



Ethanol Infusion into the Cardiac Veins to Treat Ventricular Tachycardia Arising from the Left Ventricular Summit.



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COI Disclosure

Kaoru Okishige:

The authors have no financial conflicts of interest to disclose concerning the presentation



LV summit ventricular arrhythmia remains challenging to ablate as substrates are often midmyocardial. Subxiphoidal epicardial access raises procedural risk and has a modest success rate.

Circ AE 2015;8:337-343

RF ablation in the CS and its tributaries allows access to the epicardium but is limited by inability to place the ablation catheter in the appropriate vessel, impedance rises, and proximity to coronary arteries.

Other therapeutic option has to be considered.

Trans-venous Chemical Ablation

Retrograde Coronary Venous Infusion of Ethanol for Ablation of Canine Ventricular Myocardium

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JCE 1998;9:976-984

Macroscopic view

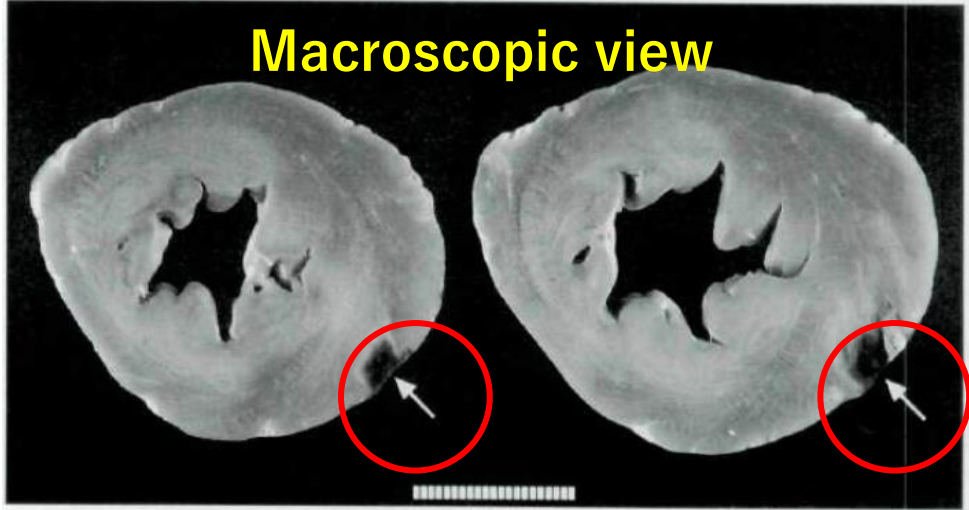
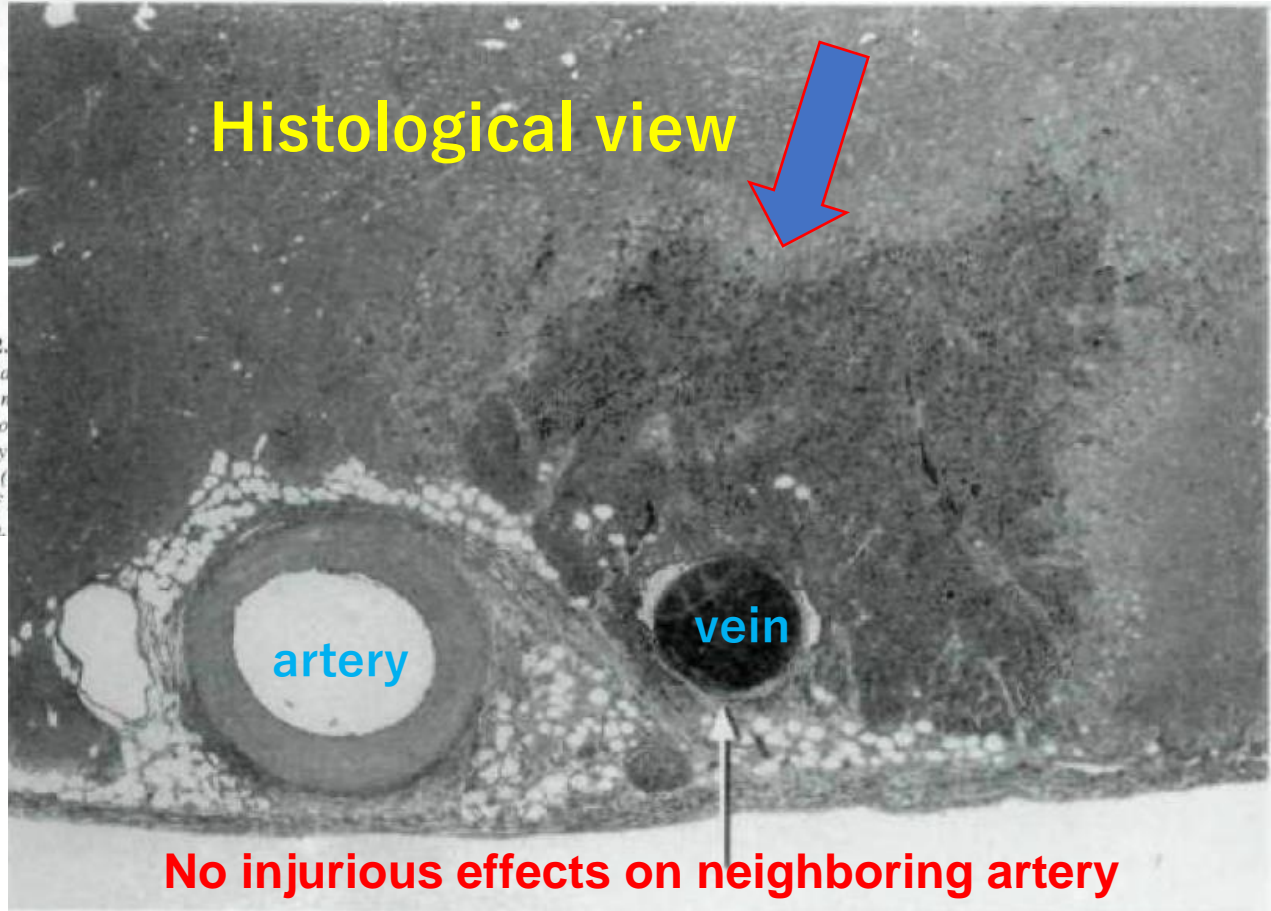


Figure 2.
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of ethano
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fusion of
nary vein.

