2015 ESC Guidelines
Catheter Ablation of Ventricular Tachycardia
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1. VT ablation in patients without overt structural heart disease

2. VT ablation in patients with scar-related heart disease
Idiopathic Ventricular Tachycardia/PVC

- **Outflow Tract ventricular tachycardias**
  - RVOT/LVOT/Coronary Cusps
  - Fascicular VT
  - Purkinje VT
  - Papillary muscle VT
Changing «Exit» RVOT/left coronary cusp during ablation

Pavlovic N et al, Heart Rhythm 2014;11:1495
PVC from the aortomitral continuity (AMC)
Follow-up: Holter monitoring

Pre-Ablation

Post-Ablation
<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Level&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Ref.&lt;sup&gt;c&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>Catheter ablation of RVOT VT/PVC is recommended in symptomatic patients and/or in patients with a failure of anti-arrhythmic drug therapy (e.g. beta-blocker) or in patients with a decline in LV function due to RVOT-PVC burden.</td>
<td>I</td>
<td>B</td>
<td>525–528</td>
</tr>
<tr>
<td>Treatment with sodium channel blockers (class IC agents) is recommended in LVOT/aortic cusp/epicardial VT/PVC symptomatic patients.</td>
<td>I</td>
<td>C</td>
<td>529–531</td>
</tr>
<tr>
<td>Catheter ablation of LVOT/aortic cusp/epicardial VT/PVC by experienced operators after failure of one or more sodium channel blockers (class IC agents) or in patients not wanting long-term anti-arrhythmic drug therapy should be considered in symptomatic patients.</td>
<td>IIa</td>
<td>B</td>
<td>195, 531–533</td>
</tr>
</tbody>
</table>
Ablation in idiopathic ventricular fibrillation

Fascicular PVCs can trigger VF

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<thead>
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<th>Level</th>
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<tr>
<td>ICD implantation is recommended in survivors of idiopathic VF.</td>
<td>I</td>
<td>B</td>
<td>154, 583</td>
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<td>Catheter ablation of PVCs triggering recurrent VF leading to ICD interventions is recommended when performed by experienced operators.</td>
<td>I</td>
<td>B</td>
<td>467, 584–587</td>
</tr>
<tr>
<td>Catheter ablation of PVCs leading to electrical storm is recommended when performed by experienced operators.</td>
<td>I</td>
<td>B</td>
<td>467, 584–587</td>
</tr>
</tbody>
</table>
Scar-related ventricular tachycardia

- Mechanism: Reentry
- Substrate: regions with slow conduction and fixed or functional conduction block

Courtesy of Dr. Bill Stevenson
Unsolved Issues
Scar-Related VT Ablation

1. VT is unmappable
   Hemodynamically unstable (50%)
   Non-inducible
   Morphology changes during entrainment mapping

2. Which/how many VT need to be ablated?
   Clinical VT only/all inducible VT/the whole substrate?

3. What is the correct substrate?

4. Problems with transmural energy delivery
   esp. septal VT, papillary muscle VT
Today’s Standard Substrate Based Ablation in Sinus Rhythm

Endocardial Substrate Maps

Ischaemic (post-MI)  Non-Ischaemic
Substrate Mapping for VT

Smaller electrodes and interelectrode spacing allow for much better spatial resolution.

3.5 mm tip and 1 mm ring

0.8 mm electrodes

Catheter ablation for the treatment of sustained monomorphic ventricular tachycardia

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<th>Level</th>
<th>Ref.</th>
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<tr>
<td>Urgent catheter ablation is recommended in patients with scar-related heart disease presenting with incessant VT or electrical storm.</td>
<td>I</td>
<td>B</td>
<td>183</td>
</tr>
<tr>
<td>Catheter ablation is recommended in patients with ischaemic heart disease and recurrent ICD shocks due to sustained VT.</td>
<td>I</td>
<td>B</td>
<td>184–186</td>
</tr>
<tr>
<td>Catheter ablation should be considered after a first episode of sustained VT in patients with ischaemic heart disease and an ICD.</td>
<td>IIa</td>
<td>B</td>
<td>184–186</td>
</tr>
</tbody>
</table>
Additional reasons to ablate PVCs in patients with structural heart disease

- Suspected PVC induced tachycardiomyopathy
- Symptoms (esp. if PVC is monomorphic)
- Inhibition of biventricular pacing in heart failure patients with implanted CRT
Ablation for recurrent VT in ischaemic CMP

- Multicenter study with 231 patients
- 53% free of VT p 6 mts
- Reduction of median # of VT
- Complications: 7%
- Procedural Mortality: 3%
- 1-year mortality: 18%

Stevenson WG, Circulation 2008;118:2773
Role of VT ablation in ICD recipients

2 RCT: ICD-implantation & ablation vs. ICD Implantation only in pts post- AMI and documented VT

SMASH-VT (128 pt) vs. VTACH (110 pt)

- Time to first VT 19 mts vs. 6 mts (VTACH)
- No mortality benefit
- Early ablation does not obviate an ICD

Reddy VY, NEJM, 2007;357:2657; Kuck KH, Lancet, 2010;375:31
VANISH Trial
Escalated AAD therapy versus ablation

- 259 ICD-patients with ischaemic cardiomyopathy and VT despite AAD
- Group A: Catheter Ablation (+ continued AAD)
- Group B: Escalated AAD (up to 300 mg amiodarone ± mexillitine)
- Composite primary endpoint: death, ≥ 3 VT/24 hrs, appropriate ICD shock

VANISH Trial
Escalated AAD therapy versus ablation

VT ablation only helpful in patients who were already on amiodarone

VT Ablation in Switzerland 2015

5’735 ablations overall

Structural VT 208 (3.6%)
Idiopathic VT 149 (2.6%)

60% performed in the top 3 centres
2015 ESC Guidelines  
Catheter Ablation of Ventricular Tachycardia

VT/PVC ablation in structurally normal heart

- Mainly symptomatic treatment
- Outflow tract VT/PVC most common form
- Ablation very safe and effective
- Ablation **class I** indication after failure of one AAD

Ablation of scar-related ventricular tachycardias

- Ablation does not replace an ICD!
- Indications for ablation
  - Incessant VT, electrical storm (**class I**)
  - Frequent ICD shocks (**class I**)
  - After first VT episode in ICD pts with ischaemic heart disease (class IIa)
- Must be performed in experienced centres (capable of epicardial access) and often is a «staged» procedure
PVC Reduction and Site of Origin

Zhong L et al, Heart Rhythm 2014;11:187
VES Ablation bei ischämischer CMP

15 Pt St. n. Infarkt

VES | Mittlere EF
---|---
22% | 38%
3%  | 51%

Sarrazin JF. Heart Rhythm 2009;6:1543