

Catheter Ablation of VT in Structural Heart Disease

경북의대 조용근

Structural Heart Disease

- Myocardial infarction
- Dilated cardiomyopathy
- Arrhythmogenic right ventricular dysplasia

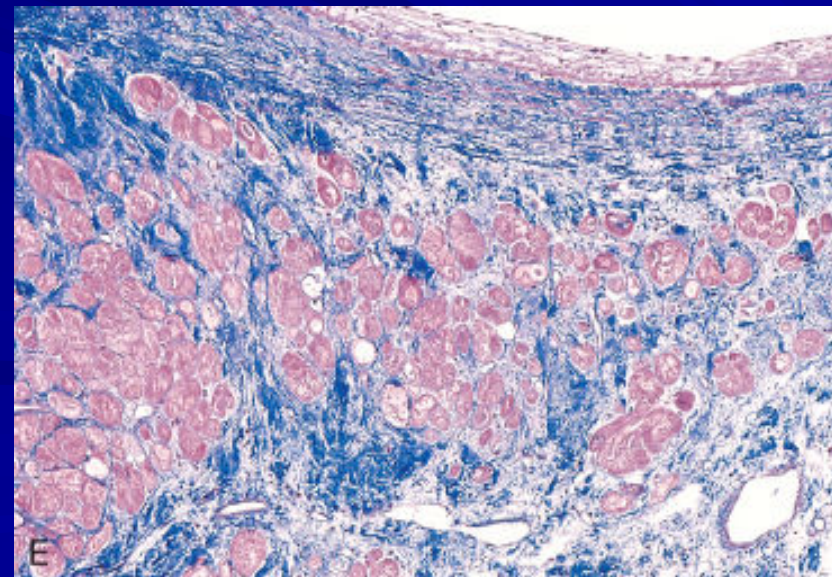
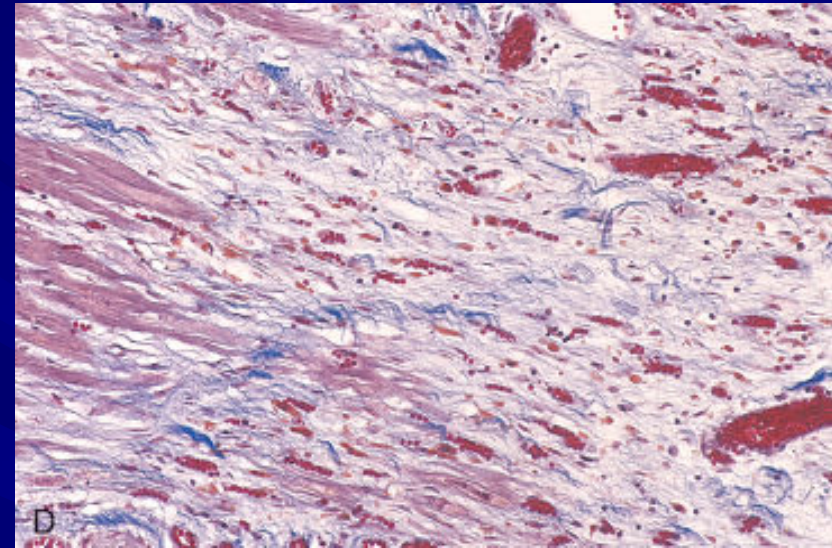
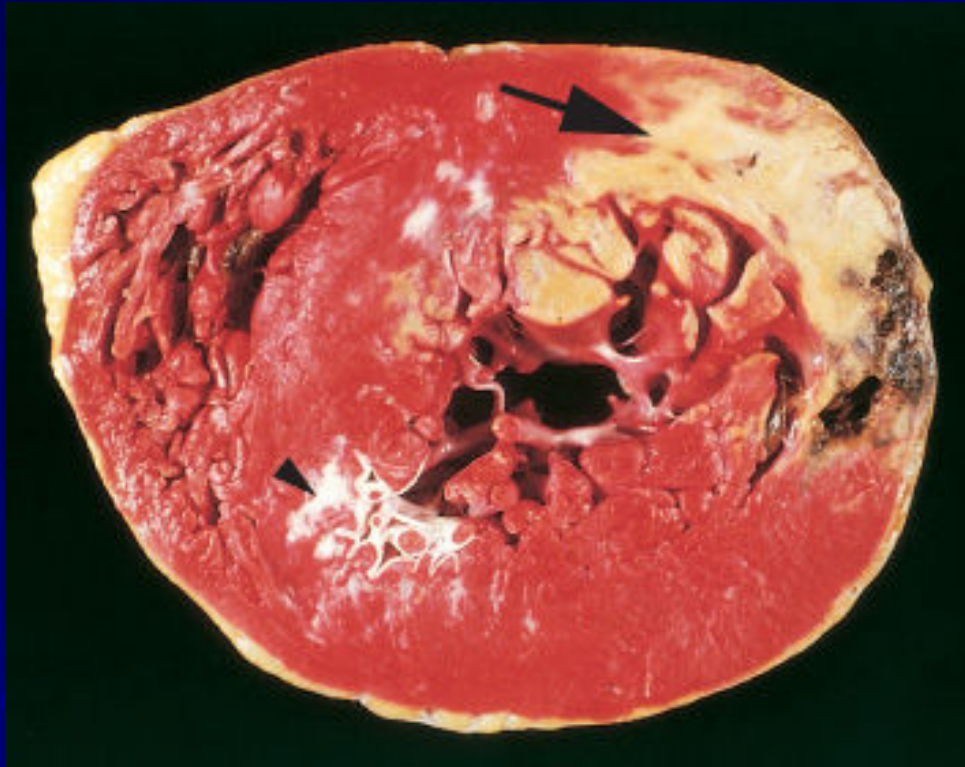
VT after MI - Patients Selection

