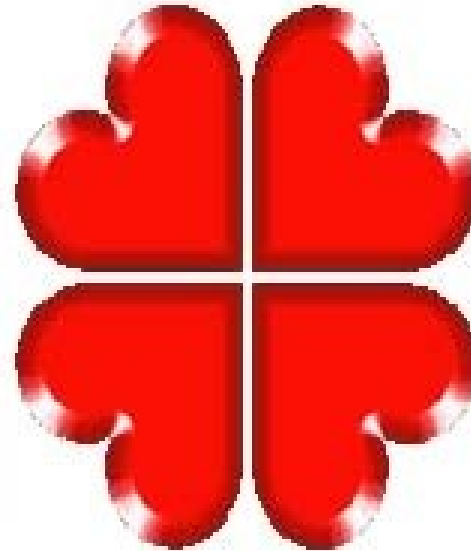


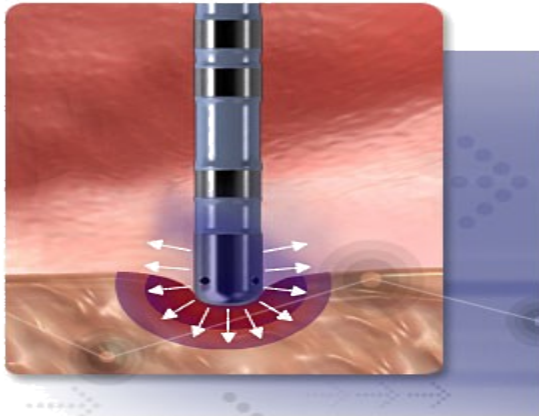
Catheter Ablation of Ventricular Tachycardia in Patients With Structural Heart Disease



Dedinje Cardiovascular Institute, Belgrade, Serbia
City Clinic, Sofia Bulgaria

Lazar G. Angelkov, Kostadin Kotirkov, Ivo Petrov, Boško Đukanović

How do We Treat Patients?



The catheter tip delivers bursts of high-energy waves that destroy the abnormal areas.

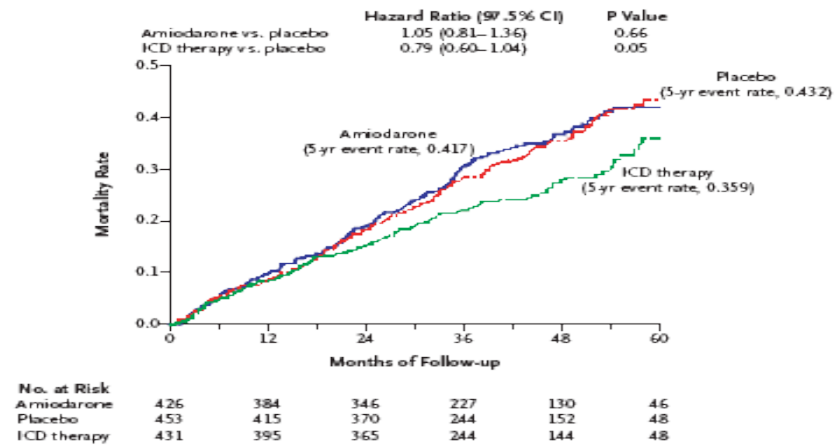
≈ 35
%



Antiarrhythmic - What We Learned From the Study ?

- CAST
- SWORD
- Dofetilid study
- EMIAT
- CAMIAT
- SCD – HeFT

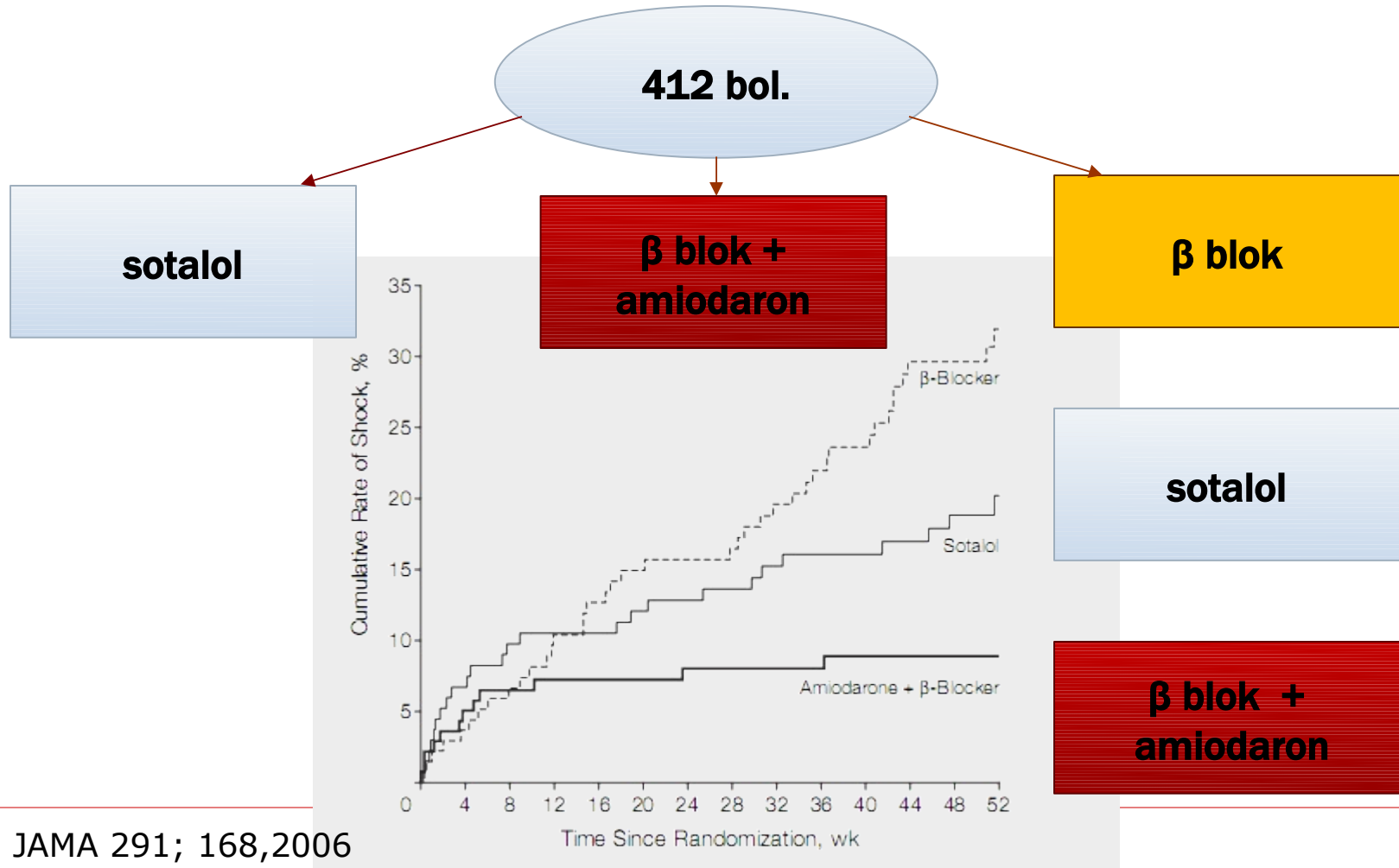
A Ischemic CHF



N Engl J med 1989; 321:406-412,
Lancet 1996; 348:7-12,
Lancet 2000; 356:2052-2058

Lancet 1997; 349: 667-674,
Lancet 1997; 349: 675-682,
N Eng J Med 2005; 352, 226-

OPTIC - Study



JAMA 291; 168,2006

Reduction of Mortality With ICD

ICD are used in preventing sudden cardiac death by treating life significant arrhythmia.

Reduction of Mortality With ICD



ICD Therapy Paradox

After adequate ICD, the shock risk of fatal outcome is increased by 3-6 times

Inappropriate shocks increase mortality twice

Indications for Catheter - based Treatment of VT in Pts With Structural Heart Disease

- *Symptomatic, long-term monomorphic VT that is recurrent despite of antiarrhythmics*
- *Incessant VT or **ventricular arrhythmia storms** which are not the result of a reversible cause*
- *Frequent PVCs, non-sustain VT or VT, which are likely to cause **ventricular dysfunction***
- *VT as a mechanism for the formation which occur in the **bundle branches or fasciculus of the His–Purkinije system***
- *Polymorphic VT or VF refractory to antiarrhythmic drugs as a trigger for the development of these arrhythmias **PVCs** can be resolved by a catheter ablation*

