

## EP CASE REPORT

# Biatrial mapping of two simultaneous tachycardia using parallel mapping module

Grégoire Massoulié<sup>1,2\*</sup>, Bastien Schmitt<sup>3</sup>, and Marius Andronache<sup>1</sup>

<sup>1</sup>Cardiology Department, CHU Clermont-Ferrand, Rue Montalembert, 63000 Clermont-Ferrand, France; <sup>2</sup>Clermont Université, ISIT-CaVITI, Clermont-Ferrand, France; and <sup>3</sup>Biosense Webster France Johnson&Johnson, Issy-Les-Moulineaux, France

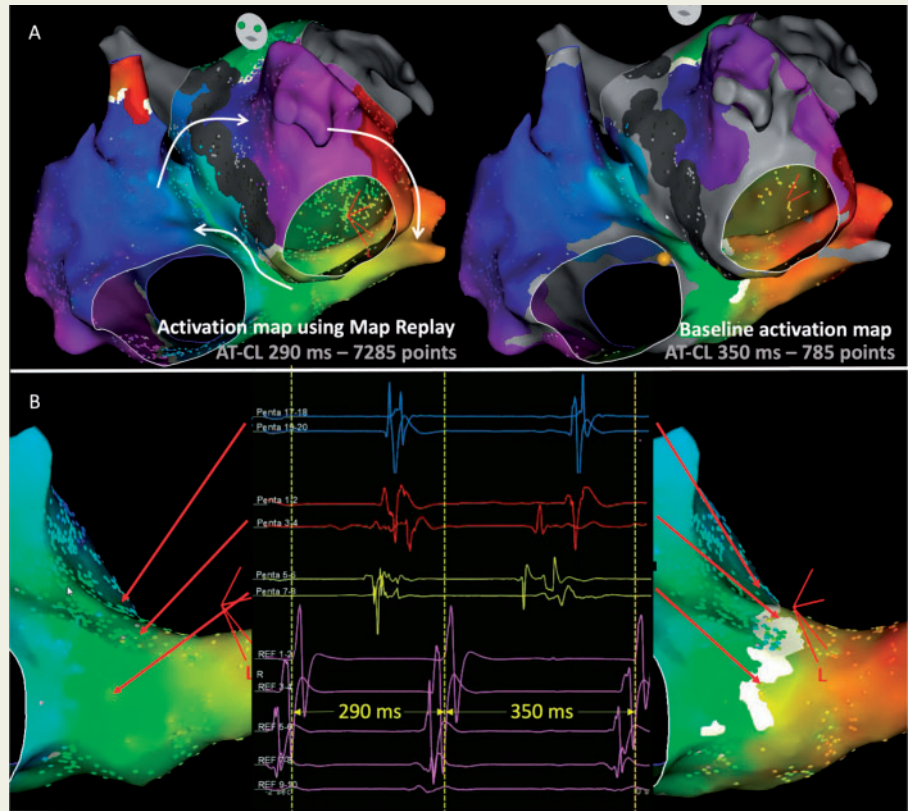
\* Corresponding author. Tel: +33 473751410; fax: +33 473754730. E-mail address: gmassoullie@chu-clermontferrand.fr

A 68-year-old man was referred for recurrent atrial tachycardia (AT) ablation. He had a history of ischaemic cardiomyopathy and symptomatic persistent atrial fibrillation (AF). Two AF ablation, one atypical flutter and an isthmus flutter were performed. At time of electrophysiological study, the patient was in persistent AT with two alternating cycle length (CL) (AT-CL1 ~290 ms/AT-CL 2 ~350 ms) mainly in a two to one pattern.

Two local activation time (LAT) maps were simultaneously created with Parallel Mapping Module<sup>®</sup> (Carto 3 system with V7 software<sup>®</sup>—Biosense Webster, Diamond Bar, CA, USA) during a single biatrial chamber mapping [filters set up: tissue proximity index (TPI): ON, position stability filter (POS): 5 mm, LAT stability: 4 ms]. Acquisition duration for right atrium was 2 min 50 s and left atrium 6 min 40 s. Parallel Mapping Module<sup>®</sup> creates simultaneous activations map with different filters set-up allowing multiple parallel mapping based on electrocardiogram pattern for premature ventricular complexes, or AT using CL filter.

To improve points density and map quality, the Map Replay Module<sup>®</sup> retrospectively allowed us to rebuild two full LAT maps with different user-defined filters: (i) LAT stability was switched off due to beat to beat CL variations leading to LAT value variations, rejecting points and increasing mapping time. This filter compares LAT value of each bipolar electrogram with its corresponding previous LAT value. In this context, and particularly beat-to-beat CL variation, LAT stability should not be used as a baseline filter. (ii) POS, comparing each electrode XYZ position with its corresponding previous XYZ position, was reduced from 5 to 4 mm to prevent non-intrinsic signal annotation. (iii) We turned off TPI, filter usually activated for accurate voltage map creation. This filter compares impedance variations to evaluate tissue proximity for each electrode. New rebuilt map gained 4658 points total for AT-CL1 and 4969 points AT-CL2 (map replay editing: 23 s. Artefacts and false point reannotation ≈ 4 min 35 s).

Activation mapping analysis identified a single loop macroreentrant biatrial AT involving inter-atrial epicardial conduction through Bachmann's bundle, and coronary sinus (CS). Both AT shared an anteroseptal obstacle from prior ablation lesions as typical and common mechanism<sup>1</sup> (Figure 1A; Materials; Supplementary material online, Video S1). A 60 ms CL prolongation is explained by a functional block



**Figure 1** Panel A - Biatrial activation map at baseline (right) and after Map Replay (left). Panel B - EGM and activation map with CS block (right, CL=350 ms) and without (left, CL=290 ms).

occurring at the CS ostium (*Figure 1B*). Ablation was first performed at the Bachman's bundle insertion in left atria to obtain sinus rhythm and block. Patient was not inducible for AT/AF anymore.

Activation mapping and high-density mapping increased 3D mapping system diagnosis efficiency during AT ablation procedure. A complete understanding of the underlined mechanism is critical, particularly in complex and biatrial AT where both atria must be mapped. Simultaneous mapping offers a new solution to reduce procedure time by acquisition of voltage, volume and multiple activation during the same chamber mapping. Baseline CL is the only criteria available to properly differentiate two simultaneous AT with Parallel Mapping Module<sup>®</sup> and require LAT stability filter deactivation. This module, initially developed to map multiple premature ventricular complexes, may also facilitate the ablation of complex AT.

## Supplementary material

Supplementary material is available at *Europace* online.

**Conflict of interest:** B.S. is employee of Biosense Webster, Inc.

## Reference

1. Kitamura T, Martin R, Denis A, Takigawa M, Duparc A, Rollin A *et al*. Characteristics of single-loop macroreentrant biatrial tachycardia diagnosed by ultrahigh-resolution mapping system. *Circ Arrhythm Electrophysiol* 2018;**11**:e005558.