

# Catheter Ablation of VT in Structural Heart Disease

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# Structural Heart Disease

- Myocardial infarction
- Dilated cardiomyopathy
- Arrhythmogenic right ventricular dysplasia

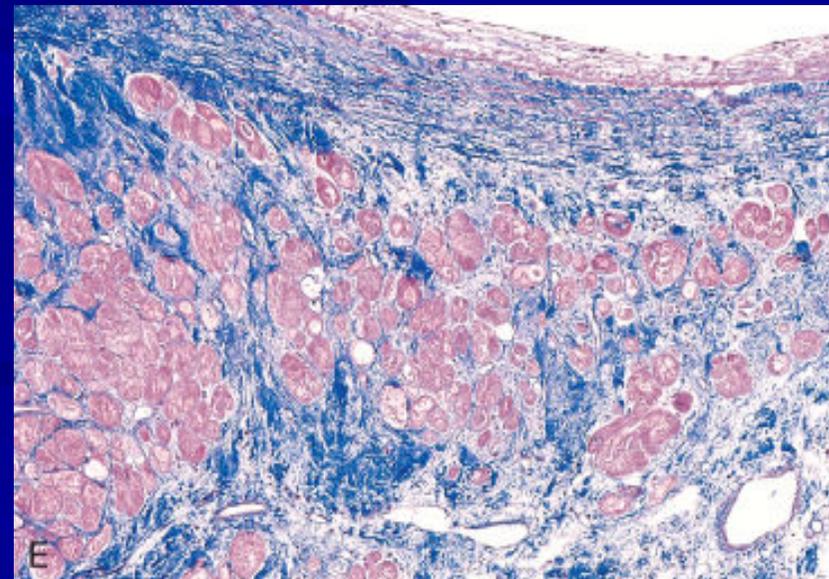
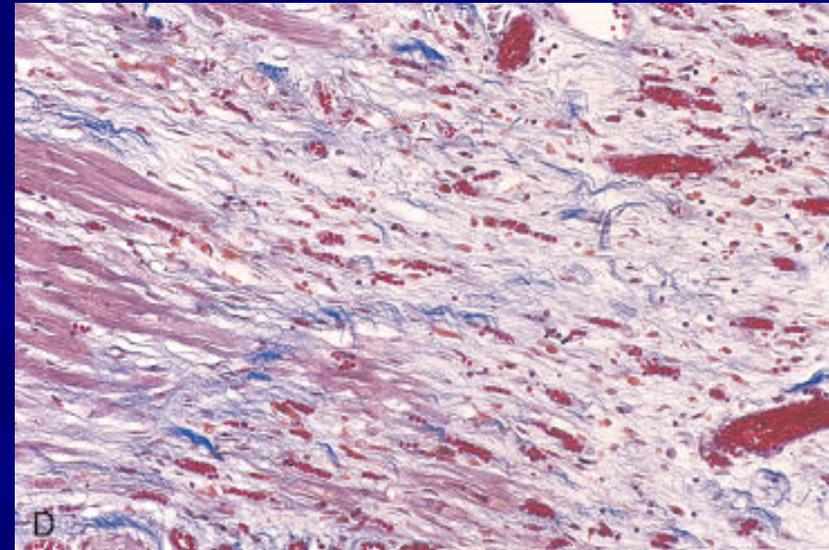
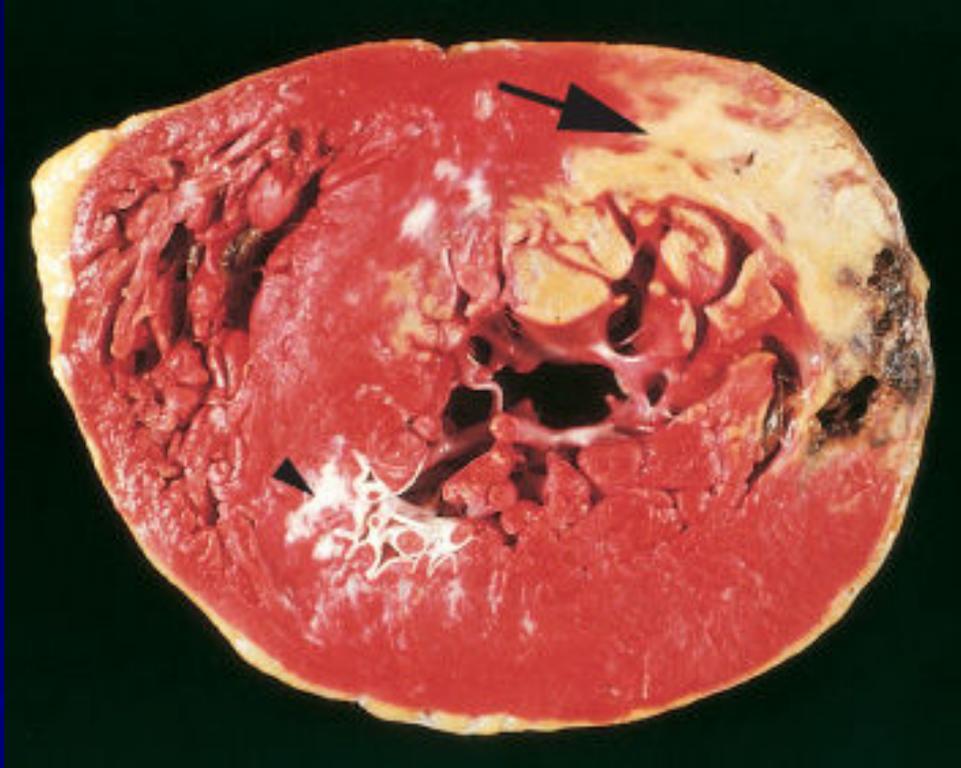
# VT after MI - Patients Selection

- Patients with symptomatic sustained VT
  - VT is drug resistant
  - Patient is drug intolerant or does not desire long-term drug therapy
  - Patient receiving multiple ICD shocks not manageable by reprogramming or concomitant drug therapy