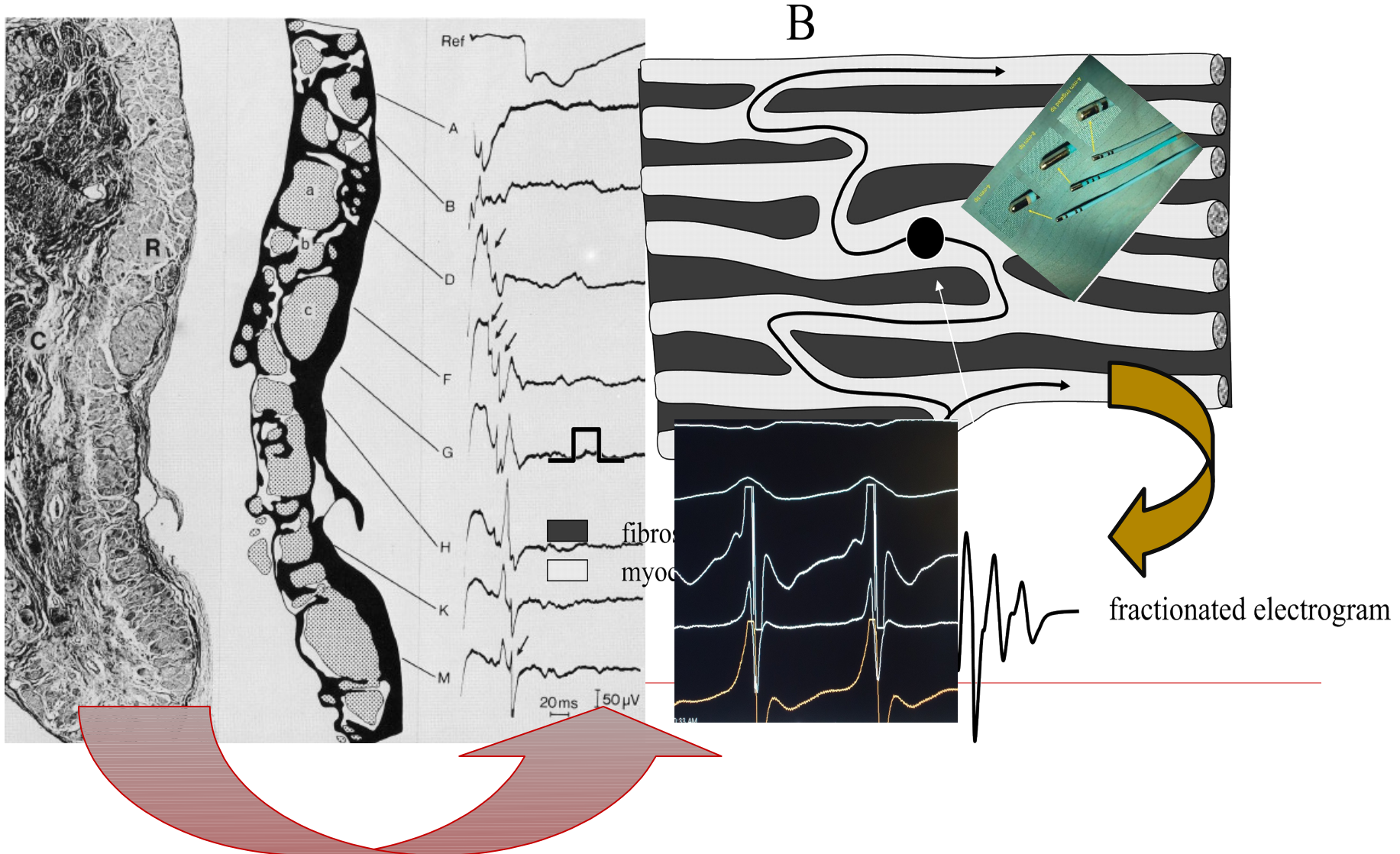
Catheter Ablation is Contraindicated

- *The presence of a mobile ventricular thrombus - (epicardial or alcohol ablation can be considered)*
- *For patients who have a non-sustained VT, not leading to a ventricular dysfunction*
- *VT as the result of reversible causes, or polymorphic VT as the result of long QT syndrome*

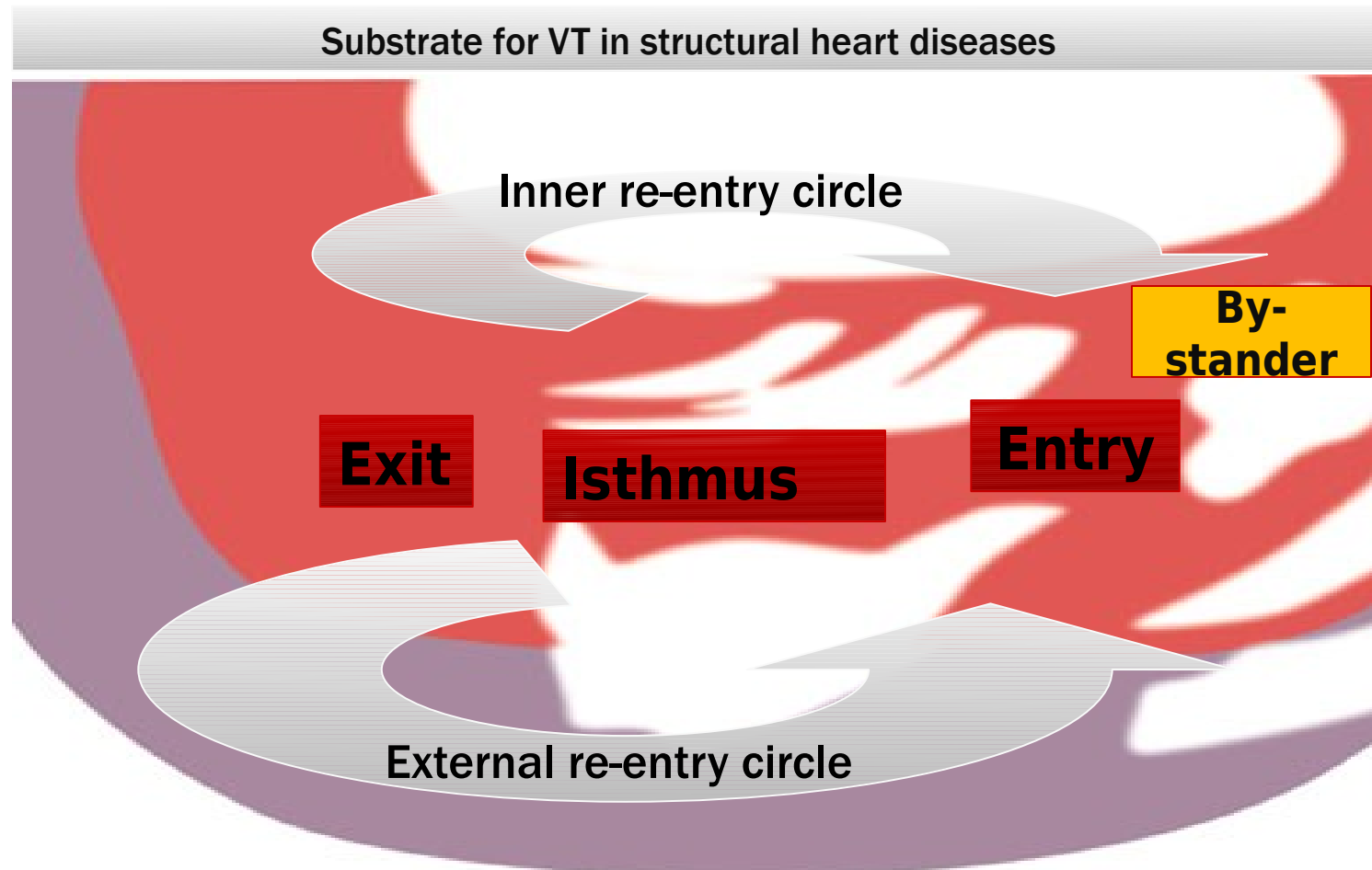
Who can Help With Catheter Ablation?

- *Patients after myocardial IM,*
 - *Dilated cardiomyopathy,*
 - *Pts with valvular diseases,*
 - *Artimogenom dysplasia DK,*
 - *Hypertrophic cardiomyopathy,*
 - *Sarcoidosis,*
 - *After the correction of congenital anomalies,*
 - *Brugada syndrome*
-

What is Sommon to These Diseases ?



