A New Era
in Contact Force Technology:
Safety, Efficacy, Efficiency
in VT Ablation

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NO CONFLICT OF INTEREST TO DECLARE
What do we need?

The ideal tool aims at improving efficacy, improving efficiency, and improving safety in VT ablation procedures.
The SmartTouch Catheter

- 8F Catheter, Monodirectional and Bidirectional (symmetric & asymmetric curves);
- Our preferred choice: Bidirectional D-F, F-J Curve
- With a 8.5F steerable introducer for TS approach
Importance of contact force (CF)

Mapping: internal points acquisition versus chamber distorsion (discrepancy with regard to the real anatomic chamber); role in VT mapping

Ablation: incomplete lesions versus risk of perforation (steam popping)
The SmartTouch Technology
What have we learned?

Contact Force Monitoring for Cardiac Mapping in Patients with Ventricular Tachycardia

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Contact Force for Ventricular Tachycardia Ablation. Background: Although the importance of contact force monitoring during mapping and ablation procedures is widely recognized, only indirect measurements have been validated.

Methods: Real-time force values were measured using the force-sensing catheter and electroanatomical mapping system from 27 chambers (13 LVs, 6 RVs, and 8 epicardial space) in 17 patients affected by ventricular tachycardia. Left ventricular mapping was performed by the transaortic approach in all patients and in 5 patients also by a transseptal approach with the aid of a deflectable sheath. All points were divided into 2 groups according to the presence of positive contact force during diastole: good and poor contact. The frequency of good contact and its impact on electrophysiological parameters such as signal amplitude, local impedance, and frequency of late potentials was evaluated. The best cut-off value to discriminate the 2 groups was calculated by a generalized linear mixed-effects model.

Results: Among all 5,926 points, 1,566 (26%) points were taken with poor contact. In healthy tissue, categorical increase of contact force caused the increase of unipolar and bipolar signal potential amplitude followed by plateau. The frequency of late potentials in the poor contact group was significantly lower when compared to the good contact group (11.9 vs 23.2%; P < 0.00001). The best cut-off force value to predict good contact during left ventricular endocardial and epicardial mappings was 9 g.

Conclusions: A combined transaortic and transseptal approach allows better endocardial contact during left ventricular mapping. Ventricular mapping with sufficient contact force produces better substrate characterization within pathological areas. (J Cardiovase Electrophysiol, Vol. 24, pp. 519-524, May 2013)

cardiomyopathy, catheter ablation, contact force, electroanatomic mapping, ventricular tachycardia
What have we learned?

Mizuno et al. Cardiovasc Electrophysiol 2013;24:519-24
What have we learned?
Good tactil feedback from the tissue

Good tactil feedback, but coming from the shaft of the catheter
Contact Efficiency: ablation
Contact Efficiency: epi-mapping
Safety issues

Safety issues

CF monitoring

Area tagged on ICE

Area tagged
Contact Force monitoring should be considered a marker of accuracy during mapping and ablation procedures: this seems particularly relevant in the setting of VT procedures depending on anatomy and substrate complexity.
Conclusions (II)

The possibility to monitor Contact Force and catheter positioning - also in conjunction with other technologies - has practical implications on procedural efficacy, efficiency and safety and should be considered a predictor of success, supporting the physician in the treatment of lifethreatening arrhythmias.
Characterization of Contact Force During Endocardial and Epicardial Ventricular Mapping

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Ventricular mapping demonstrates important regional variations in CF but in general, CF is higher endocardially than epicardially where poor catheter orientation is associated with higher CF. In the pericardium, the sole amount of applied force may be misleading and force orientation has to be carefully monitored. Endocardially lower CF is observed in the basal septum and basal anterior regions. However, a trans-septal approach may lead to improved contact, particularly in the apico-septal and inferior regions.