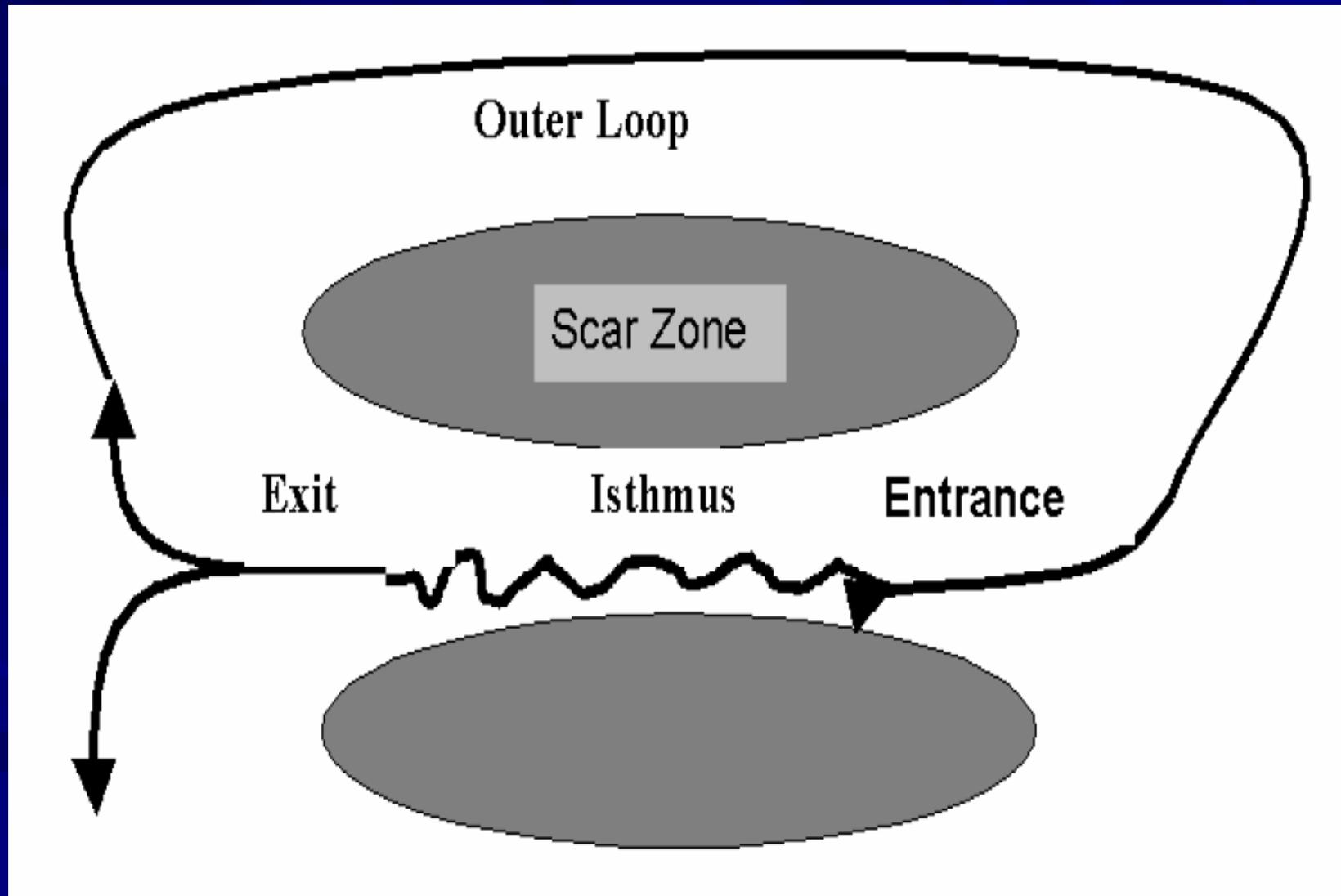
# Preparation Prior to Ablation

- Assessment of reversible ischemia
- Determination of LV function and reserve
- Anticoagulation status
- Exclusion of LV thrombus
- Evaluation of peripheral pulses
- Neurologic examination
- Details of antiarrhythmic therapy
- 12-lead ECGs and ICD recordings during VT

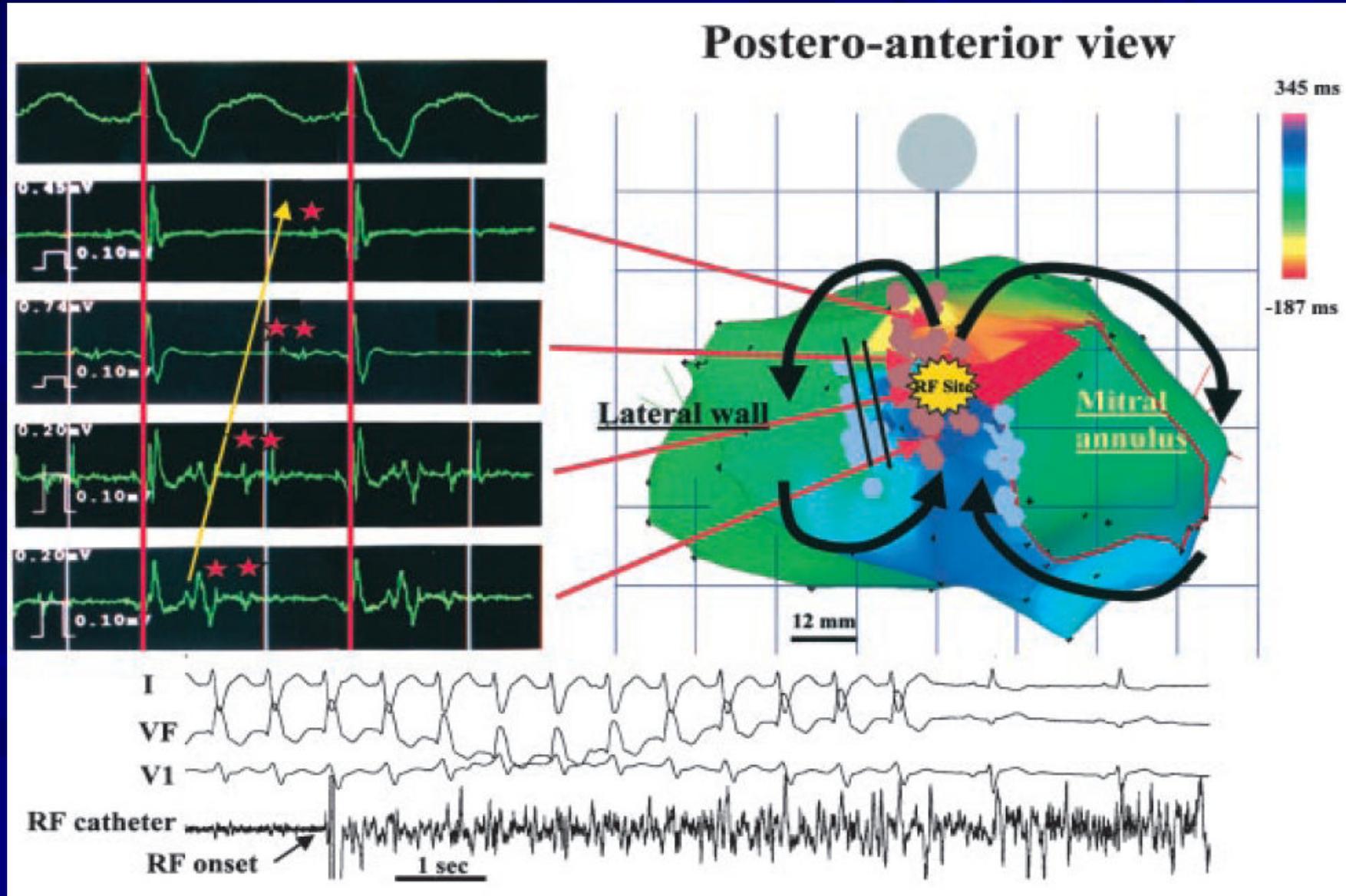
# Macro/Microscopic Findings of MI



# VT after Myocardial Infarction



# Illustration of figure-8 VT circuit



# Mapping Techniques

- Mapping during VT
  - Define a reentry circuit isthmus for ablation
  - Early systolic activity/diastolic potentials
  - Entrainment mapping
- Mapping during sinus rhythm
  - Unstable or noninducible VT
  - Delineate the anatomic and electrophysiological substrate
  - Pacemapping: define potential exit sites along the border of any-low voltage area
- Newer mapping tools
  - CARTO
  - Ensite

