Ablating Ventricular Tachycardia when 12-lead ECG Localisation is Deceptive

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ROYAL BROMPTON HOSPITAL, LONDON, UK
Background

55 yo ♂

Dilated cardiomyopathy with LVEF 15-20% and LVEDD 75 mm

Primary prevention CRT-D since 2008

Comorbidities: Factor VII deficiency, Inflammatory bowel disease, CKD stage 3b

Medications: Bisoprolol 10 mg od, Candesartan 32 mg od, Spironolactone 50 mg od, Ivabradine 7.5 mg bd
Baseline ECG
Echo

Severely dilated LV
EF 15-20%

Mildly dilated LA and RA

Mild functional MR
Mild AR

Normal RV size with normal systolic function
Presentation

Admitted with recurrent shocks and ATP from CRT-D to local hospital

Transferred to Royal Brompton for VT ablation

Until transfer:

- Loaded with amiodarone
- Recommended mexiletine, but not available so started on lidocaine infusion peripherally
- Bisoprolol 10 mg od
EGMs
VT ablation

VT ablation performed under sedation, conversion GA as the case progressed
3D Mapping using Precision system and Advisor™ HD Grid Mapping Catheter
Ablation catheter: F/J curved irrigated tip “Tacticath Sensor Enabled”
Intially had endocardial approach with mapping of RV and LV endocardium
VT induced by pacing from RV apex with an 8 beat drive at 600 ms followed by an extrastimulus at 300 ms
Where is the exit site for this VT?

1. RV endocardium
2. RV epicardium
3. LV endocardium
4. LV epicardium
Algorithms to help localise VT


Vallès, Marchlinski. Circ Arrhythm Electrophysiol. 2010
Where is the exit site for this VT?

1. RV endocardium
2. RV epicardium
3. LV endocardium
4. LV epicardium
LV endocardium
Endocardial RV map in SR
RV Endocardium
Basal LV epicardium
Apical LV free wall epicardium
LV apex epicardium
Epicardial RV map in SR
RV free wall epicardium
Epicardial map of VT earliest activation found in RV
Coronary angiogram prior to RF application

VT epicardial propagation map
Ablation site – epicardial Surface of RV

Ablation sites:
- RV free wall
- Infero-septal basal aspect of LV

Endpoint:
No inducible VT
**Follow up – 4 m**

### Biventricular defibrillator

**Follow-up report**

<table>
<thead>
<tr>
<th>Royal Brompton and Harefield Trust</th>
<th><strong>Follow-up date:</strong> 2018 - 08 - 24</th>
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<tbody>
<tr>
<td><strong>Site:</strong> Royal Brompton</td>
<td>Performed by: Loren Deller</td>
</tr>
<tr>
<td><strong>Location:</strong> Device clinic</td>
<td><strong>Role:</strong></td>
</tr>
<tr>
<td><strong>Remote follow-up:</strong> Yes</td>
<td><strong>Next follow-up:</strong> 0018 - 11 - 13</td>
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### Patient:

<table>
<thead>
<tr>
<th>Date of birth:</th>
<th>Hospital number:</th>
<th>Sex: Male</th>
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<tbody>
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<td></td>
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<td>Consultant:</td>
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### RHYTHM:

- Pacing dependent: No
- V pacing during check: Yes
- Current un-paced ECG: Normal sinus rhythm
- Comments: Not previously dependent

### COMMENTS:

Scheduled remote transmission to assess arrhythmias.
- Presenting EGM: A paced, BIV paced @70ppm.
- Battery and leads trends stable.
- No AHR > 176bpm.
- No VHR > 140bpm.
- Histograms show spread 70-90bpm.
- Satisfactory download. FU booked for November.

### DEVICE:

- **Biventricular ICD**
- Implant date: 2013 - 08 - 19
- Model: Medtronic / Viva XT / DTBA2D1

### BATTERY:

- Status message: Intensify follow up
- Battery check summary: Approaching ERI
- Min estimated longevity: 9 months
- Voltage: 2.9V (ERI 2.73V)
Conclusion

1. The 12 lead ECG can be deceptive when trying to localise the exit site, despite what the algorithms say.

2. Always see what the QRS morphology looks like at termination if possible.

3. Always keep an open mind!
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- Increase visibility of Young EPs and boost their careers
- Provide up-to-date educational content to Young EPs
- Facilitate participation of Young EPs in congresses & EP events
- Create a Young EP exchange program

Who can join?

Electrophysiologists
- out of training ≤40 yrs
- >40 years old if <3 years out of training

https://www.escardio.org/The-ESC/ESC-Young-Community/Young-electrophysiologists