

sected from the adjacent cardiac structures, with preset power and application time irrespective of the atrial wall thickness, especially when overlapping ablation lines were created. The mere use of radiofrequency was not responsible.

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doi:10.1016/j.jtcvs.2003.08.007

Reply to the Editor:

Laczkovics and colleagues have proposed that the 4 cases of esophageal perforation reported in our recent publication¹ were the result of a combination of factors unique to our clinical practice, rather than a result of unipolar radiofrequency in and of itself. They have suggested several possible explanatory variables, which we will address in sequence. First, they suggest that our radiofrequency ablation probe was susceptible to temperature overshoot. It is important to stress that we vigilantly monitored probe tip temperature at all times during these procedures to avoid exceeding our target temperature. It should also be stressed that our esophageal perforations occurred despite a lower target temperature (60°C) than that used by other investigators. In addition, other groups have reported esophageal perforations with different unipolar radiofrequency probes than the one we used.^{2,3} It may be true that irrigated radiofrequency probes result in a lower risk of esophageal complications, but more data and experience are required. Second, Laczkovics and colleagues suggest that we did not adequately account for atrial wall thickness in our patients. Although we agree that this may be an important variable, we also believe that atrial wall thickness is difficult to quantify and highly variable, even within patients, thereby making use of this information difficult. Third, they suggest that our esophageal complications were due to the right lateral minithoracotomy and lesion line pattern that we used. It is true that all of our complications occurred after minimal access surgery. However, others have reported these same complications after standard median sternotomy and after using a set of atrial lesion lines that were different from the one we described.^{2,3} It should also be noted that we attempted to avoid overlapping of lesion lines at all times.

Laczkovics and colleagues point to several case series in the literature without esophageal perforations as evidence that our described complications are institution specific. It is worth noting, however, that our publication represents the largest reported series to date, and therefore more complications may be reported as more experience is gained. In addition, our report demonstrated that patients who die of sudden stroke after ablation surgery may have

an undiagnosed atri-esophageal fistula. This catastrophic complication may therefore be underreported in the literature. It is also worth noting that other complications of atrial fibrillation ablation surgery are being described as more experience is gained. Manasse and associates⁴ recently reported the case of a patient who had left main coronary stenosis develop after microwave epicardial ablation.

We have not, as Laczkovics and colleagues suggested, recommended against the use of all radiofrequency ablation techniques. We concluded that unipolar radiofrequency ablation "is associated with a small but definite risk of esophageal perforation" and that a "high degree of vigilance must be maintained" to avoid and detect this dreaded complication.¹ Other types of radiofrequency ablation, particularly bipolar radiofrequency, may significantly lower the risk of damage to collateral tissue structures. However, we must continue to watch for and report complications associated with these atrial fibrillation surgical devices and procedures, which are rapidly escalating in popularity.

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doi:10.1016/j.jtcvs.2003.08.006