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## References

1. Ratajczak T, Blank R, Parikh A, Wase A. Late-onset asystolic episodes in a patient with a vagal nerve stimulator. *HeartRhythm Case Rep* 2018;4:314–317.
2. Pachon JC, Pachon EI, Pachon JC, Lobo TJ, Pachon MZ, Vargas RN, Jatene AD. “Cardioneuroablation”—new treatment for neurocardiogenic syncope, functional AV block and sinus dysfunction using catheter RF ablation. *Europace* 2005; 7:1–13.
3. Scanavacca M, Hachul D, Pisani C, Sosa E. Selective vagal denervation of the sinus and atrioventricular nodes, guided by vagal reflexes induced by high frequency stimulation, to treat refractory neurally mediated syncope. *J Cardiovasc Electrophysiol* 2009;20:558–563.
4. Aksu T, Golcuk E, Kivanc Y, Guler TE, Erden I. Simplified cardioneuroablation in the treatment of reflex syncope, functional AV block, and sinus node dysfunction. *Pacing Clin Electrophysiol* 2016;39:42–53.
5. Yao YI, Shi R, Wong T, Zheng L, Chen W, Yang L, Huang W, Bao J, Zhang S. Endocardial autonomic denervation of the left atrium to treat vasovagal syncope: an early experience in humans. *Circ Arrhythm Electrophysiol* 2012;5:279–286.

*To the Editor—The proper usage of electroanatomic mapping-guided cardioneuroablation*



We read with great interest the case report of cardioneuroablation in ictal asystole by Antolic and colleagues.<sup>1</sup> They tried to ablate ganglionated plexi (GPs) by targeting fractionated electrograms (EGMs) in the anatomic areas where GPs for sinus and atrioventricular node innervation are located. The usage of fractionated EGMs for cardioneuroablation was first defined by our group.<sup>2,3</sup> In our protocol, bipolar endocardial atrial EGMs were evaluated for amplitude and number of deflections at special filter settings and sweep speed. All EGMs were divided into the following subgroups: normal, low-amplitude fractionated EGM (LAFE), and high-amplitude fractionated EGM (HAFE). Then, the sites demonstrating HAFE or LAFE pattern in a region that is consistent with probable localization of GPs were tagged as ablation targets in both atria. Other sites demonstrating LAFE pattern were accepted as scar tissue and excluded from the assessment.

In the present work, the authors should have defined why all sites demonstrating fractionated pattern were not targeted, because it is well known that superior and inferior left atrial GPs are located between the left pulmonary veins (PVs) and the left atrial appendage and within the fat pad below the left inferior PV, respectively.<sup>4</sup> In our research, we demonstrated that both superior and inferior left atrial GPs might be detected by using fractionated EGMs.<sup>3</sup>

Although the majority of the fractionated EGMs were detected at the insertion of the right PVs and at the superior vena cava insertions or surrounding the coronary sinus ostium in the left and right atria, respectively, the number of fractional EGMs was higher than that found in the interatrial septum.<sup>3</sup> The main problem for the cardioneuroablation procedure is to localize GPs. Our new electroanatomic mapping-guided strategy may be used to define GP sites by using conventional electrophysiological equipment to achieve complete vagal denervation.

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## References

1. Antolic B, Rutar Gorisek V, Granda G, Lorber B, Sinkovec M, Zizek D. Cardioneuroablation in ictal asystole—new treatment method. *HeartRhythm Case Rep* 2018;4:523–526.
2. Aksu T, Guler TE, Yalin K, Bozyel S. Vagal ganglia ablation: a little-known route in the treatment of vasovagal syncope. *EP Lab Digest* 2017; 17:26–27.
3. Aksu T, Guler TE, Mutluer FO, Bozyel S, Golcuk SE, Yalin K. Electroanatomic-mapping-guided cardioneuroablation versus combined approach for vasovagal syncope: a cross-sectional observational study [published online ahead of print July 28, 2018]. *J Interv Card Electrophysiol*. <https://doi.org/10.1007/s10840-018-0421-4>.
4. Stavrakis S, Po S. Ganglionated plexi ablation: physiology and clinical applications. *Arrhythm Electrophysiol Rev* 2017;6:186–190.

*Reply to the Editor—The proper usage of electroanatomic mapping-guided cardioneuroablation*



We appreciate Aksu and colleagues for showing interest in our case in which we present cardioneuroablation as a treatment option to prevent ictal asystole.<sup>1</sup>

In their comments they describe the approach of targeting low- and high-amplitude fractionated electrograms (LAFE and HAFE) in anatomical regions that are consistent with probable localization of ganglionated plexi.<sup>2</sup>

Although some authors have tried to define procedural targets and endpoints of cardioneuroablation,<sup>3</sup> they are not generally agreed upon; consequently, multiple different methods of achieving the same clinical endpoint are currently present.

In our case, the aim was to achieve sufficient vagal denervation to prevent heightened parasympathetic tone during focal epileptic seizure, which induced sinus arrest and syncope. To achieve this goal, we decided to target fractionated potentials in the anatomically defined areas. Furthermore, we decided to limit our ablation lesions