Histological view

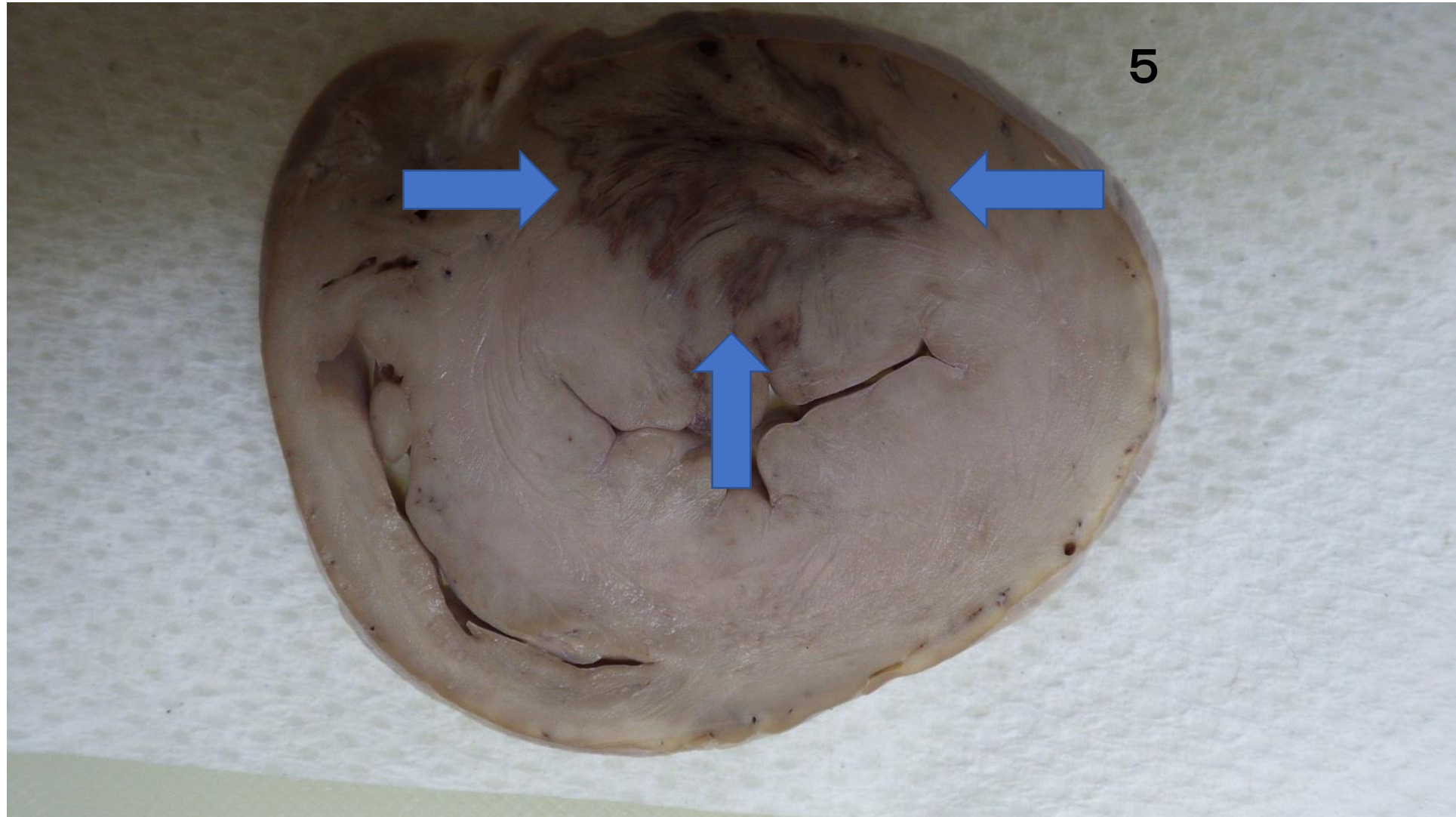


No injurious effects on neighboring artery

Mechanism of tissue injury by intravenous ethanol infusion

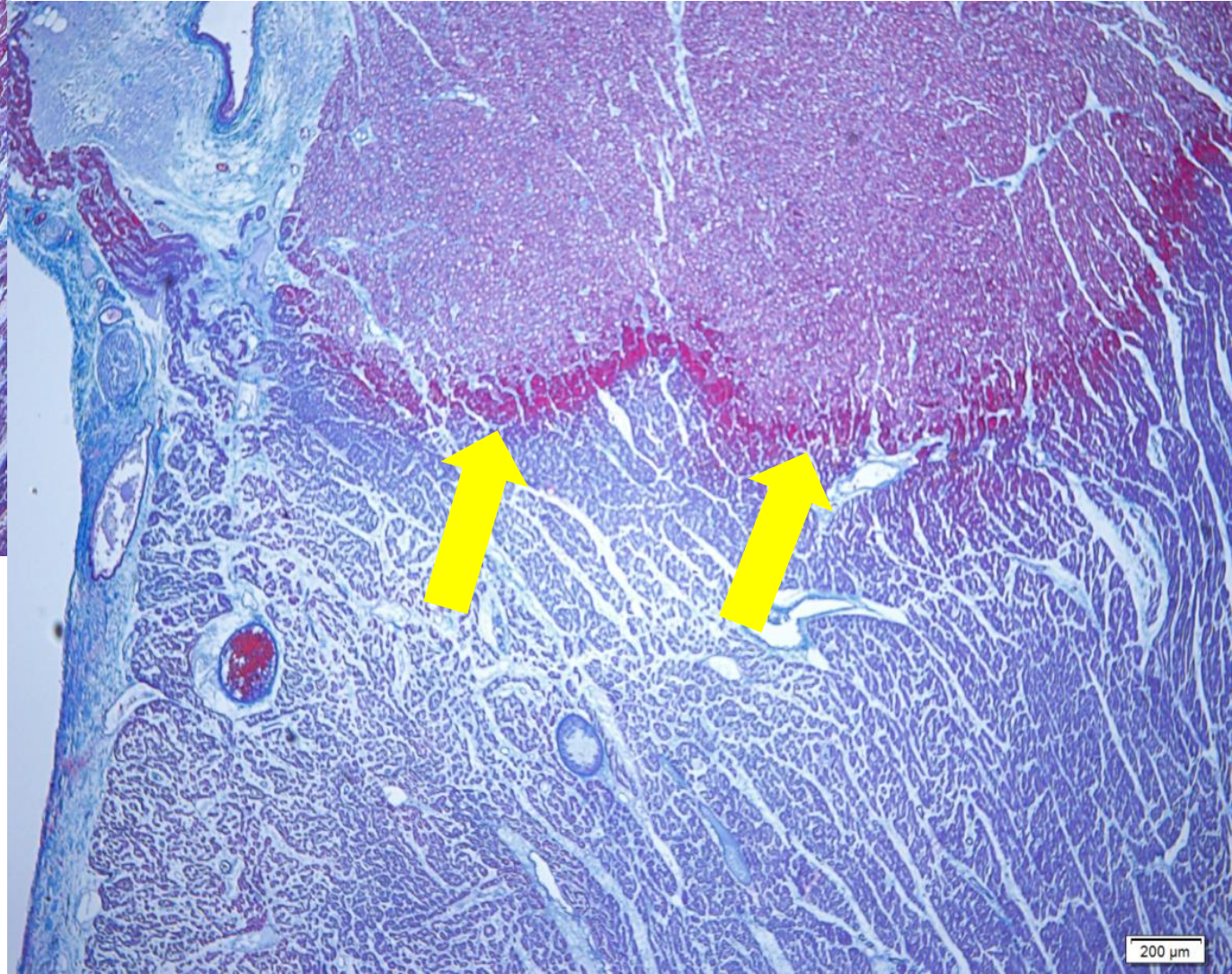
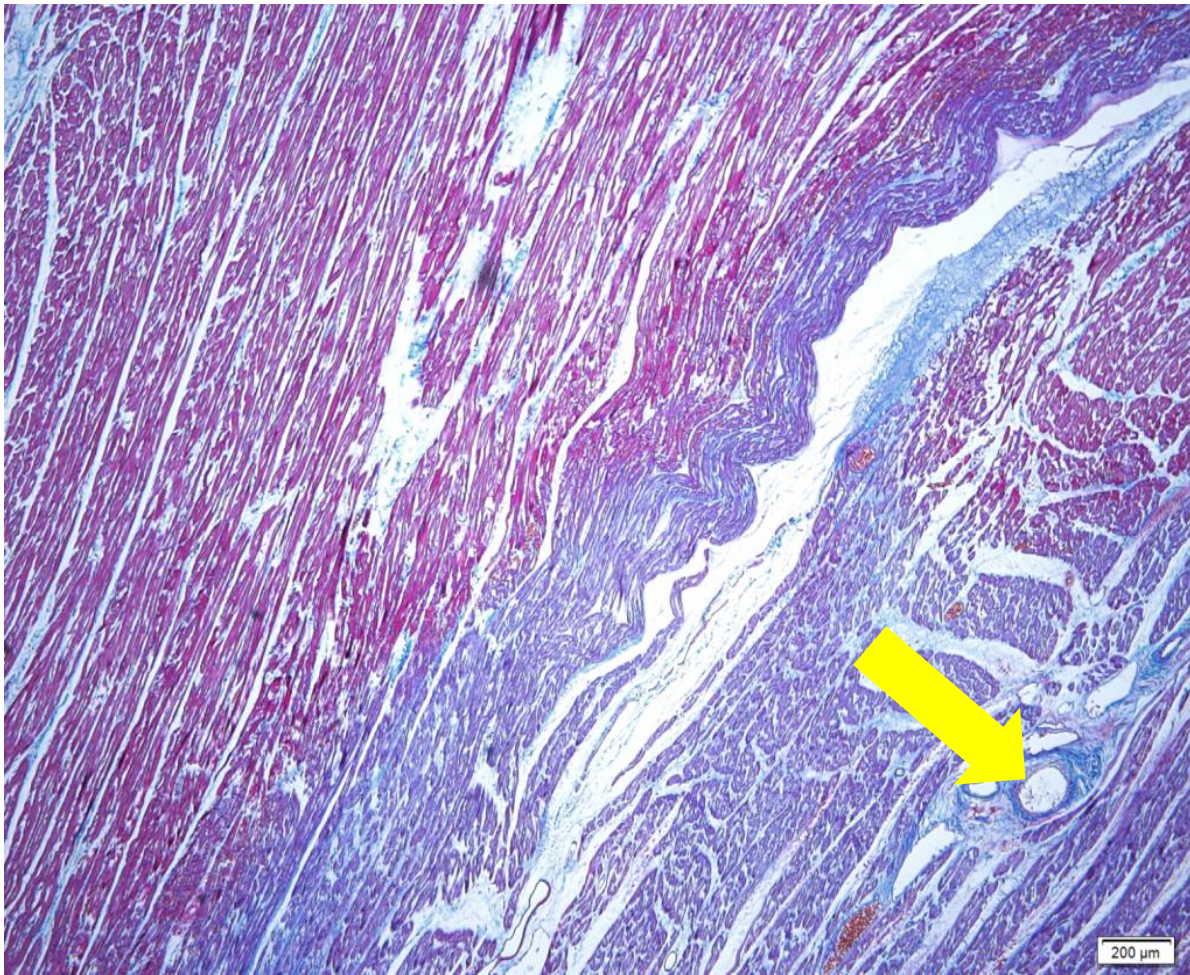
- One report offered
 - ▼ *the direct ethanol toxicity to the target tissue*
 - ▼ *the tissue infarction by the loss of venous perfusion*
as the important mechanism of lesion formation of
coronary venous EI .

Infarcted Area after Ethanol Injection



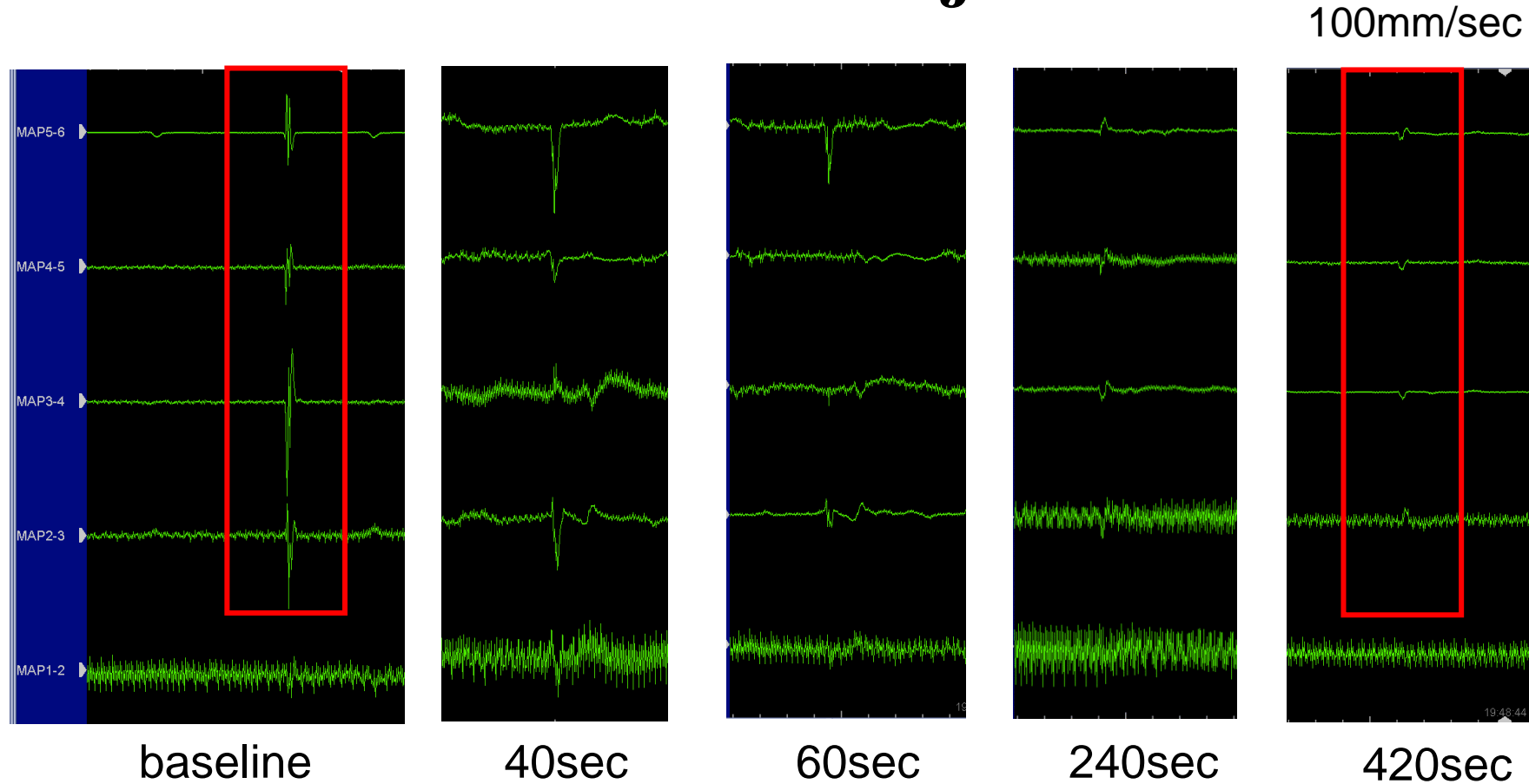
Courtesy of Prof. O. Igawa

Histological Findings



Courtesy of Prof. O Igawa

Time course change of intra-cardiac Electrograms after Ethanol Injection



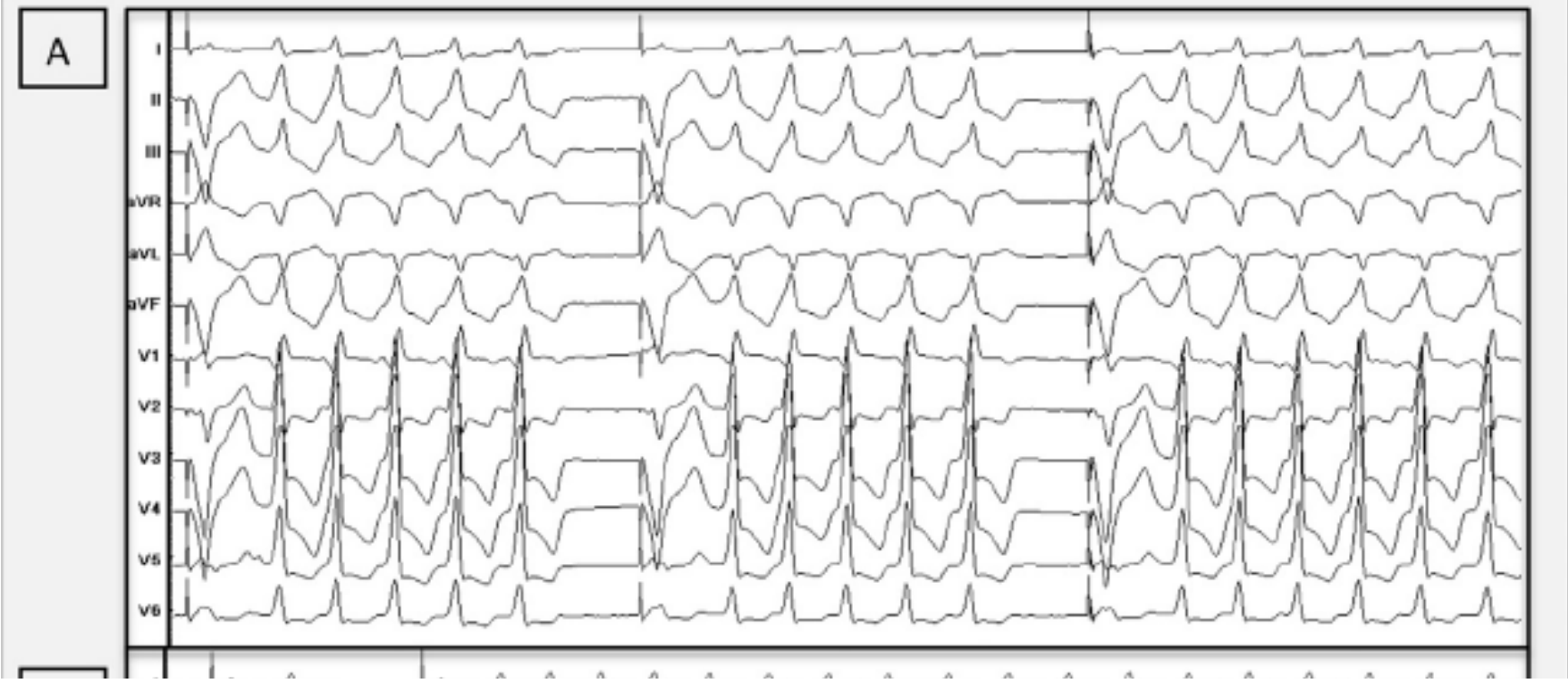
Okishige. K, Keida T. Igawa. O

A case of incessant VT from an intramural septal focus: Ethanol or bipolar ablation?

