The tranquil consciousness of effortless superiority

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During the mid-1980s, we all knew that sinus rhythm originated in the S-A node, atrial flutter was a re-entrant rhythm, and atrial fibrillation was inscrutable chaos. Then, in 1988, Jimmy Cox and Jack Boineau placed 156 atrial epicardial bipolar electrodes in 14 patients during WPW surgery.¹ That study demonstrated that atrial activation maps could be meaningfully produced clinically, and that there were many widely divergent extranodal atrial pacemaker sites. The right atrial pacemaker region extended from the sulcus terminalis posterior and up to the precaval band anteriorly, but left atrial escape pacemakers were also clearly documented. At that point, most of us were confident that atrial fibrillation derived from a million atrial cardiomyocytes firing spontaneously, chaotically, and completely independently.

The conceptual breakthrough came when the Cox-Boineau team conceived of atrial fibrillation as a re-entrant rhythm. Then, in a 1991 series of 4 publications,²⁻⁵ they reported testing surgical strategies of isolating the re-entrant circuitry in dogs. If atrial fibrillation was just a bunch of irritable myocytes firing independently, then a group of surgical incisions might make things even worse. However, if atrial fibrillation really was re-entrant, a surgical incision might serve as an effective barrier to conduction of the re-entrant impulse. I remember thinking, at a National Institutes of Health study section, that there was no way it could work. Cox and Boineau² began their breakthrough article with: “On the basis of known electrophysiologic mechanisms of atrial fibrillation...” For me (and I think for most of us) there were no known mechanisms of atrial fibrillation. But with the tranquil consciousness of effortless superiority, the authors forged ahead and created a surgical therapy for the very common and debilitating problem of atrial fibrillation.

In a patient with atrial fibrillation and a large left atrium secondary to mitral valve disease, a formal Cox-maze IV biatrial procedure takes a little longer. But it is doable. In a deep-chested man with atrial fibrillation and small-to-normal sized atria, the biatrial procedure can be a struggle, so a compromise procedure was really appealing. With

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Central Message

We should be proud of our academic cardiac surgical instincts.

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years of experience, it is now apparent that the zone surrounding the pulmonary veins is disproportionately the dysrhythmia culprit. Half-Cox-maze pulmonary vein isolation procedures—both intra- and extracardiac—have been proposed.

In a beautiful example of everything that is good about academic cardiac surgery, Blackstone and colleagues⁶ prospectively randomized 260 patients with chronic atrial fibrillation to mitral valve surgery plus or minus biatrial Cox-maze or pulmonary vein isolation. All 3 approaches provided gratifyingly successful results. Looking back at the original data from Cox and Boineau, in which the right atrium was occasionally the culprit, it is predictable that inclusion of the right atrium in the formal isolation is, indeed, a little better.

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