Electrophysiological Characteristics of the Re-entry Circuit

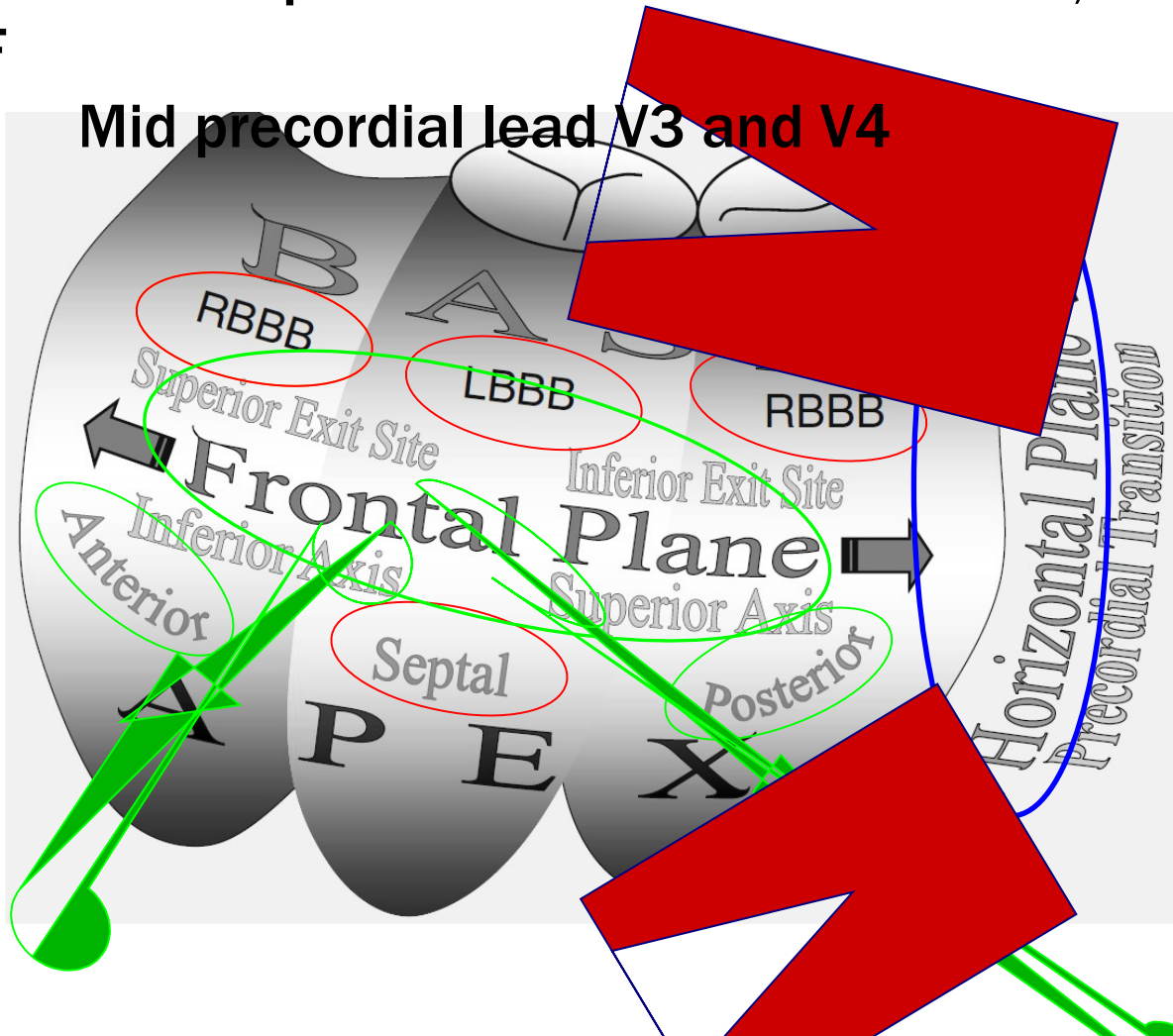


Clinical Assessment of Pts Before the Interventional Procedure

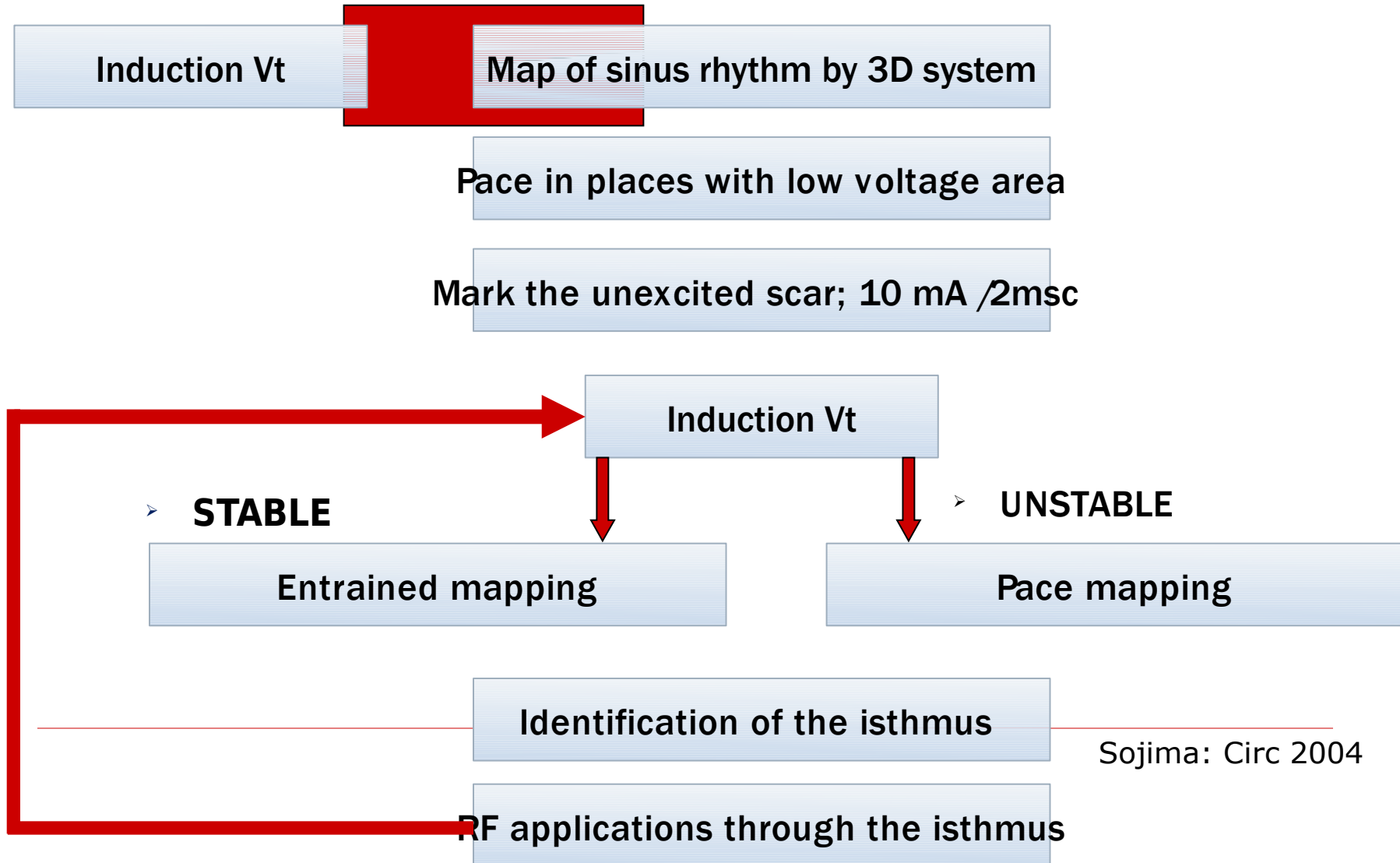
- *Anamnesis and objective status*
 - *Use of **anticoagulant therapy***
 - *Presence of **newly angina pectoris***
 - *Echocardiography: to determine **left ventricular function** and exclude the **presence of thrombus** in the LK*
 - *Analysis of the **12 lead ECG** for **clinically significant VT** or*
 - *Analysis of the event stored in ICD*
-

ECG to Guide the Ablation of VT

- Step 1** Dominant wave in lead V1
- Step 2** Frontal plane dominant deflection D2, D3, aVF
- Step 3** Mid precordial lead V3 and V4