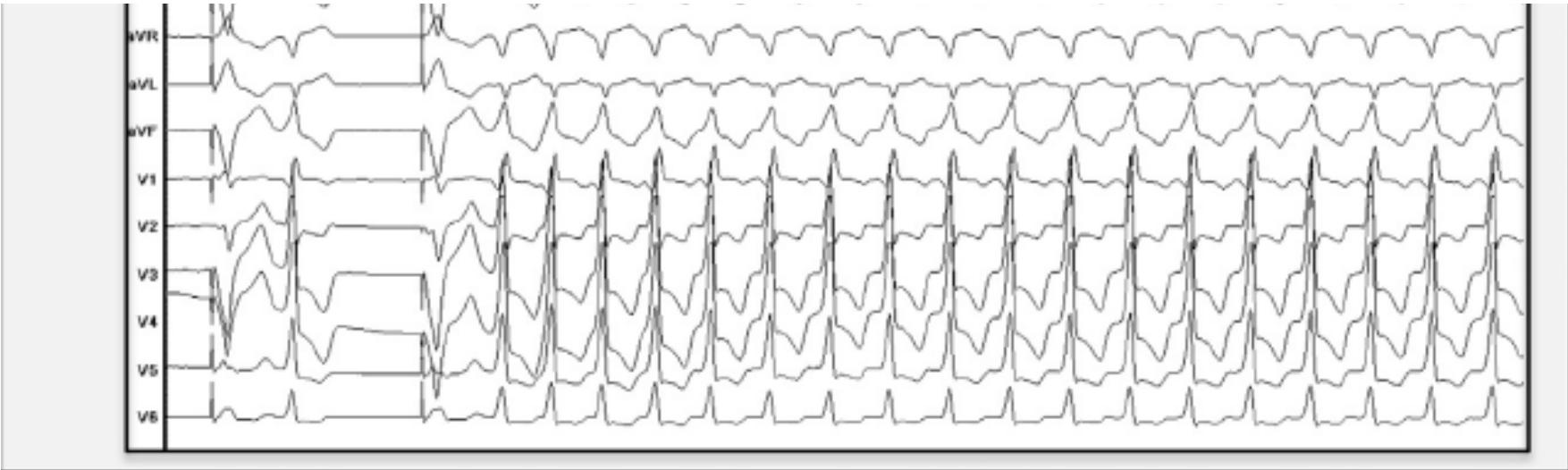


Benjamin Berte, MD, Nicolas Derval, MD, Frederic Sacher, MD, PhD, Seigo Yamashita, MD, PhD,
Michel Haïssaquerre, MD, PhD, Pierre Jaïs, MD, PhD

(Heart Rhythm Case Reports 2015;1:89–94)



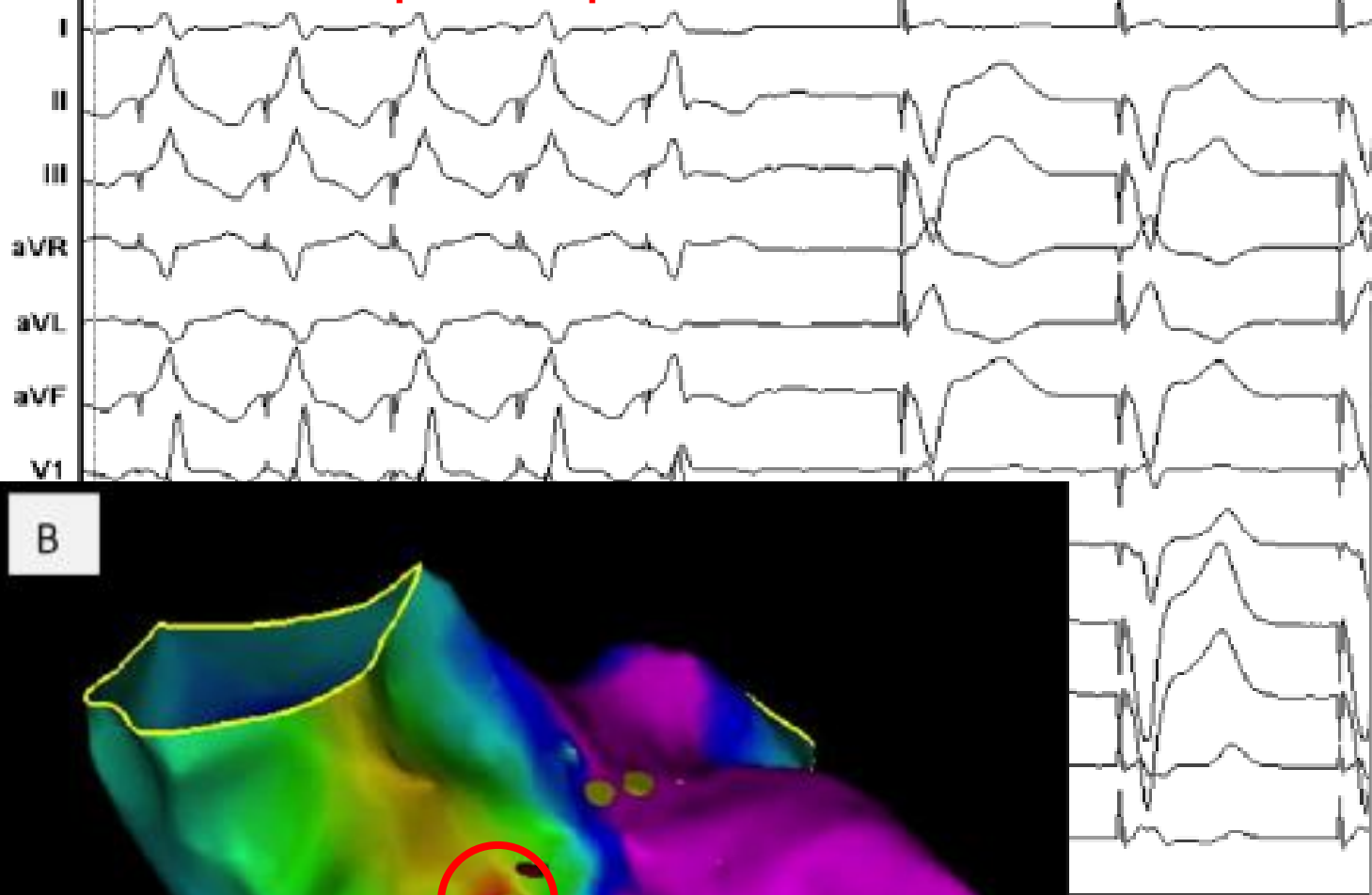
suggesting an exit site at the aortomitral continuity.