# Mapping Criteria

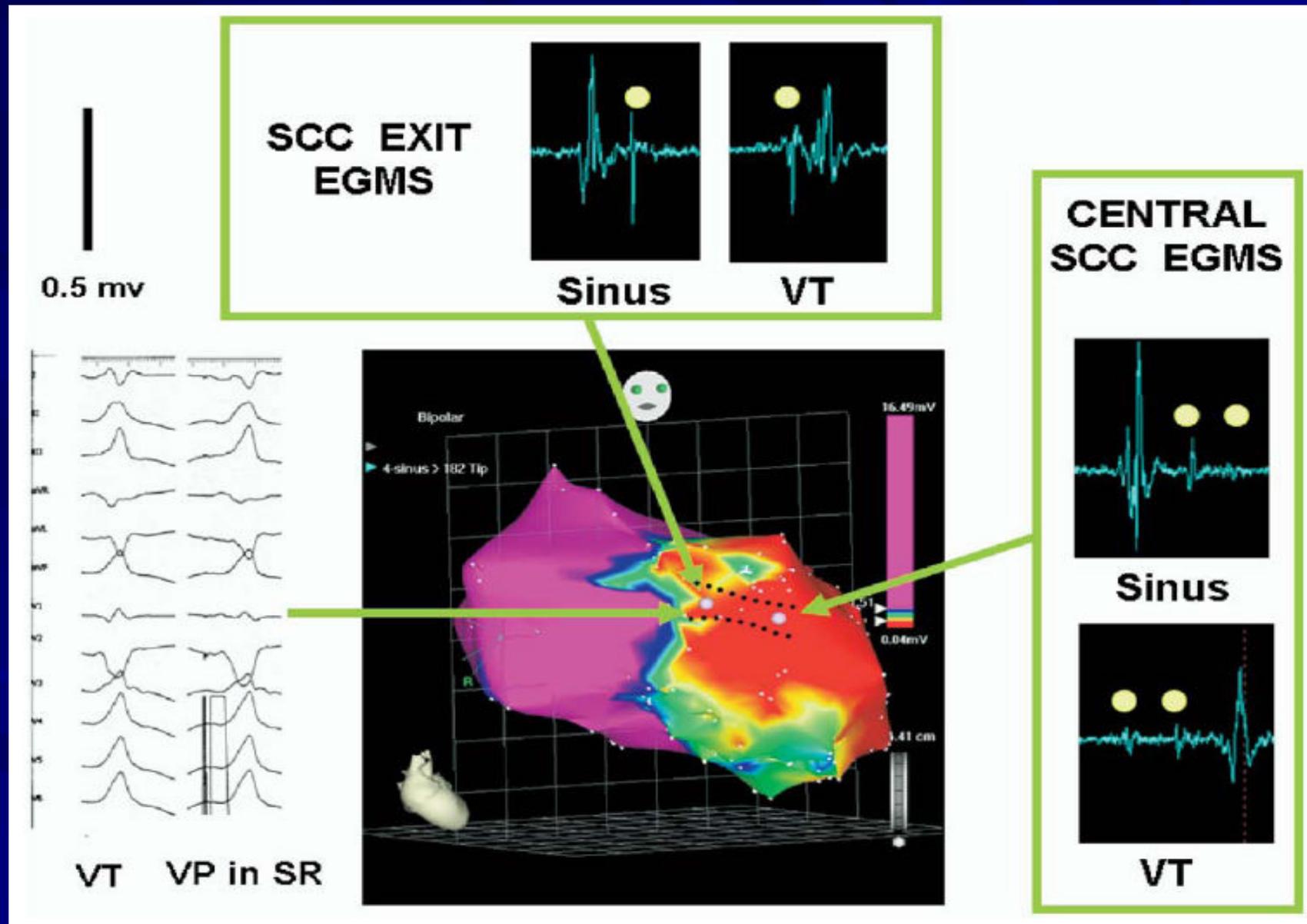
## ■ Standard mapping

- Fragmented DP recorded during VT
- Stim-QRS interval during pacing = DP-QRS interval during VT
- Pre-systolic DP timed  $<70\%$  of VT CL before QRS onset
- Entrainment with concealed fusion
- PPI = VT CL

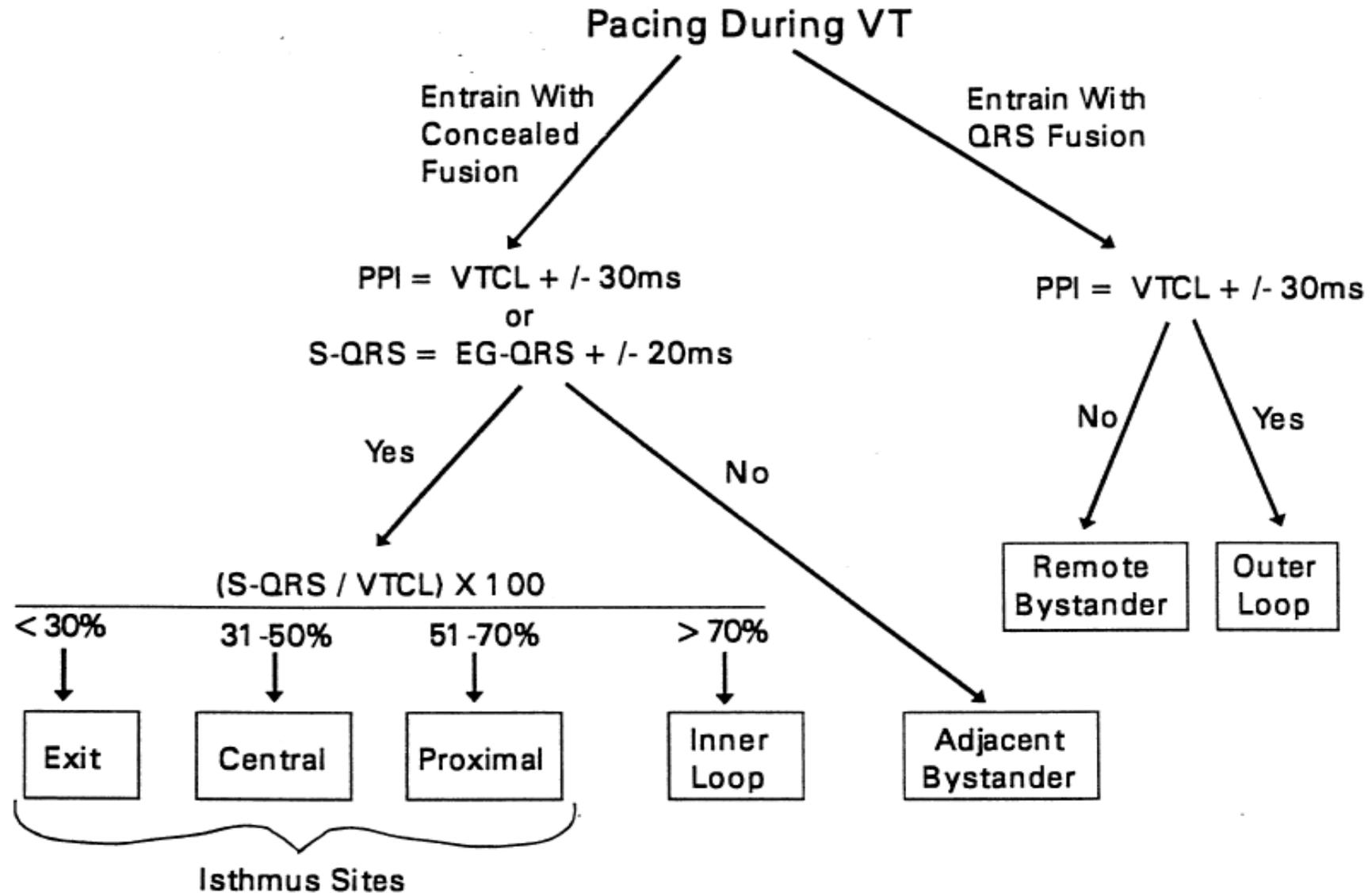
## ■ Anatomic mapping

- Site is within area of low voltage endocardial scar
- Isolated DP recorded during SR or VT
- Site is bounded by electrically unexcitable tissue
- Long Stim-QRS delay evident during pacing
- Pace map matches VT QRS morphology