- 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

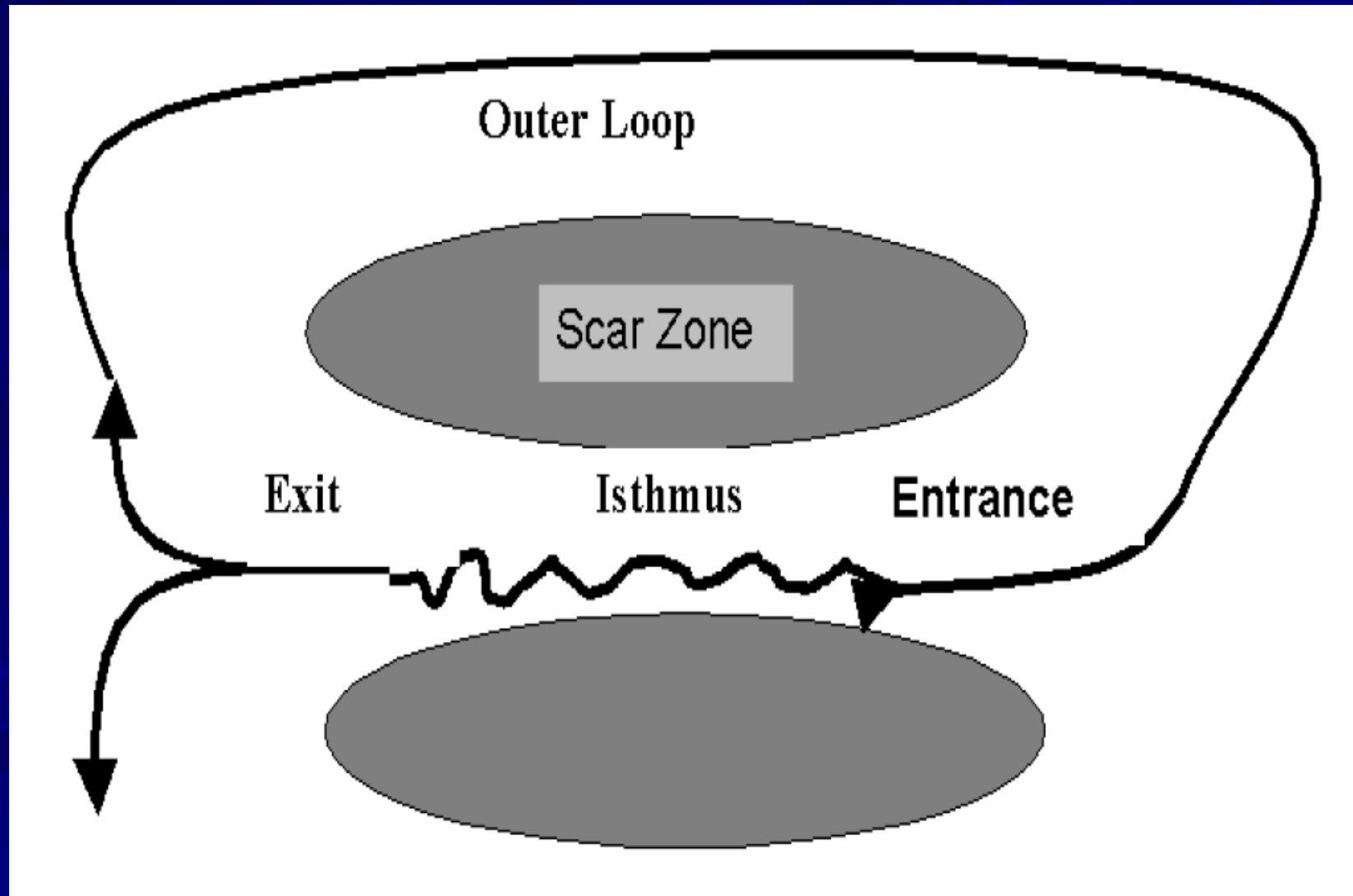
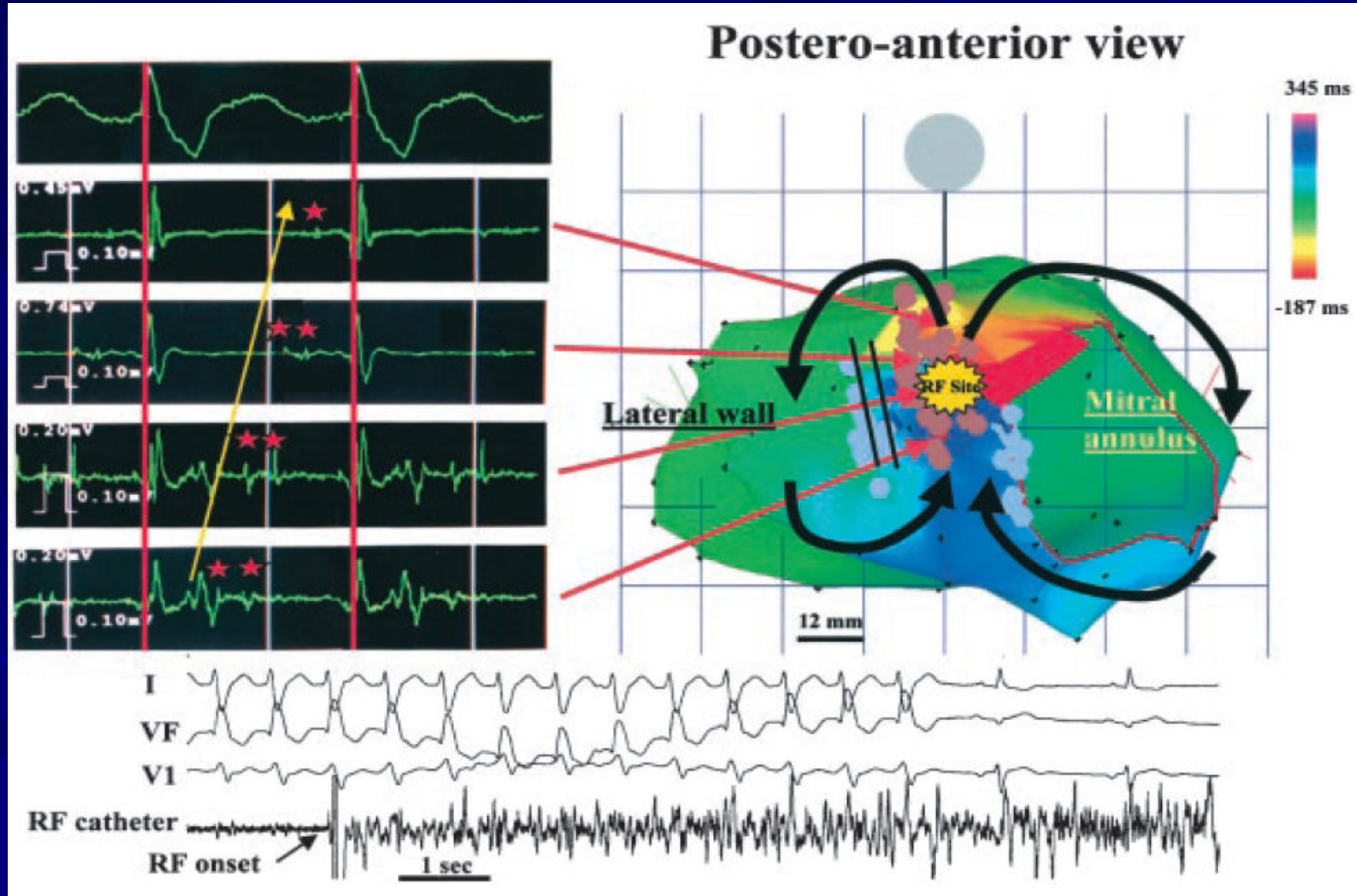