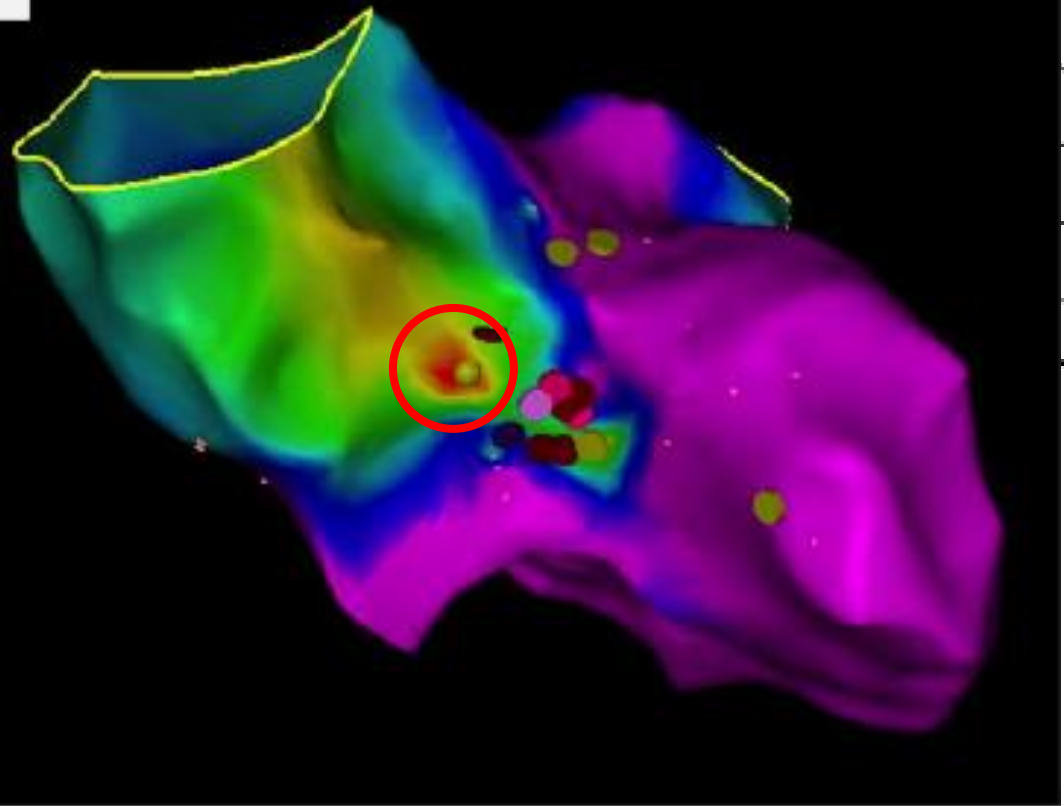
81 yrs old, male
3 vessel disease

Perfect pace map 12/12

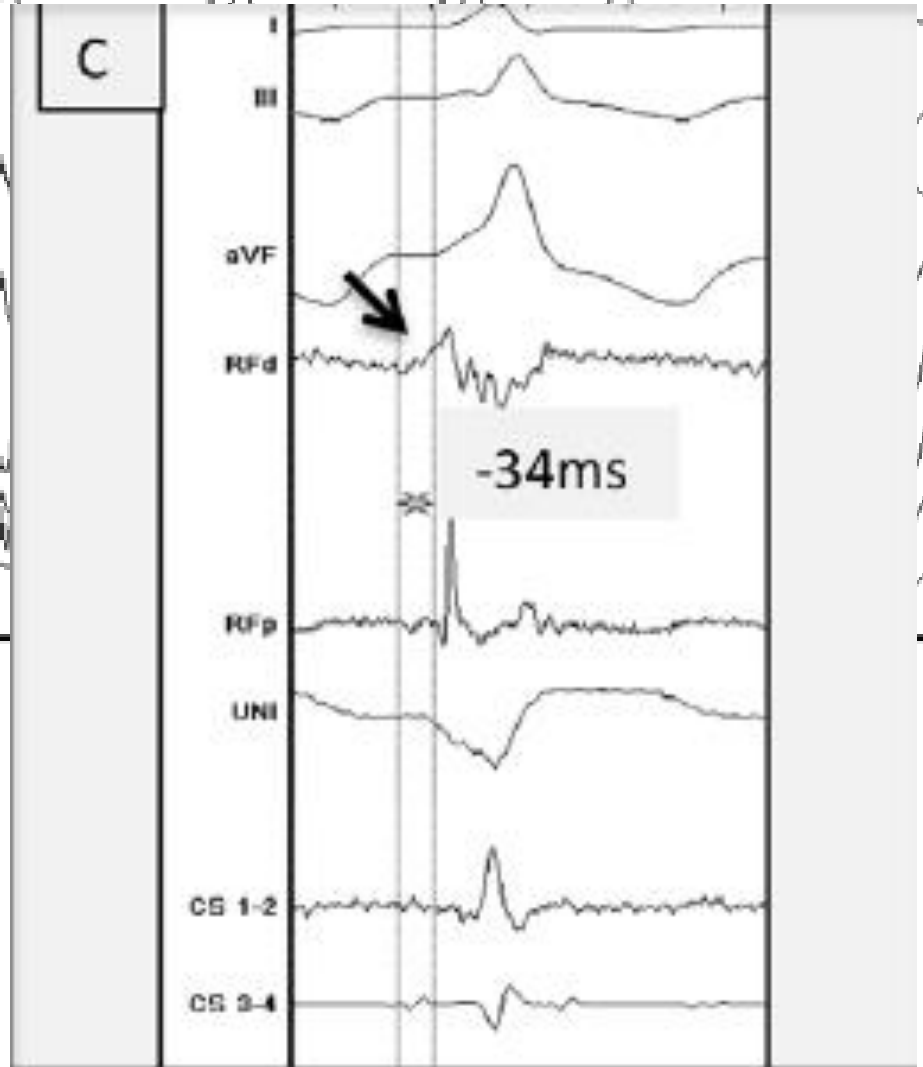
A



B

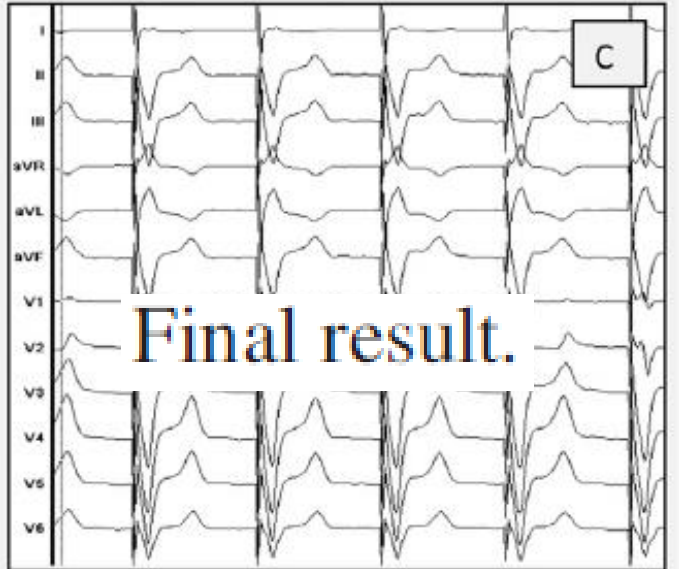
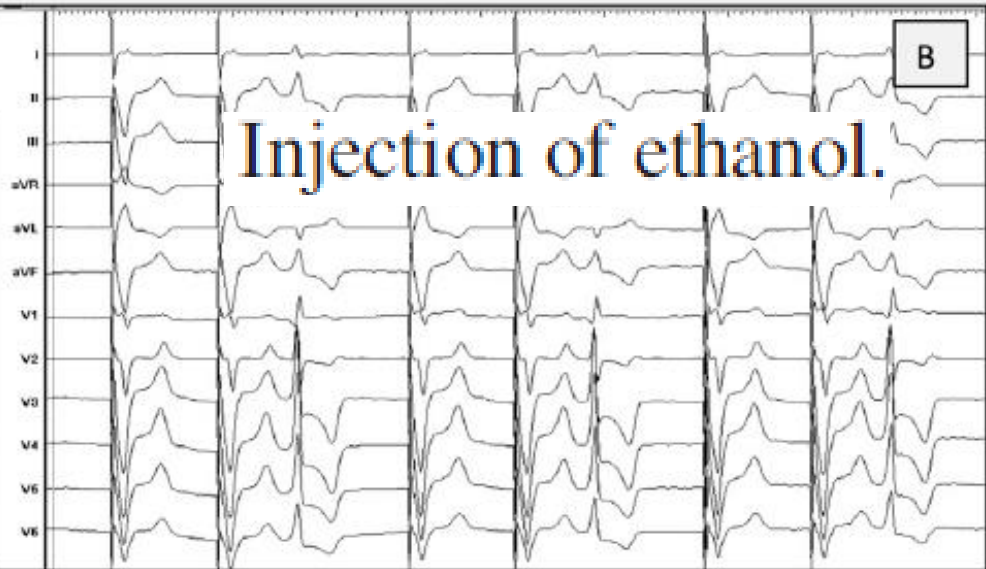
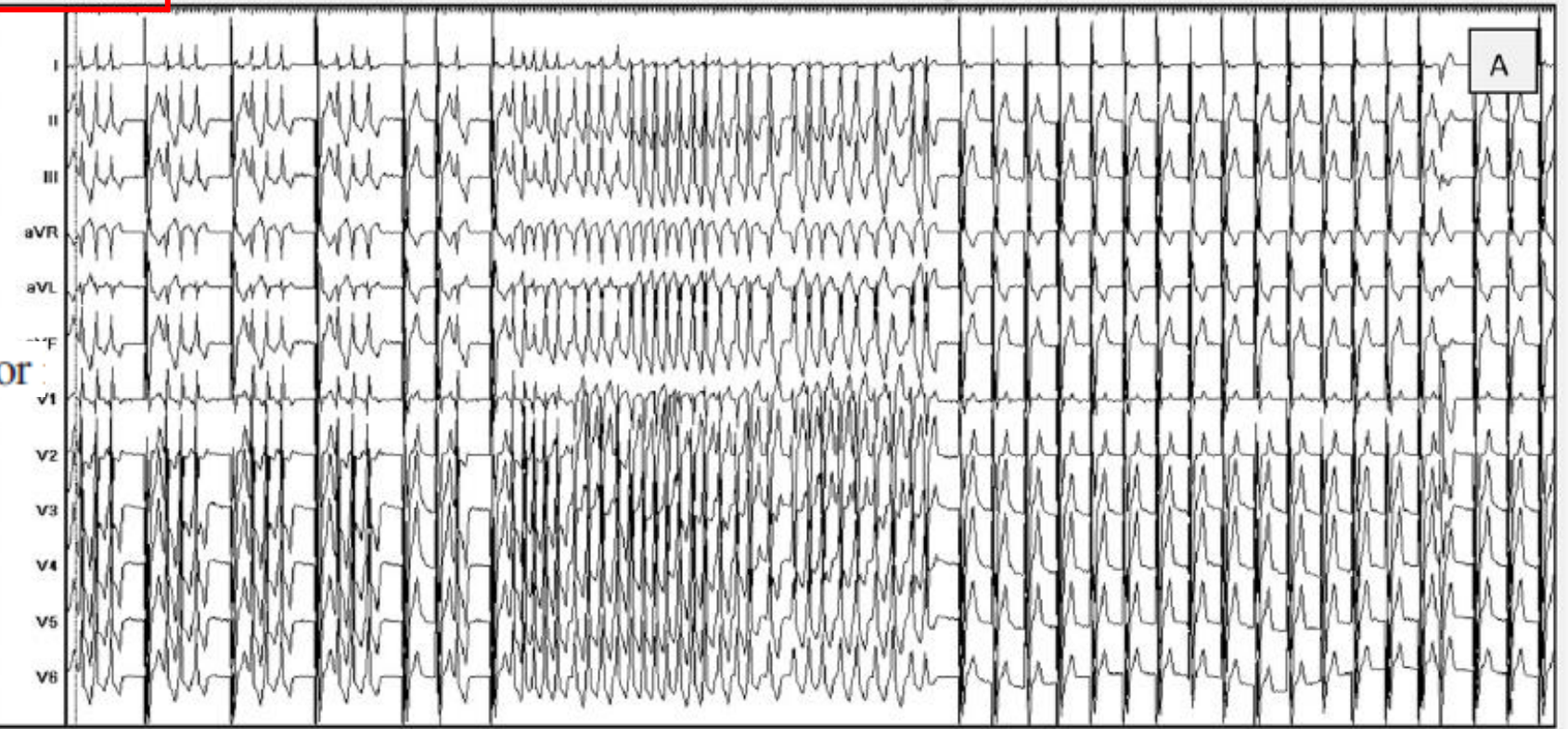
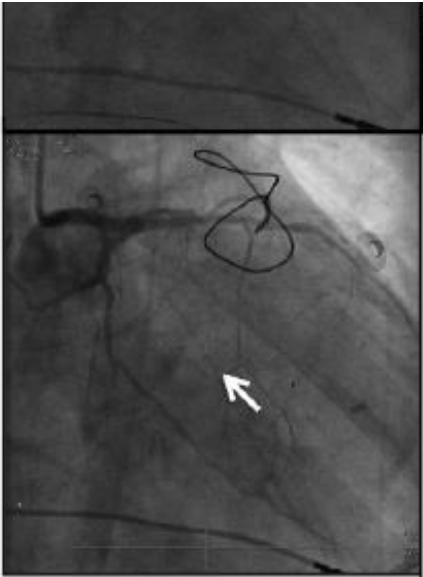
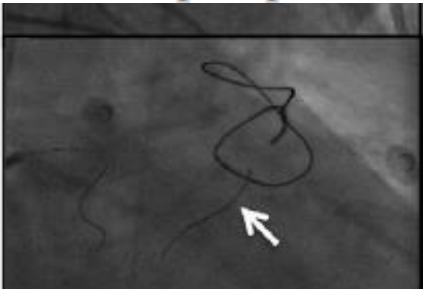
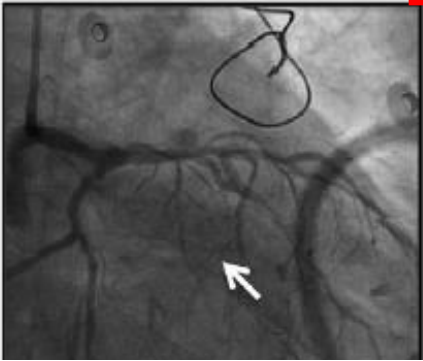


C




Iced saline

30sec



Chemical ablation of ventricular tachycardia arising from the left ventricular summit

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doi: [10.1002/ccr3.1397](https://doi.org/10.1002/ccr3.1397)

Case Presentation

38 years old, male

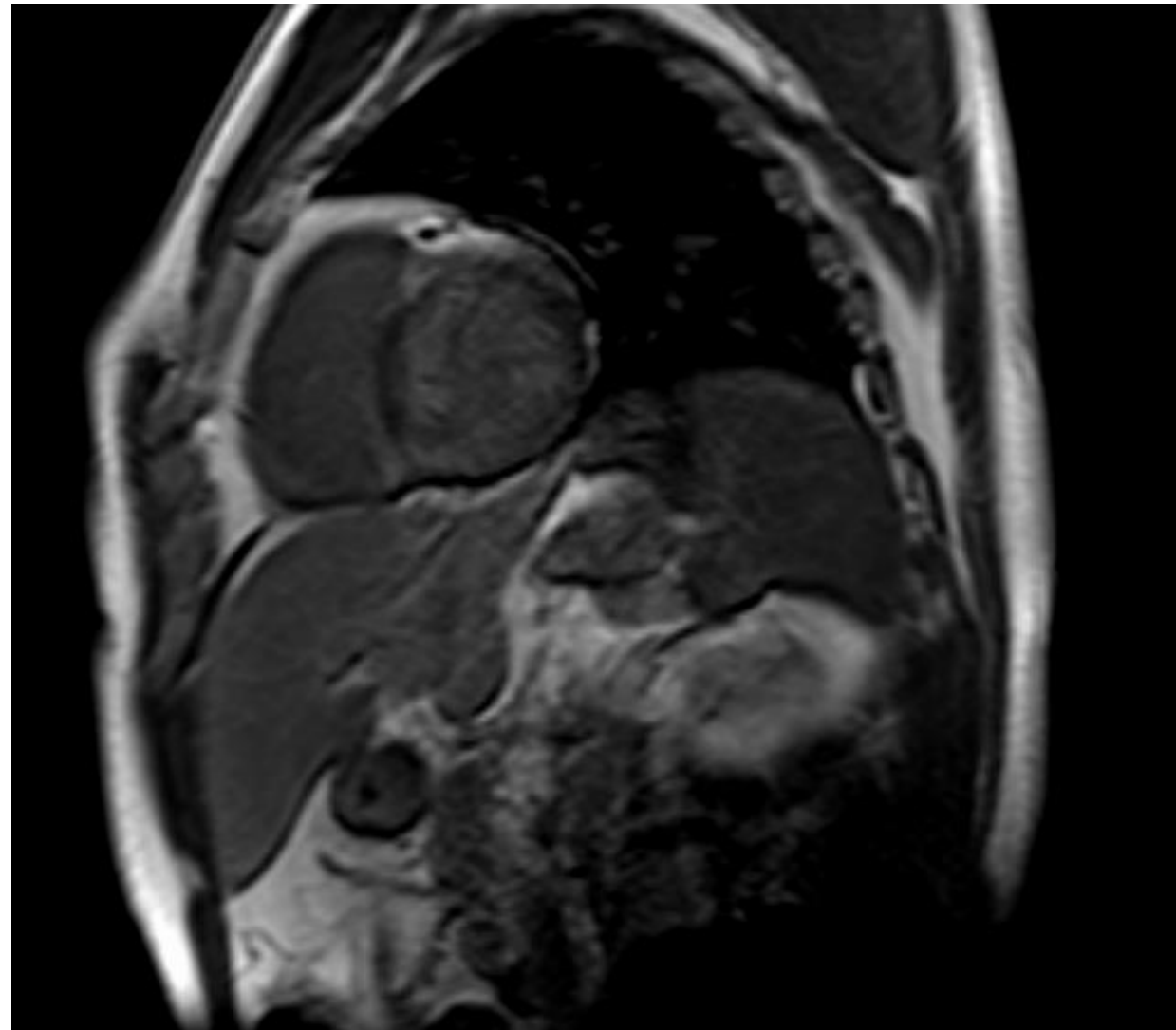
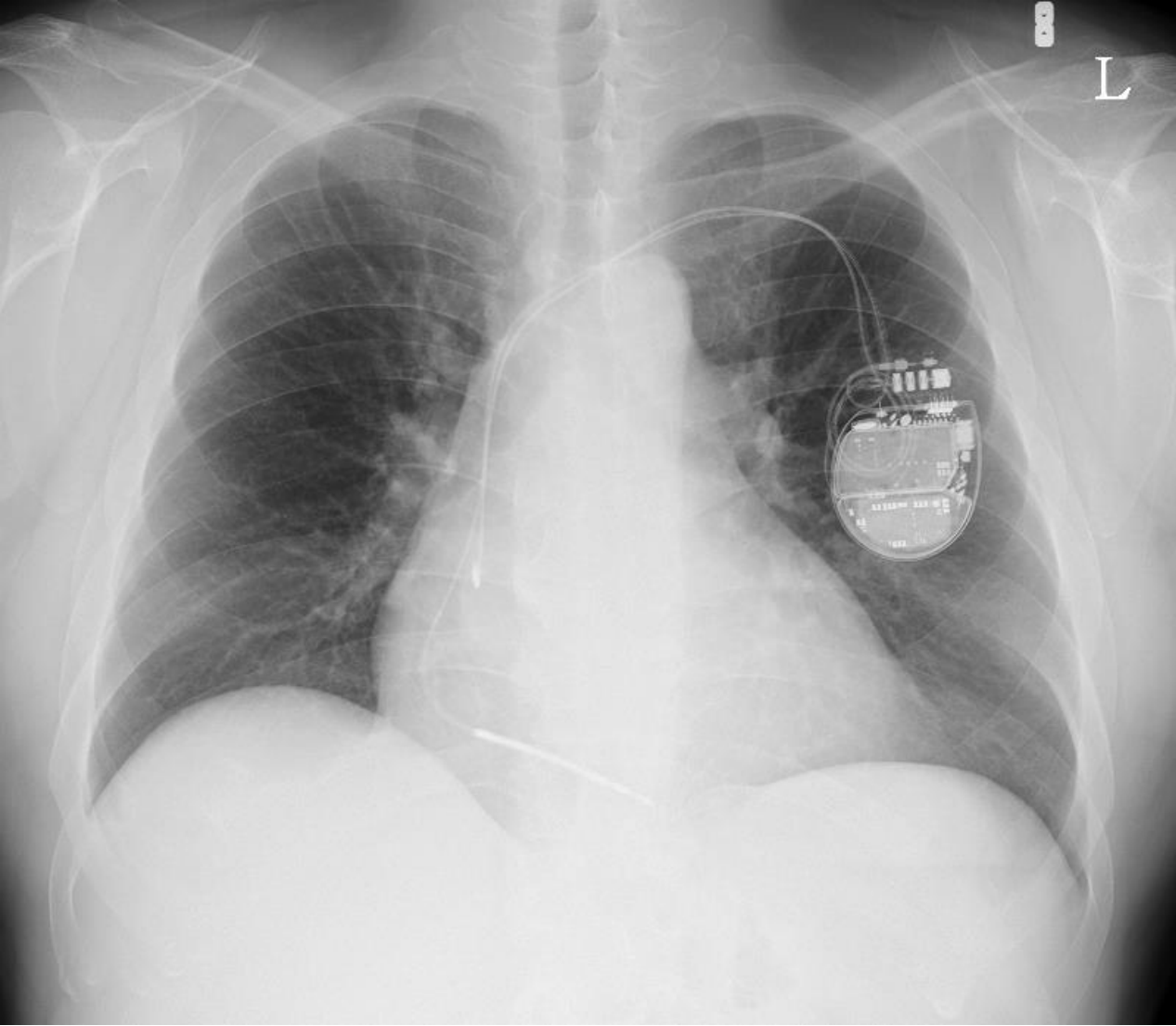
Current History:

