Pulsed field ablation-guided cardioneuroablation – experience from the University Hospital Centre Split

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Introduction: Endocardial vagal denervation, known as cardioneuroablation (CNA), is an emerging treatment option for treating conditions associated with symptomatic periods of increased vagal tone such as refractory vasovagal syncope (VVS), functional atrioventricular block, and sinus node dysfunction (SND)[1]. The cornerstone of CNA is targeting groups of autonomic ganglia known as ganglionated plexi (GP)[1]. Pulsed field ablation (PFA) is a non-thermal form of energy during which a strong electric field delivered to the underlying tissue leads to the opening of pores on the cell membrane, resulting in the destruction of the cell[2].

Patients and Methods: Cardioneuroablation was performed in symptomatic patients with proven cardioinhibitory reflex. The procedure was performed in deep sedation with propofol, fentanyl and midazolam. Standard transseptal approach was obtained and 3D electroanatomical mapping of the left atrium was preformed prior to the ablation. The presumed anatomical location of the right superior vagal GP was verified by the delivery of focal PFA lesion in anterosuperior aspect of right superior pulmonary vein ostium. The proximity to the ganglion was verified by the induction of transitory sinus

FIGURE 1. An example of the use of pulse field ablation (PFA)-guided cardioneuroablation (CNA) in one patient. *Panel A*: application of PFA (yellow dot) to the anterior superior ostium of the right superior pulmonary vein causes transient sinus bradycardia, indicating proximity to the right superior vagal ganglion. *Panel B*: set of radiofrequency ablation lesions surrounding the initial PFA application site. *Panel C*: after ablation, application of PFA does not induce sinus bradycardia.

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TABLE 1. Cohort of patients treated with cardioneuroablation guided by pulsed field ablation at University Hospital Centre Split.

Pt.	Sex	Age	Indication	Follow up period (months)	Recurrence
001	F	35	Sinus arrest	14	NO
002	F	40	Vasovagal syncope	12	NO
003	M	42	Vasovagal syncope	12	NO
004	M	44	Sinus arrest	1	NO

bradycardia after PFA delivery. Once the anatomical position was verified, further ablation was performed using radiofrequency energy. Additional consolidation lesions were applied from the right side of interatrial septum. The ablation was considered successful by the lack of vagal response after repeated PFA delivery at the initial position (**Figure 1**)[3].

Results: The PFA-guided CNA was performed in 4 patients. In 2 the indication was SND and in other 2 VVS. Acute endpoint was obtained in all patients. During the median follow up period of 12 months all patients remained symptom free (**Table 1**).

Conclusion: A PFA-guided CNA is a safe procedure with promising acute success rate and could be the treatment option for patients with pronounced drug-refractory cardioinhibitory reflex. Larger randomized studies are warranted to assess the procedural success rate and further optimize ablation strategy.

LITERATURE

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