Illustration of figure-8 VT circuit



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

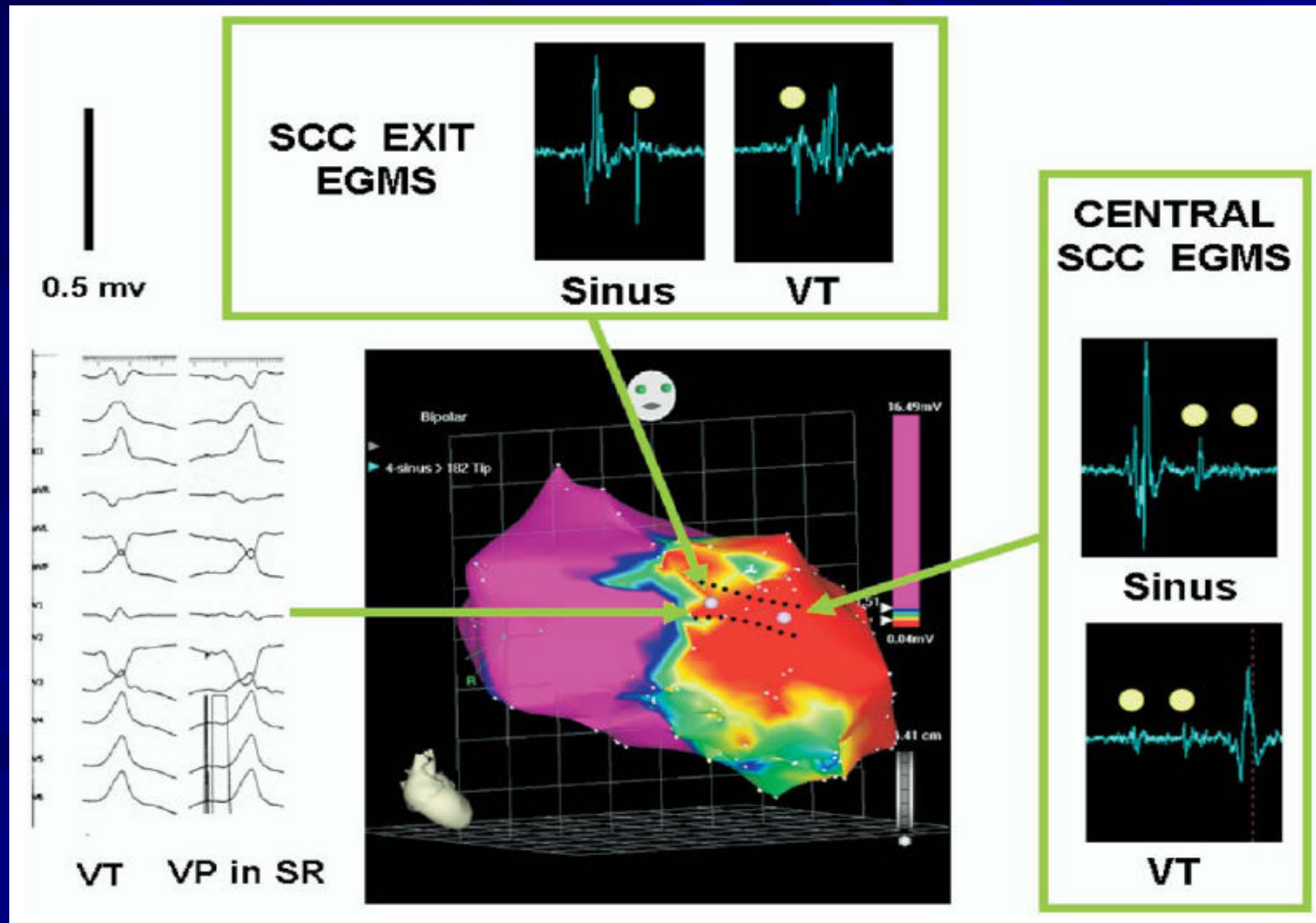
■ Standard mapping

- 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

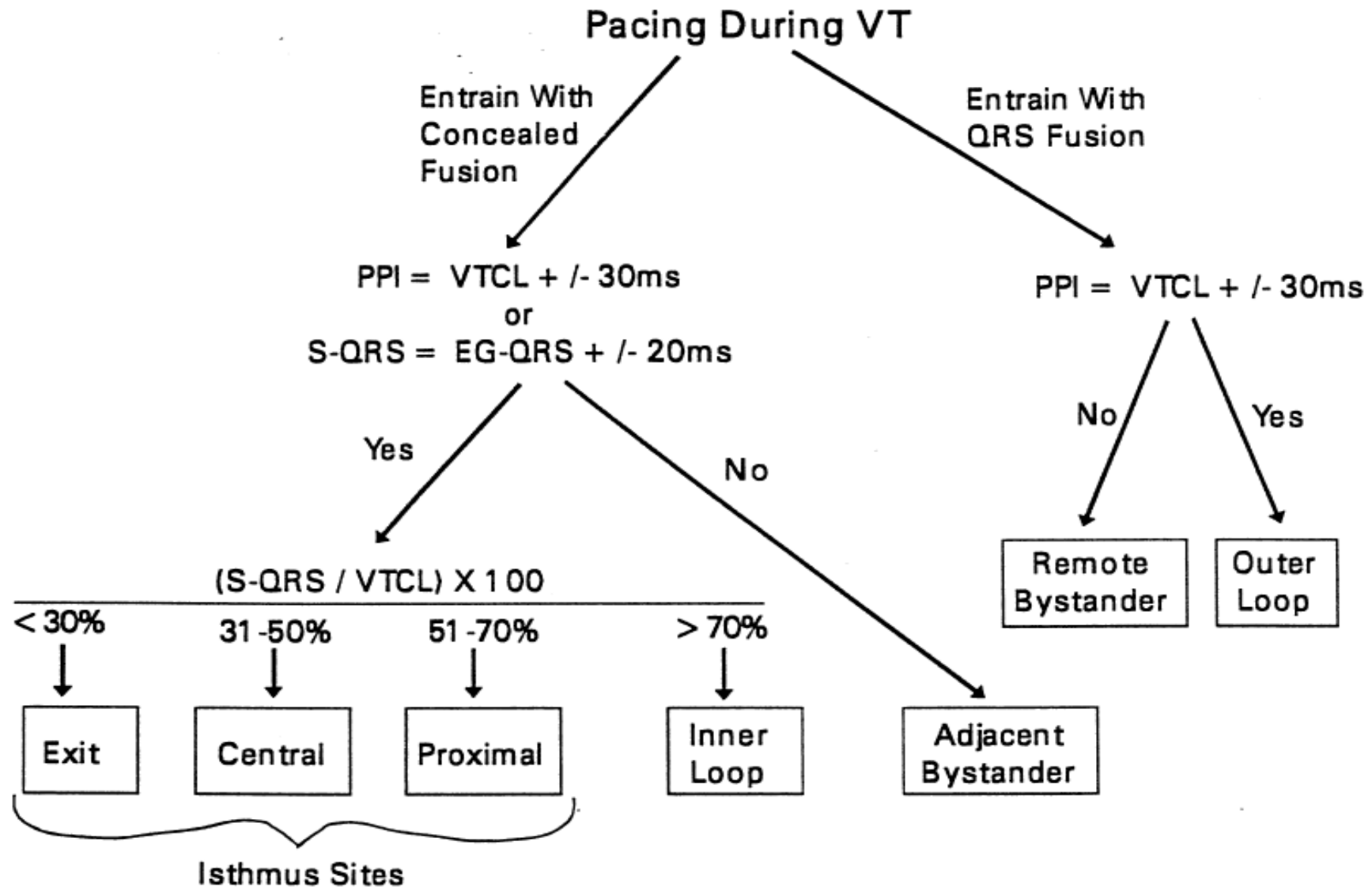