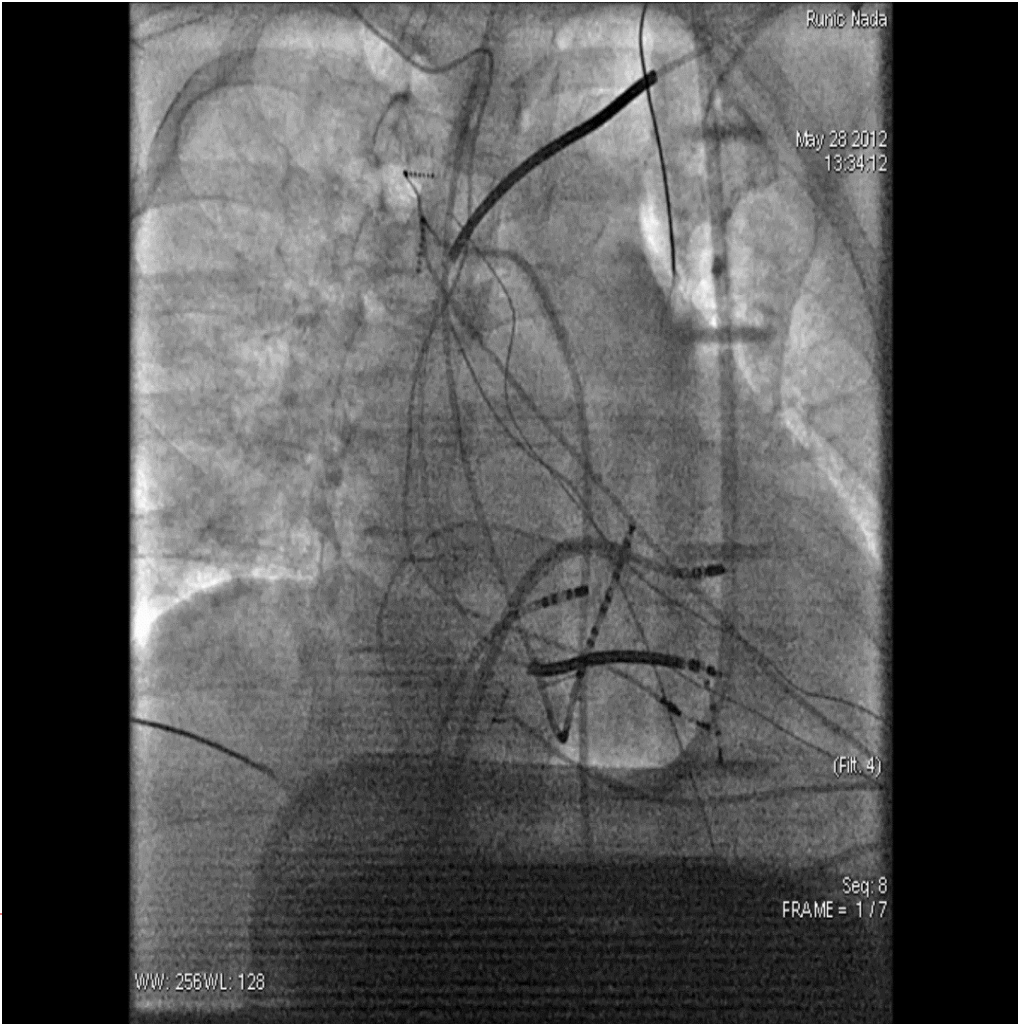


Algorithm for Mapping VT

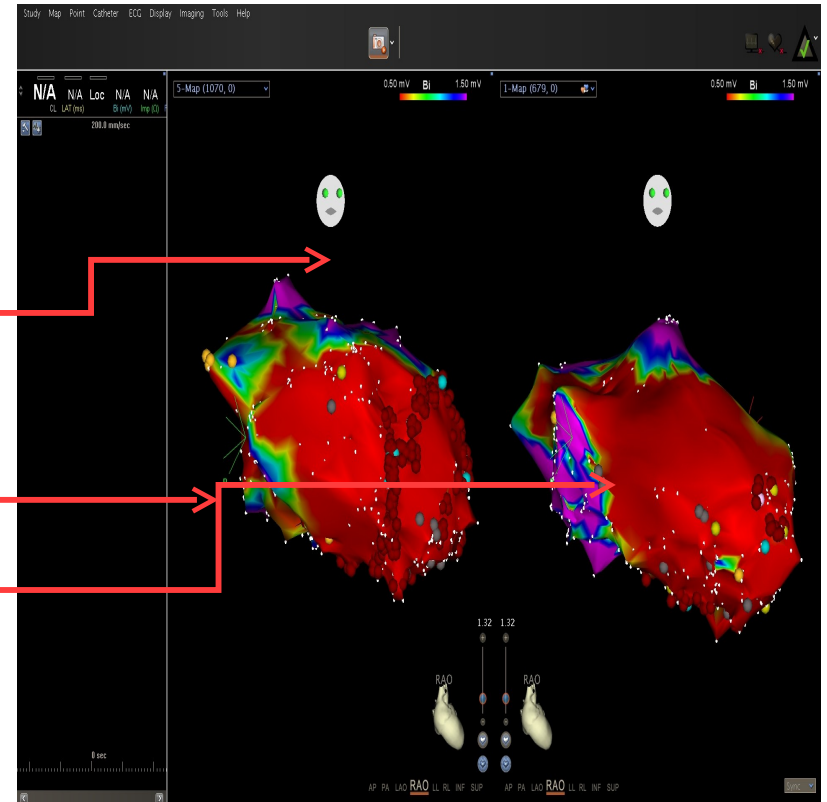
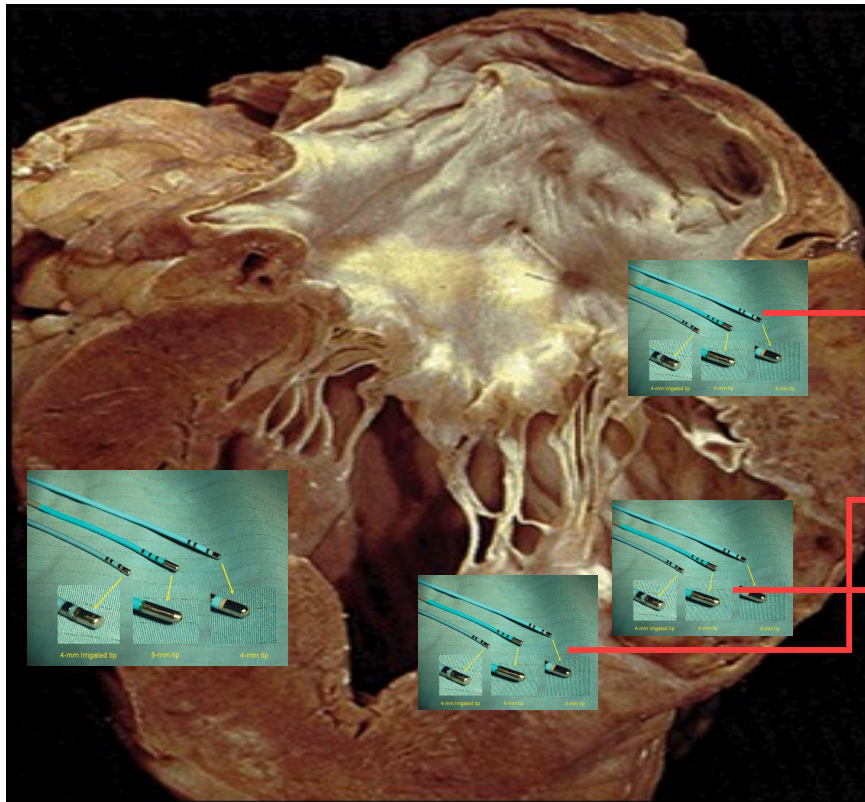


