Tips and Tricks for VT ablation: Lessons from adult cases II: Stepwise approach to ablation

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## **Idiopathic VT**

Type of VT	QRS morphology/axis	Pharmacotherapy sensitivity	Entrainment	Treatment
RVOT VT and monomorphic extrasystoles	LBBB/inferior axis	Adenosine, β-blocker, verapamil (or diltiazem)	No	β-Blocker, verapamil, RF ablation
LVOT VT	S wave in Lead I, R-wave transition in V1 or V2	Adenosine, β-blocker, verapamil (or diltiazem)	No	β-Blocker, verapamil, RF ablation
ILVT, focal reentry	RBBB/left superior axis (exit, posterior fascicle); RBBB/right inferior axis (exit, anterior fascicle)	Verapamil	Yes	Verapamil, RF ablation
IPVT	RBBB or LBBB (monomorphic or polymorphic)	Propranolol	No	β-Blocker

# **Idiopathic VT – By origin**

- RVOTLVOTOthers:
  - Fascicular VT (Idiopathic LV VT)
  - RV/LV free wall / Septum
  - Epicardial
  - Tricusp/Mitral annulus VT

## **Differential diagnosis**











## **Clinical presentation**



## **RVOT vs. LVOT**

#### RVOT VT

Late transition ≥V3
Septal: QRS≤140, DII/III R, aVL QRS (-)
Free wall: QRS>140, DII/III RR'-Rr'

## LVOT VT

- Early transition V1-V2
- DIS wave
- S wave in V5/V6 infravalvular (otherwise supravalvular)



## Outflow Tract Tachycardia With R/S Transition in Lead $V_3$

Six Different Anatomic Approaches for Successful Ablation

Hildegard Tanner, MD, Gerhard Hindricks, MD, Petra Schirdewahn, MD, Richard Kobza, MD, Anja Dorszewski, MD, Christopher Piorkowski, MD, Jin-Hong Gerds-Li, MD, Hans Kottkamp, MD *Leipzig, Germany* 

OBJECTIVES	The aim of this study was to analyze different anatomic mapping approaches for successful
BACKGROUND	ablation of outflow tract tachycardia with K/S transition in lead $V_3$ . Idiopathic ventricular tachycardia can originate from different areas in the outflow tract, including the right and left ventricular endocardium, the epicardium, the pulmonary artery, and the aortic sinus of Valsalva. Although electrocardiographic criteria may be helpful in predicting the area of origin, sometimes the focus is complex to determine, especially when ORS transition is preserved in lead is in V
METHODS	We analyzed surface electrocardiograms of 33 successfully ablated patients with outflow tract tachycardia: 20 from the right ventricular outflow tract (RVOT) and 13 from different sites. The R/S transition was determined, and the different anatomic approaches needed for successful catheter ablation were studied.
RESULTS	Overall, R/S transition in lead $V_3$ was present in 19 (58%) of all patients. In these patients, mapping was started and successfully completed in the RVOT in 11 of 19 (58%) patients. The remaining eight patients with R/S transition in lead $V_3$ needed five additional anatomic accesses for successful ablation: from the left ventricular outflow tract (n = 3), aortic sinus of Valsalva (n = 2), coronary sinus (n = 1), the epicardium via pericardial puncture (n = 1), and the trunk of the pulmonary artery (n = 1), respectively.

**CONCLUSIONS** A R/S transition in lead  $V_3$  is common. In patients with outflow tract tachycardia with R/S transition in lead  $V_3$ , a stepwise endocardial and epicardial mapping through up to six anatomic approaches can lead to successful radiofrequency catheter ablation. (J Am Coll Cardiol 2005;45:418–23) © 2005 by the American College of Cardiology Foundation

50 mm/s





S wave in I and R transition in V1: aortic cusp
 S wave in V5 and V6: infravalvular



S wave in I and R transition in V3: aortic cusp
No S wave in V5 and V6 : supravalvular origin

## Finding the right ablation spot!

Activation Mapping Pace-Mapping Electroanatomic mapping ◆ CARTO EnSite-Navx

Non-contact mapping (EnSite-baloon): Not possible in LVOT VT !

## **RFA-Practical guide**

#### VT induction

- Programmed ventricular stimulation
- **Burst** pacing
- **Drugs: isuprel, alupent, dobutamine**

## **RFA-Practical guide**

## Mapping

- □ Activation mapping during VT
- PVC mapping
- If we are definitely sure about LVOT origin, we start mapping the aortic cusp first.
- If we are not definitely sure about LV origin, we first map in the right site (RVOT, PA, ParaHisian)
- If there is no early activation in the right site, than we move to the left side
- If there is no early activation in the right and left site, there is ablation failure or relapse consider epicardial mapping

## **RFA-Practical guide**

## Ablation at the aortic cusp

- Less power (Max 30 watts)
- Lower heat (Max 55-60 C)
- **Gamma** Fewer RF application
- **Cryo energy may be preferred?** 
  - **Better stability**
  - Less endothelial damage
  - □ Less coagulum
  - **More precise lesion border**

#### VT

#### Activation mapping at the LCC

#### Pacemapping at the LCC

















REVIEW Page#: 3 16:24:47 Baseline







REVIEW Page#: 3 16:27:31 Baseline





28 years old female with long history of palpitation
P.exam: Normal except irregular pulse
ECG: Outflow tract PVC
Echocardiography: Normal
Exersize test: Normal, No VT
Holter: Frequent PVC



























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- 76 years old male
- Have VDD pacemaker for complete AV block
- ECG: Wide QRS complex tachcardia with supeiro axis and QRS pattern (Baseline ECG: AF and complet AV block, %100 V pacing)
- EKO: LV normal
- KAG: Normal





