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INSIDE THIS ISSUE

STATE-OF-THE-ART REVIEW

Fibrosis and Atrial Fibrillation: Computerized and Optical Mapping: A View Into the Human Atria at Submillimeter Resolution

531

Brian J. Hansen, Jichao Zhao, Vadim V. Fedorov

Presented in this review are insights linking 3-dimensional (3D) fibrosis architecture with mechanisms of atrial fibrillation (AF) maintenance gained from submillimeter, high-resolution ex vivo imaging modalities directly of human atria, as well as in silico 3D computational techniques that are able to overcome in vivo limitations. The systematic integration of functional and structural imaging ex vivo may inform the necessary integration of electrode and structural mapping in vivo. A holistic view of AF driver mechanisms may begin to identify the defining characteristics or "fingerprints" of re-entrant AF drivers, such as 3D fibrotic architecture, to design optimal patient-specific ablation strategies.

FOCUS ON PULMONARY VEIN ISOLATION

Development of Nonpulmonary Vein Foci Increases Risk of Atrial Fibrillation Recurrence After Pulmonary Vein Isolation

547

Rintaro Hojo, Seiji Fukamizu, Takeshi Kitamura, Yuya Aomyama, Mitsuhiro Nishizaki, Yoichi Kobayashi, Harumizu Sakurada, Masayasu Hiraoka

The authors studied 216 patients who underwent a second electrophysiological study 6 months after the first pulmonary vein isolation, regardless of atrial fibrillation (AF) recurrence. Nonpulmonary vein foci (NPVF) detected for the first time in the second session were defined as newly developed (new-NPVF). They examined the effects of new-NPVF on AF recurrence after the second procedure. They also sought predictive factors for the new-NPVF development. Patients with new-NPVF had a significantly higher AF recurrence than those without. New-NPVF and AF recurrence after the first session were independent predictors for AF recurrence after the second procedure. AF history and NPVF in the first session were independent predictors for new-NPVF.

■ EDITORIAL COMMENT

Sorting Out the Significance of Nonpulmonary Vein Triggers

556

Francis E. Marchlinski, Irene Lucena Padros, Maciej Kubala



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Atrial Fibrillation and Pulmonary Venous Electrical Conduction Recovery After Full Surgical Resection and Anastomosis of the Pulmonary Veins: Insights From Follow-Up and Ablation Procedures in Lung Transplant Recipients

559

Ayman A. Hussein, Tanmay S. Panchabhai, Marie M. Budev, Khaldoun Tarakji, Amr F. Barakat, Walid Saliba, Bruce Lindsay, Oussama M. Wazni



Pulmonary venous (PV) conduction recovery accounts for most failed atrial fibrillation (AF) catheter ablation procedures. The lung transplant population affords researchers the opportunity to assess success rates of a PV-only AF ablation, and further to assess whether PV conduction recovery is possible in this setting. In 755 consecutive lung transplant recipients, who underwent full surgical resection of the PVs, a prior history of AF was associated with late AF, regardless of whether patients underwent single or bilateral lung transplant. PV conduction recovery still occurred and was observed in most patients who underwent left atrial ablation procedures for recurrent AF.

Defining Blanking Period Post-Pulmonary Vein Antrum Isolation

568

Pouria Alipour, Zahra Azizi, Meysam Pirbaglou, Paul Ritvo, Alfredo Pantano, Atul Verma, Yaariv Khaykin

The window after pulmonary vein isolation during which any recurrence of atrial fibrillation can be dismissed as clinically insignificant has traditionally been 90 days. However, previous studies have shown that recurrences during the latter part of this window are a reliable predictor of subsequent recurrences, which may require further treatment. This study was conducted to determine the number of days after PVI during which recurrences can be dismissed as nonsignificant, thus better defining the blanking period. This clinical finding challenges traditional views and should be used to provide a more realistic outlook and long-term expectations to patients.

■ EDITORIAL COMMENT

Early Recurrences of Atrial Tachyarrhythmias After Ablation of Atrial Fibrillation: How Long Do We Have to Be Blind?

577

Sakis Themistoclakis, Paolo China

Anatomic Parameters Predicting Procedural Difficulty and Balloon Temperature Predicting Successful Applications in Individual Pulmonary Veins During 28-mm Second-Generation Cryoballoon Ablation

580

Takatsugu Kajiyama, Shinsuke Miyazaki, Junji Matsuda, Tomonori Watanabe, Takayuki Niida, Takamitsu Takagi, Hiroaki Nakamura, Hiroshi Taniguchi, Hitoshi Hachiya, Yoshito Iesaka

This study evaluated anatomic and thermal predictors of successful applications during second-generation cryoballoon ablation. The authors enrolled 110 patients with paroxysmal atrial fibrillation. A thinner left lateral ridge, higher ovality, and longer pulmonary vein (PV) ostium-bifurcation distance were associated with repeated freezes for successful PV isolation of left superior PVs. An older age and shorter PV ostium-bifurcation distance required multiple applications for successful PVIs of the right superior and right inferior PVs, respectively. Successful PV isolation could be predicted using the temperature at the start of the plateau phase with positive predictive values of >80% during the early cryoballoon ablation freezing phase.

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