Electrocardiogram parameters predicting atrial fibrillation recurrence after radiofrequency catheter ablation

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Introduction: Prolonged PR interval is reported to be associated with atrial fibrillation (AF) recurrence after radiofrequency catheter ablation. However, other electrocardiogram parameters have not been identified. This study aims to identify the association between pre-ablation electrocardiogram parameters and AF recurrence following radiofrequency ablation.

Methods: Electronic medical records of 239 patients with AF (95 persistent and 144 paroxysmal AF), who underwent AF ablation (pulmonary vein isolation +/- linear ablation) at the Queen's Medical Center between September 2011 and March 2017, were retrospectively reviewed. Demographic data, AF recurrence, and pre-procedural 12-lead ECG parameters were obtained by independent investigators. Multivariate logistic regression was performed to explore an association between baseline ECG parameters and AF recurrence following ablation. Multivariate analysis was performed adjusting for age, gender, redo procedure, history of heart failure, PR interval, and heart rate.

Result: In a continuous model, increasing heart rate was independently associated with recurrence at 12 months (OR=1.037, 95% confidence interval 1.004 to 1.071, p=0.027). For every increase in heart beat per minute there was a 4% increased likelihood of atrial fibrillation recurrence. Increasing PR interval was also associated with recurrence at 12 months (OR=1.029, 95% confidence interval 1.007 to 1.053, p=0.012) or for every one millisecond increase of PR interval there was a 2.9% greater chance of atrial fibrillation recurrence. When PR interval and heart rate was categorized into 4 quartiles, increased PR interval and heart rate in each quartile were statistically associated with increased recurrence at 12 months (OR=2.041, 95% confidence interval 1.252 to 3.236, p=0.004 and OR=1.680, 95% confidence interval 1.061 to 2.661, p=0.029, respectively). Fragmented QRS, axis deviation, left ventricular hypertrophy, right ventricular hypertrophy, QRS interval, QTc interval, fascicular block, left bundle branch block, and right bundle branch block did not predict AF recurrence after radiofrequency catheter ablation.

Conclusion: Increased baseline heart rate and prolonged baseline PR interval could be prognostic factors to predict clinical recurrence of atrial fibrillation after pulmonary vein isolation. However, clinical benefits of this predictor remained unclear, warranting further studies.