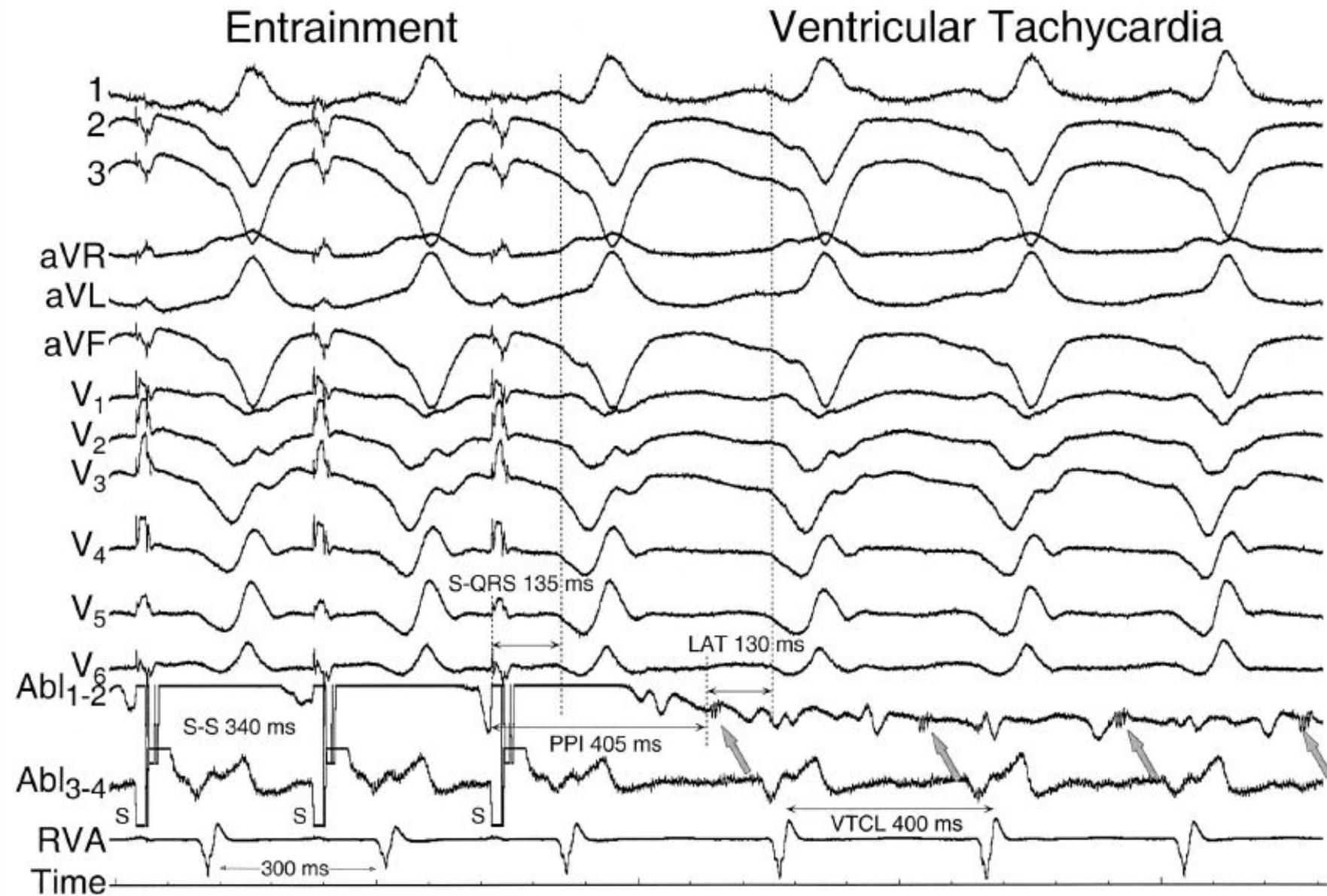
# Low Amplitude Diastolic Potentials



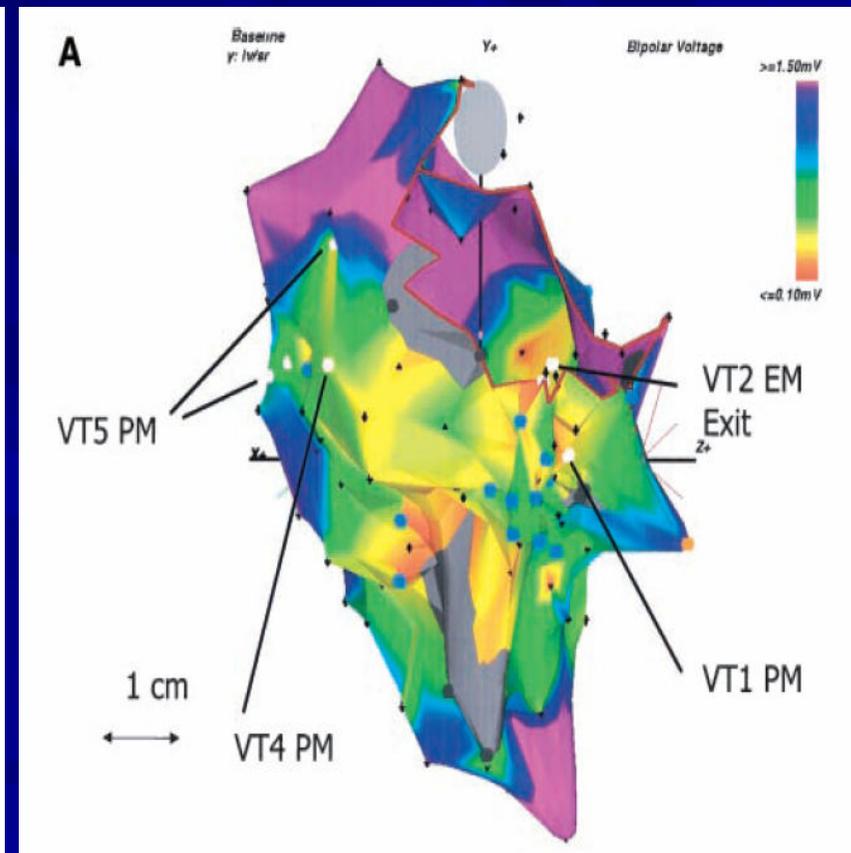
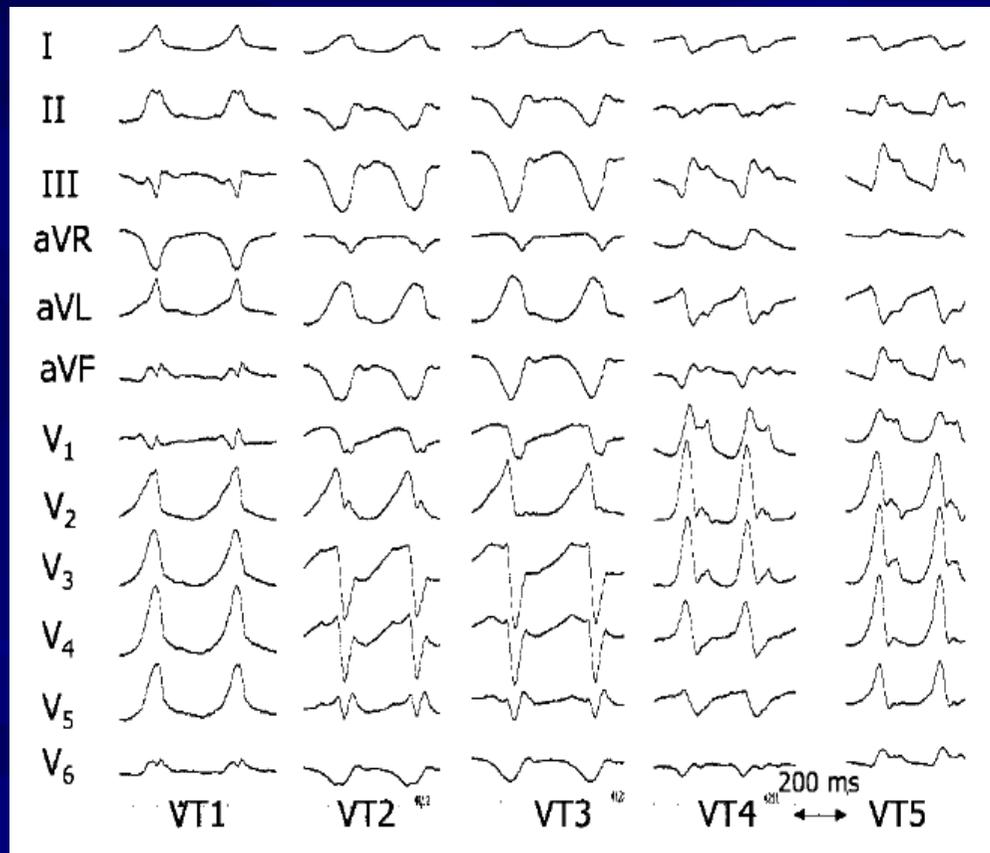
# Mapping during VT



