Late Diastolic Potential Guided Ventricular Tachycardia Ablation in Patient With Electrical Storms and Ischemic Heart Disease

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Figure 1. Twelve-lead surface electrocardiogram during (A) sinus rhythm and (B) the targeted ventricular tachycardia (cycle length 466 ms). The QRS morphology is a left bundle branch block and superior axis morphology. (C) The intracardiac electrocardiogram at the site of the successful ablation. CS, coronary sinus; RV, right ventricle; ABL, ablation catheter.
An 80-year-old man had a history of ischemic heart disease and previous coronary artery bypass grafting 8 years prior. Two months previously, he received an implantable cardioverter-defibrillator (ICD) because of ventricular tachycardia (VT). The echocardiogram revealed a poor left ventricle (LV) function (ejection fraction = 26%) with inferior-lateral and septal wall hypokinesis. On this admission, he underwent radiofrequency catheter ablation due to an electrical storm (ES) despite tolerating the maximal dose of anti-arrhythmic drugs. An initial endocardial approach was used under the guidance of a NavX mapping system (NavX 8.0, St. Jude Medical, Inc). A substrate-based voltage map of the LV endocardium during sinus rhythm was constructed, which revealed the presence of a low voltage area (defined by voltages of <0.5 mV) in the inferior-lateral and septal walls of the LV. A sustained monomorphic VT was induced with a left bundle branch block and superior axis morphology and a tachycardia cycle length (TCL) of 466 ms (Figure 1B).

The activation map from the earliest to the latest signal encompassed 70% of the duration of the TCL (Figure 2, Movie S1). Late diastolic potentials (LDP) could be recorded along the scar area (voltage <0.1 mV) in the inferior-lateral LV during the VT (Figure 2). The VT terminated during a linear ablation at an area where LDP were recorded (Figure 1C).

Catheter ablation has played an increasingly important role in controlling VT episodes in patients with structural heart disease who have an ICD. In patients with hemodynamically tolerated VT, ablation at isthmus sites that also have isolated LDP most consistently terminates the VT with limited RF energy applications and a low risk of recurrent VT during the follow-up. We incorporated an activation mapping during VT with the identification of LDP to define the location of the potential critical isthmus, which was longer than the mapped isthmus. Catheter ablation along the extended isthmus terminated the VT successfully suggesting an LDP-guided ablation might be a useful adjuvant mapping tool when activation mapping could not terminate the VT.

**Disclosure**

Conflict of interests: The authors have no conflicts of interest to declare.

**References**

5. Nakagawa E, Takagi M, Tatsumi H, Yoshiyama M. Successful...


Supplemental Files

Supplemental File 1
Movie S1. Endocardial electroanatomic reconstruction of the left ventricular in the left posterior oblique view. The propagation map revealed that the ventricular tachycardia encircled the critical isthmus.

Please find supplemental file(s):