Sojima: Circ 2004

Transseptal or Retro-Aortic Access



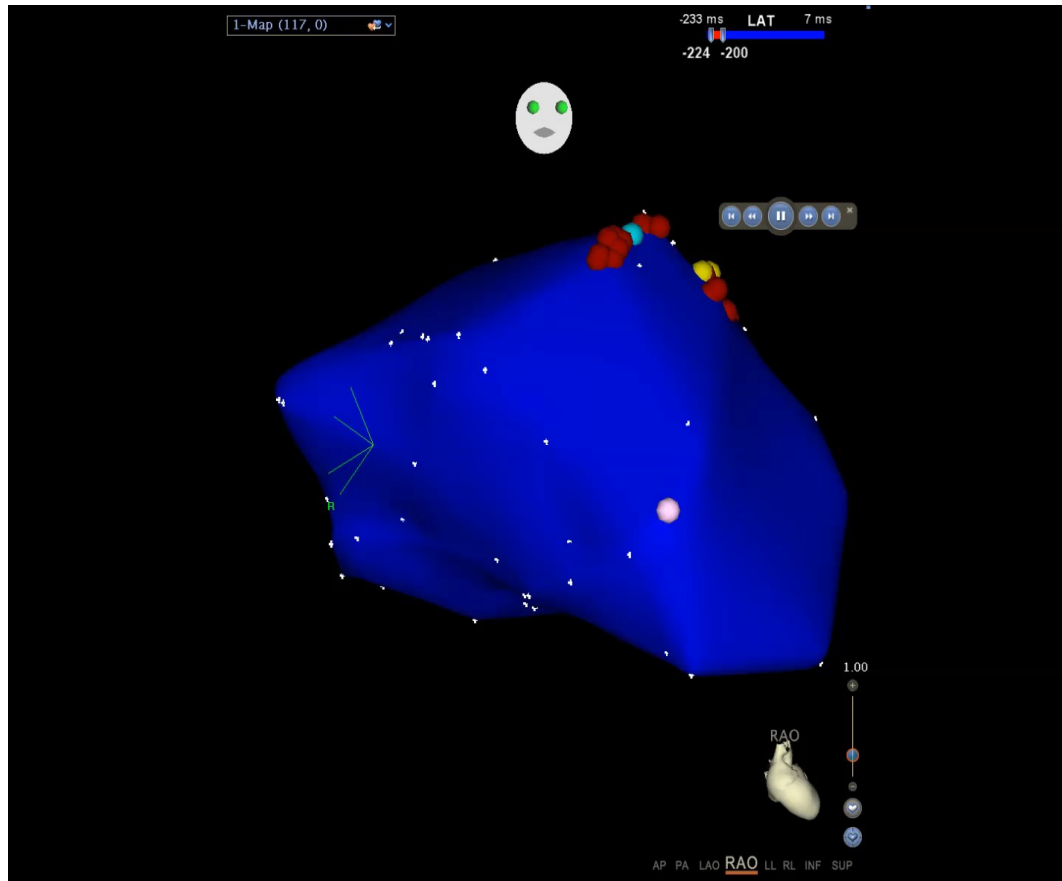
Voltage Map



Border zone	0,5 - 1,5mV
Normal myocard	≥ 1,5 mV
Scar	≤ 0,5mV

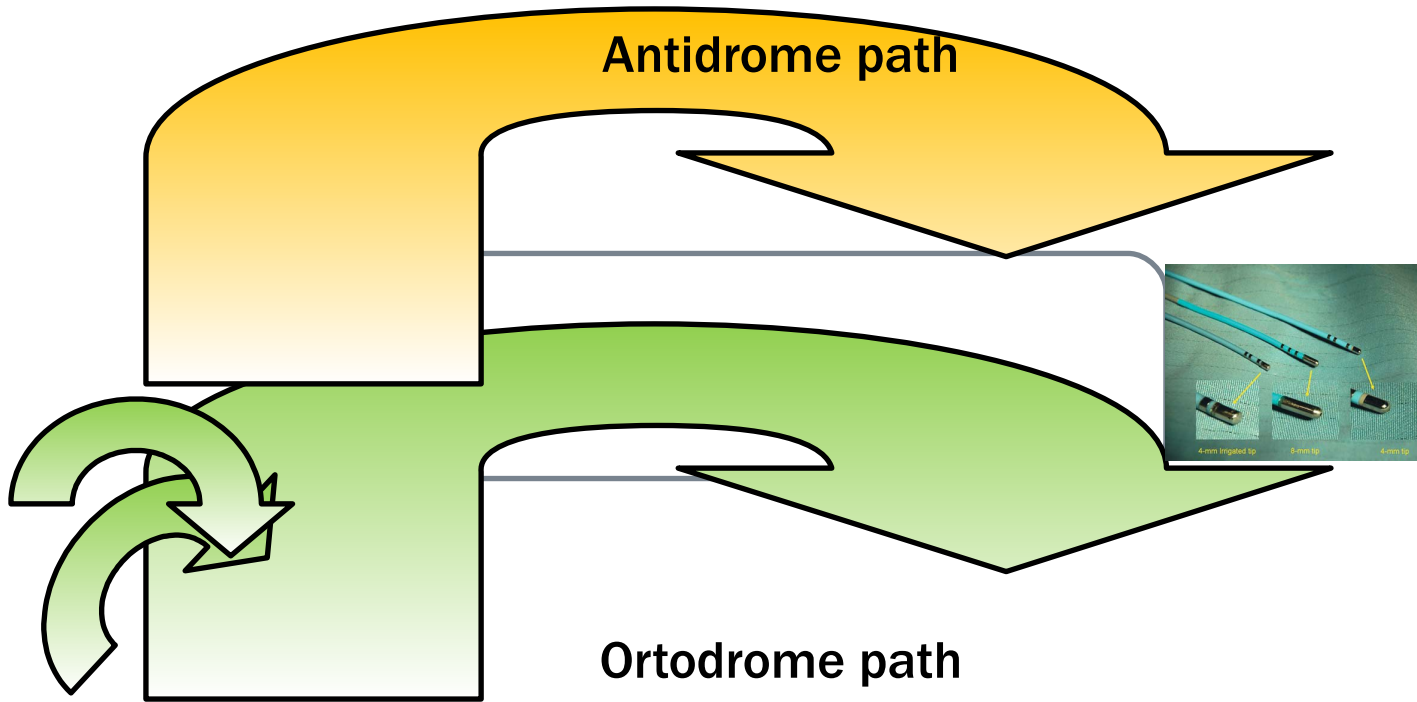
Colour spectrum
Purple
Red

Mapping and Ablation of Stable VT



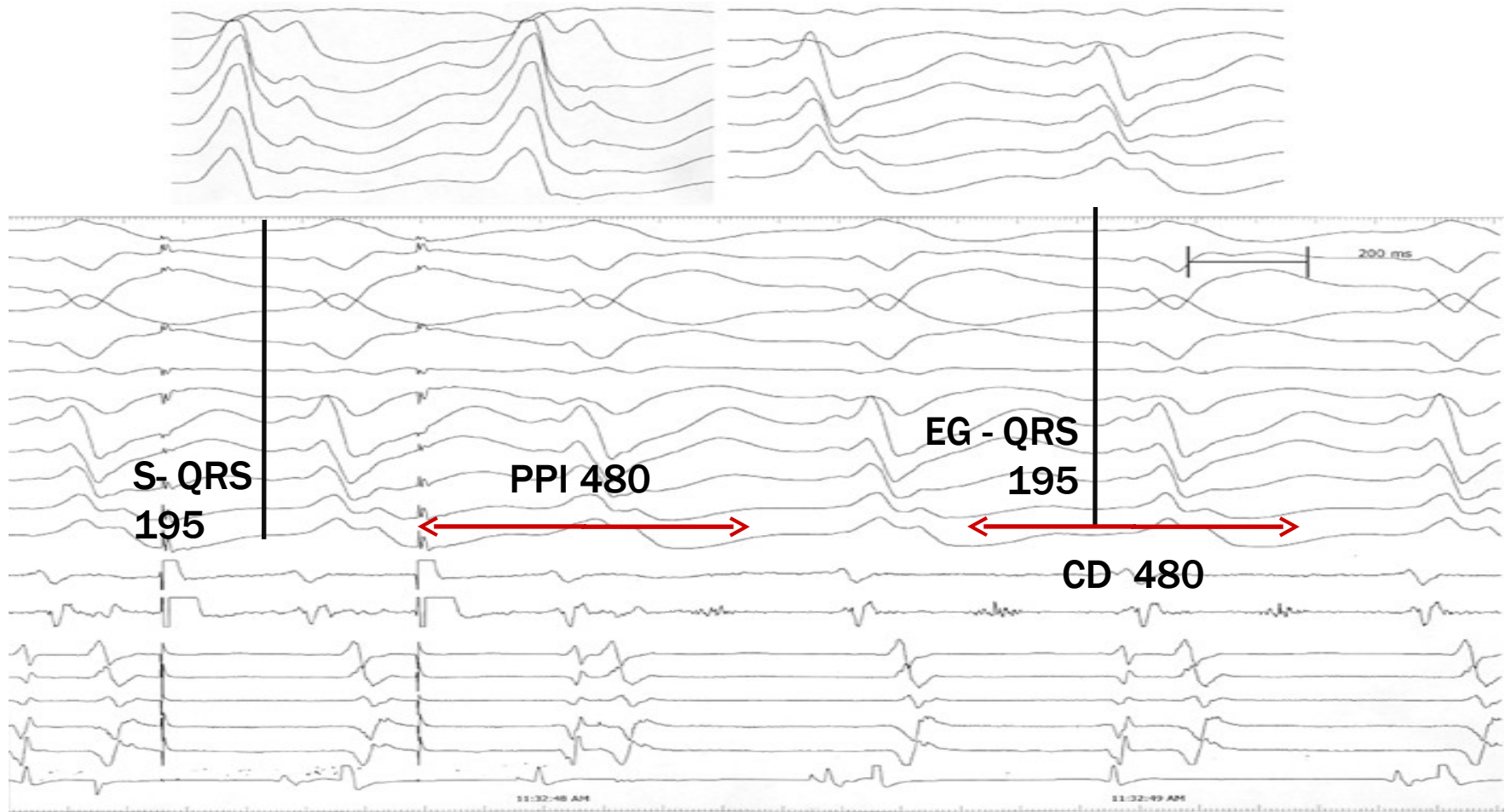
-
1. Activation map
 2. Entrainment technique

Entrainment Technique



Scar

Entrainment Criteria

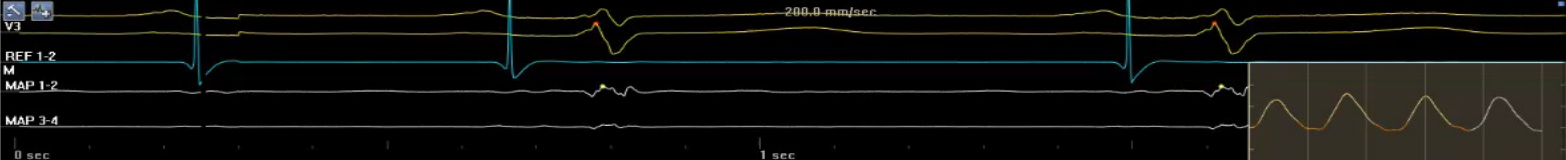
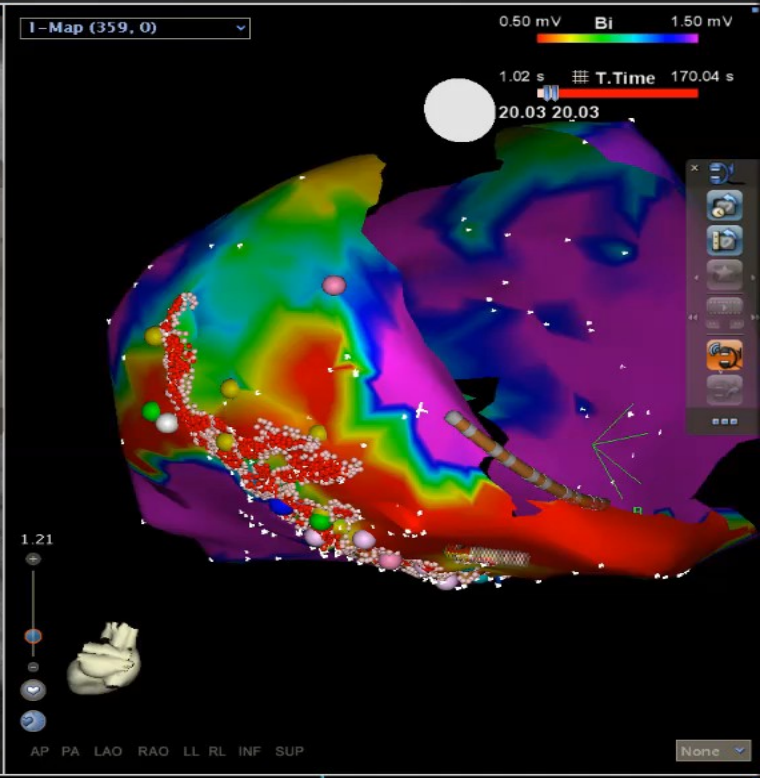
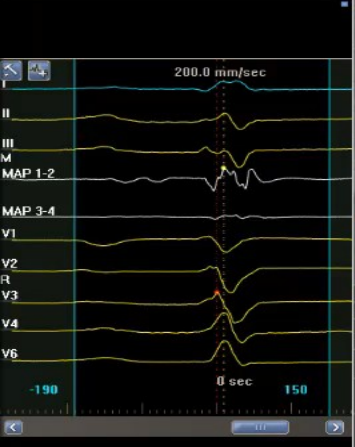
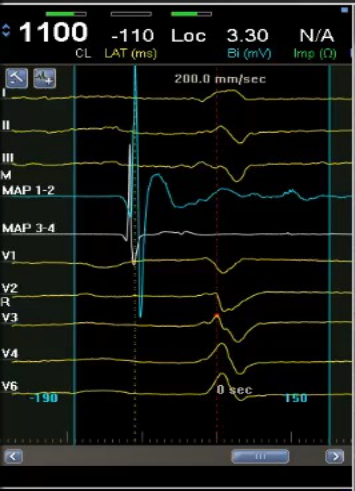


Deficiencies of Entrainment Technique

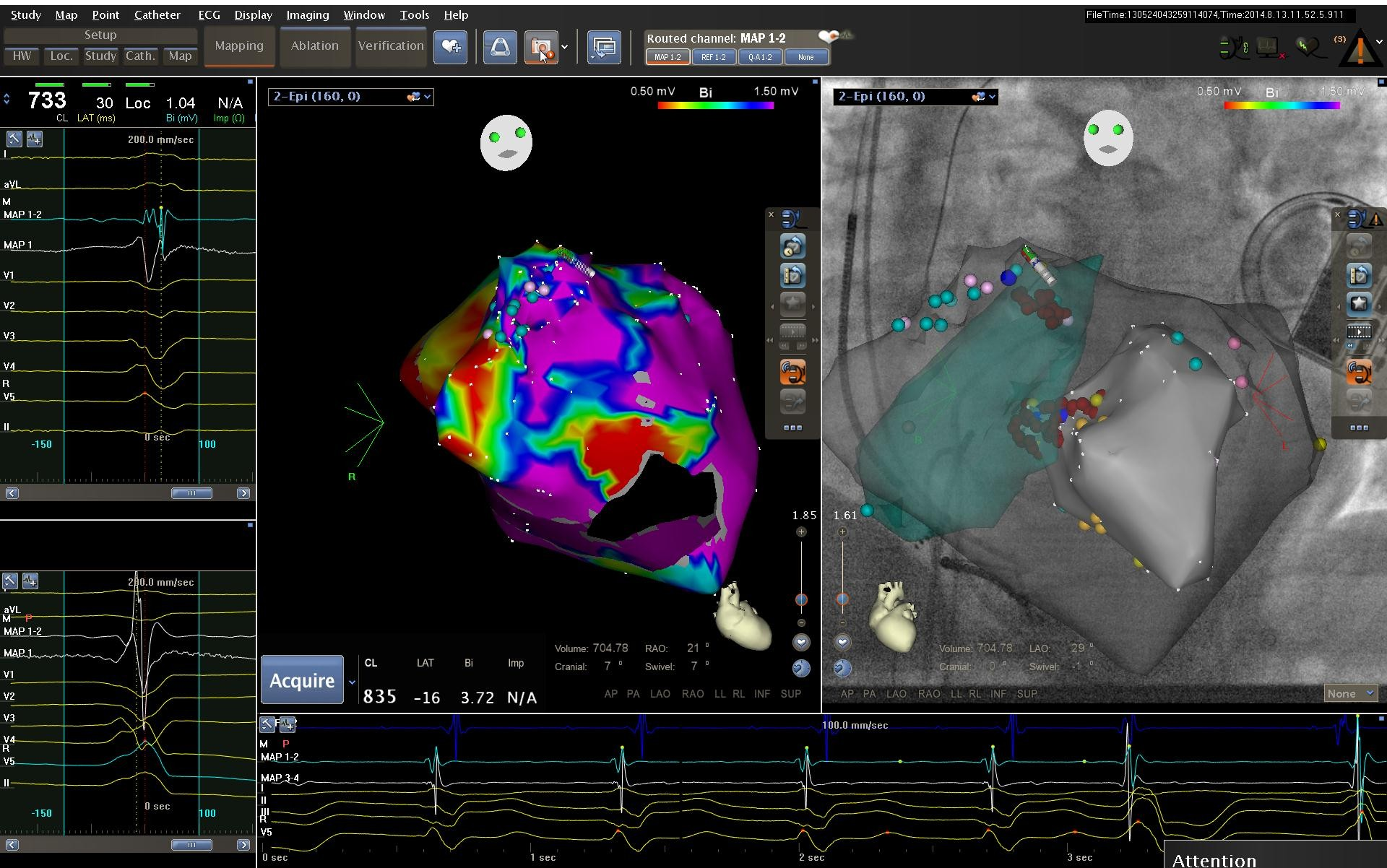
- **Wide isthmus VT,**
 - **Intramyocardial and/or epicardiac localization of isthmus VT**
 - **Stability of catheter**
 - **Antiarrhythmics drugs which produce false extension of stimulus to QRS and post pacing interval**
-

