Black is the new black

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Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication Aug 1, 2017; accepted for publication Aug 8, 2017; available ahead of print Sept 13, 2017.

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J Thorac Cardiovasc Surg 2018;155:618-9

0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2017.08.010>

Since the cut-and-sew Cox-maze (CM) operation was first described, there have been numerous developments in surgical ablation for atrial fibrillation (AF), including surgical technique, ablative technologies, postablation monitoring, and outcome reporting. Heterogeneity of clinical practice has made it difficult to draw conclusions across studies, most of which are retrospective. Although controversies abound, such as the optimal lesion set,¹ biatrial versus right atrial,² management of the left atrial appendage (LAA),³ and postoperative antiarrhythmic management,⁴ there is sufficient evidence such that concomitant ablation at the time of mitral valve surgery is a class I, level of evidence A recommendation.⁵

In this issue, Wang and colleagues⁶ present a randomized trial comparing concomitant ablation with a CM-III to no ablation in patients with AF undergoing surgery for rheumatic mitral valve disease. Their results once again demonstrate that the CM-III is safe, efficacious, and offers stroke reduction and survival benefits. This is not news, because many studies have already demonstrated the safety and efficacy of CM-III in rheumatic patients,⁷⁻¹¹ some with contemporary postoperative monitoring utilizing Holter^{8,9} and with even longer follow-up of anywhere from 3 to 9 years. Given the prior evidence, then, what was the rationale for the design of the study by Wang and colleagues⁶? The authors offer 2 reasons: their prior retrospective study of a CM-IV approach with freedom from AF of 76% at 1 year and 67% at 5 years and recent data showing a 40% concomitant ablation rate in eligible patients. Based on this, they theorize that lack of confidence in energy-based ablation is what drives the low rate of concomitant ablation. In fact, when considering mitral patients, database rates of concomitant ablation are higher than other cardiac lesions, at 52% overall¹² and as high as 61% in mitral repairs.¹³ Nevertheless, the fact remains that there is room for improvement.

Drilling down into the results, the primary end point was composite freedom from death or stroke. Actuarial survival analysis showed no mortality difference at 1 year. This suggests that the composite end point was likely driven by a difference in stroke, which was substantial (12.3% vs 0%).

	Class I Benefit >> Risk
Level A High-quality evidence	IA

Concomitant atrial fibrillation ablation at the time of mitral surgery is a class I, level of evidence A recommendation.

Central Message

The Cox-maze III procedure has long been known to be safe and efficacious for the ablation of atrial fibrillation, even in patients with rheumatic disease. What remains unclear is the comparison of Cox-maze III with Cox-maze IV.

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With 90% of patients undergoing mechanical valve replacements, this is curious. Would this magnitude of stroke benefit of a maze operation be expected in patients who were reportedly fully anticoagulated? Notably, management of the LAA differed between groups, with the CM-III group undergoing excision and nonmaze patients undergoing ligation or internal suture, with excision reserved only for the presence of thrombus. Lee and colleagues¹⁴ previously demonstrated a difference in late neurologic events according to technique, LAA excision being superior (0.2% vs 1.3% annualized). If one were to extrapolate, at 1-year follow-up the magnitude of difference in the study by Wang and colleagues⁶ is roughly double what would be expected. In light of a predominantly young population with mechanical valves, this raises more questions about anticoagulation management than about maze procedure efficacy for stroke reduction.

To move the needle on concomitant AF ablation, the real comparison should not be CM-III versus no ablation, but rather CM-III versus CM-IV. In fact, some data do exist. Baek and colleagues⁸ compared CM-III with cryomaze, finding equivalent freedom from AF at 2 years and event-

free survival at 4 years. Using radiofrequency ablation techniques, Guang and colleagues¹¹ demonstrated 77% freedom from AF rate at 3 years (with the caveat that a homemade ablation device and electrocardiogram-only postoperative monitoring were used). There is technique and judgment in applying CM-IV lesions as well. Wang and colleagues⁶ may do well to re-examine their CM-IV operation and outcomes in light of this.

Some reference a hesitation to performing CM-III due to its purported risk and complexity. It is neither a casual operation—it requires technical skill and experience—nor an obsolete operation, with Ad and colleagues¹⁵ recently reporting outcomes with concomitant aortic valve replacement and coronary artery bypass graft. Although the authors should be commended for practicing and promoting the gold standard, this study skirts an ethical line. It is true that there is a paucity of randomized trials on AF ablation, but the guidelines are clear: concomitant AF ablation at the time of mitral valve surgery is a class I recommendation with level of evidence A. Sixty-five patients in this study were denied this guideline adherence and consequently the short- and long-term benefits of surgical ablation. This experiment need not, and should not, be repeated. Future endeavors should not sacrifice rigor of treatment and patient care purely for scientific rigor.

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