Ultra high-density mapping catheters in complex atrial arrhythmias

Steve Murray
Freeman Hospital Newcastle upon Tyne
Tips and tricks

• A surprising number of tachycardias are CTI dependent, even with a short BCL...

• ...and a rare number utilize both atria

• Therefore if tachycardia is leading in proximal CS start mapping in RA, and don’t bother with entrainment

• If it is peri-mitral breaking into RA passively, there will be a diffuse focal point often in CS and mid septum (Bachman’s bundle)
“Something about colour and breakout speeds...”
Fractionation and double-potentials

• Mark them by all means, but don’t worry about them

• Trust in *Rhythmia* to properly deal with them...
• ...analyse them ‘off line’ prior to ablation

• Once you have decided on a strategy, then you can entrain in the critical spots
Think about “substrate ablation” a la VT ablation

• Correlate voltage maps with proposed circuits
  • Again, the system is working at a much lower baseline for voltage then conventional mapping systems

• Triangulate all your EP data – LAT map, voltage map, track signals ‘off-line’ and the traditional signals if relevant

• Many cases just need a robust PVI!
Case example 1

• 59 year old lady
• DMII, treated hypertension
• Previous nMarque PVI with some relief of PAF, but palpitations re-emerged 9 months post procedure
• Redo with PVAC Gold
• Good symptom control for nearly 18 months, with recurrent regular tachycardias
Induction from proximal CS
• These signals were found in anterior wall of LA, heading towards LAA

• Note that across that area of the Orion basket approx. 250ms of the 270ms BCL are contained across these signals

• Would you a) mark them & continue mapping, b) burn them! Burn them now!!, or c) entrain from these sites?
As mapping continued, a site below these areas was associated with a ‘bump’ termination.
Re-induction attempts (230ms)
Case 2

• 43 year old female, referred from another centre, 3 previous ablations

• Previous Sinus mode modification for inappropriate sinus tachycardia

• Then developed a refractory tachycardia, arising from septum, resulting in CS mouth ablation, a cryo PVI and a CTI line over a 5 year period (using Carto)
Baseline ECG
BCL 280; Orion mapping
Fractionation signals
My “EP instinct” was that this was a gap in the crista terminalis
About 60ms ahead of surface P wave; not a very exciting signal per se though
Note the area of fractionation (left panel) is anterior to the focus (right panel) and probably passively activated (although we cannot rule out slow conduction into the epicardium and breaking back into endocardium)
Nothing inducible...
...down to 200ms
81 yr old male, 4 previous AF ablations for peAF (Birmingham QE live course – thanks lads...)
76 yr old male, 4 previous ablations (QE live course case 2)
23 yr old female; previous cryo PVI. Noted to be driven from RUPV with termination in past
After the lesion at that site, vein isolated
In summary, HD mapping allows

• Mapping > entrainment

• Conservative ablation strategies akin to osteal segmental ablations

• Less distraction from non-specific findings such as fractionation