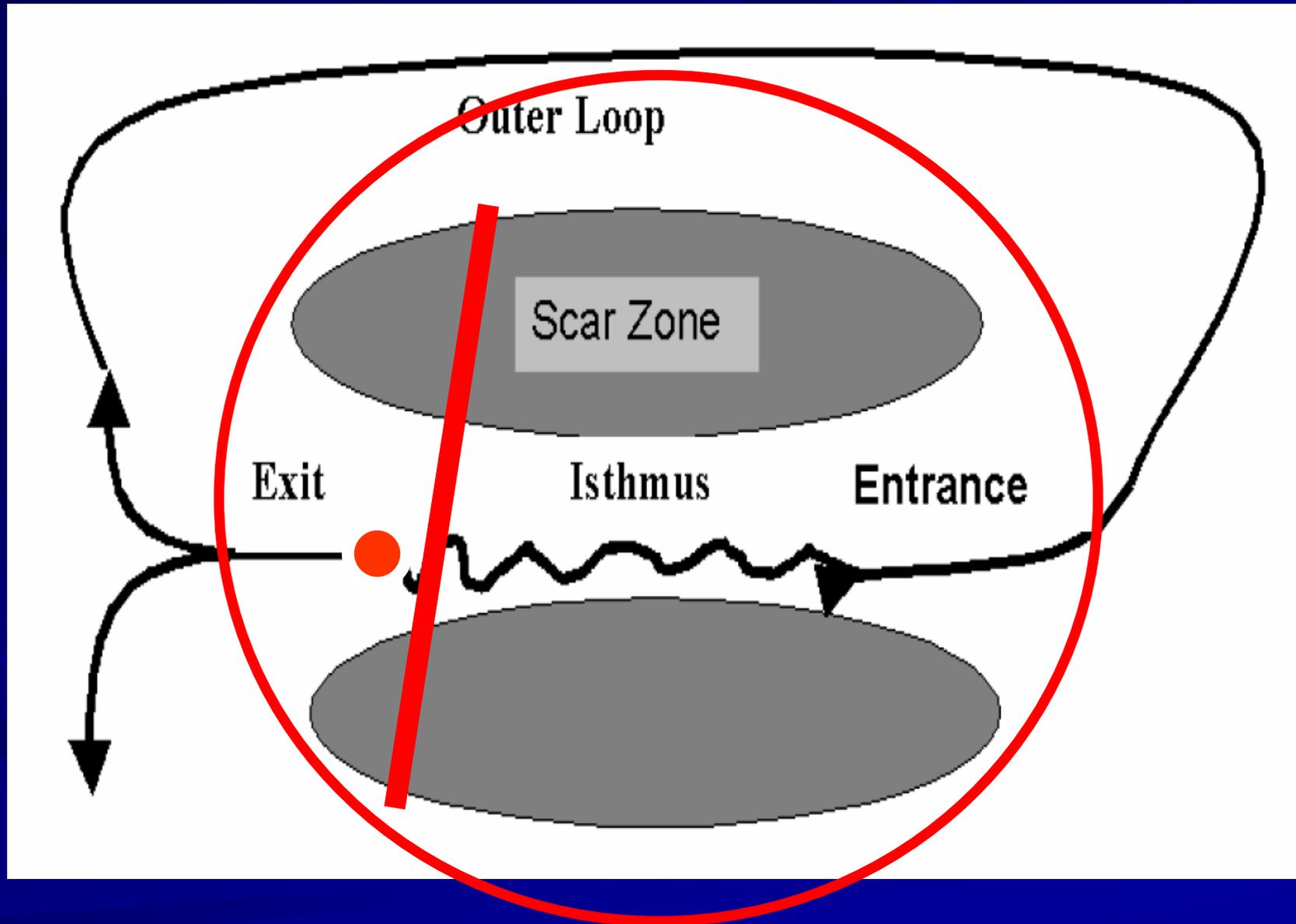
# Ideal Site



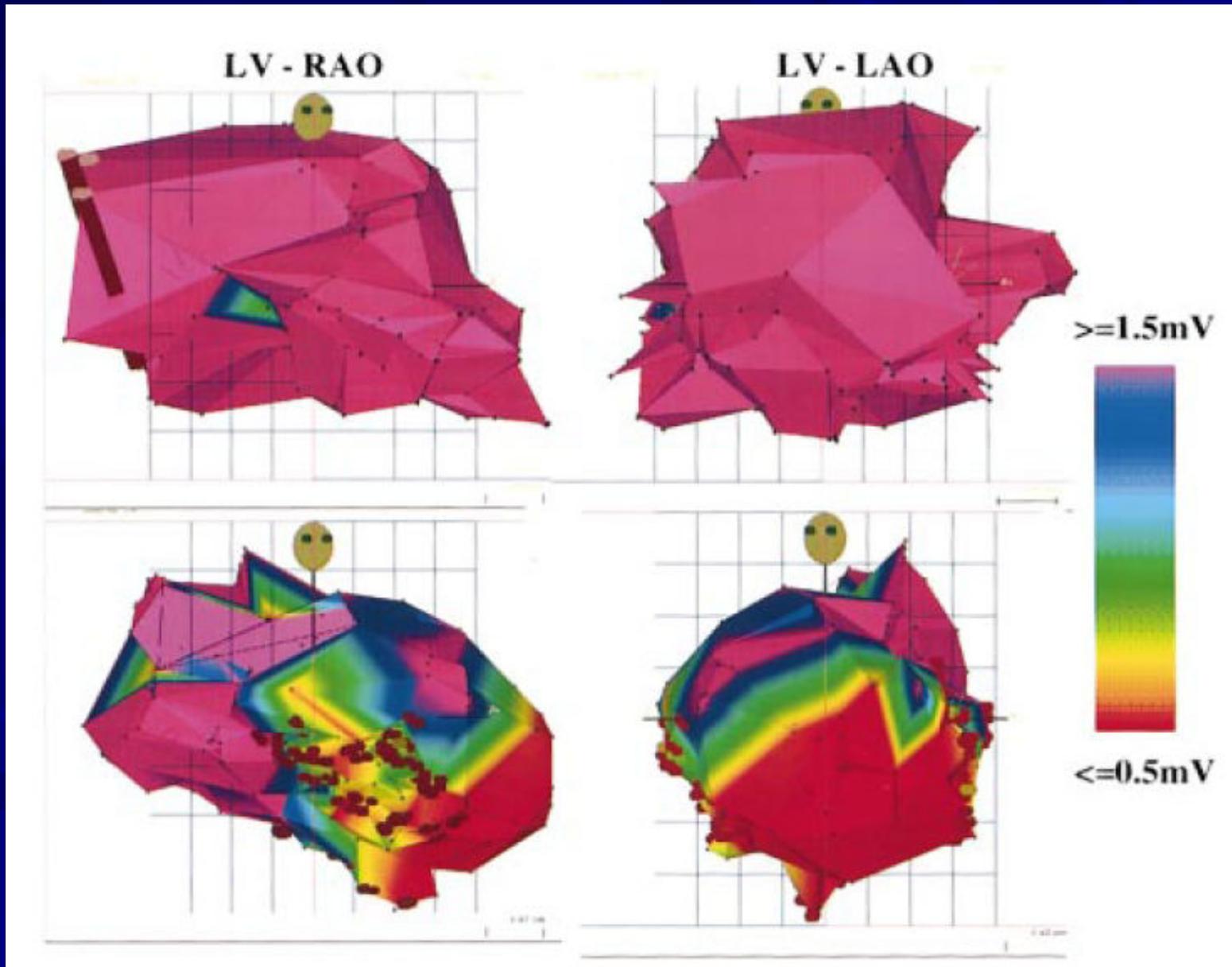
# 73-year-old women with old inferior MI and recurrent VT