2012, December Hospitalized for treatment of CHF,
and diagnosed as HCM.

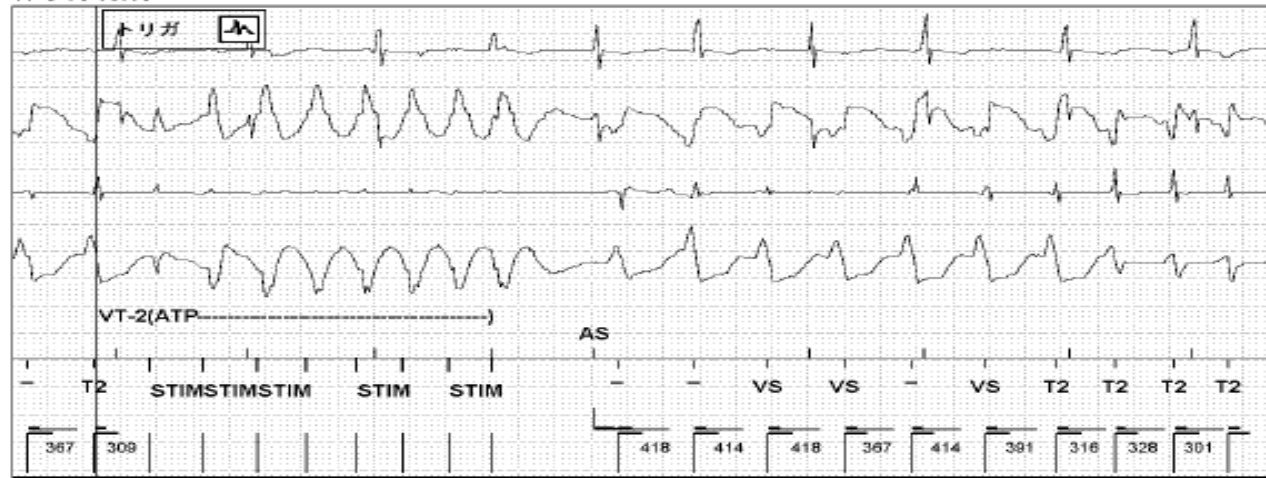
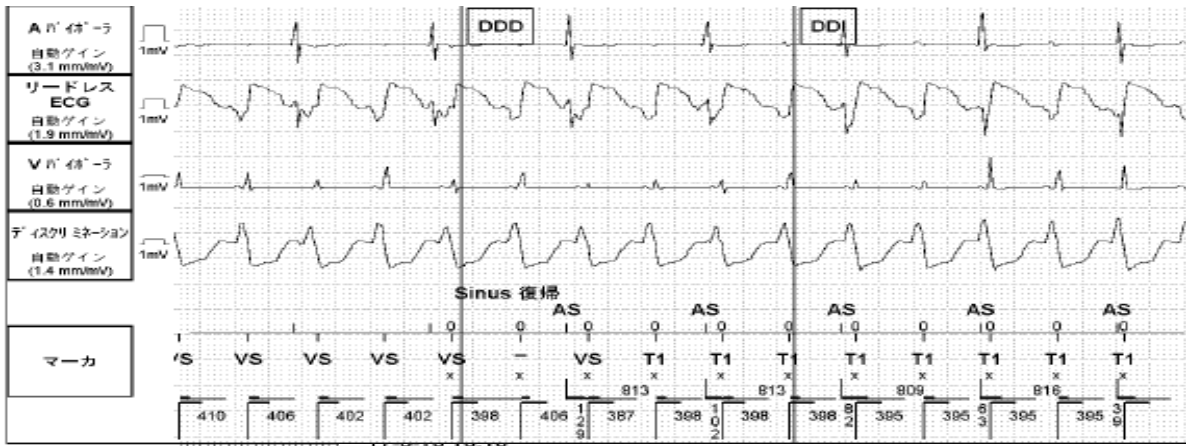
2014, October ICD was implanted for sustained VT
RF catheter ablation

2016, September VT was non-inducible by EP Study
under Tx of d, l-Sotalol & Mexiletine.

2017, June Appropriate treatment of ICD for sustained VT.



EGM of VT



VT acceleration by ATP

---episode---

VT/VF	48	NSVT
32		
ATP	59(VT-1)	2(VT-2)
DC		1(VT-2)