Modification of a Scar Substrate With Ablation

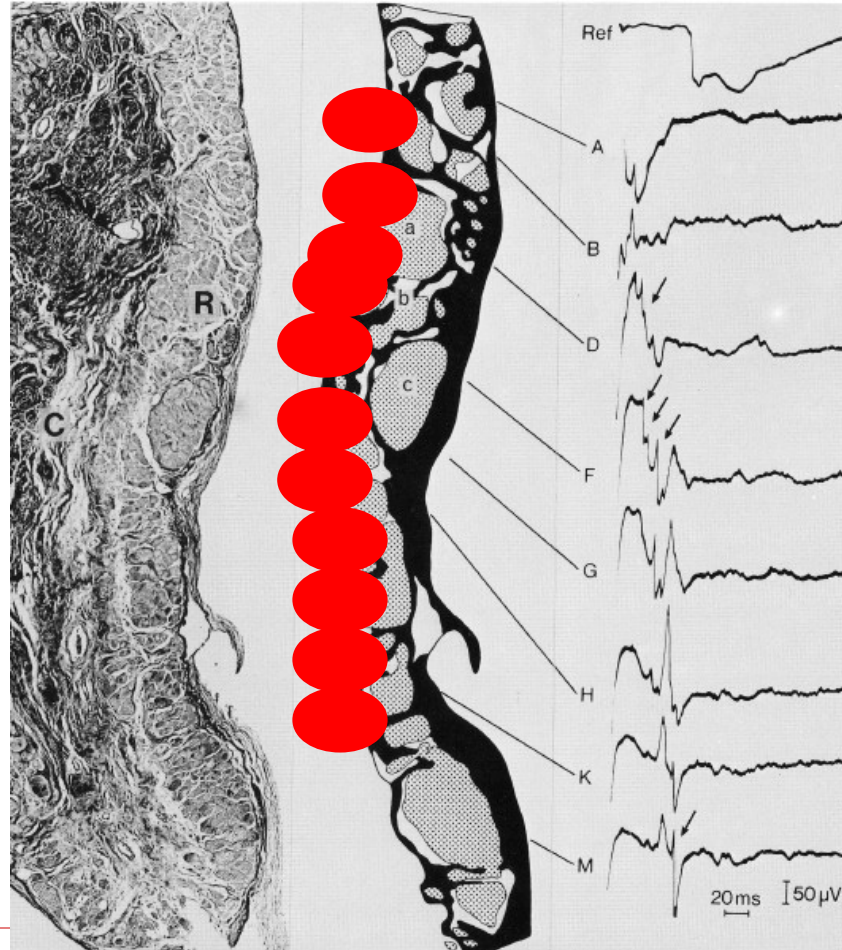
- Failure with activation / entrainment technique
 - In pacing maneuver, the morphology of VT is modified or a patient has a multiform VTs
 - In case of non-inducible, non-sustain or intolerant VT
-



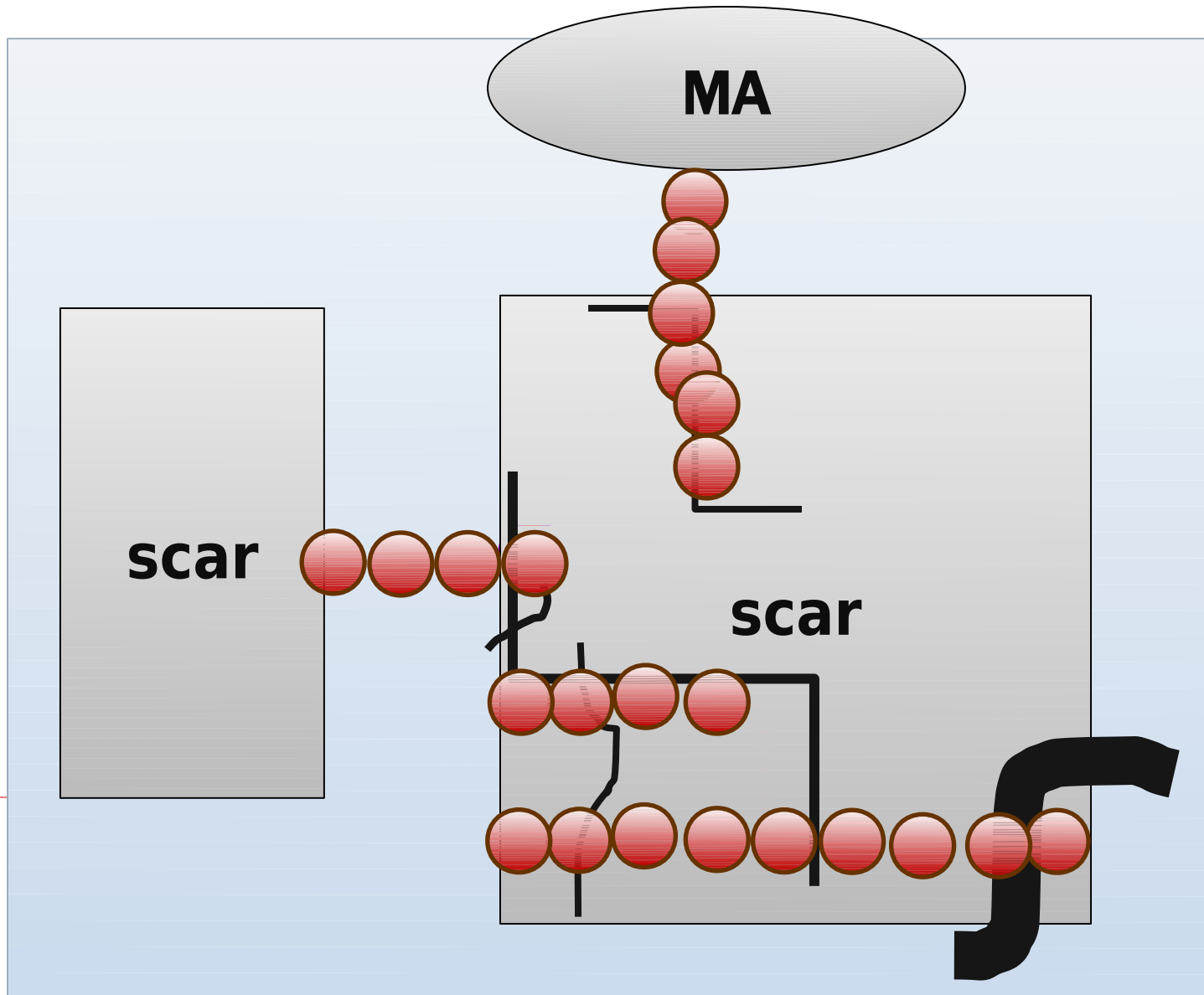
Spots With Late Potentials



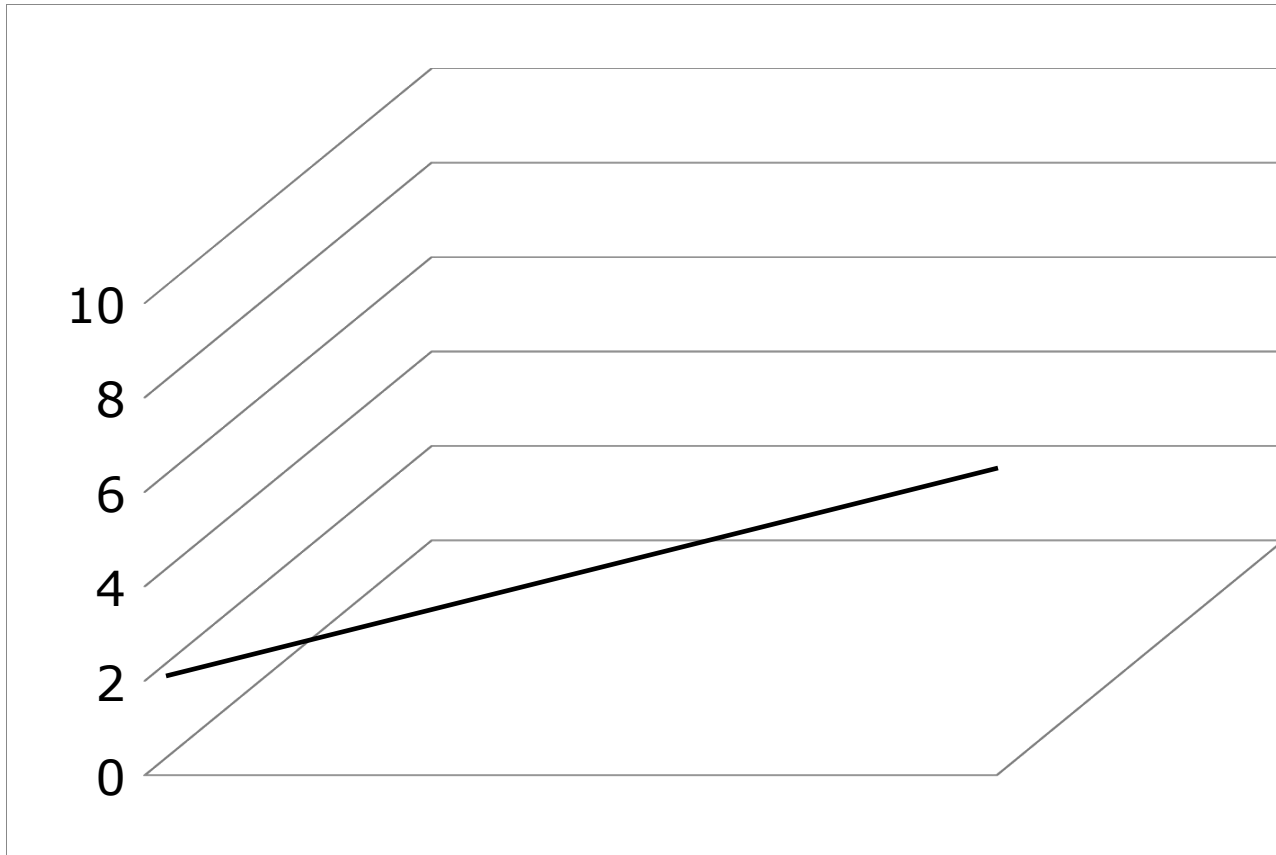
Why Drawing Linear Lesions?



