A Transient Drop in Blood Pressure Upon Deflation After Cryoballoon Pulmonary Vein isolation Indicates Successful Ablation

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Introduction: Cryoballoon ablation is an effective method of pulmonary vein isolation as treatment for atrial fibrillation. Since continuous recording of pulmonary vein potentials is not always possible during Cryoballoon ablation, correlates are often relied upon to determine successful isolation. We noted that immediately upon deflation after ablation, vagal response, defined as a transient drop in blood pressure, would at times occur. Accordingly, we sought to determine if a vagal response was a reliable marker for successful cryoballoon ablation.

Methods: We recorded the drop in systolic blood pressure that occurred immediately after deflation of the balloon in 88 pulmonary veins (22 LSPV/22 LIPV/22 RIPV/22 RSPV) in 22 consecutive patients (11 M/11F), with mean age 70 (IQR 52-86) years. We tested if a vagal response, defined as a drop in blood pressure of >20mmHg, was correlated with gender, age, left atrial pressure, a specific pulmonary vein or nadir temperature (NT) of <-50 C (a measure of successful cryoballoon ablation).

Result: 151 applications of cryoballoon ablation were delivered to 88 pulmonary veins. All veins achieved isolation. Cryoballoon temperatures ranged from -35 C to -72 C (mean -53.3 C). Females experienced a vagal response more often than males (31/44 veins (71%) vs 21/44 veins (47%), p=.03). Older age was also associated with a vagal response (mean age with vagal response 72y vs. 67y, SEM 1.02, p=.03). The degree of drop in blood pressure (r=.187, p=.04), and nadir temperatures were associated with a vagal response. Specifically, balloon temperatures below -50 C correlated with achieving a vagal response (OR 2.45, p=.003), implying it was an accurate marker for pulmonary vein isolation success. There was no relationship between vagal response and left atrial pressure on a continuous scale (p=.211), or to superior vs. inferior PV (13/22 vs. 13/22, p=1.0) and left vs right PV (13/22 vs. 12/22, p=.67).

Conclusion: A transient drop in blood pressure upon deflation after cryoballoon ablation correlates with nadir temperature, especially if <\(-50^\circ\)C, indicating successful pulmonary vein isolation. Vagal response is more prevalent in females, and older age, but not related to left atrial pressure, and is not associated with any particular pulmonary vein.