12 leads- ECG of VT

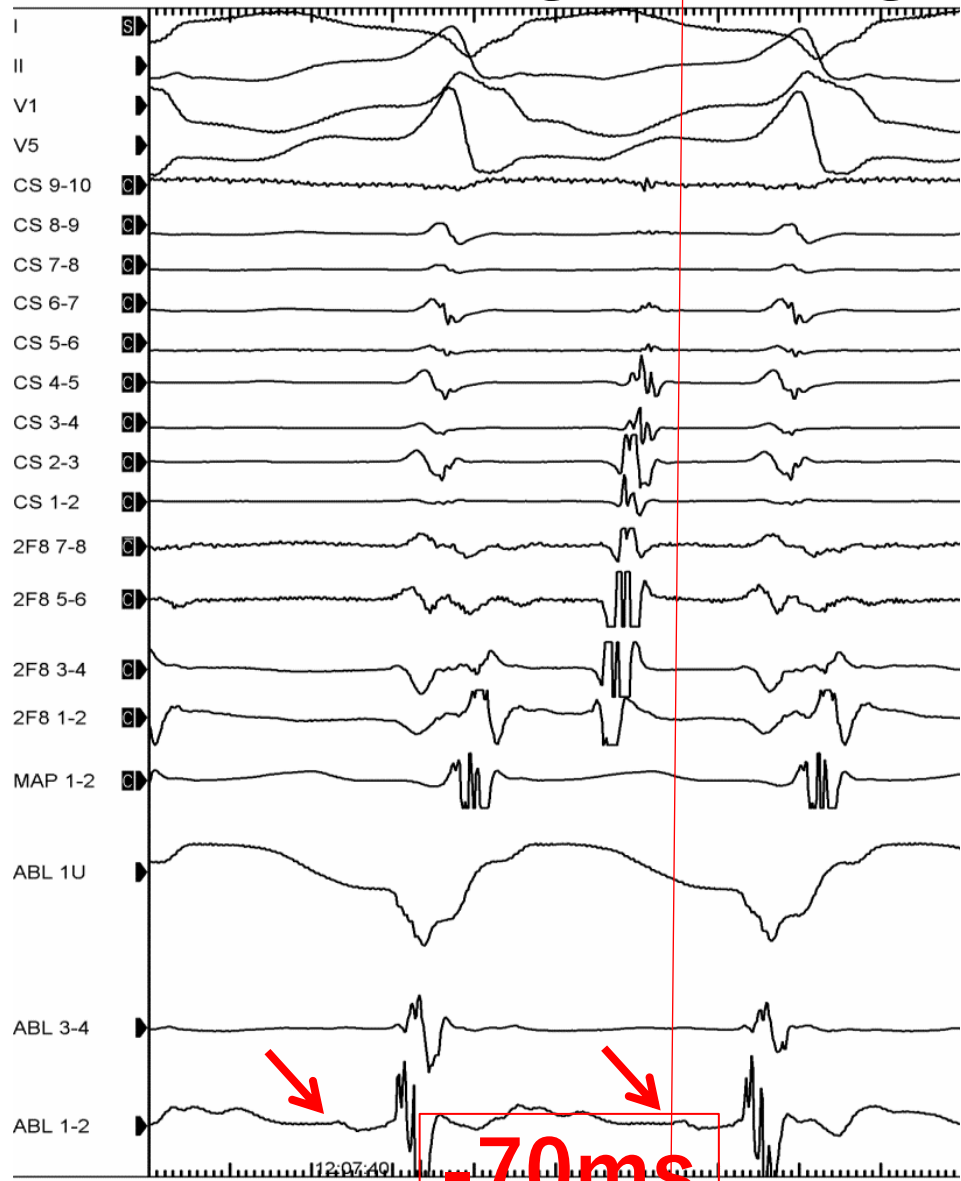


2014

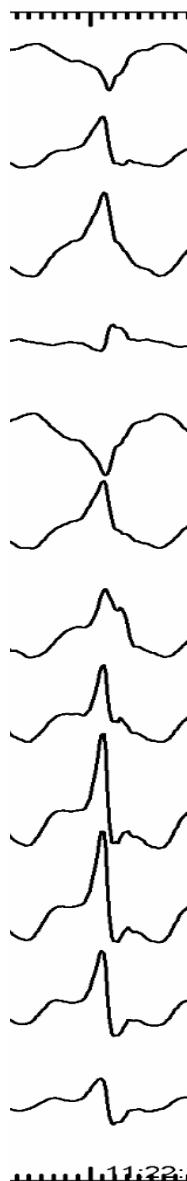
2014

RF catheter ablation

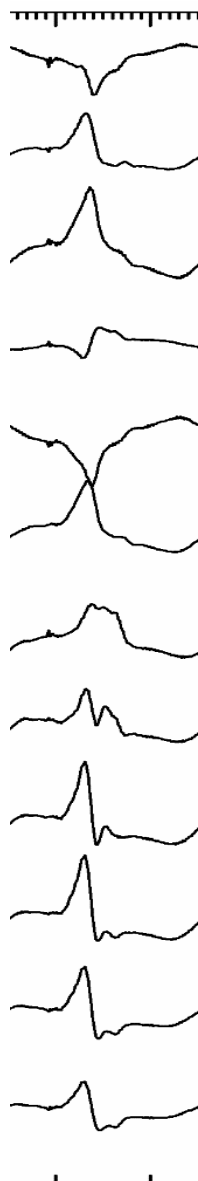
Intracardiac electrograms during VT



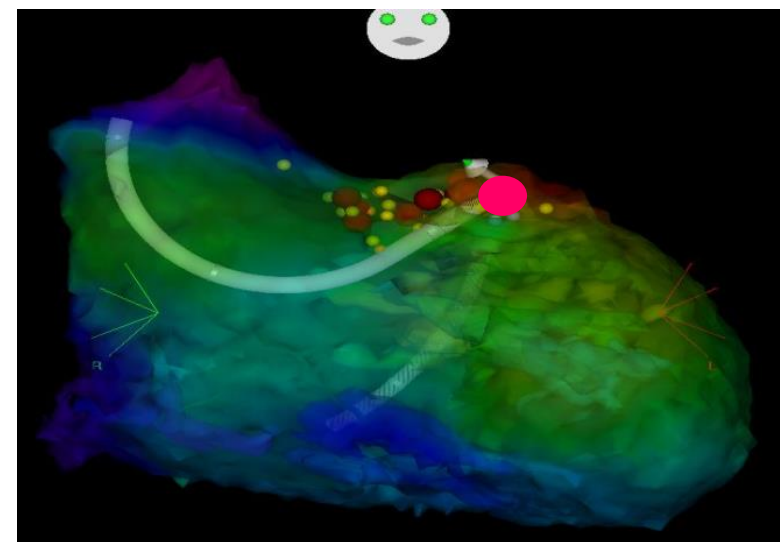
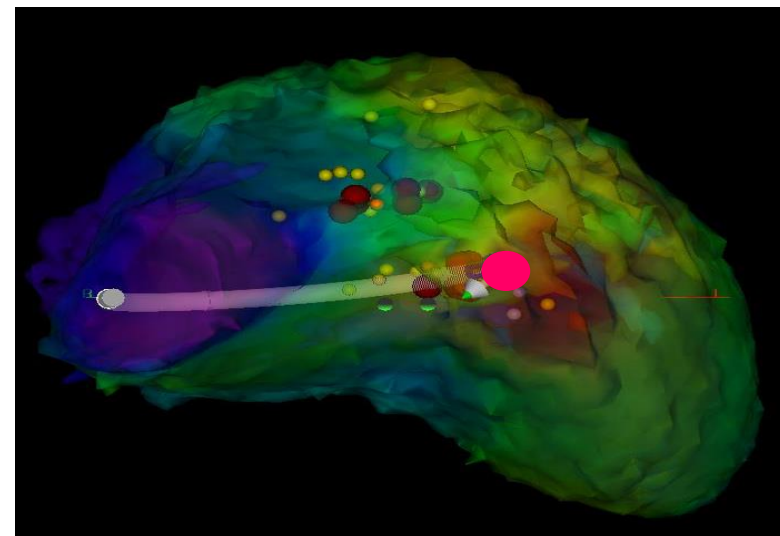
VT



pacemap

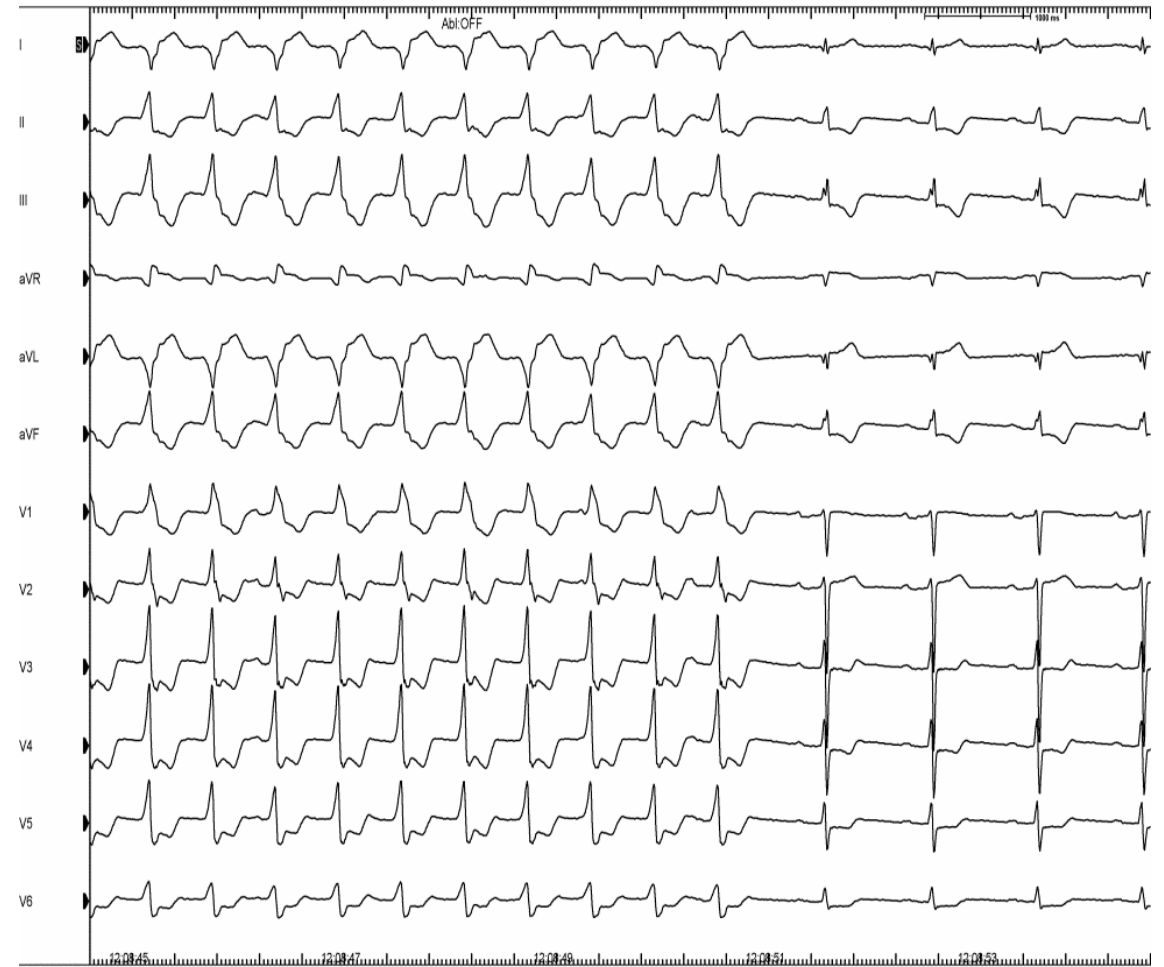
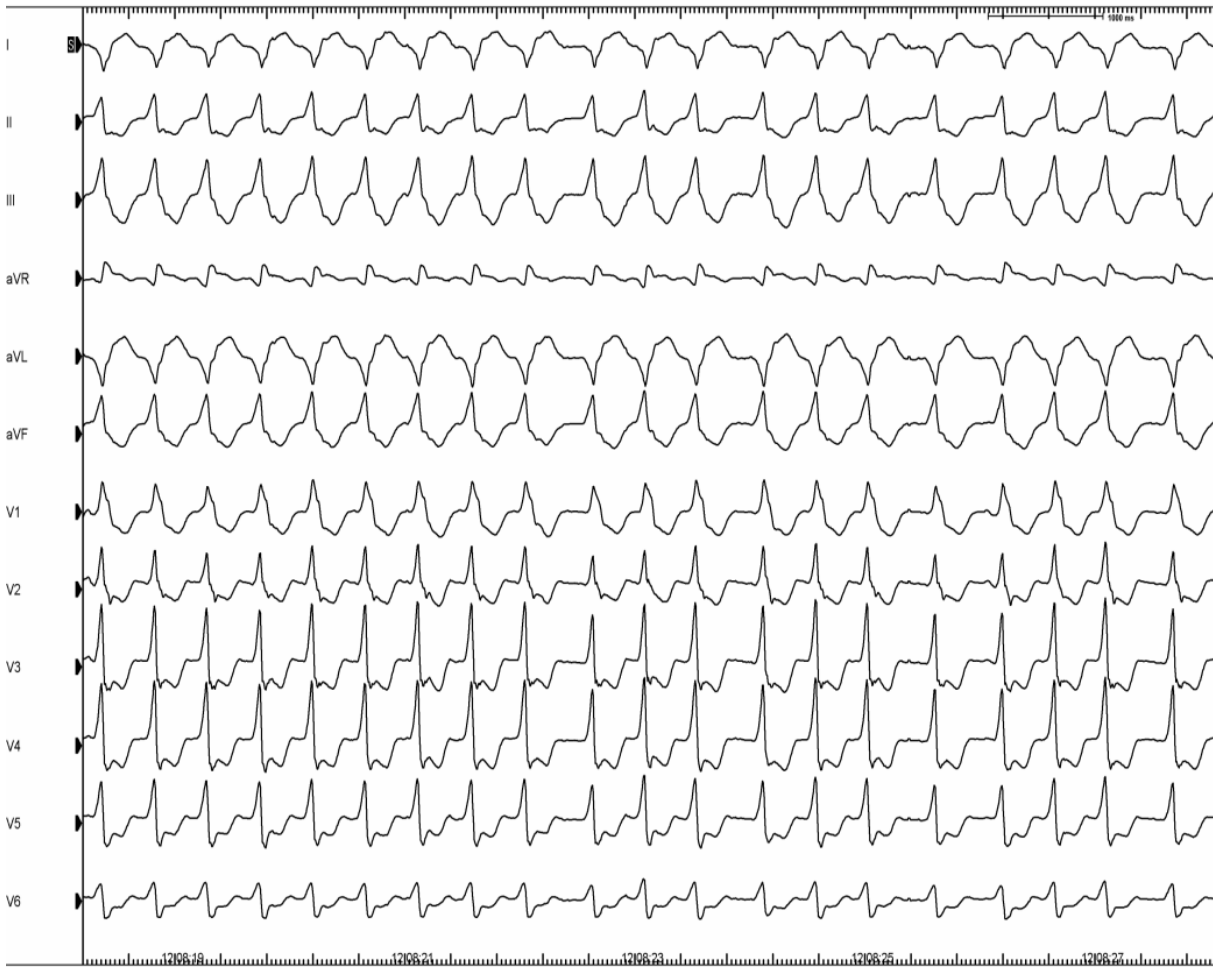


