

## IMAGES IN ELECTROPHYSIOLOGY

# Cardio-Neuromodulation

## The Right-Sided Approach

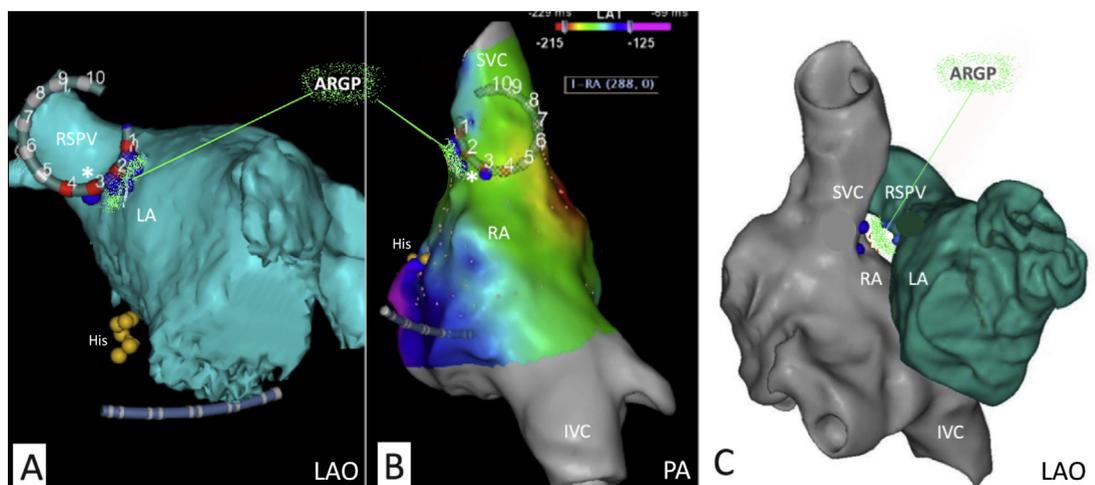
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We have previously shown that neurally-mediated syncope and inappropriate sinus bradycardia can be treated by cardio-neuromodulation (CardNM), which is a selective and tailored ablation of the anterior right ganglionated plexus (ARGP) (1). In our first publication, the

left-sided approach was described, and its rationale discussed. Five additional patients have now been treated by a right-sided approach. A circular multielectrode irrigated catheter (nMARQ; Biosense Webster, Diamond Bar, California) was positioned at the posteroseptal side of the junction between

