Typical Atrial Flutter

Matt Wright
St. Thomas’ Hospital
London

Heart Rhythm Congress
Birmingham, 2011
Typical Right Atrial Cavotricuspid Dependent Flutter

• A macro re-entrant arrhythmia
  – Anatomical barrier
  – Zone of slow conduction

• Typical CTI Dependent atrial flutter
  – Contained within the right atrium
  – Constrained anteriorly by the tricuspid valve
  – Constrained posteriorly by the crista terminalis and eustachian ridge
  – Travels in a counterclockwise direction around the atrium
Atrial Flutter
Atrial Flutter
Atrial Flutter: Activation Mapping
Atrial Flutter: Positioning Catheters
Atrial Flutter: Anatomy
Confirmation of Diagnosis

• Careful examination of the surface ECG

• If suspected:
  – low to high activation of septum
  – high to low activation of the lateral wall
  – CS activation proximal to distal, earlier than His A

• Entrainment
  – Two disparate sites within the circuit (PPI-TCL <30ms)
  – On the isthmus- concealed entrainment
Atrial Flutter: Lesion
Endpoint: Bidirectional Conduction Block

- After RF terminates atrial flutter conduction through the isthmus often persists.
- Conduction slowing often occurs before isthmus block.
  - Conduction slowing can be rate dependent.
- Recovery of conduction after initial isthmus block is common.

Differential Pacing

BLOCK

SLOW CONDUCTION

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Double Potentials

Tada JACC 2001;38:750
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Markers of Conduction Block

• increase in trans-isthmus conduction time
  ➢ differential pacing

• double potentials
  ➢ 100 - 110 ms interval between potentials
    • along entire ablation line
  ➢ differential pacing

• reversal of electrogram polarity on the opposite side of the ablation line from the pacing site

• change in p-wave morphology pacing lateral to the ablation line

Plateau

Rapid descent
Differential Pacing: Closer to Line

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Differential Pacing: On the line

RFd

130ms

RFp

CS 1-2

CS 3-4

190 ms
**Drug therapy vs first-line ablation for atrial flutter**

61 patients
> 1 episode of atrial flutter
no prior antiarrhythmic drug therapy

**Antiarrhythmic Drug Therapy**
- sotalol, amiodarone
- flecainide, procainamide, propafenone

**RF Ablation**
- > 90% reduction in electrogram amplitude along ablation line

<table>
<thead>
<tr>
<th></th>
<th>Drug therapy</th>
<th>RF Ablation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial Flutter Recurrence:</td>
<td>93%</td>
<td>6%</td>
</tr>
<tr>
<td>Atrial Fibrillation:</td>
<td>60%</td>
<td>29%</td>
</tr>
<tr>
<td>Sinus rhythm last f/u</td>
<td>36%</td>
<td>80%</td>
</tr>
</tbody>
</table>

mean follow-up: 22 months

Natale et al J Am Coll Cardiol 2000
Heart Rhythm Congress
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Results

- Meta-analysis of 10 year period (10719 pts)
  - Acute success rate of 91% and 88% (8mm vs irrigated)
  - Recurrence rates 9% with bidirectional block vs 24%
  - Atrial Fibrillation seen 34% patients during follow up
  - Previous AF 53%; new diagnosis 23%
Summary

- Catheter ablation is first line therapy for typical flutter
- It’s a macro-reentrant tachycardia
- Activation and entrainment manoeuvres are used to confirm the diagnosis
- Long term success rates > 90%
- Bidirectional block not termination of flutter is the endpoint
- Atrial Fibrillation seen 34% patients during follow up
Matt Wright MRCP PhD
Cardiac Electrophysiology

Rayne Institute
Department of Cardiology
St. Thomas' Hospital
Westminster Bridge Road
London
SE1 7EH
United Kingdom

cardiology unit email: matthew.wright@kcl.ac.uk
Atrial Flutter
Atrial Flutter
Atrial Flutter: Anatomy

- Normal
- Prominent Eustachian Ridge
- Sheath Use

Clockwise torque

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Atrial Flutter
Pitfalls Assessing Block

The Lower Loop

Crista

Lower loop reentry

Typical flutter

Pacing site

Pseudocondution

Pseudoblock

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