Where to Draw Linear Lesions?



VT Features in Patients With DCM

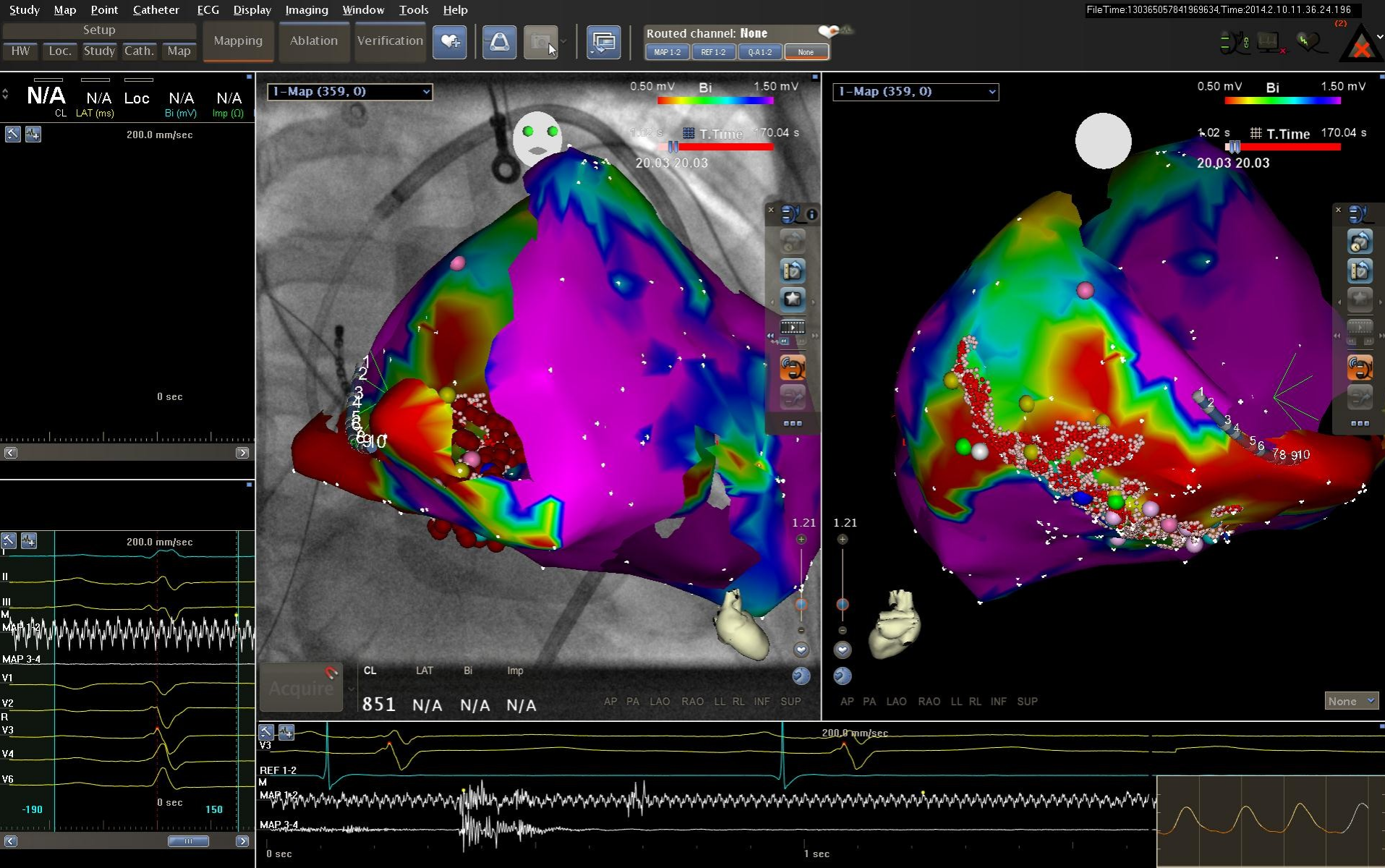


~ 40% VT pts with DCM

VT Features in Patients With DCM

- *Significant number of the VT re-entry circles are **epicardially localized**,*
- *Frequent appearances of **different VT morphology, (2,9 ± 1,7 per patient)***
- *Difficulty in producing VT during the **EP study**,*
- *More frequent low voltage areas occurrence (**72 %**) in mitral and **tricuspid annulus***

VT Features in Patients With DCM



EKG Features Indicating Epicardiac Localization

	Finding	Definiton	Sen	Speci
	QRS dur. ≥ 198 ms	Total QRS duration	86%	69%
	Pseudo Δ wave > 34ms	Earliest ventricular activation to erliest fast deflecton in any precordial lead	80%	80%
	RS complex duration ≥ 121 ms	Interval form earliest ventricular activation to peak of R wave in lead V2	82%	57%
	Intrinsicoid deflection time ≥ 85 ms	Interval from earliest ventrivular activation to nadir of the first S wave in any precordial lead	80%	50%
	Delayed maximal peak deflection index		100%	98,7%

