LETTER FROM THE EDITOR

Dear Readers,

This issue brings together a variety of engaging contributions that we hope will have a positive impact on your daily practice. I would like to focus my commentary on the recently approved cryoballoon technology, which is highlighted within our Atrial Fibrillation Section in an original contribution that originates from the University of Basel Hospital in Switzerland.

In this article, Kühne and Sticherling discuss the current state of the cryoballoon for atrial fibrillation ablation. Cryoballoon technology for atrial fibrillation ablation has certainly emerged as an exciting new ablation approach to atrial fibrillation.

As we take a step back and look at the big picture of atrial fibrillation management, there is a critical need to apply a safe and effective approach to the treatment of this exploding worldwide epidemic. Unfortunately, antiarrhythmic therapy generally has very limited efficacy with significant potential drug toxicities. On the other hand, point-by-point ablation techniques for atrial fibrillation, with or without 3D mapping, are very tedious and time consuming with operators only able to complete 2 to 3 AF ablations per day. Not to mention the fact that there is a long learning curve before operators can expect to achieve an extremely low risk of potential procedural related complications.

How then can we treat the AF masses with a safe and effective treatment? Cryoballoon technology could represent a disruptive technology which may change the paradigm for the way we manage AF. In order to apply this treatment to the masses, this procedure would need to done with a single transseptal approach in under 30 minutes without the need for “touch up” lesions or any other mapping catheters in the left atrium. Moreover, a larger and more steerable compliant balloon would be needed to quickly navigate from vein to vein while applying a more antral durable lesion in 1–2 short (one minute or less) applications of cryo energy. With a larger more compliant balloon resulting in a proximal lesion set, the risk of phrenic nerve palsy could be avoided. My gut feeling is that we can achieve this lofty goal with cryoballoon technology but it likely will not happen until the 3rd or 4th generation cryoballoon.

What then do we make of our current first generation device? For new labs and operators, it could represent a shorter learning curve to achieving an effective AF ablation procedure for paroxysmal atrial fibrillation. It could also be a safer tool in less experienced labs in minimizing the risk of pulmonary vein stenosis and esophageal injury. At more experienced centers where the risk of these complications with radiofrequency energy is incredibly rare or virtually non-existent, I still have some significant safety concerns with the cryoballoon technology. My concern is primarily with the risk of phrenic nerve palsy.

In the STOP-AF Trial, the study which allowed this technology to be FDA Approved, there was a 11.2% risk of phrenic nerve injury. In my opinion, even a 1% risk of phrenic nerve injury is still too high. Fortunately, most of these cases resolved over time, however, some patients were left with a permanent phrenic nerve palsy. A phrenic nerve injury can be devastating to a patient and even result in permanent shortness of breath and disability. Based on the early learning experience with this technology, the recommendations are now to only use the larger balloon and to perform continue phrenic nerve pacing when cryo ablating the right upper pulmonary vein. Certainly, these safety measures have decreased this risk however there is still a real and significant risk of phrenic nerve injury.

In contrast, when performing radiofrequency ablation of atrial fibrillation, a phrenic nerve injury is a complication that is rarely, if ever, encountered. In our experience, we have performed more than 3,000 AF procedures over the last decade with only 1 case of phrenic nerve injury. This is likely because with radiofrequency ablation of AF, the lesion set is in the antrum and away from the right upper pulmonary vein.

Despite these safety concerns with the first generation device, I am confident that this technology will only improve and become even safer, more effective, and quicker to use with time. The lessons learned from this first generation device will be definitely be overcome by the many physicians, scientists, and companies currently working on the next generation devices. Stay tuned as cryoballoon technology will likely become an even larger player in the AF ablation arena in the years ahead.

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