Activation map of VT



VT termination by RF delivery

RF
↓



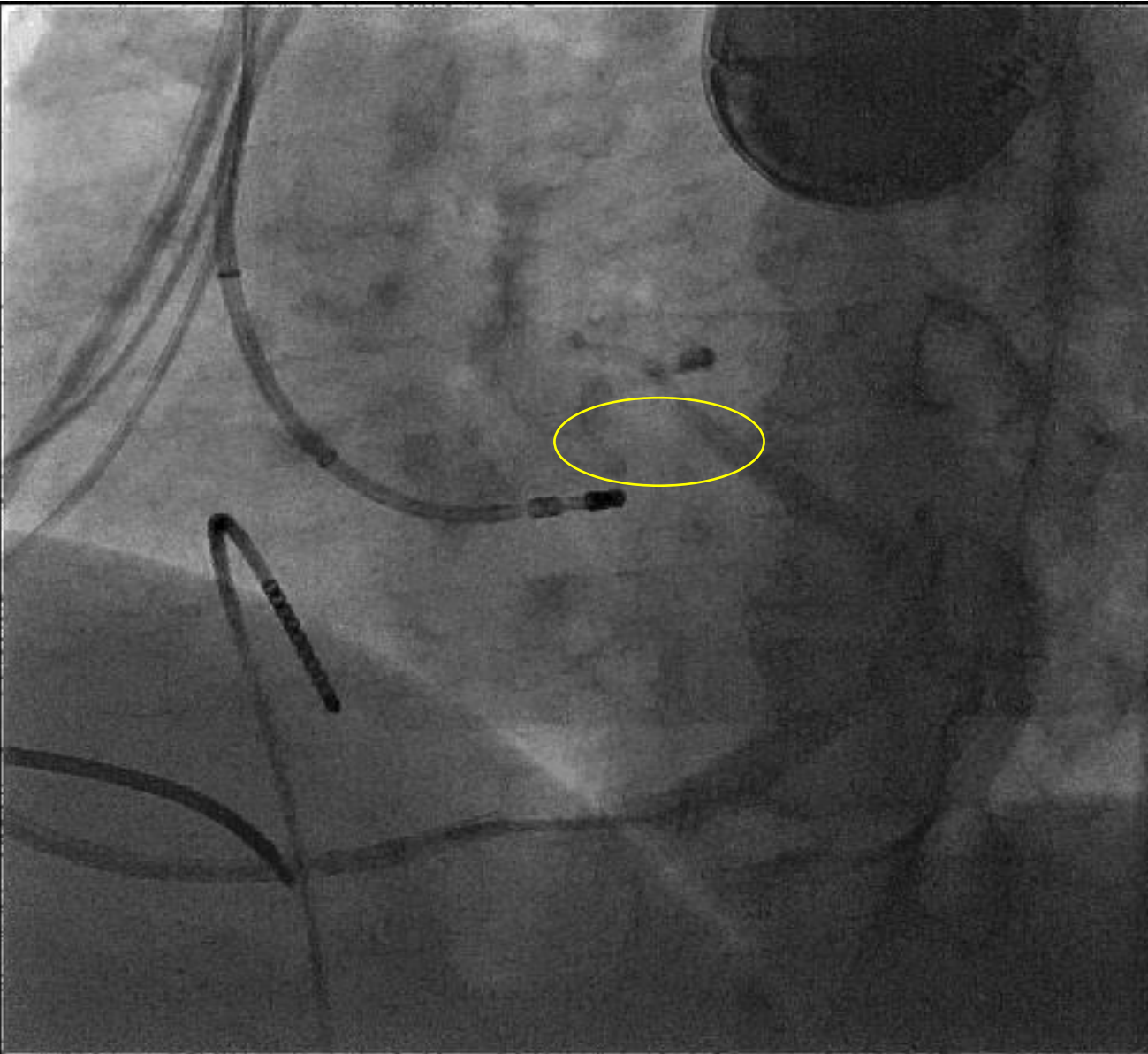
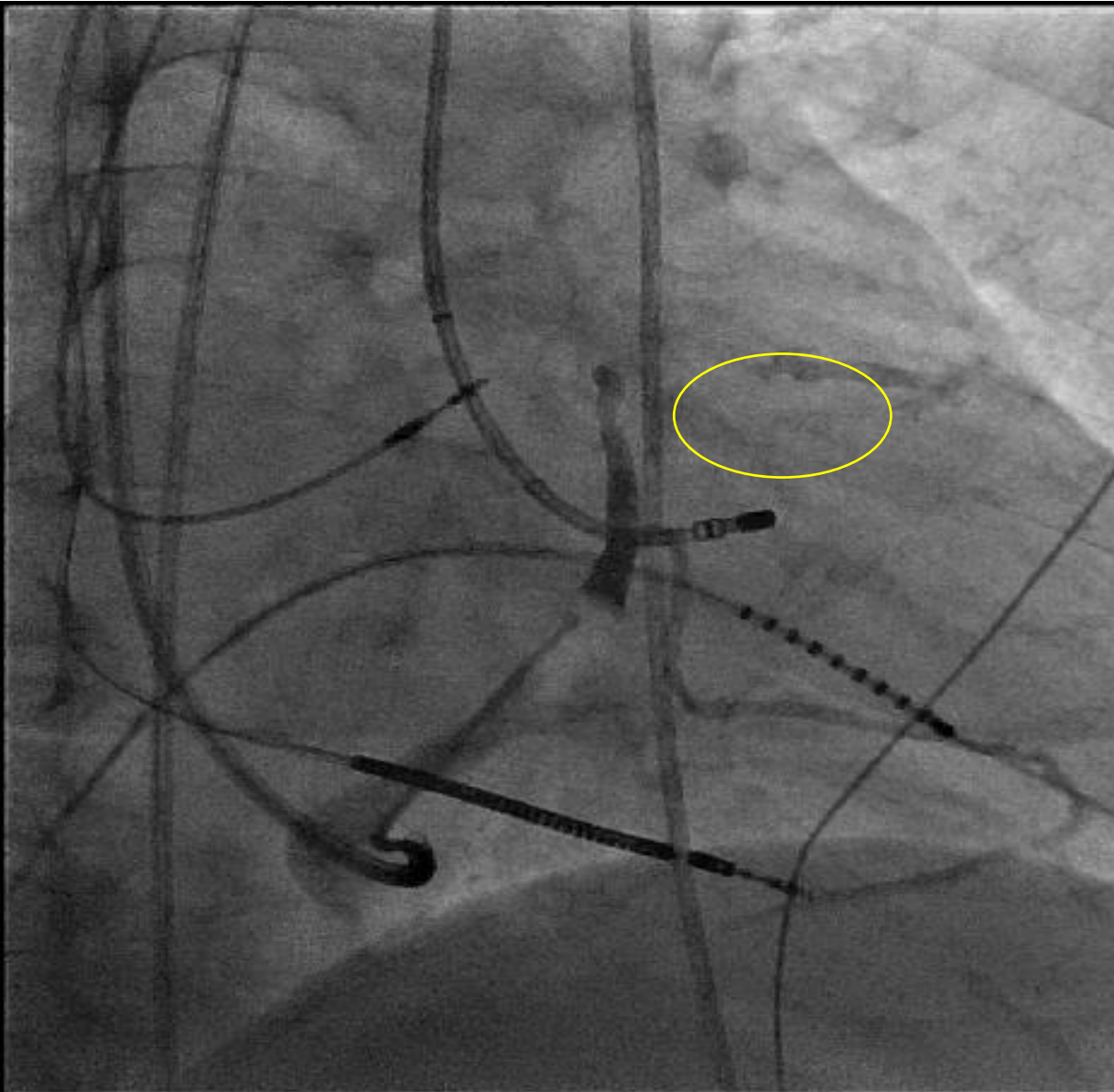
Significant prolongation of VT cycle length

VT termination during RF application

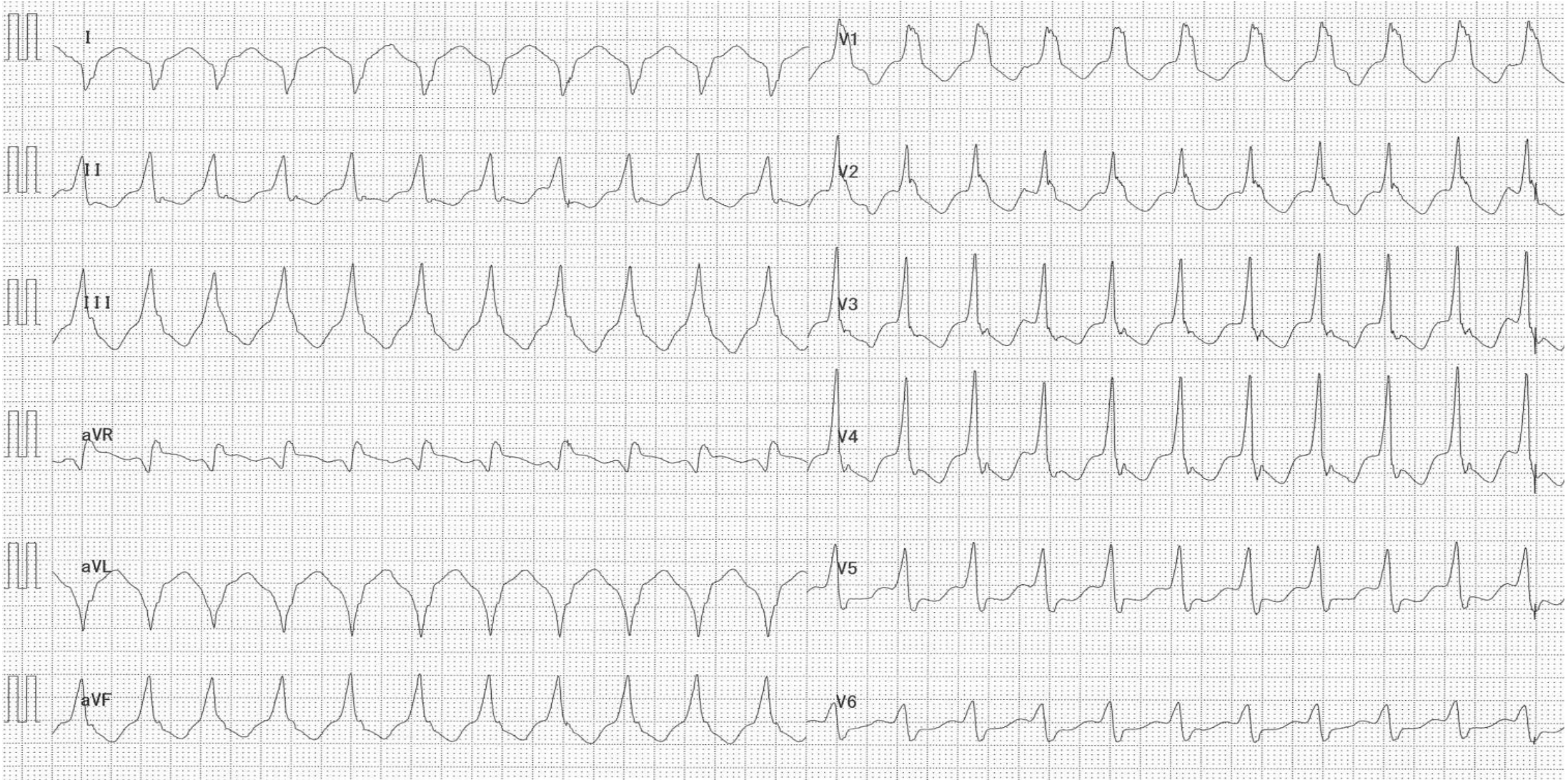
Spatial relationship between endocardia ablation success site and cardiac vein location

RAO 30

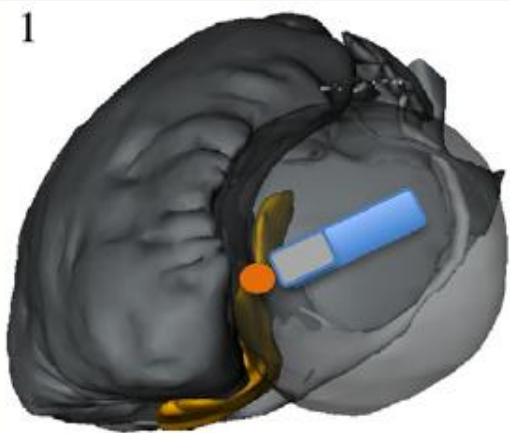
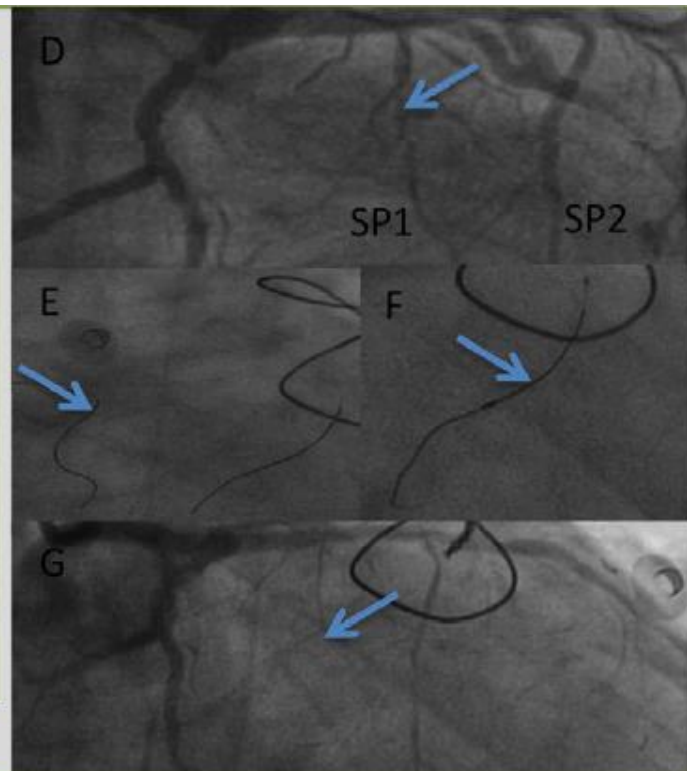
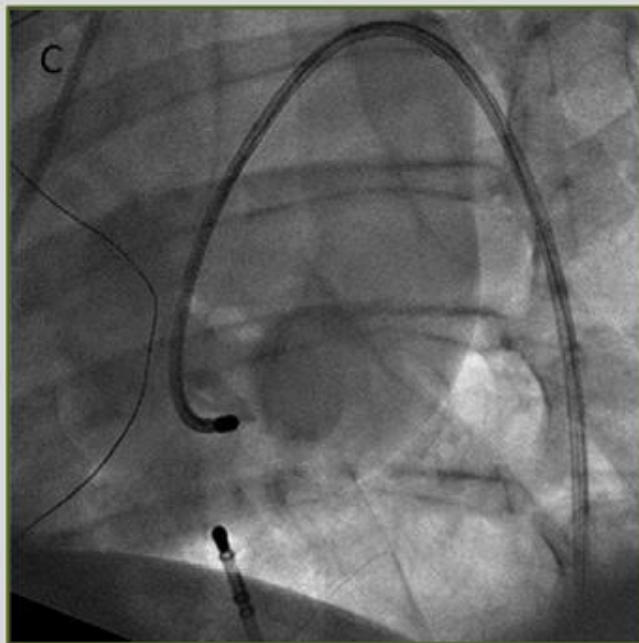
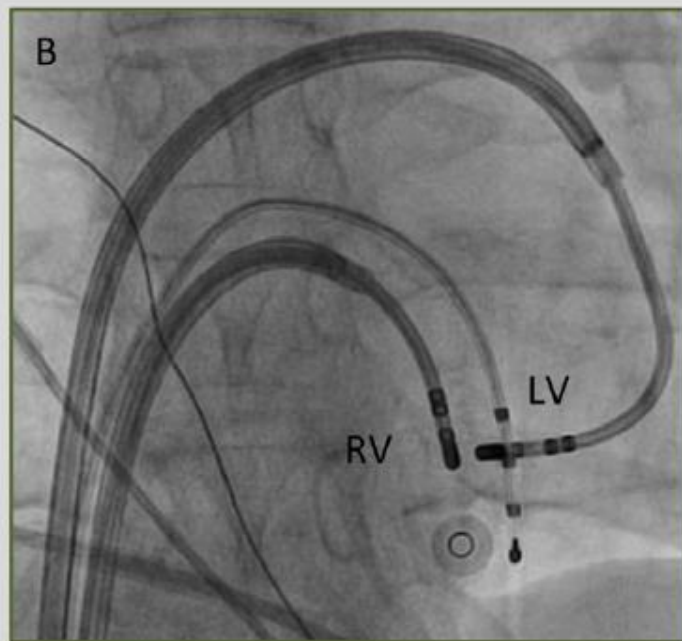
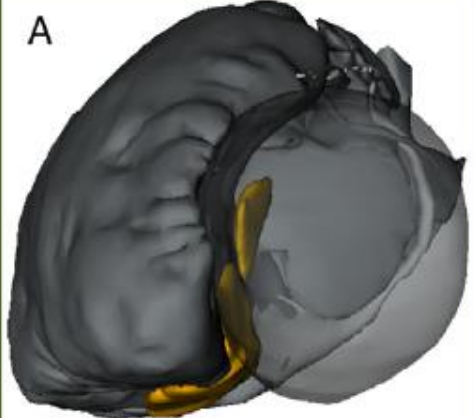
LAO 60



