Modern day ablation

Will Foster
Consultant Cardiologist and Electrophysiologist
What is ablation?

• Targeted destruction of tissue (usually to treat an arrhythmia)

• Uses a variety of modalities to induce cell damage / stress
  – Most involve delivering energy (heat, radiofrequency, electrical current, laser)
  – Also achieved by cooling to low temperature (cryoablation)

• First technologies not very targeted (eg DC ablation), now highly selective
Ablation catheters
Who needs an ablation?

• Patients with arrhythmias requiring control where creating lesions will achieve that

• There are risks so patient selection is important
  – Dangerous arrhythmias
  – Highly symptomatic arrhythmias
  – Less symptomatic arrhythmias but still unpleasant
  – Not dangerous and asymptomatic arrhythmias with other benefits to rhythm control
Access to ablation

• UK access to most cardiac treatments lags behind other developed nations
• Access to specialised cardiac services has historically been particularly poor
• Large regional variations; even the regional breakdowns don’t show the full picture
UK ablations 2007-2014

Fig 1: Ablations 2007-14

- Total Ablations
- Targets
Benefits of local services

• Patients have much better access to the service
  – Numbers go up
  – Waiting times go down
• Less travel for patients
• Added benefits – eg pacemakers, local expertise, better management
• Local hospital financial stability
• Professional pride
• Develop other staff groups
Disadvantages of local services

• Harder to maintain quality in a smaller centre
  – Safety concerns
  – Compliance with national standards
  – Less resourcing, eg out of hours care

• The solution – as always – is collaboration
Types of ablation

• For SVTs, the vast majority of operators will use a single ‘point-by-point’ catheter to ablate the target – eg slow pathway, accessory pathway, cavotricuspid isthmus

• For AF, there are 2 types of procedure – ‘point-by-point’ using 3D mapping systems, and using larger catheters designed to ablate a wider area of tissue with each application

• For other complex arrhythmias, 3D mapping / point by point is the main method
Outcomes for standard ablations

• For most ‘SVTs’, the arrhythmia is cured with a single low-risk procedure (eg 95% cured, 1% complication rate)
• For AF, the success rates vary from around 50% to up to 80% but a substantial minority of patients require more than one procedure and there are higher risks (eg 3-4%)
• Most patients with SVTs or atrial flutter should be offered an ablation
• Most patients with AF should try medication first
SVTs

Normal

SVT
SVT ablations

• Most are ‘AV node re-entry’ or accessory pathways
• Ablation involves Xray screening to show where the catheters are, combined with interpretation of the electrical signals to map the target for ablation.
• Typically takes about 1 – 2 hours to do
• Now done as a day case procedure in the vast majority of cases / centres
Types of SVT

Accessory pathway

AVNRT
Atrial fibrillation

- Most AF originates within pulmonary veins draining into the left atrium
- Electrical isolation of those veins can prevent AF
- Burning or freezing around those veins is the target of ablation
Cryoballoon
3D mapping of AF
Other arrhythmias

• Complex atrial tachycardias
• Ventricular tachycardia
• 3D mapping systems can now show the ‘substrate’ – ie the condition of the underlying heart cells; the activation pattern – ie the timing of the points in the circuit; and can annotate structures and where we have ablated
• Ablation catheters now give lots of information ... the electrical signals underneath, temperature achieved, contact force, and the direction of that force

• Complex arrhythmias are complex ... They require a sophisticated mapping system, expertise and patience ... Ablations can take many hours
More 3D mapping
Conclusions (1)

• We now have a huge variety of technologies available
  – Diagnostic catheters
  – Ablation catheters including contact force, irrigation, temperature regulation
  – 3D mapping systems
  – Macro catheters

• Ablation still requires patience and expertise
Conclusions (2)

- Local ablation services are vital for improving access and quality of care for our patients.
- Catheter ablation is usually a good option for most SVTs.
- Ablation is a good option for many AF patients.
- Catheter ablation can be useful for more complex arrhythmias.
- Our threshold for intervention is falling as new technologies and our experience develop.
Thank you for listening!

Any questions?