, and comparisons across studies are methodologically unsound. Nevertheless, the authors are to be congratulated on their foresight and ongoing commitment to refining not only the surgical technique of the Cox-maze procedure but in refining their outcomes reporting and our understanding of surgical ablation for AF.

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Commentary: Do teach old dogs new tricks

Leonid Sternik, MD

First of all, I wish to thank Khiabani and colleagues¹ for their great efforts in the field of surgical treatment of atrial fibrillation (AF). This retrospective study is a kind of summary of their work. The authors describe 853 patients who underwent surgical treatment of AF at the same institution between 2003 and 2018. Interestingly, the classic technique of surgical AF ablation, the cut-and-sew maze (Cox-maze III), was developed by Cox and his colleagues more than 30 years at the same institution.² Cox-maze III was a very

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CENTRAL MESSAGE

Cox-maze IV is an example of a new technology, based on old Cox-maze III and makes it easier to employ. Experienced “old” surgeons have to learn these new “tricks” and educate their young colleagues.

efficient procedure but not easy to perform and hasn't spread worldwide.¹ The Cox-maze IV, developed by Damiano and his team, is based on the lesion set of Cox-maze III, but many lesion lines are performed by radiofrequency and

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cryoablaters instead of surgical incisions.¹ These new tools made ablation much easier and caused a great increase in the number of surgical ablations over the last 20 years worldwide. I feel that all ablation lines also can be performed by cryoprobe only.

The Cox-maze IV procedure is a great example of a new technology based on the old and good operation Cox-maze III and makes this classic operation easier to employ. Thinking generally of our business, we shouldn't assume that currently available new technologies will be applied only by young surgeons. I feel that well-established "old" surgeons have to learn these new "tricks" and educate their young colleagues.

Follow-up after AF ablation is difficult, and I think some episodes of silent atrial arrhythmia can be missed. Only 76% of patients in this paper had prolonged electrocardiogram monitoring.¹ More implantable loop recorders can give us better understanding of a real success rate of ablation.

Remarkably, that authors performed relatively many stand-alone AF ablations (218 patients, 25.6%) and showed that the success rate of concomitant and stand-alone ablations is the same.¹

I was pleased to find that Khiabani and colleagues¹ look not only for perfect sinus rhythm but also for atrial contractility to quit anticoagulation. Buber and colleagues³ found that up to one third of patients had cerebrovascular problems when anticoagulation was stopped with noncontractile left atrium.

In most cases, the authors performed a biatrial lesion set like in Cox-maze III. I have to mention that there are some data that left atrial ablation can be sufficient for many patients and cause less permanent pacemaker implantation.⁴⁻⁶

Khiabani and colleagues¹ found that a biatrial lesion set is a risk factor for pacemaker implantation.

Incomplete isolation of posterior wall was an exclusion criterion in this study.¹ I completely agree with authors that a complete isolation of posterior wall is very important.^{2,7,8} We published that bilateral pulmonary vein isolation is not necessary for the complete isolation of the posterior wall, and it can be achieved by connection of left atriotomy to left atrial appendage stump with a bipolar radiofrequency ablator.⁸ I would like to congratulate authors for this great study.

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