■ Anatomic mapping

- 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

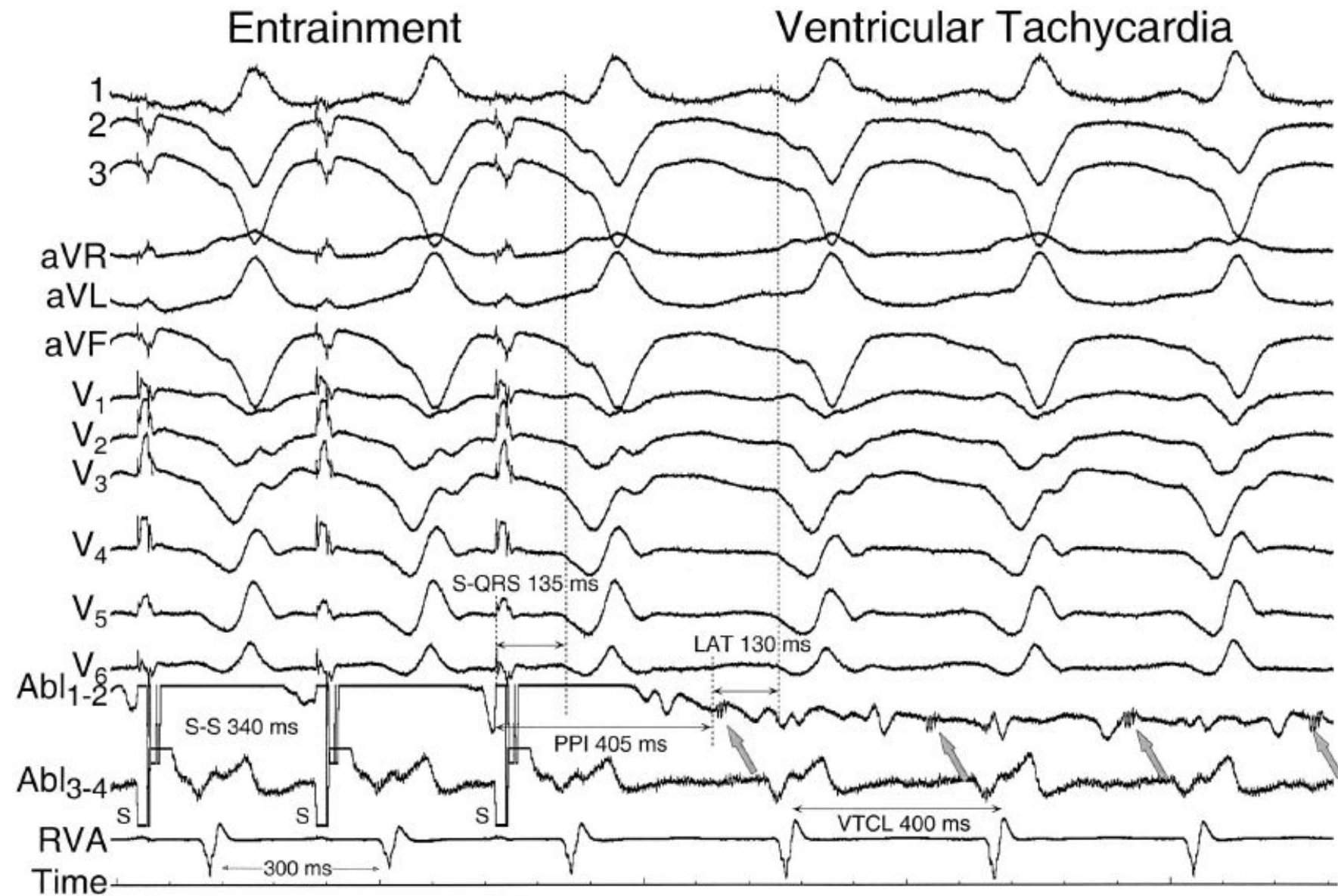
Low Amplitude Diastolic Potentials



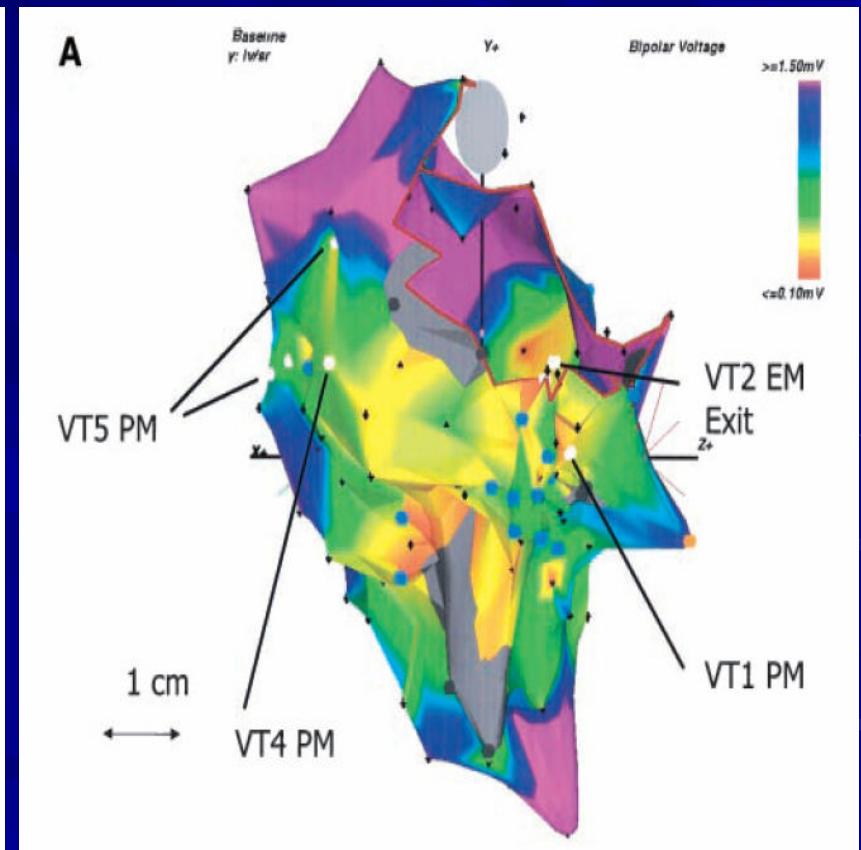
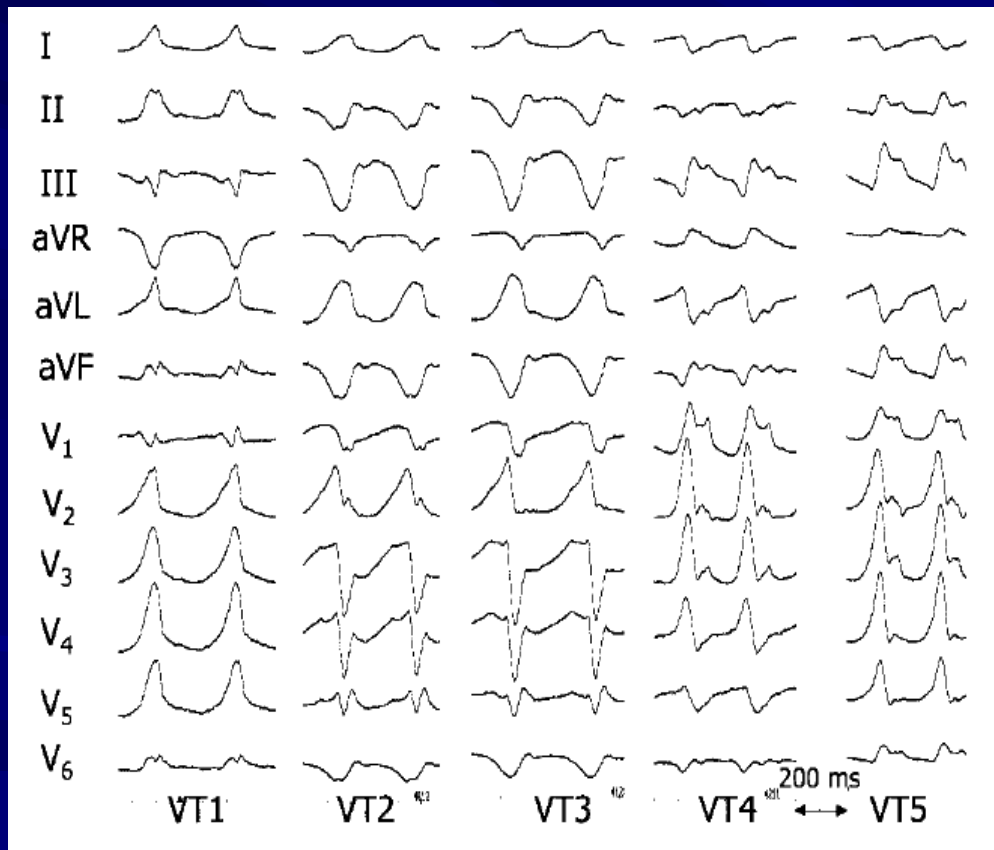
Mapping during VT



