

Electrogram Parameters (Injury Current, Amplitude and dV/dt) and Impedance are Poor Predictors of Electrode-Tissue Contact Force for Radiofrequency Ablation

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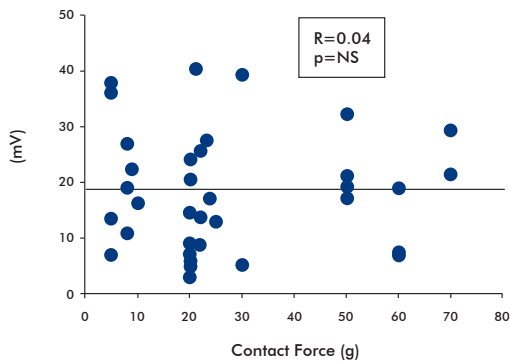
Introduction: Electrode-tissue contact force (CF) is an important determinant of RF lesion size and steam pop. Intracardiac electrogram (Eg) parameters (injury current, amplitude and dV/dt) and impedance have been used as indirect measures of CF. A novel catheter uses 3 optical fiber strain sensors to determine CF by measuring distal tip deformation (every 100 ms) with high resolution (<1 g). The purpose of this study was to determine the relationship between CF, Eg parameters and impedance in the canine heart.

Methods: 7 dogs were studied closed chest. A 7F catheter with 3.5mm electrode and contact sensor (Endosense SA) was positioned in right ventricle (RV) and left ventricle (LV) under fluoroscopy. The catheter was maneuvered in RV (18 sites) and LV (18 sites) to obtain a wide range of CF (5-70g, median 21.5g). Unfiltered unipolar (1-500 Hz) Eg were recorded from the tip electrode while measuring CF. Ventricular Eg amplitude (peak to peak) and dV/dt, injury current amplitude, and impedance were compared with CF.

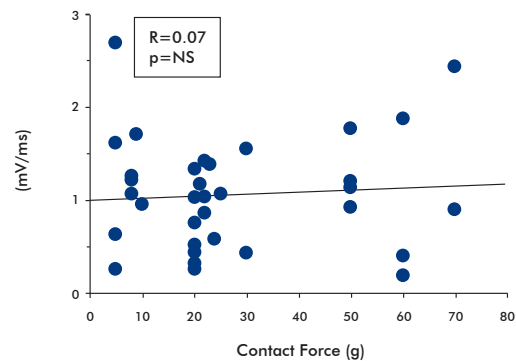
Results: There was no significant relationship between CF and ventricular Eg amplitude (Fig A) or dV/dt (Fig B) and only a weak relationship with injury current amplitude (Fig C). There was a large overlap in injury current amplitude between low (<10 g) and moderate (20-30g) CF and between moderate and high (>50g) CF. There was no significant relationship between CF and impedance (Fig D).

Conclusions: Intracardiac electrogram parameters (including injury current) and impedance are poor predictors of CF for RF ablation.

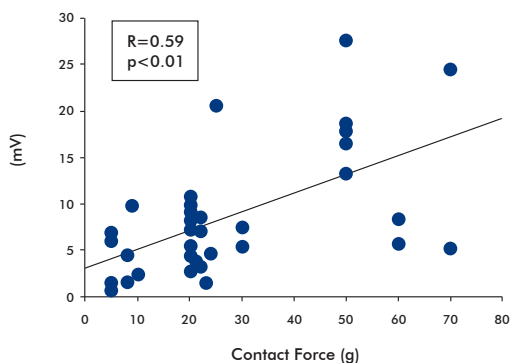
A. Ventricular Potential Amplitude



B. Ventricular Potential dV/dt



C. Injury Current Amplitude



D. Impedance

