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EDITORIAL

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Editorial to utility of directional high-density mapping catheter (Advisor HD Grid) in complex scar-related atrial tachycardia

Multipolar mapping catheters such as the Pentaray® (Biosense Webster) and Orion® (Boston Scientific) are often used for creating high-density maps rapidly in the patients with complicated tachycardias. These catheters can only record local atrial electrograms parallel to their bipoles. However, the Advisor HD grid HD mapping catheter (Abbott Technologies) makes a significant contribution to the bipole recording in that it can record not only parallel but also perpendicular to the splines, which differs from conventional mapping and ablation catheters.[1] Therefore, the HD grid can create high-density maps to define anatomical substrates and identify a low-voltage isthmus regardless of the direction of activation. The impact of the utility of the Advisor HD Grid might lead to new and unique mapping.

Scar-related atrial tachycardias (ATs) in patients with open-heart surgery involve complex circuits to be mapped. The cycle length (CL) of atrial reentrant tachycardias can exhibit variability, especially in complicated tachycardias. In a recent report, some cases had a CL variability associated with nonanatomical macro-reentrant ATs.[2] Actually the ATCL might depend on the direction of the wavefront propagation. However, conventional mapping catheters might not capture the direction of the wavefront propagation especially in low-voltage zones. According to VH Tan et al, in the case of complex scar-related ATs, the use of the Advisor HD grid made it possible to detect fractionated atrial electrograms in the isthmus area as compared to the absence of electrograms with the bipole ablation catheter in the same area despite an adequate contact force.[3] The fractionated signals were clearly seen with the Advisor HD grid electrodes, which were parallel to the wavefront propagation recorded by the ablation catheter, which was perpendicular to the wavefront propagation.

The circumferential pulmonary vein isolation (PVI) has become an effective approach for paroxysmal atrial fibrillation (AF) ablation, with reconnections resulting in recurrences of AF or AT. However, a gap between the left atrium and pulmonary veins sometimes cannot be identified on the ablation bipoles recorded with conventional recording systems. The Advisor HD Grid could demonstrate the gap potentials that were not visible on ablation catheter recordings.

Low-voltage areas (LVAs) mapped using the HD grid might be less than those mapped by conventional catheters. In AF patients, an ablation strategy based on LVAs as detected by left atrial (LA) voltage mapping during sinus rhythm (SR) has recently been reported.[4] However, this strategy might be reconsidered because of the definition of the LVAs. Usually a peak-to-peak bipolar voltage of <0.05 mV and 0.05 to 0.5 mV has been defined as scar and LVA, respectively. Under such a definition of LVAs, the LVAs required for a substrate modification might be more greatly reduced than if we performed an ablation based on LVAs.

The superior vena cava (SVC) has been targeted as a non-PV trigger of AF associated with atrial tissue degeneration. An SVC isolation is effective in patients with long SVC sleeves and large SVC potentials, which are arrhythmogenic triggers of AF.[5] However, the SVC sleeve might depend on whether or not the Advisa HD grid was used. The SVC sleeve might be longer when evaluated using the Advisa HD grid electrodes, which are parallel to wavefront propagation as compared to that recorded by a circular catheter located in the SVC, which would be perpendicular to the wavefront propagation. The indication for an SVC isolation may be reconsidered on the basis of the SVC sleeve length.

Thus, the Advisor HD Grid is the only directional HD mapping catheter that not only identifies local electrical signals, but more importantly, captures the direction of the wavefront propagation, especially in low-voltage zones. The impact of the utility of the directional HD Grid might lead to a new mapping method demonstrating that the local electrograms have not been visible when using conventional mapping and ablation catheters.

CONFLICT OF INTEREST

All authors declare no conflict of interest related to this study.

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