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INSIDE THIS ISSUE

STATE-OF-THE-ART REVIEW

Substrate Mapping for Ventricular Tachycardia: Assumptions and Misconceptions

Mark E. Josephson, Elad Anter

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Substrate mapping is used to identify critical sites in post-infarction ventricular tachycardia (VT) circuits during sinus rhythm. The methods used are based on assumptions that have not been validated, which limit the ability to accurately define the true arrhythmogenic substrate. These include: 1) re-entrant circuits are produced by a fixed substrate of immutable scar; 2) low voltage (≤ 0.5 mV) implies dense scar; 3) isthmuses defined in patients with tolerated VT using entrainment mapping are valid and provide an accurate depiction of isthmuses in less hemodynamically tolerated VTs; and 4) current mapping methods can delineate specific electrophysiologic features that will determine the barriers forming channels during re-entrant VT.

NEW RESEARCH PAPERS

Scar Extension Measured by Magnetic Resonance-Based Signal Intensity Mapping Predicts Ventricular Tachycardia Recurrence After Substrate Ablation in Patients With Previous Myocardial Infarction

Pablo Ávila, Esther Pérez-David, Maite Izquierdo, Antonio Rojas-González, Juan M. Sánchez-Gómez, María J. Ledesma-Carbayo, M. Pilar López-Lereu, Gerard Loughlin, José V. Monmeneu, Esteban González-Torrecilla, Felipe Atienza, Tomas Datino, Loreto Bravo, Javier Bermejo, Francisco Fernández-Avilés, Ricardo Ruiz-Granel, Ángel Arenal

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In 46 consecutive patients with previous myocardial infarction who underwent ventricular tachycardia (VT) substrate ablation before cardioverter-defibrillator implantation, contrast-enhanced magnetic resonance imaging (MRI) was performed to measure areas of endocardial and epicardial scarring and heterogeneous tissue using signal intensity maps. MRI endocardial scar extension was the only independent predictor of VT recurrence (hazard ratio: 1.310; $p = 0.034$). Freedom from VT recurrence was higher in patients with small endocardial scars (< 65 cm²) than in those with larger scars (≥ 65 cm²) (85% vs 20%, log-rank $p = 0.018$). This information could be useful in decisions on VT ablation indications, as in selecting candidates for VT ablation.

■ EDITORIAL COMMENT

Prognostic Value of Scar Imaging for Substrate Ablation of Ventricular Tachycardia: Fact or Fiction?

Timm M. Dickfeld, Alejandro Jimenez

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Verapamil-Sensitive Upper Septal Idiopathic Left Ventricular Tachycardia: Prevalence, Mechanism, and Electrophysiological Characteristics

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Ahmed Karim Talib, Akihiko Nogami, Suguru Nishiuchi, Shinya Kowase, Kenji Kurosaki, Yumie Matsui, Satoshi Kawada, Atsuyuki Watanabe, Masatsugu Nozoe, Kikuya Uno, Atsuhiko Yagishita, Yasuteru Yamauchi, Yoshihide Takahashi, Taishi Kuwahara, Atsushi Takahashi, Koji Kumagai, Shigeto Naito, Tetsuya Asakawa, Yukio Sekiguchi, Kazutaka Aonuma

Among 193 patients with idiopathic left fascicular ventricular tachycardia (ILVT), the authors identified 12 patients (6.2%) with upper septal ILVT (US-ILVT) with a narrow QRS interval (90 ± 19 ms). Of 12 patients, 6 had previous history of catheter ablation for common ILVT. During US-ILVT, Purkinje potentials were activated in a reverse direction to that of common ILVT; namely, the diastolic potential was activated retrogradely but the pre-systolic potential was activated antegradely. Catheter ablation was successful at the left upper-middle ventricular septum with a diastolic potential. In conclusion, US-ILVT is an orthodromic form of ILVT, and some cases appeared after common ILVT ablation.

Chronic Obstructive Pulmonary Disease and Risk of Sudden Cardiac Death

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Kumar Narayanan, Kyndaron Reinier, Audrey Uy-Evanado, Carmen Teodorescu, Lin Zhang, Harpriya Chugh, Gregory A. Nichols, Karen Gunson, Jonathan Jui, Sumeet S. Chugh

The authors evaluated the association between chronic obstructive pulmonary disease (COPD) and sudden cardiac death (SCD) in the general population by comparing adult SCD case subjects ($n = 728$; age 69.9 ± 13.7 years) with geographic control subjects with coronary artery disease ($n = 548$; age 67.2 ± 11.3 years) in the Oregon Sudden Unexpected Death Study. COPD (odds ratio: 2.2; 95% confidence interval: 1.4 to 3.5) was significantly associated with SCD independent of medications and clinical and electrocardiographic risk markers; this association was maintained in propensity score-matched analysis. Short-acting beta-agonists were also independently associated with SCD in subjects not taking beta blockers (odds ratio: 3.3; 95% confidence interval: 1.4 to 7.7) but not in those taking beta blockers. Novel mechanisms linking COPD to SCD warrant further investigation.

■ EDITORIAL COMMENT

Sudden Cardiac Death and Chronic Obstructive Pulmonary Disease: Evidence, Mechanisms, and Therapeutic Implications

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Tomas Konecny, Virend K. Somers

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