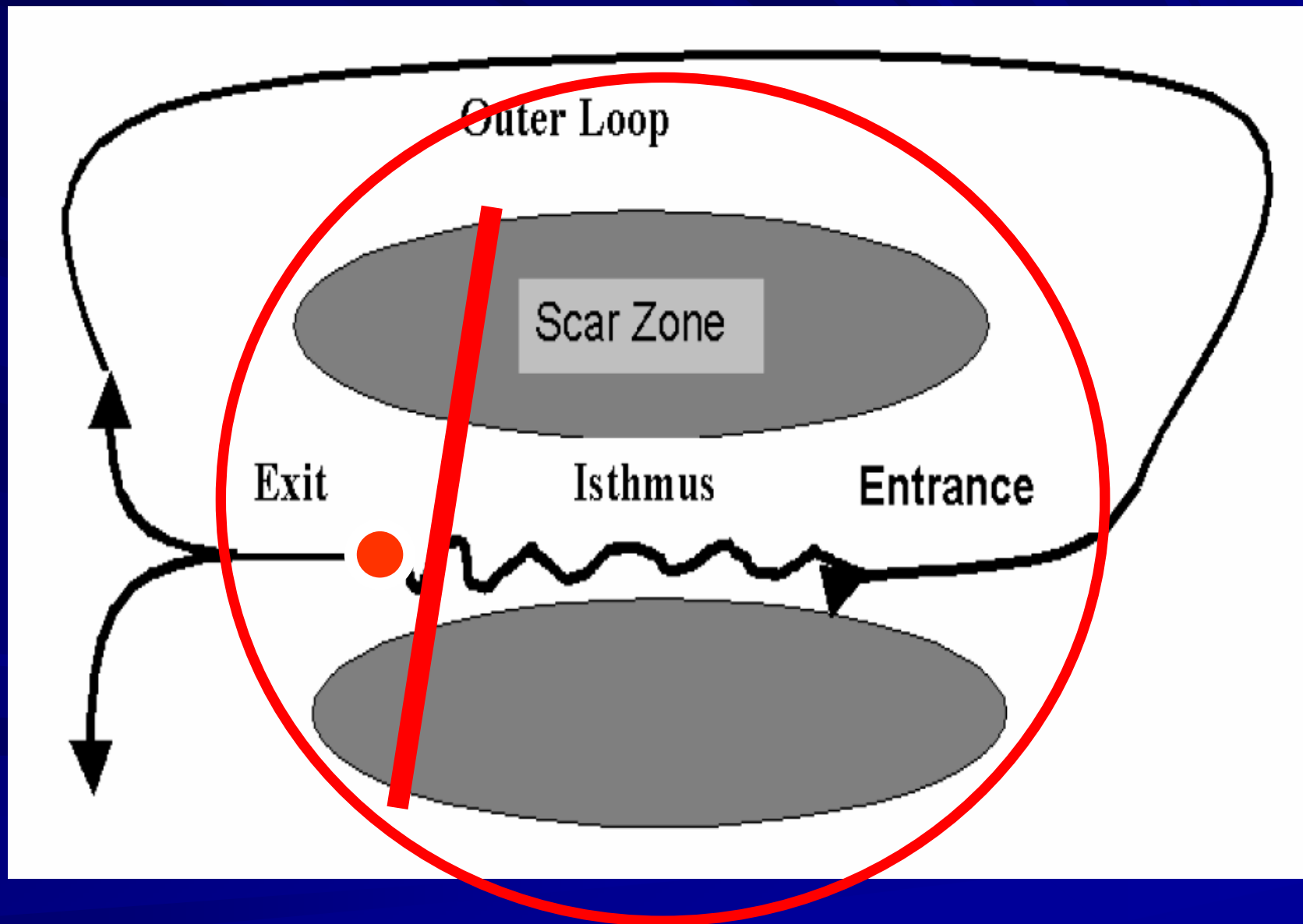
Ideal Site



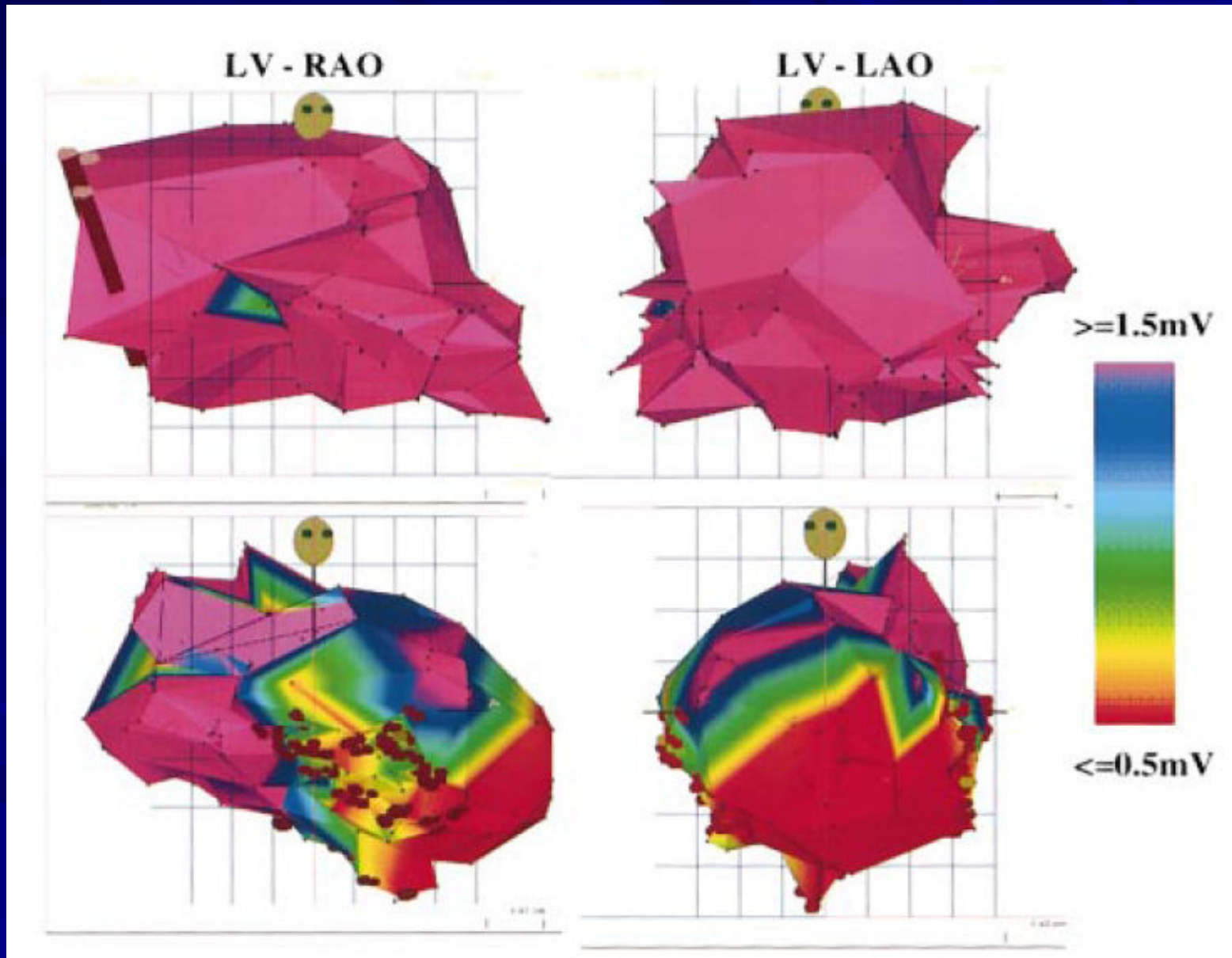
73-year-old women with old inferior MI and recurrent VT



