

Catheter Contact Force during Human Right and Left Atrial Mapping in Humans

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Introduction: Electrode tissue contact is necessary for effective RF ablation. We compared operator estimated tissue contact in human atria with real-time contact force (CF) measurement using a new ablation catheter (TactiCath®, Endosense, Switzerland).

Methods: An 8 Fr open irrigated ablation catheter with a real-time (10 Hz) fibre-optic CF sensor (sensitivity 1g) was placed with subjectively judged good contact during arrhythmia, sinus rhythm, and atrial pacing (500 & 400 ms cycle length (CL)) in the right atrium (RA) of SVT patients (6 sites) and in the left atrium (LA) of AF patients (6 sites) by operators blinded to CF measurements.

Results: Eleven experienced operators evaluated 'good' contact in the RA in 20 patients and in the LA in 5 patients. Significant variations were observed for inter-operator ($p < 0.0001$ for RA & $p = 0.0033$ for LA), site-specific ($p = 0.0033$ for RA & $p = 0.0056$ for LA) and intra-operator CF (figure, Coefficient of Variation range 61,2-107.5g). RA CF was 12.6 ± 12 g, range 1-75g, and LA CF was 20.5 ± 18 g, range 1-91g. Higher CFs were observed at both RA and LA septum ($p = 0.0002$ & $p = 0.0028$ respectively) and with long sheath use ($p < 0.0001$). CL did not change CF significantly. Frequent (27 +/- 19 events) involuntary CF > 100g were observed in 6 / 7 patients during LA ablation and tamponade occurred at the end of one procedure (max CF 138 g).

Conclusions: Subjective good contact in the RA and LA produces catheter tip CF with wide inter-operator and site specific variations. Higher tip CFs were observed at the interatrial septum and with long sheath use. Catheter manipulation frequently produces involuntary CF over 100 g.

Force variation [g] -- RA -- all sites - all rhythms

