Comparison of two commercially available cryoballoon ablation systems

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Background: Cryoballoon pulmonary vein isolation (PVI) is an established anatomical single-shot procedure for the treatment of atrial fibrillation (AF).

Purpose: We compared efficiency of two commercially available cryoballoon ablation systems (CBS) to treat AF.

Methods: We prospectively enrolled 121 consecutive AF patients and treated them with either a compliant or a non-compliant CBS.

Results: Evaluation of procedural characteristics revealed a significantly longer procedure duration ($p=0.007$) and fluoroscopy time ($p=0.008$) in the group of the compliant CBS. The nadir cryoballoon temperature was lower using the compliant system compared to the non-compliant CBS ($p<0.0001$), likewise the time to isolation was not different between both groups. The non-compliant CBS showed a better occlusion for the right superior pulmonary vein (RSPV, $p=0.039$) leading to a higher rate of isolation with first freeze ($p=0.004$) and lower number of ablations at the RSPV ($p=0.015$).

A mean follow-up period of 310.8±189.7 days within a 90-day blanking period. 68% of patients treated with the non-compliant and 65% of patients treated with the compliant CBS showed freedom from atrial arrhythmia recurrence ($p=0.724$). Kaplan-Meier estimation showed no significant difference between both groups (LogRank $p=0.768$).

Conclusion: The novel compliant CBS showed a longer procedure duration and fluoroscopy time, as well as, a lower nadir cryoballoon temperature. The non-compliant CBS was more effective in isolation of the RSPV. Acute PVI success and long-term freedom from atrial arrhythmia recurrence after a mean follow-up of ten months did not differ between groups.