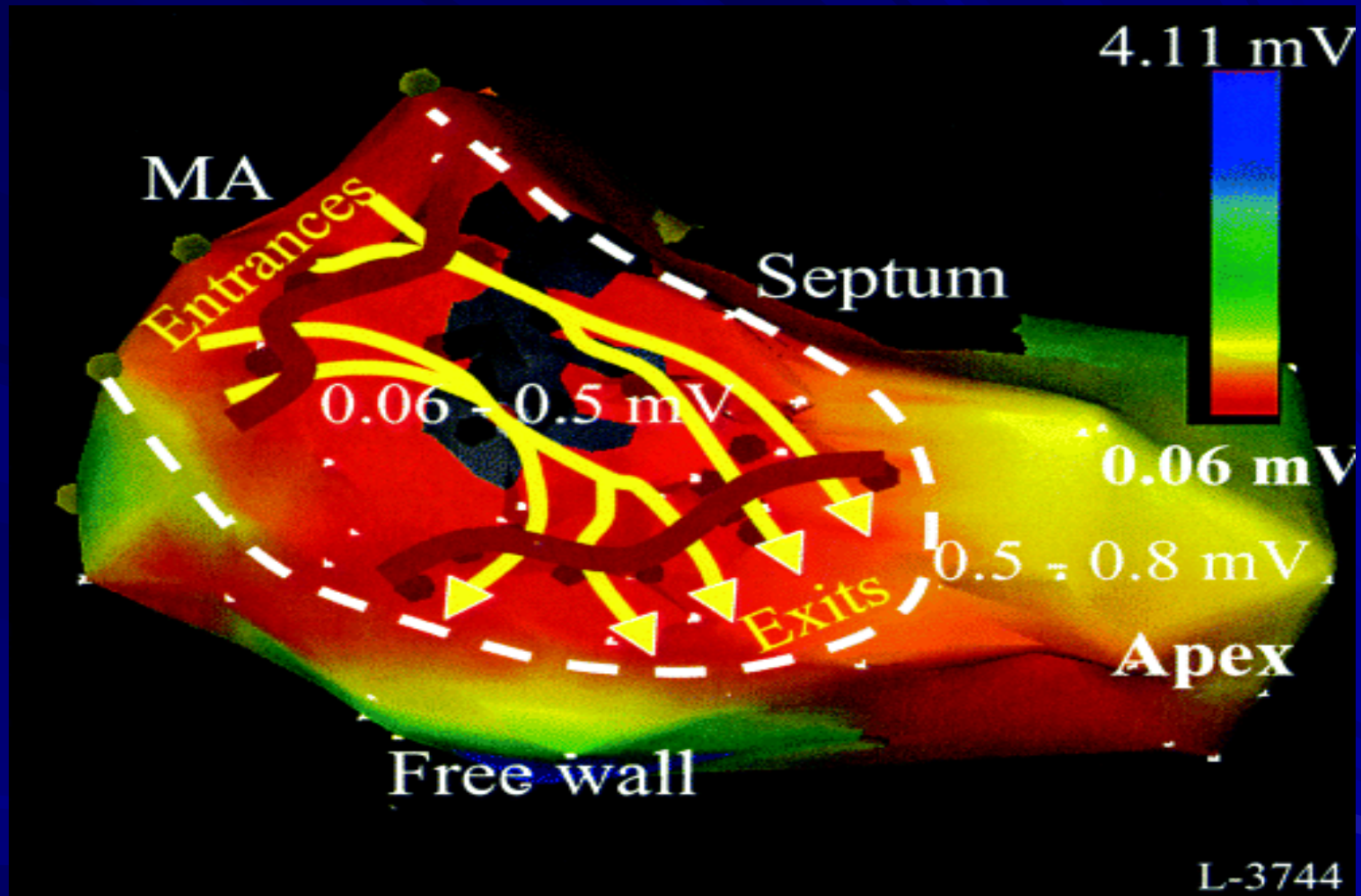
Ablation Techniques



Infarct Localization and Linear Ablation



Isthmus and Linear Ablation

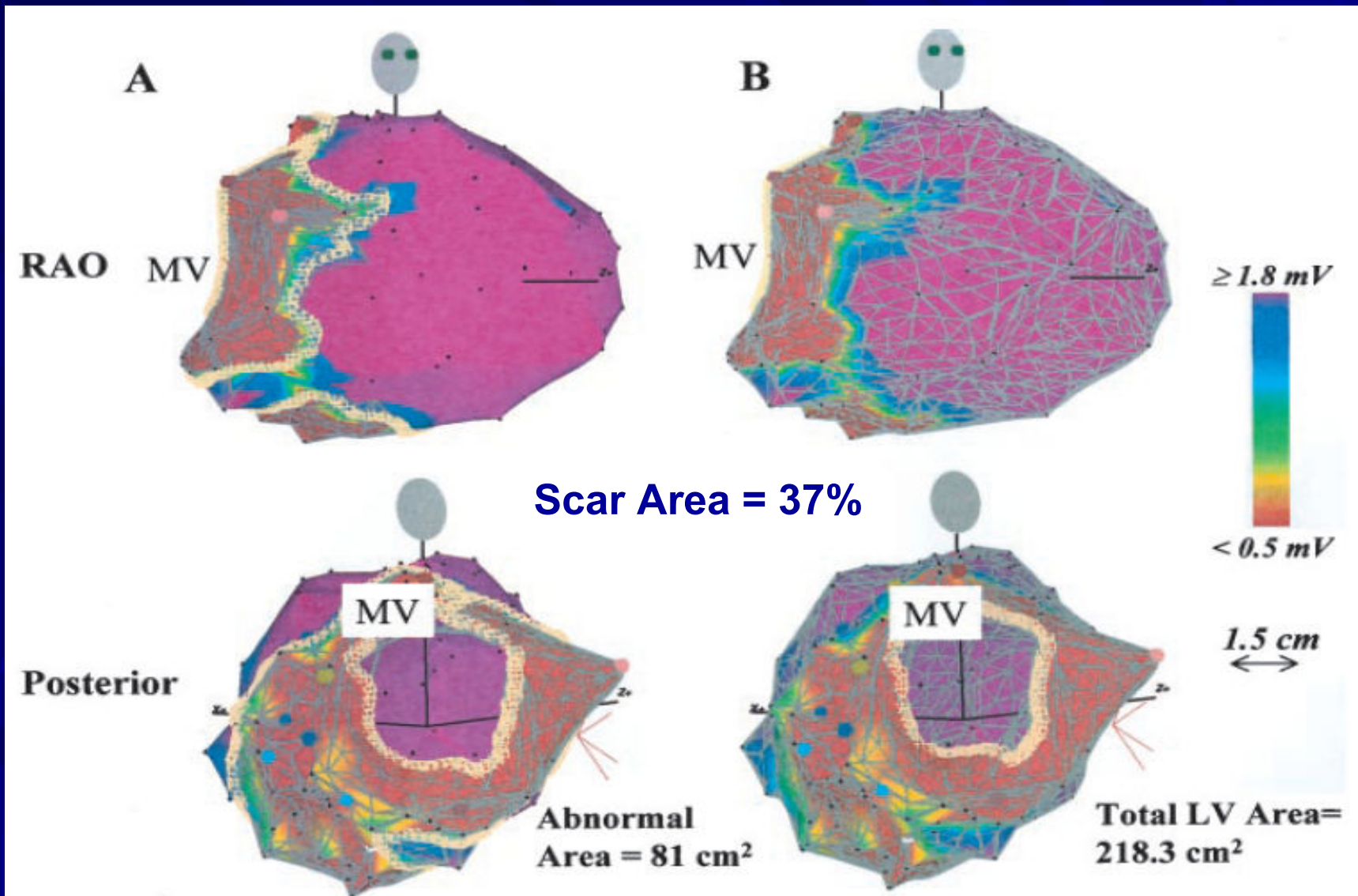


Isthmus Width = 16 ± 8 (6-36) mm Circulation 125:726,2002

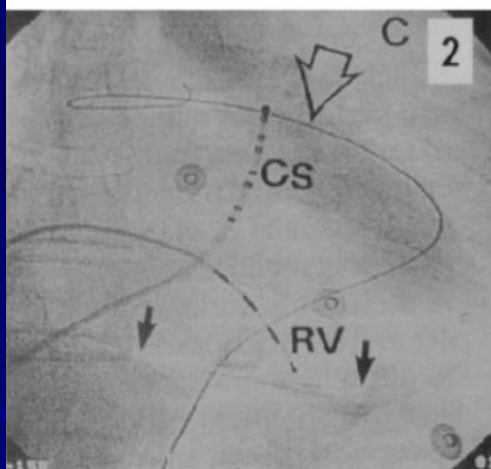
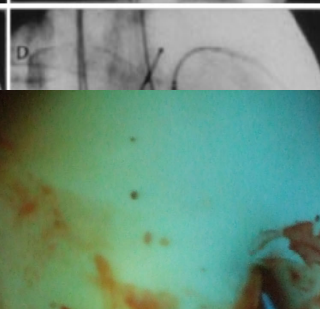