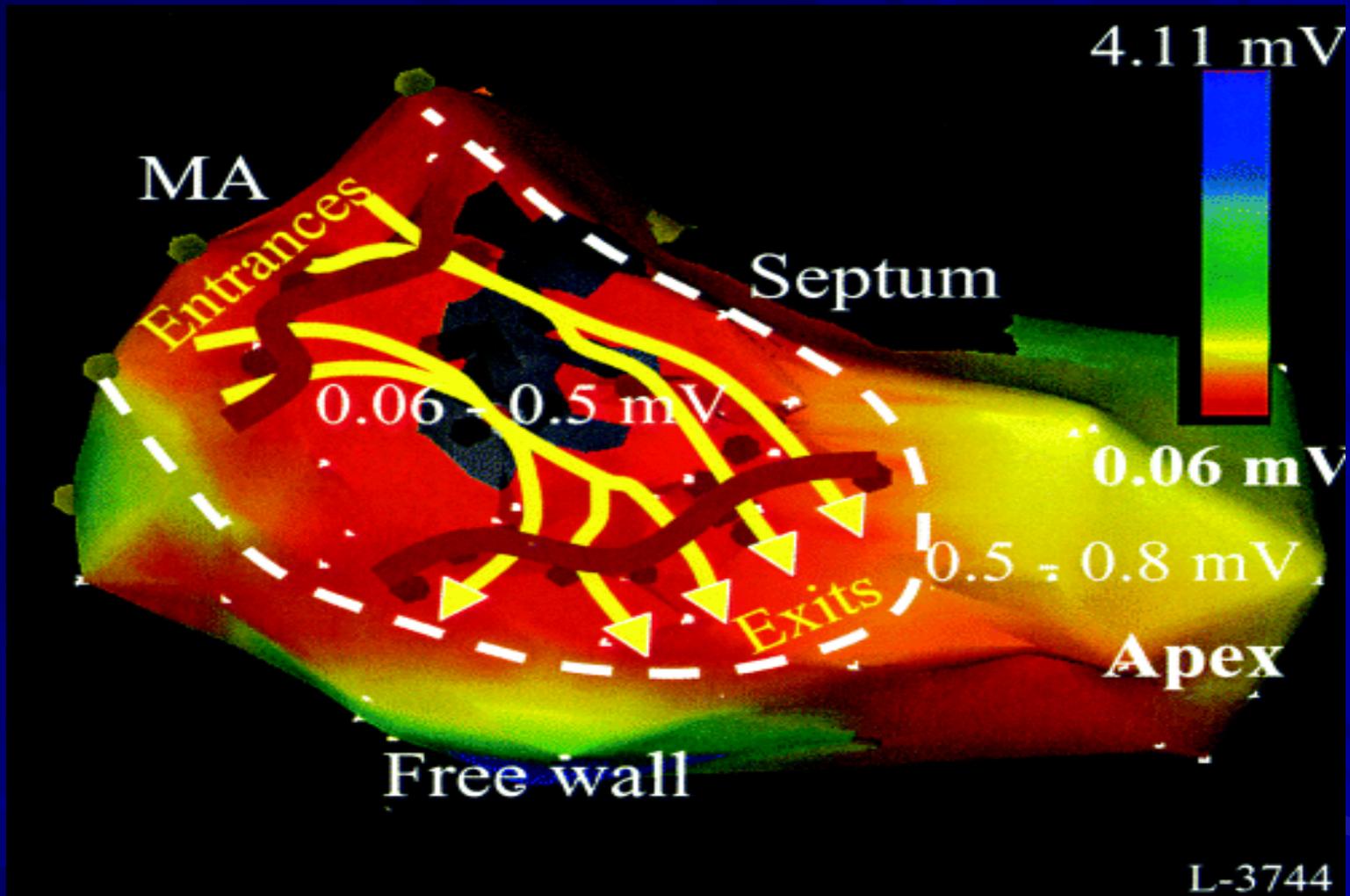
# Ablation Techniques



# Infarct Localization and Linear Ablation



# Isthmus and Linear Ablation

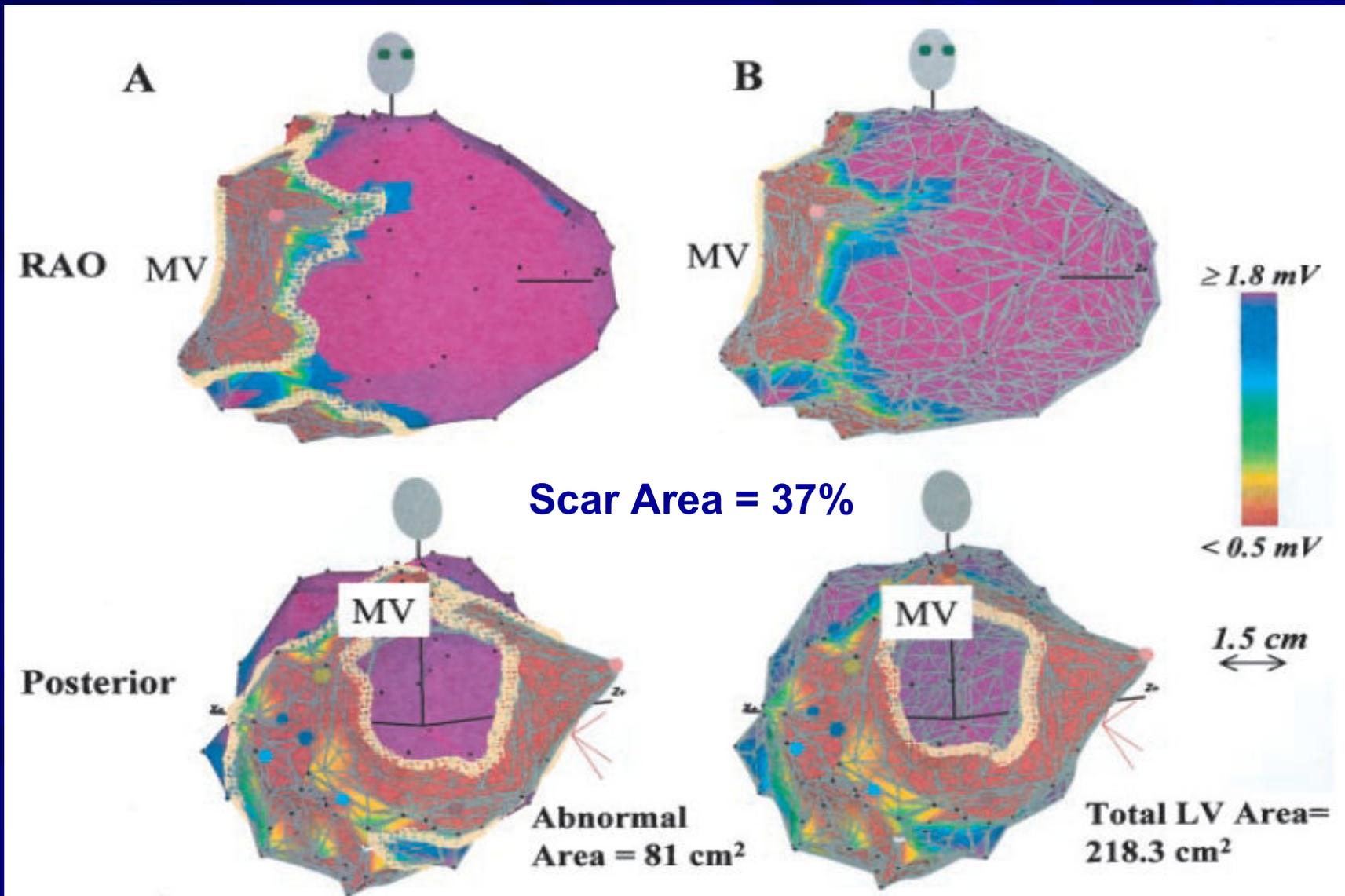


**Isthmus Width =  $16 \pm 8$  (6-36) mm** Circulation 125:726,2002

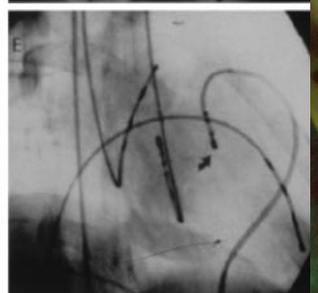
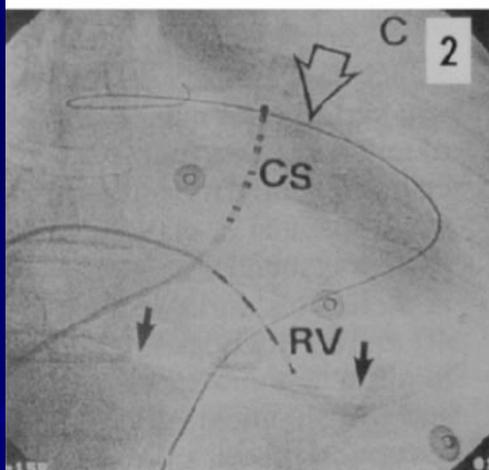
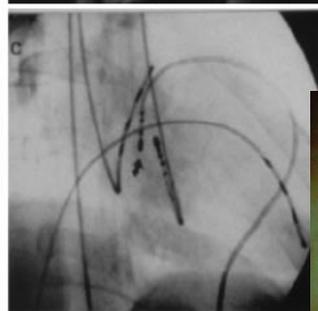
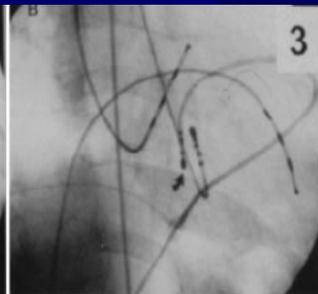
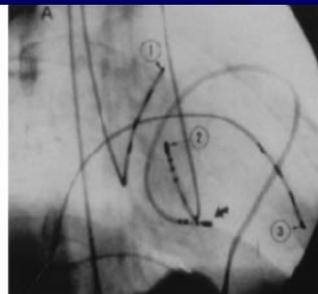
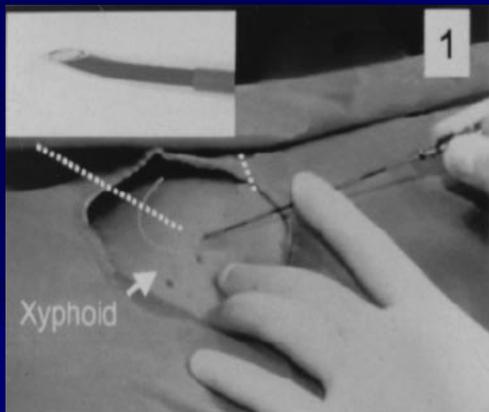
# VT in Dilated Cardiomyopathy

- Mechanism: JCE 2000;11:11-17
