Is There Any Clinical Significance of the Acute Antral Lesion Size After Pulmonary Vein Isolation Using Different Balloon Technologies or Ablation Energy?

To the Editor:

We read with great interest the article by Perrotta et al published recently in the Journal.1 In their study, the authors compared the final scar size of the isolated antral surface area (IASA) and the isolated surface area (ISA) between cryoballoon and laser balloon. To detect scar size, they used the bipolar voltage map software of NavX Ensite VelocityTM (St. Jude Medical, St. Paul, MN, USA) before and after pulmonary vein isolation (PVI) in sinus rhythm.

In a recently published article, we investigated additional atrial substrate modification effects of cryoballoon in a patient with long-standing persistent atrial fibrillation (AF).2 After we created a 3D reconstruction of the left atrium (LA) and pulmonary veins (PVs) using the Ensite NavX mapping system (St. Jude Medical), high-frequency atrial potentials showing multiple deflections from the isoelectric line and suggesting complex fractionated atrial potentials were detected with the NavX CFAE mean tool of the system. Atrial CFAE mapping was performed before and after cryo-PVI. The reduction in CFAE area was 12.3 cm² on the right PVs and 9.2 cm² posteriorly. Furthermore, this was the first case demonstrating successful combined usage of cryoballoon and radiofrequency (RF) ablation in a patient with long-standing persistent AF. After cryo-PVI, we targeted ablation of all CFAE sites. During the 5th minute of RF ablation of the remaining CFAEs on the anterior wall, AF was terminated, and could not be induced by programmed stimulation. The patient was in sinus rhythm at the end of 12 months’ follow-up.

Although it was not indicated by the present authors, Kenigsberg et al3 first described and quantified the ablated surface area after the application of cryoablation lesions with the 2nd-generation cryoballoon. They revealed that the posterior wall of the LA was the most affected site with the cryoballoon. They speculated that posterior LA wall debulking could be a part of the cryoballoon efficacy beyond a wide and antral PVI effect. As a supporting finding of this speculation, we found that cryo-ablation may cause a larger troponin increase and tissue necrosis compared with RF ablation.4 To evaluate whether there is clinical superiority of a wide antral ablation effect of cryoballoon to RF ablation, we compared combined cryo-PVI and RF substrate modification with RF PVI and substrate modification in patients with long-standing persistent AF.5 No difference was seen in freedom of AF between the combined and whole RF groups (80% vs. 87.0%, P=0.344). Similar to the present report, larger ablation did not bring any additional clinical benefit.

In conclusion, we speculate that cryoballoon causes a larger ablation area than RF ablation and laser balloon. These ablation effects are not only detected during sinus rhythm by voltage mapping, but also during AF by using the CFAE mean tool. Larger and prospective randomized trials with adequate statistical power will be able to answer whether a larger ablation leads to more freedom from AF and whether one ablation technology is superior to another.

Disclosures

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References


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