Received: 18 July 2020 | Revised: 19 August 2020 | Accepted: 26 August 2020

DOI: 10.1002/joa3.12433

CARDIAC ARRHYTHMIA SPOT LIGHT

Journal of Arrhythmia Open Access WILEY

Look inside the slow or no conduction zones

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Funding information
None declared.

KEYWORDS
atrial tachycardia, catheter ablation, coherent activation mapping, scar threshold, slow or no conduction zone

1 | DESCRIPTION

Coherent activation mapping, equipped with the latest electroanatomical mapping system (CARTO3 version 7, Biosense Webster, Diamond Bar, CA), is a software module with an automatic algorithm that identifies slow or no conduction (SNO) zones and displays conduction vectors based on mapped bipolar voltage. Although this is a promising tool to delineate the complex atrial tachycardia (AT) circuit, tips and tricks for the use of this technology should be clarified.

A 72-year-old woman after the surgical repair of an atrial septal defect was referred for catheter ablation of sustained AT. Following the identification of concentric atrial activation in the coronary sinus, the tachycardia circuit (cycle length of 250 ms) was evaluated within the right atrium using a multielectrode mapping catheter (Pentaray; Biosense Webster, Diamond Bar, CA). The bipolar electrograms were filtered from 30 to 500 Hz. Electroanatomic mapping was performed using the CARTO3 version 7 system. Voltage mapping during AT identified patchy, low-voltage areas at the posterior junction of the superior

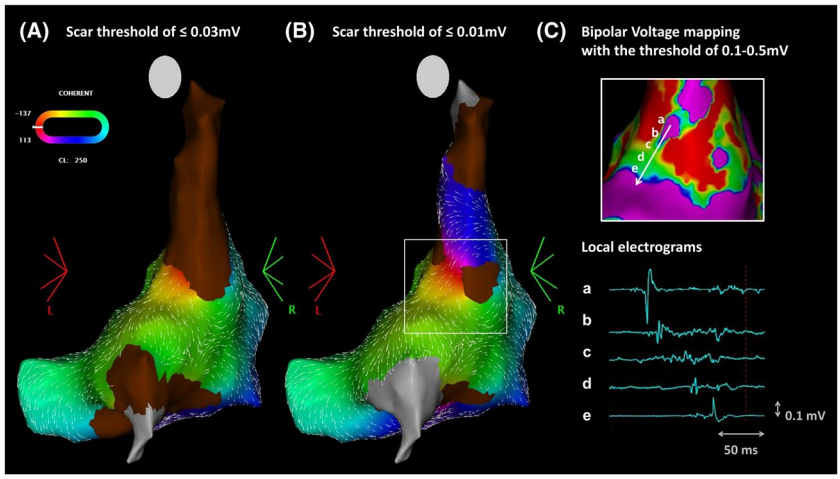

FIGURE 1 (A, B) Coherent activation mappings with different scar thresholds during atrial tachycardia. The automatic algorithm describes slow or no conduction (SNO) zones as copper-colored areas without conduction vectors. (C) Bipolar voltage mapping and local electrograms of the manifested SNO zone.

vena cava and the right atrium, which were possibly associated with the previous surgery. Coherent activation mapping with the conventional scar threshold setting (bipolar voltage amplitude ≤ 0.03 mV) displayed a centrifugal spread from a superior SNO zone (Figure 1A). AT was considered to have a focal mechanism. However, entrainment pacing around the lateral border of the "SNO" zone exhibited a post-pacing interval equal to the tachycardia cycle length, which suggested that the AT mechanism was macro-reentry. By decreasing the scar threshold (bipolar voltage amplitude ≤ 0.01 mV), AT was determined to be a macro-reentrant figure with a slow conduction isthmus between the septal and lateral SNO zones (Figure 1B and Movie S1). Low-amplitude, long-duration, and highly fractionated electrograms were observed in this wavefront deceleration zone (Figure 1C). Linear catheter ablation across the two SNO zones terminated the AT. The patient remained arrhythmia-free during the 6-month follow-up.

Coherent activation mapping and the consequent SNO zones, which were the results of the automatic algorithm, facilitate recognition of AT circuit and critical slow conduction areas. In this case, the SNO zones with the conventional scar setting (copper-colored areas on the coherent map without conduction velocity vectors) identified potential critical areas; however, they paradoxically masked the valuable vector and activation information on the macro-reentrant AT. When using this new system, adjusting scar settings even below the noise level (bipolar voltage amplitude ≤ 0.03 mV) should be considered to obtain the important information contained in the SNO zone.

ACKNOWLEDGMENTS

We thank the nursing staff, clinical engineers, radiological technologists, and office administrators of Sakurabashi-Watanabe Hospital for their support in conducting this study.

CONFLICT OF INTEREST

Koichi Inoue received honoraria from Johnson and Johnson KK. The remaining authors have no conflicts to declare.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Okada M, Tanka N, Tanaka K, Hirao Y, Yoshimoto I, Inoue K. Look inside the slow or no conduction zones. *J Arrhythmia*. 2020;36:1112–1113. https://doi.org/10.1002/joa3.12433