  - Reentry associated with scar: 62%
  - Focal: 27%
  - Bundle branch reentry: 17%
- Scar: JACC 43;1834,2004
  - Often adjacent to a valve annulus
  - Deep to the endocardium, transmural, epicardial

# Endocardial Abnormality in DCM



# Epicardial ablation of VT

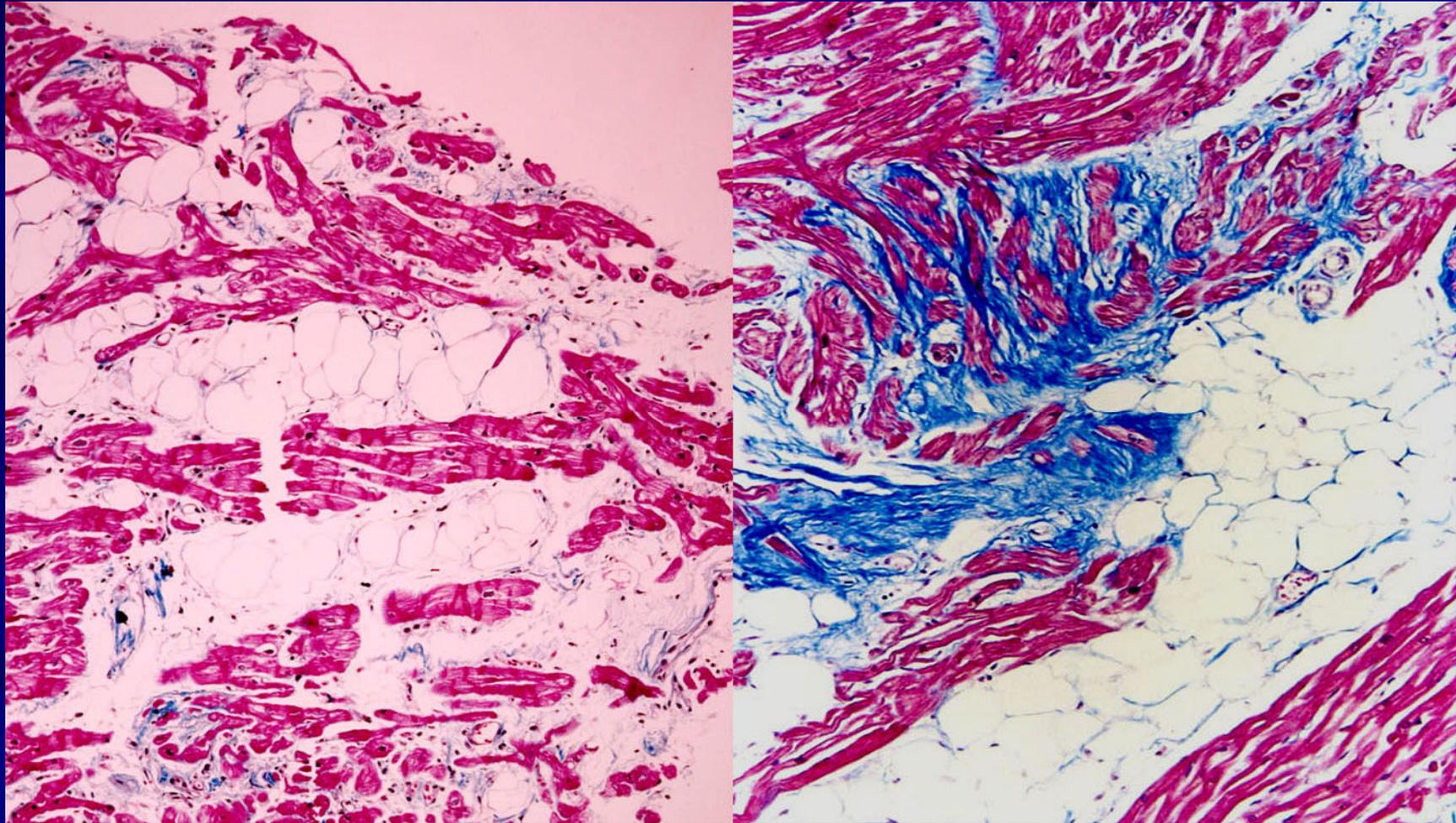


# Epicardial ablation of VT: When?

- Patient with LV thrombus
  - Patient with prosthetic valve
  - Other vascular access problem
  - Endocardial failure
- 
- Possible damage to coronary artery & phrenic nerve