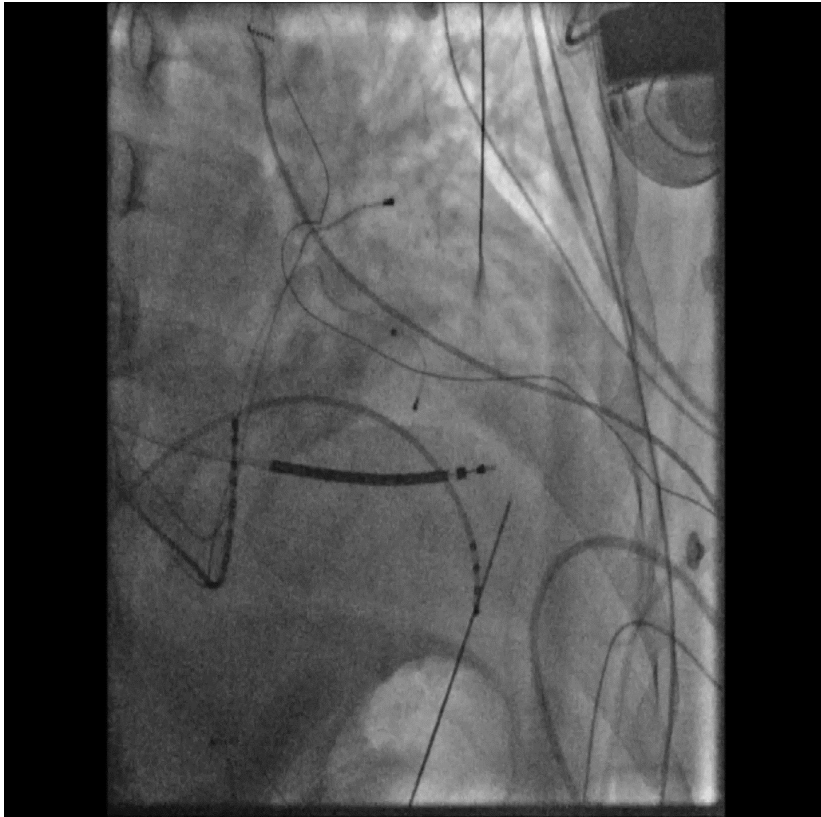
Epicardiac Radiofrequency Ablation



Epicardial Approach



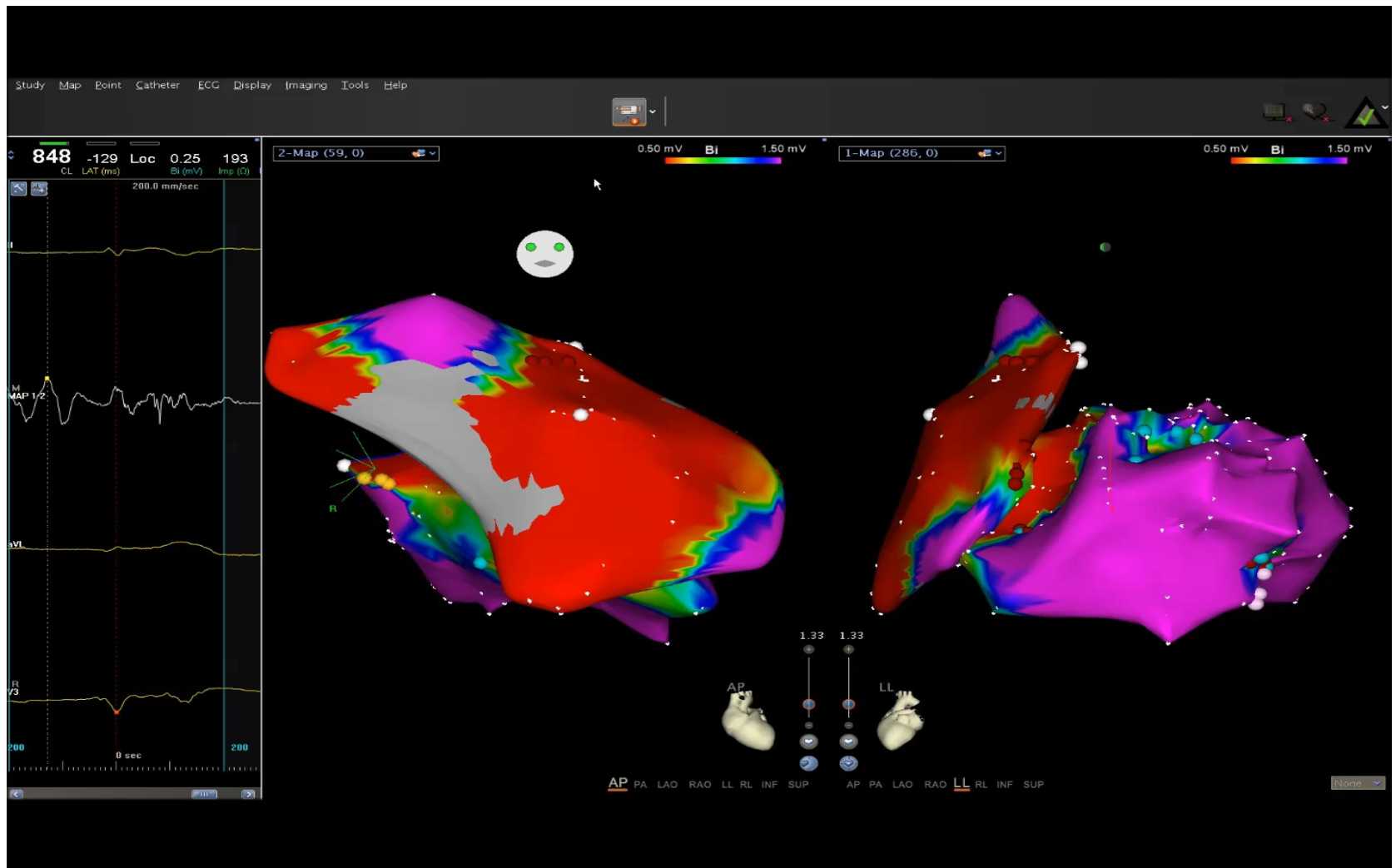
Epicardial Approach



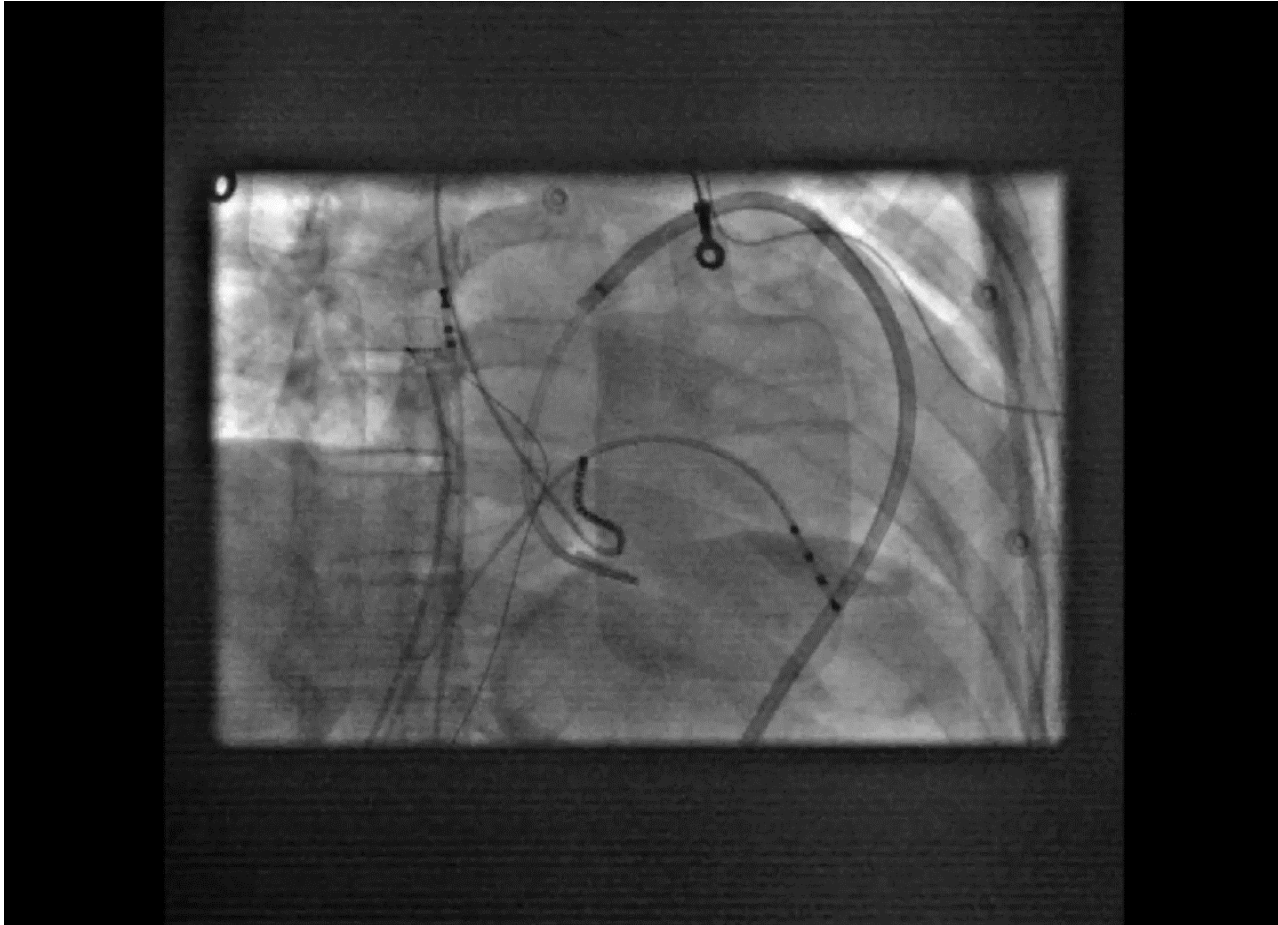
Epicardiac Approach



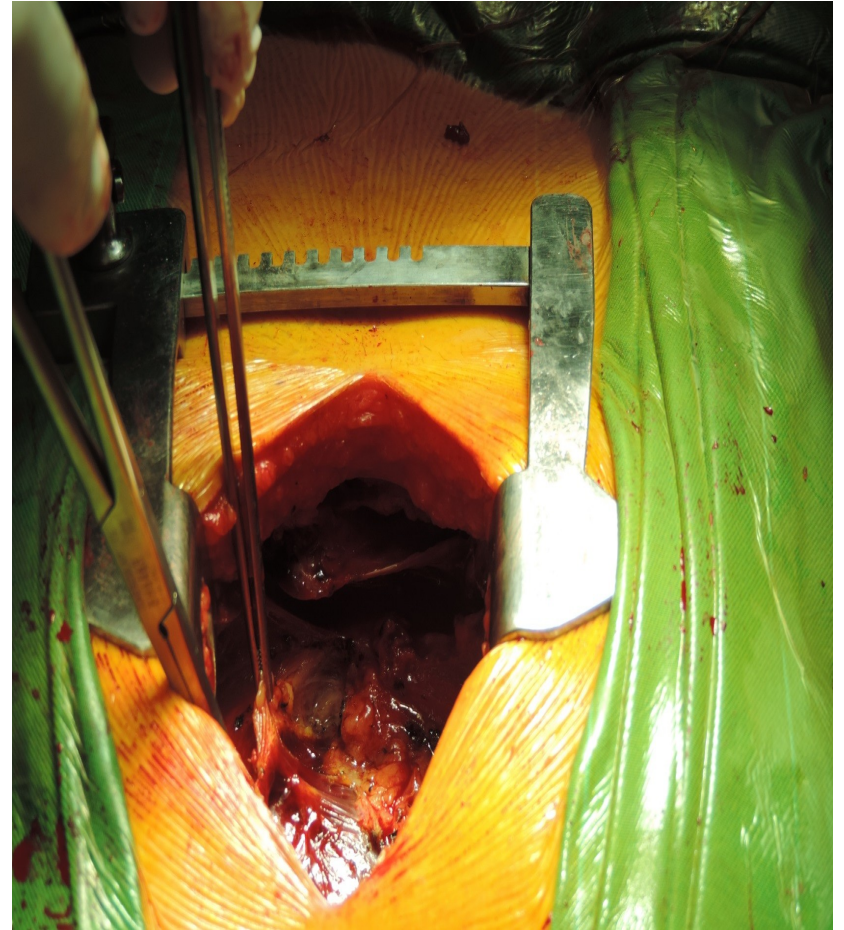
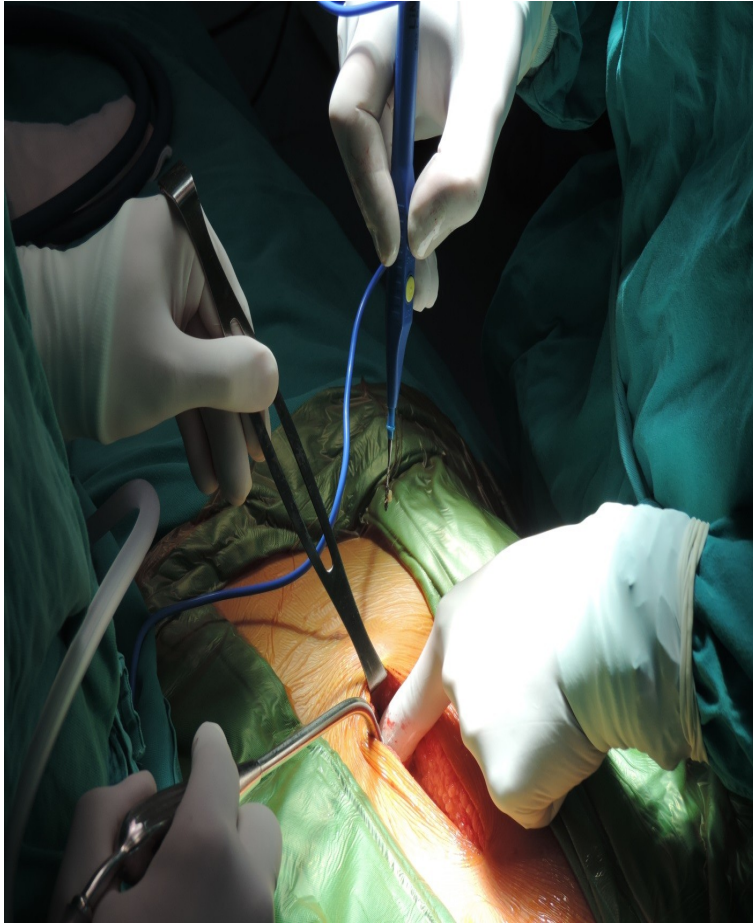
Endo - Epicardiac Mapping



Epicardiac Approach



Redo Procedure



Summary

1. **ICD remains the golden standard in the treatment of pts with structural heart disease and malignant arrhythmias, exclusively when dominantly used as antitachycardia pacing.**
 2. **For the time being, the catheter ablation is an adjuvant therapy, which if technologically developed, may become a leading therapeutic approach in patients with structural heart disease and malignant arrhythmias**
-

2017.



Thank you for your attention