

The Single-Big-Cryo-Balloon Technique for Pulmonary Vein Isolation in Paroxysmal Atrial Fibrillation

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Background: Cryothermal-energy (CTE) applied via a balloon catheter (Arctic Front, Cryocath™) represents a novel technology which may facilitate accomplishing the challenging endpoint of complete electrical pulmonary vein isolation (PVI). However, as in all balloon based PVI approaches, phrenic nerve (PN) injury remains a concern. Therefore, we pursued the „single big cryo-balloon technique“ deploying proximal (antral) CTE to (1) achieve complete electrical PVI and (2) avoid PN palsy in patients (pts) with paroxysmal atrial fibrillation (PAF).

Methods: After double transseptal punctures one lasso catheter and the big 28 mm Cryo-balloon catheter (10.5 F) using a steerable sheath (15F) were inserted into the left atrium (LA). PV angiographies and ostial lasso recordings from all PVs were obtained. Selective PV occlusion angiographies were used to evaluate balloon to LA-PV junction contact. One CTE freezing cycle lasted 300 seconds. To early identify PN injury, the PN was constantly paced (10 V, 2.9 ms) from the superior caval vein while applying energy at the right superior PV (RSPV). Follow up included weekly telephonic interviews, holter ECGs, office visits after 1, 3 and 6 months and additional daily tele ECG.

Results: Twenty-six pts (18 males, mean age: 56 ± 9 , LA size: 41.5 ± 5.2) with highly symptomatic paroxysmal atrial fibrillation (mean duration: 6.7 ± 5.8 years) despite antiarrhythmic drug therapy (3 ± 1) were included in this study. Complete electrical PV isolation was achieved in 93/95 PVs (98%) using exclusively the big balloon technique. Mean procedural-, balloon- and fluoroscopy-time were 239 ± 99 , 135 ± 66 , and 56 ± 22 min, respectively. One persistent PN palsy occurred due to an unanticipated ablation inside the RSPV (inner balloon defect). A total of 17 pts (62 %) remained in sinus rhythm during a mean follow up of 142 ± 114 days.

Conclusions: Using exclusively the “single big cryo-balloon” technique, the vast majority of all PVs (98%) can be electrically isolated resulting in an acceptable clinical success rate after one procedure. PN palsy is avoided as long ablation is performed at the proximal LA-PV junction.

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