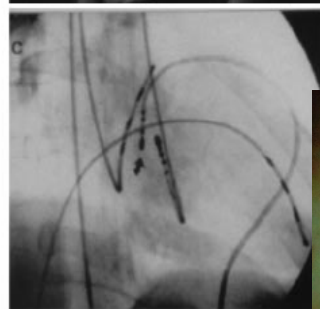
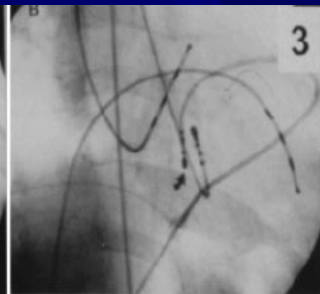
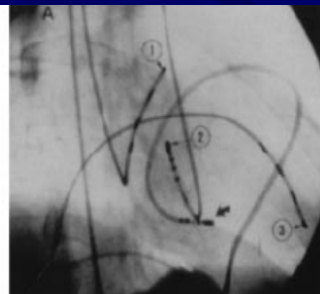
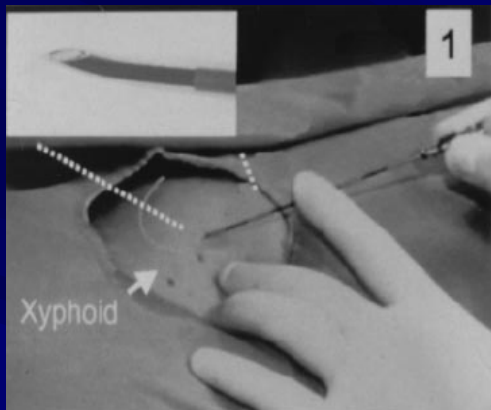
VT in Dilated Cardiomyopathy

- 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

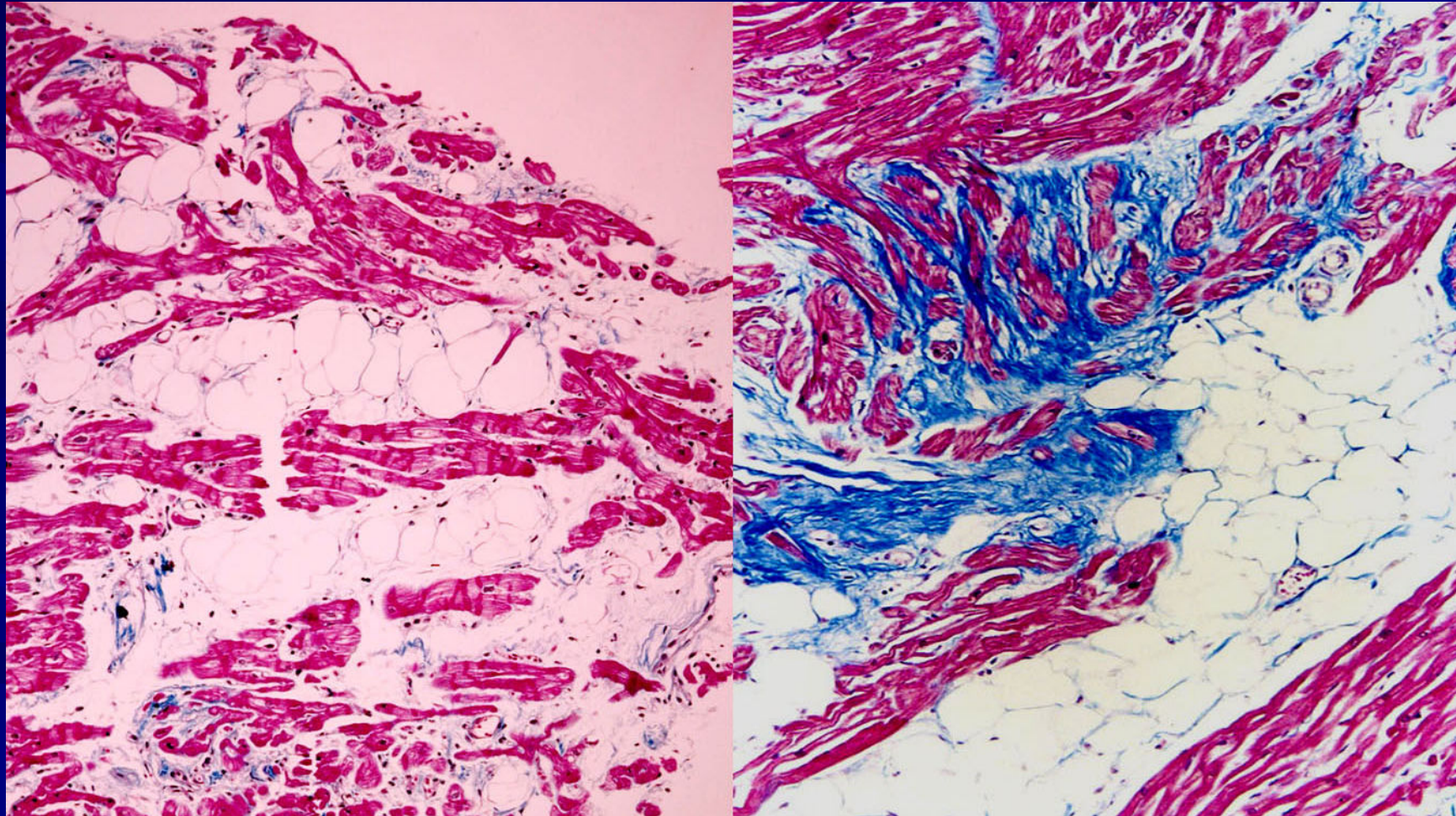


Epicardial ablation of VT: When?

