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Cryo vs RF p-wave Characteristics Comparative Analysis

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Introduction: Atrial fibrillation (AF) is the leading cause of stroke. Patients with drug-refractory AF are managed with Radiofrequency (RF) or Cryoballoon (Cryo) pulmonary vein isolation (PVI). Approximately 30% of PVIs result in AF recurrences. There is clinical utility in identifying patients at higher risk of AF recurrence with readily available ECG parameters.

Methods: This retrospective study analyzed the ECG characteristics and AF recurrence of 86 paroxysmal AF patients who underwent PVI. Baseline characteristics were collected by chart review and p-wave parameters were measured with electronic calipers in the MUSE (GE) ECG database. AF recurrence was defined as any documented atrial tachyarrhythmia. Statistical analyses performed in SPSS included t-tests and ROC curves to compare group means and to select parameter cutoffs to predict AF recurrence, respectively.

Results: There were no differences in % AF recurrences (Cryo: 26% vs RF: 37%; P = 0.25) or Δp-wave parameters (pre-PVI values - post-PVI values) except for ΔPwD(III) (Cryo: 11ms vs RF: -3ms; P = 0.023). Patients with AF recurrences had greater CHA_2DS_2-VASc scores (P = 0.014), Left atrial volume (P = 0.031), Pre-PR-intervals (P = 0.006), Pre-PwD(III) (P = 0.013),

Pre-PwD(V1) (P = 0.001), Pre-PwD(V2) (P = 0.02), Pre-PwD-terminal (P = 0.0002), Post-PR-intervals (P = 0.038), Post-PwD(III) (P = 0.002), and Post-PwD(aVF) (P = 0.009). Patients whose p-wave duration (PwD) increased in V1 were less likely to have a recurrence (P = 0.01). Pre-PwD(V1) > 120ms yielded a sensitivity of 68.4% and specificity of 67.6% for predicting AF recurrence.

Discussion: Cryo is non-inferior to RF regarding AF recurrence. This finding is further supported by similar PVI-induced Δp-wave parameters between the two modalities. Pre-PwD(V1), along with other parameters can be used in combination to reasonable predict recurrence and to guide clinical management of AF.