

There are still debates on cardioneuroablation strategy despite increasing evidence. Commentary to the article: “Cardioneuroablation using an anatomical approach: a new and promising method for the treatment of cardioinhibitory neurocardiogenic syncope”

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We read with great interest the recent paper by Piotrowski et al. [1]. In this well-written article, the authors aimed to present their initial experience related to cardioneuroablation (CNA) strategy in patients with reflex syncope (RS). Although RS is the most common type of syncope, there is still no well-defined and effective strategy for the management of cardioinhibitory-type RS in patients under the age of 40 years [2]. CNA is a relatively new strategy; nevertheless, previous studies demonstrated its promising results [2, 3]. In the present article, the authors performed a stepwise and empirical anatomical ablation in the previously determined ganglionated plexi (GP).

Four strategies have been used to map the GP and identify the ablation targets: high-frequency stimulation, purely anatomical localisation, atrial electrogram characteristics, and different combinations of these strategies [4]. In the anatomical approach, empirical ablation is performed in previously defined sites, on the basis of animal studies and human autopsy specimens. However, the anatomical location and number of GP identified during an electrophysiological study (EPS) may vary significantly among patients [5]. This may explain the variety of approaches used by authors, such as: ablation exclusively in the left or right atrium, ablation in both atria, or ablation only in the interatrial septum. The strategy applied in the present cases, i.e. empirical anatomical ablation from the right or left atrial side, was previously used by some groups [5].

Although no need for additional equipment such as a stimulator with high-frequency stimulation feature or a software programme to convert local electrograms to spectral potentials seems to be the most important advantage of anatomical-based ablation, it was found to be related to higher RS recurrence rates in our recently published meta-analysis [4]. Also, an anatomical-based approach may increase the number of ablation points due to empirical ablation in the presumed sites.

Thus, to perform a more specific and restricted ablation without compromising the success, one would need a method taking into account these anatomical variations during EPS. With this aim, we used the electroanatomic mapping-guided CNA strategy and compared this technique with a hybrid approach in which a combination of high-frequency stimulation, spectral analysis, and additional anatomical ablation was used [3]. Median event-free survival was comparable between the groups. There was no new syncopal episode in any patient at the end of six-month follow-up. The main advantage of our new technique is the opportunity to localise GP without using any additional equipment during EPS.

Secondly, in the paper by Piotrowski et al. [1], only an increase in heart rate or a decrease in the degree of atrio-ventricular (AV) block was used as a procedural endpoint [1]. Defining reasonable procedural endpoints seems to be the Achilles' heel of CNA strategy because we still do not know how to detect complete vagolysis and whether an incomplete

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ablation may change the success rate or not. Based on data from previous studies, the following two methods were used: (1) elimination of all targeted electrograms that may change according to the method used for determination of GP; (2) electrophysiological evidence of vagal denervation that may be detected by an increase in heart rate or AV conduction properties. Atropine response can be used as an endpoint when it was positive before the procedure and is negative postprocedurally. Also, a new technique has recently been developed to confirm the elimination of the vagal effect following CNA through vagal stimulation by an electrophysiological catheter placed in the internal jugular vein. Although there is no well-defined extent of the vagolytic endpoint required to achieve a clinical response, usage of the above-mentioned quantifiable parameters may increase the success rate in long-term follow-up.

When the ablation points in Figure 1 are examined in detail, it can be seen that the authors performed ablation mainly in the superior and posterior right atrial GP, but there was no ablation point around the coronary sinus ostium (CSO). In our latest report, to detect GP distribution in ablation sites, we divided both atria and the coronary sinus into seven segments. The great majority of the fractionated electrograms in the right and the left atria were detected in superior and posterior right atrial GP and along the anterior part of a common vestibulum of the right pulmonary veins, opposite to the right-sided ablation lesions, respectively [3]. However, the

second most common location of GP was the area surrounding the CSO in the left and right atria, which was in accordance with a human autopsy study in which a significant number of GP were located around the CSO [5].

Although restricted anatomical ablation seems to be an effective strategy, further studies are needed to confirm whether it is sufficient in all cases.

Conflict of interest: none declared

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