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

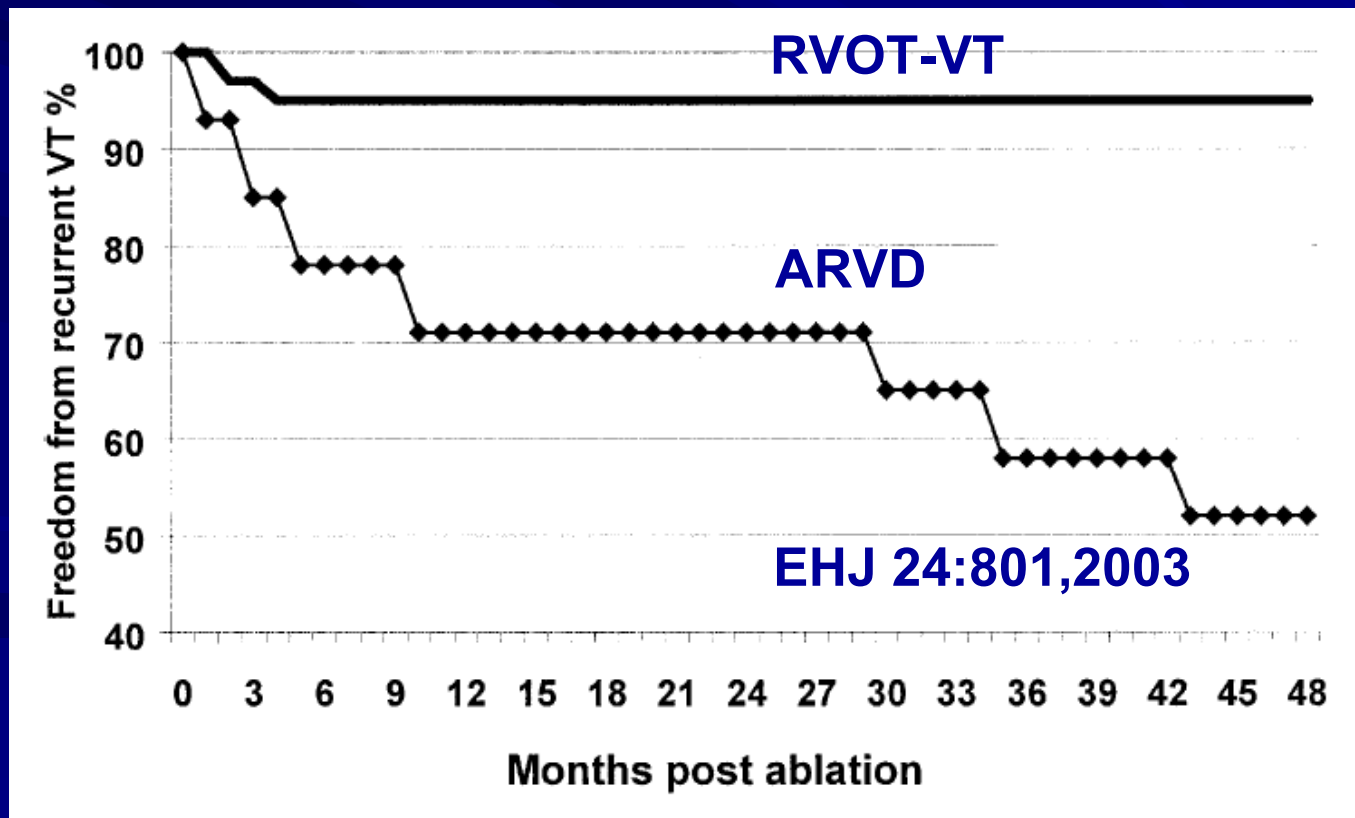
Arrhythmogenic RV Dyspalsia

- Progressive fibrofatty infiltration of myocardium



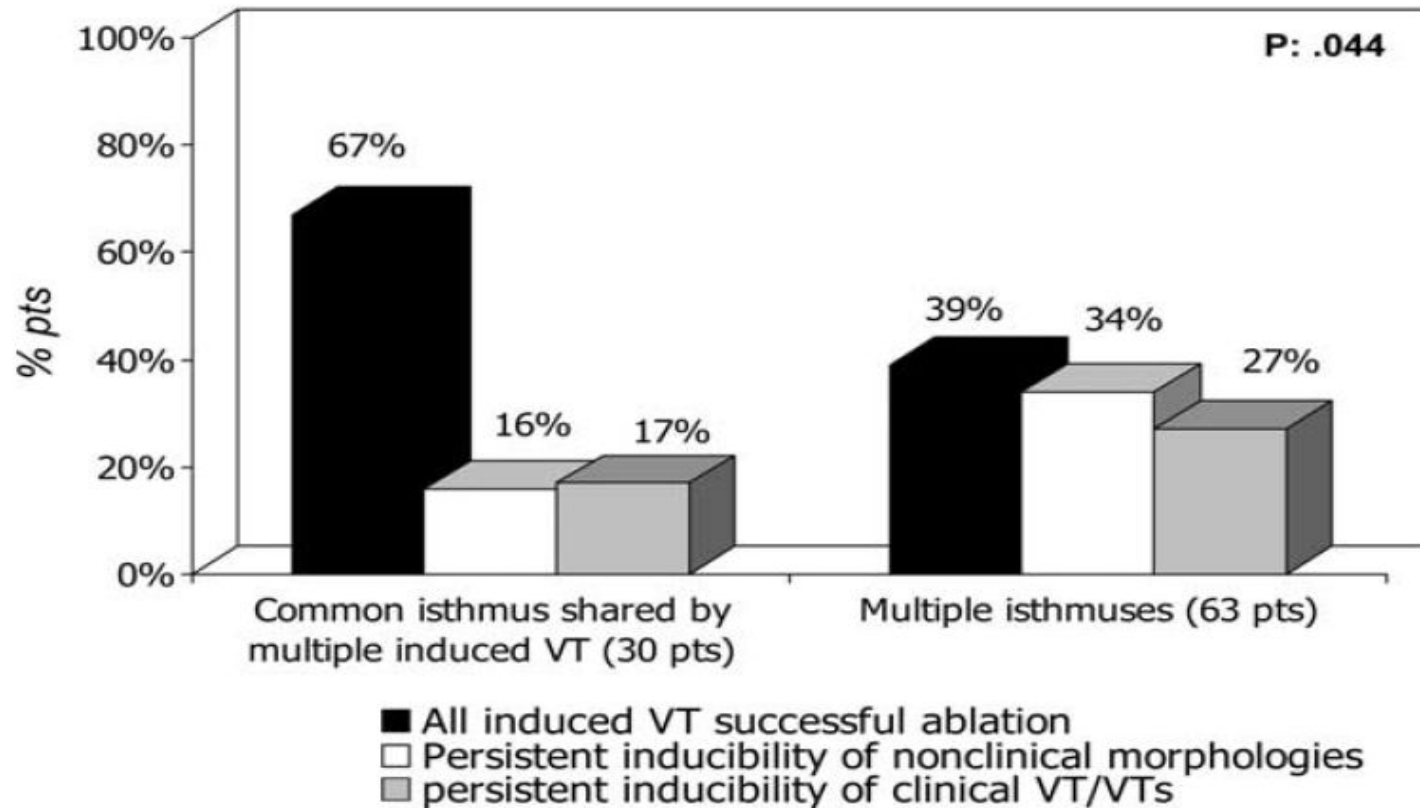
VT Ablation in Patients with ARVD

- 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.