Left Atrial Appendage Closure: Killing 2 Birds With 1 Stone?

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Left atrial appendage (LAA) closure in patients with atrial fibrillation (AF) has been practiced since the 1930s, even without evidence-based data in the form of randomized controlled trials in support of this procedure. Initially, LAA closure through excision or ligation was performed by cardiothoracic surgeons in the context of open heart surgery for other reasons, akin to general surgeons removing the appendix during abdominal surgery. The main goal of LAA exclusion is to reduce the incidence of thromboembolic events, mainly strokes, in the context of a diagnosis of AF.

Nearly 15% of all strokes are attributable to AF, whether the AF diagnosis is recognized during the stroke event or whether it is discovered at a later time incidentally or through targeted cardiac monitoring. It is estimated that 90% of all cardiac clots that form during AF are localized to the LAA. Because of the high prevalence of AF in the aging US population, the devastating impact of stroke on patients’ longevity and quality of life, and the implications for the cost of health care, minimizing the risk of stroke is a top priority. Stroke risk assessment scores such as the CHADS2 scores have been developed to assess the risk of thromboembolic events and to determine whether the AF patient should receive anticoagulation.

Despite the advent of new anticoagulation agents, there is much reluctance to start patients on anticoagulation for fear of bleeding complications. Epidemiological studies have shown that more than one-third of AF patients eligible for anticoagulation because of an elevated CHA2DS2-VASc score (≥2) continue to be managed suboptimally with no anticoagulation or with only antiplatelet agents, presumably because of an overinflated perception of their risk of bleeding.

Because of these considerations, there has been a resurgence of interest in closing the LAA—believed to be the main nidus of clot formation in AF—using less invasive techniques than surgical ligation or excision. Along these lines, an epicardial, minimally invasive closure tool (Lariat system; SentreHeart Inc) was developed and obtained quick 510(k) approval by the US Food and Drug Administration (FDA), followed just a few weeks ago by approval of the first endovascular closure device (Watchman device; Boston Scientific) for the US market after multiple reviews by FDA committees spanning several years since 2010. These minimally invasive tools allow for the closure of the LAA without having to commit patients to long-term anticoagulation.

Now that LAA closure devices are being used more frequently, emerging literature has focused on the electrical remodeling that takes place in the atria during and after these procedures. In this issue of the Journal of the American Heart Association (JAHA), Kawamura et al have reported their data on the changes in atrial electrical parameters that take place in the short aftermath and up to 3 months after LAA closure. In 15 AF patients undergoing LAA ligation using the epicardial Lariat system, evidence of shortening of the P-wave duration and decrease in atrial dispersion of repolarization were documented. These electrical changes indicate a decrease in the total mass of atrial tissue, presumably because of the exclusion of the LAA, and a decrease in dispersion that is likely correlated with a lower propensity for AF recurrence. This study by Kawamura et al adds to the growing literature that suggests LAA closure may have antiarrhythmic effects beyond its salutary antiembolic benefits.

Whether all methods of LAA closure are created equal when it comes to altering the atrial electrical milieu and potentially reducing the recurrence rates of AF is unclear at the present time. Although devices like Watchman merely close the LAA orifice to prevent clot formation and embolization from that pouch, without electrically isolating LAA tissue from the overall atrial mass, devices like the Lariat actually induce tissue ischemia and necrosis by strangulation of atrial muscle. It is unlikely that the impact of these 2 methods of LAA closure on atrial electrical remodeling is properly cited and is not used for commercial purposes.
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similar, but it remains poorly defined at the present time. Future studies are needed to ascertain whether, in fact, LAA closure has antiarrhythmic effects beyond its antiembolic protection and whether all methods of LAA closure are created equal in this respect. These data, once available, are likely to reshape future management of AF patients.

In medicine, as in life, killing 2 birds with 1 stone is highly appealing. If closing the LAA can lead to stroke reduction as well as reduction in AF recurrence, then the landscape of AF management in the electrophysiology laboratory is very likely to change quickly over the next few years. Since the inception of AF ablation procedures nearly 2 decades ago, pulmonary vein isolation has been the cornerstone of these procedures, but it continues to search for additional sets of ablation lesions to improve the efficacy and durability of AF ablation. Despite multiple proposed complementary ablation techniques, this goal has remained elusive. If LAA closure, beyond its proven stroke-protection benefits, is shown to have added antiarrhythmic effects over pulmonary vein isolation, then it would very likely soon become an intrinsic component of AF ablation procedures performed by electrophysiologists. A “1-stop shop” for AF rhythm control and the management of its associated stroke risk provides 2 therapies for the price of 1—an attractive proposition in these days of cost containment in health care.

Disclosures

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References


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