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Editorial commentary: Pulmonary vein isolation in the age of 'single shot' devices

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During the last two decades, catheter ablation (CA) with pulmonary vein isolation (PVI) has emerged from an experimental procedure – performed at only a few specialized electrophysiology centers – into a routine and highly efficacious treatment for patients with atrial fibrillation (AF) [1]. The introduction of radiofrequency current (RFC) ablation in conjunction with 3D mapping was revolutionary and facilitated the understanding and treatment of cardiac arrhythmias. However, RFC ablation aiming at PVI demands a long learning curve and electrical reconnection of formerly isolated pulmonary veins (PVs) is a common finding in patients with repeat ablation for AF recurrence [2]. Therefore, 'single shot' devices have been designed allowing for PVI with only one energy application. This simplification resulted in short learning curves, short procedure times and a greater patient accessibility to AF ablation due to the increased number of centers performing CA [3]. The cryoballoon (CB) represents the most popular and by far best evaluated 'single shot' device.

It is within this context that Ciconte et al. [4] give a comprehensive overview of CB ablation highlighting initial steps, latest progress and future aspects. It is a particular strength of this article that the potential advantages of cryothermal energy as compared to RFC are presented in detail. Moreover, clinical outcomes according to different dosing strategies, i.e. fixed freeze cycle durations vs. time-to-isolation (TTI) guided CB ablation, are discussed. The authors emphasize the impact of a short TTI of targeted PVs and a low nadir temperature for lesions quality, and, thus, for durable PVI.

Although, data indicate that CB ablation is associated with a high durability of PVI [5], reconnection of the PVs is still a major issue [6,7]. The CB certainly represents a noteworthy development of CA for AF; however, efforts should be made to take the second step and ensure lasting PVI after the index ablation procedure without negatively affecting safety. Novel catheter designs with improved efficiency of energy delivery into the tissue might overcome this limitation and ensure durable transmural lesion formation.

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