Anatomical Predictors for Acute and Mid-Term Success of Cryoballoon Ablation of Atrial Fibrillation Using the 28 mm Balloon

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Anatomical Predictors for Acute and Mid-Term Success of Cryoballoon Ablation. Introduction: Cryoballoon (CB) pulmonary vein isolation (CB-PVI) for the treatment of paroxysmal atrial fibrillation (AF) has been demonstrated to be safe and reliable. Preprocedural patient selection to address the high variability in pulmonary vein (PV) anatomy may improve the acute and chronic success of CB-PVI. The purpose of this study was to identify anatomical predictors for CB-PVI failure using the 28 mm balloon. Methods and Results: We included 47 patients with paroxysmal AF undergoing CB-PVI with the 28 mm CB. Anatomical global left atrial and PV selective parameters were quantified from 3-dimensional reconstructed preprocedural computed tomography or magnetic resonance imaging data. The mean follow-up was 26 ± 9 months (range: 12-32 months). Multivariate logistic regression analysis revealed that a continuous sharp left lateral ridge between the left PVs and the left lateral appendage (OR, 7.09; 95% CI, 1.17-43.47) and a sharp carina between the left superior and left inferior PV (OR, 5.99; 95% CI, 1.33-27.03) predict acute and mid-term failure. For the right inferior PVs, a non-perpendicular angle between the axis of the PV and the ostial plane (OR, 6.33; 95% CI, 1.20-33.33) and an early branching PV with change in the axis angle (OR, 7.41; 95% CI, 1.44-38.46) were predictors of acute and mid-term failure. Conclusion: Anatomical variables preventing maximal heat transfer from the tissue to the CB could be identified as predictors for CB-PVI failure with the 28 mm balloon. These findings may be a step toward a more tailored ablation strategy based on individual anatomical variations. (J Cardiovasc Electrophysiol, Vol. 24, pp. 132-138, February 2013).