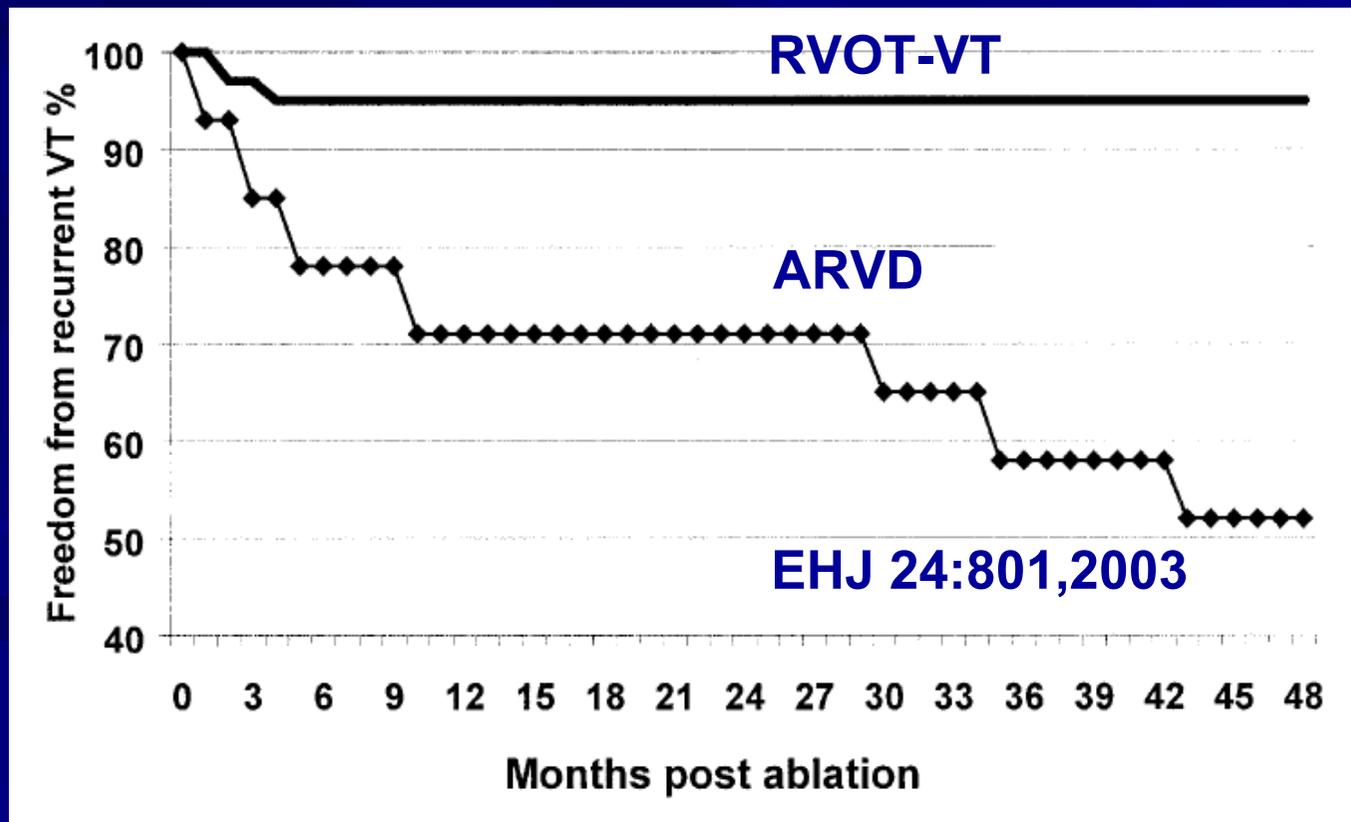
# Arrhythmogenic RV Dyspalsia

- Progressive fibrofatty infiltration of myocardium



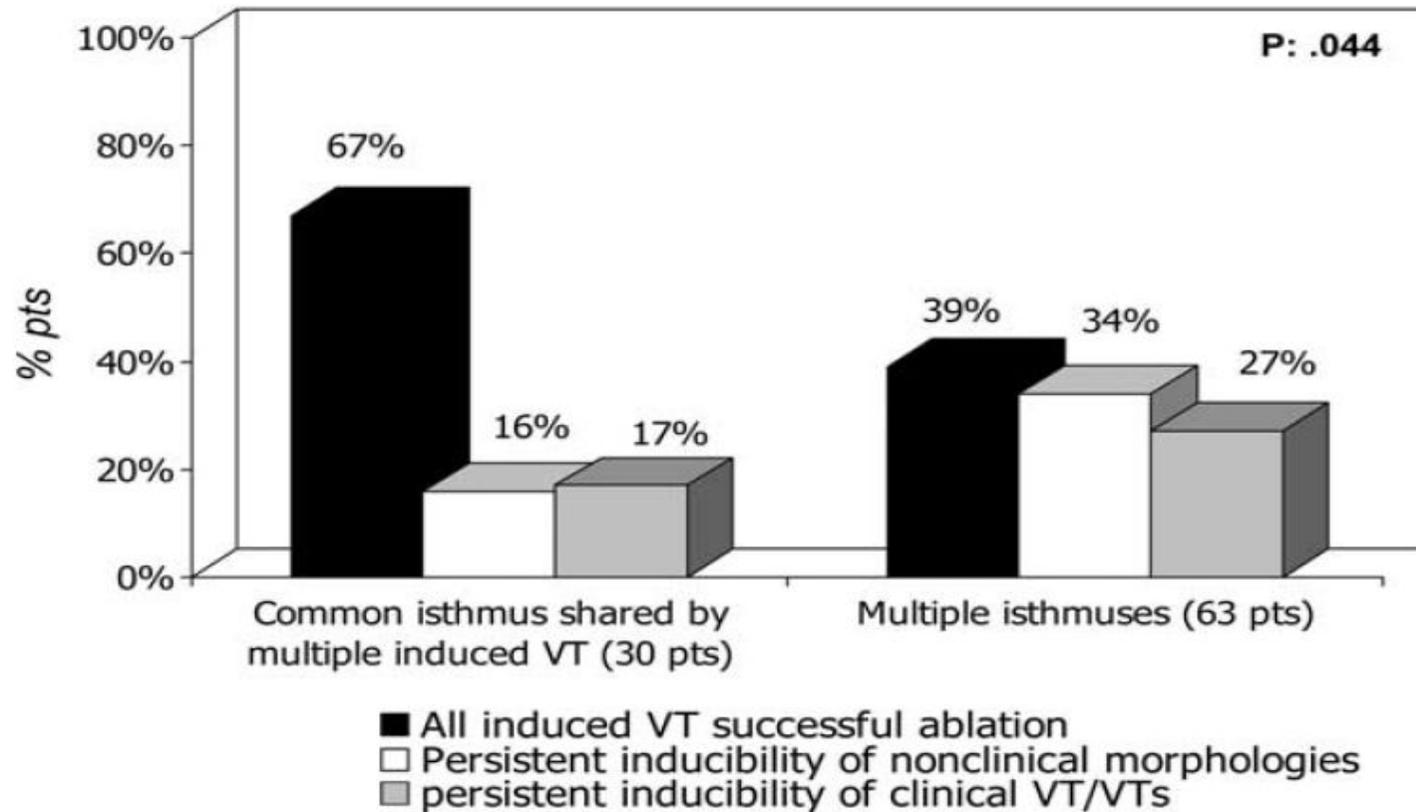
# VT Ablation in Patients with ARVD

- Reentry in over 80%
- Ablation was complete or partial success in 71%
- VT recurred in 48%



# Success Rate

- C
- F
- N
- M
- CU



# Complications

- Vascular injuries (hematoma, pseudoaneurysm, fistula): <3%
- Cardiac perforation/tamponade: <0.5%
- Neurologic events (embolic or hemorrhagic stroke): <2.8%
- MI or death: very rare
- Increased creatine kinase/troponin: in most
- Heart block
- Possible dislodgement of defibrillator leads
- Possible aggravation of heart failure
- Pericarditis: in epicardial ablation

# Conclusions

- ICDs are first-line therapy for patients with VT and SHD.
- When antiarrhythmic drug therapy fails to control symptomatic recurrences of VT, catheter ablation should be considered.
- Elimination of recurrent or incessant VT leading to repeated ICD therapies is the anticipated outcome.
- Long term VT elimination is achievable in up to two-thirds who have mappable or unmappable VT.