**FIGURE 1** Typical Anterior Right Ganglionated Plexus Ablation Site During Cardio-Neuromodulation

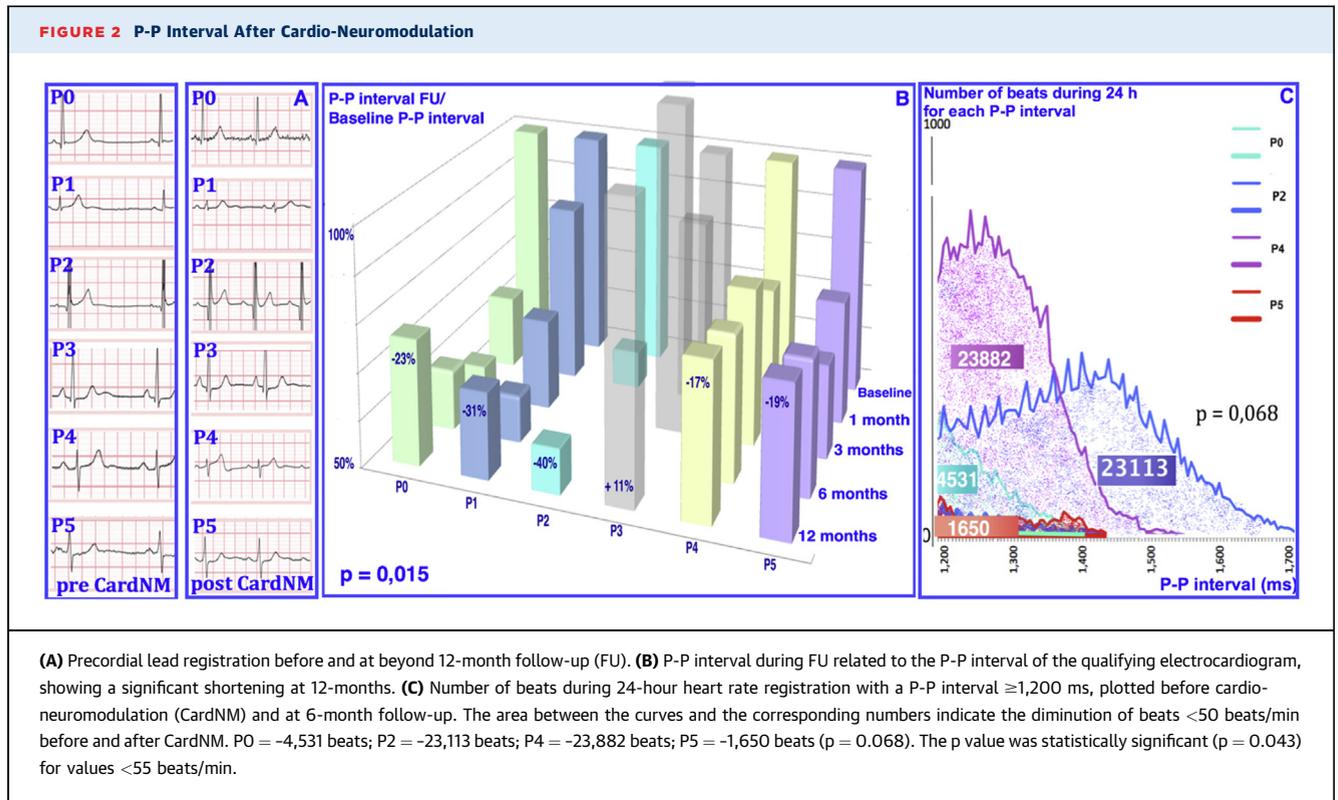


Typical anterior right ganglionated plexus (ARGP) ablation site during cardio-neuromodulation, located between left (A and C) and right (B and C) veno-atrial structures, and targeted with the n-MARQ catheter (asterisk) from the (A to C) right and left (C) sides. His = His bundle; IVC = inferior vena cava; LA = left atrium; LAO = left anterior oblique view; PA = postero-anterior view; RA = right atrium; RSPV = right superior pulmonary vein; SVC = superior vena cava.

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All authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Clinical Electrophysiology* [author instructions page](#).

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the right atrium and the superior vena cava facing the mid and caudal parts of the right superior pulmonary vein antrum (Figures 1A and 1B). In 1 of the patients (Figure 1C), we delivered a single radiofrequency application from the right atrium and completed CardNM from the left side, demonstrating the geographical match between the right and left ablation sites, sandwiching the ARGP. Ablation duration was  $< 5$  min per patient. The baseline P-P interval shortened along a sigmoid curve ( $r^2 \geq 0.98$ ) by  $310 \pm 165$  ms during CardNM ( $p = 0.028$ ). We postulated that the first plateau of the curve reflected the time needed to reach an epicardial target. We allocated the steep part of the curve to lesion formation, whereas the second plateau was in line with the maximal volume of injury from a particular ablation site. There was a reduction in syncopes at 12-month follow-up ( $p = 0.035$ ), and the

shortening in P-P interval was maintained at 12 months (Figures 2A and 2B). The number of beats  $< 50$  beats/min tended to be reduced at 6-month follow-up ( $-9,847$  beats/24 hours) (Figure 2C). CardNM as a treatment for neurally-mediated syncope and inappropriate sinus bradycardia is currently being evaluated in a larger trial (Second Study on Cardio-neuromodulation in Humans [CardNMH2]; NCT02954666).

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**REFERENCE**

1. Debruyne P. "Cardio-Neuromodulation" with a multi-electrode irrigated catheter a potential new approach for patients with cardio-inhibitory syncope. J Cardiovasc Electrophysiol 2016;27:1110-3.

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