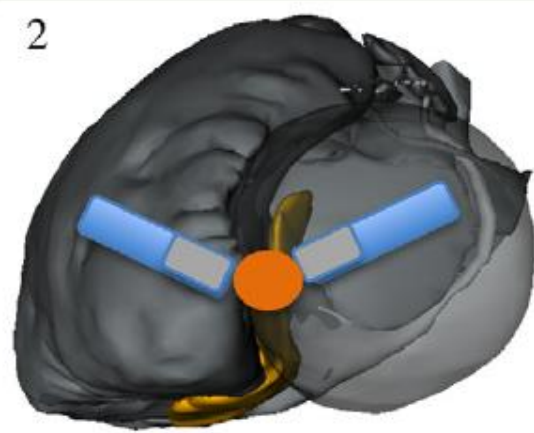
VT recurred two days after RF ablation



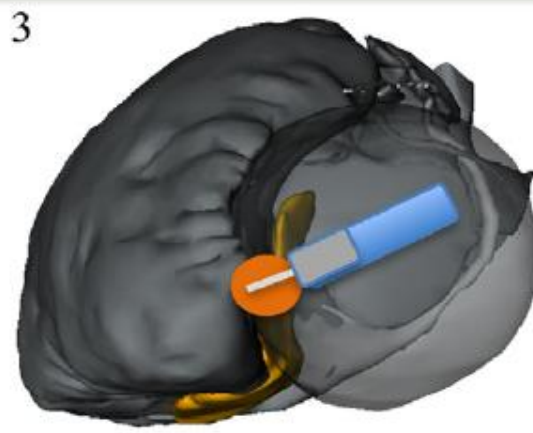
Intraseptal or
intramural scar



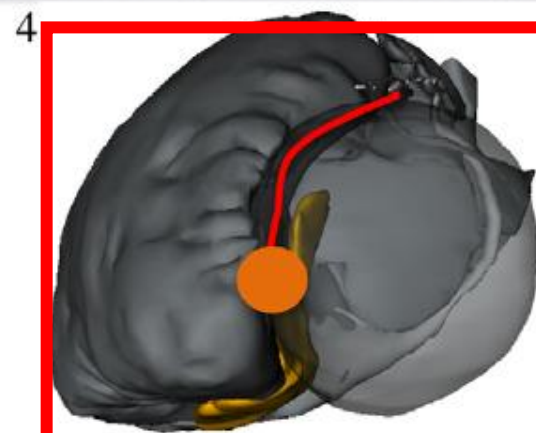
Unipolar ablation



Bipolar ablation



Needle ablation



Ethanol ablation

Chemical ablation

Catheter setting:

RAO 30

CPS Direct™ Universal (Outer Guide Catheter)

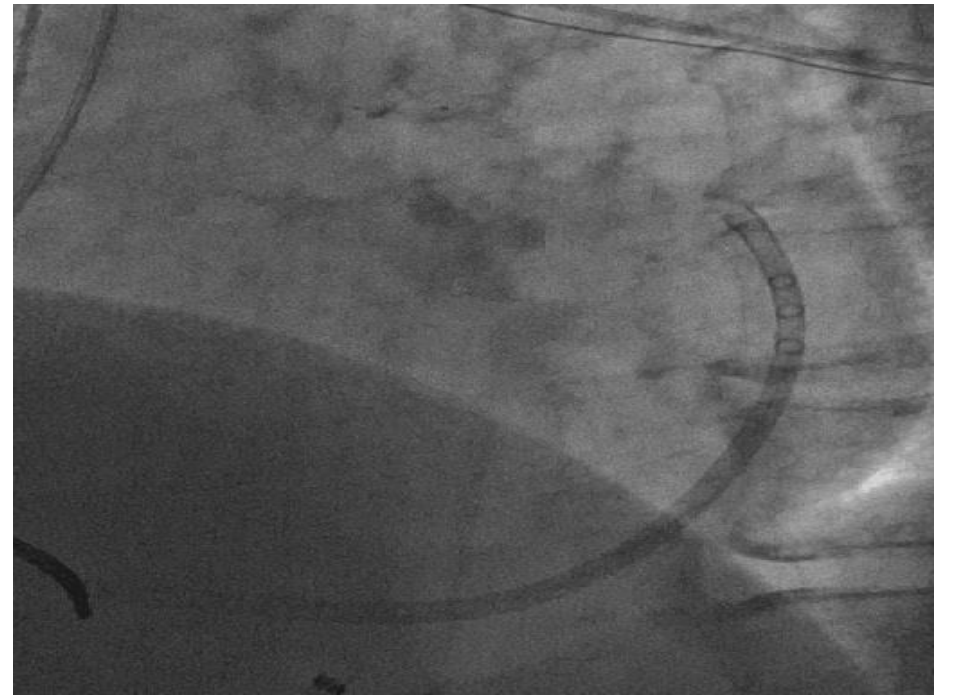
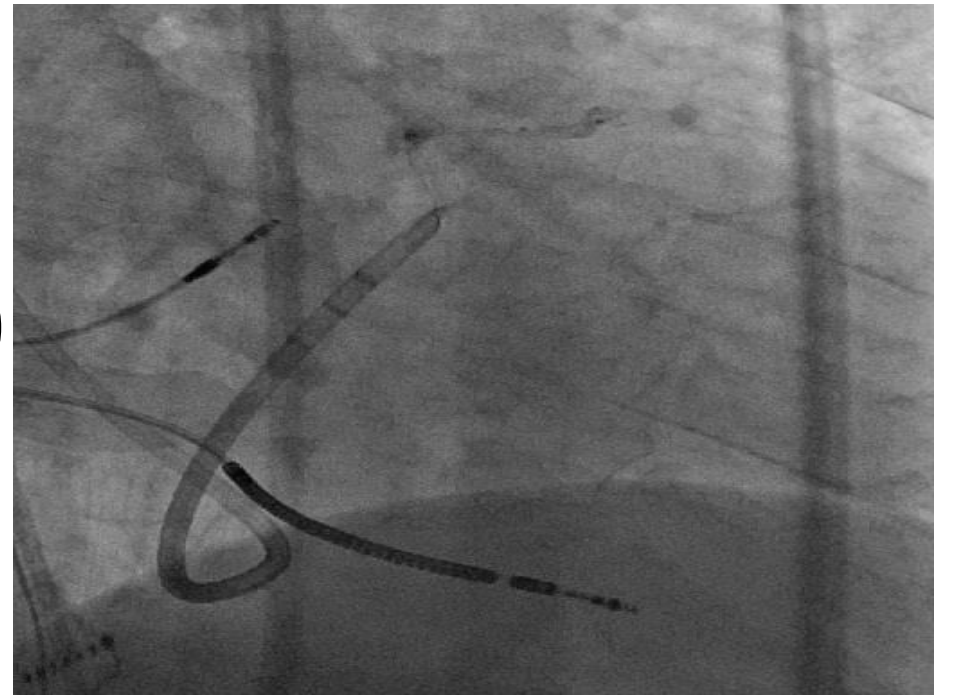
CPS Direct Aim™ Universal (inner Guide Catheter)

Guidewire: 0.014 Fr.

Balloon

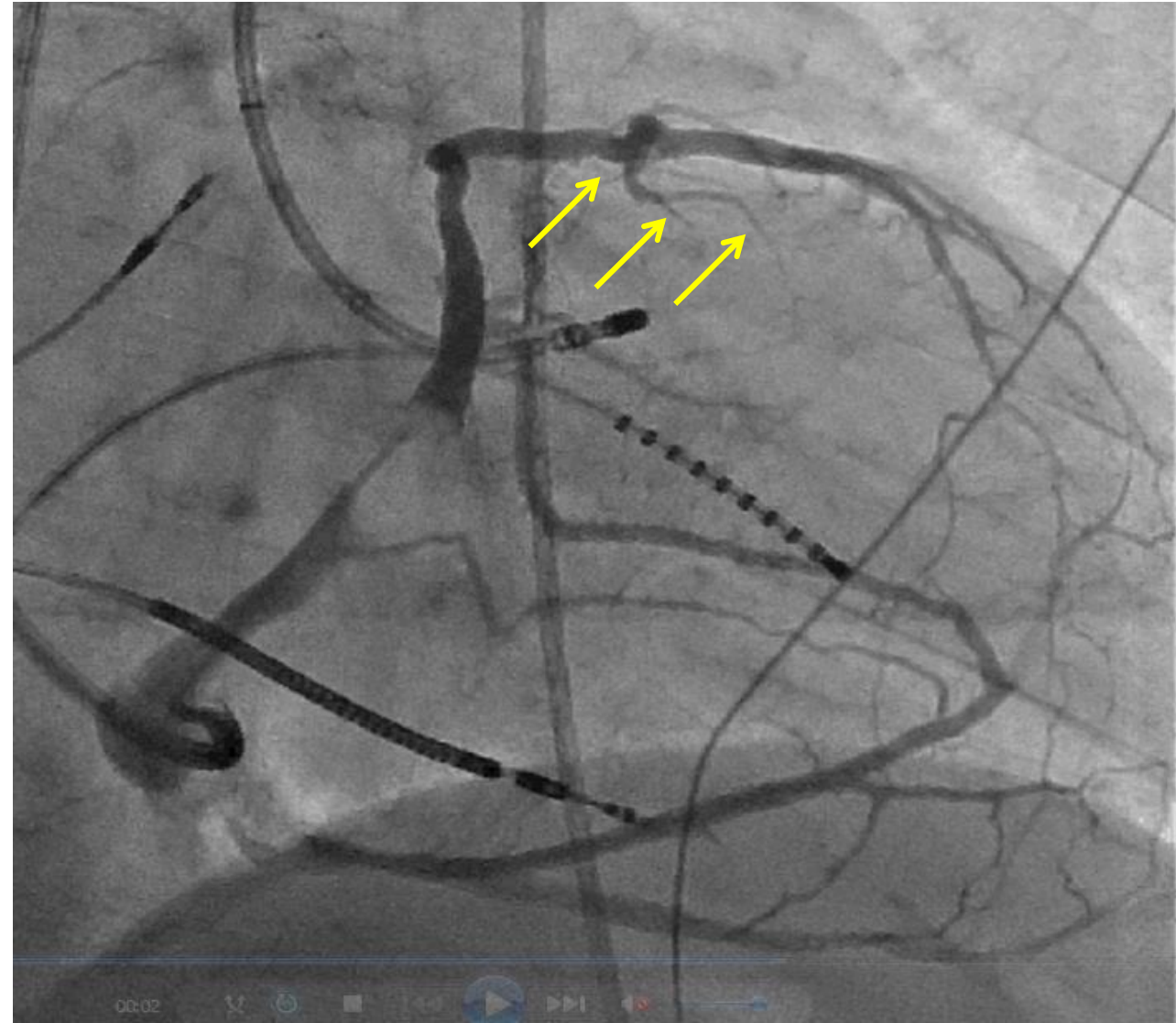
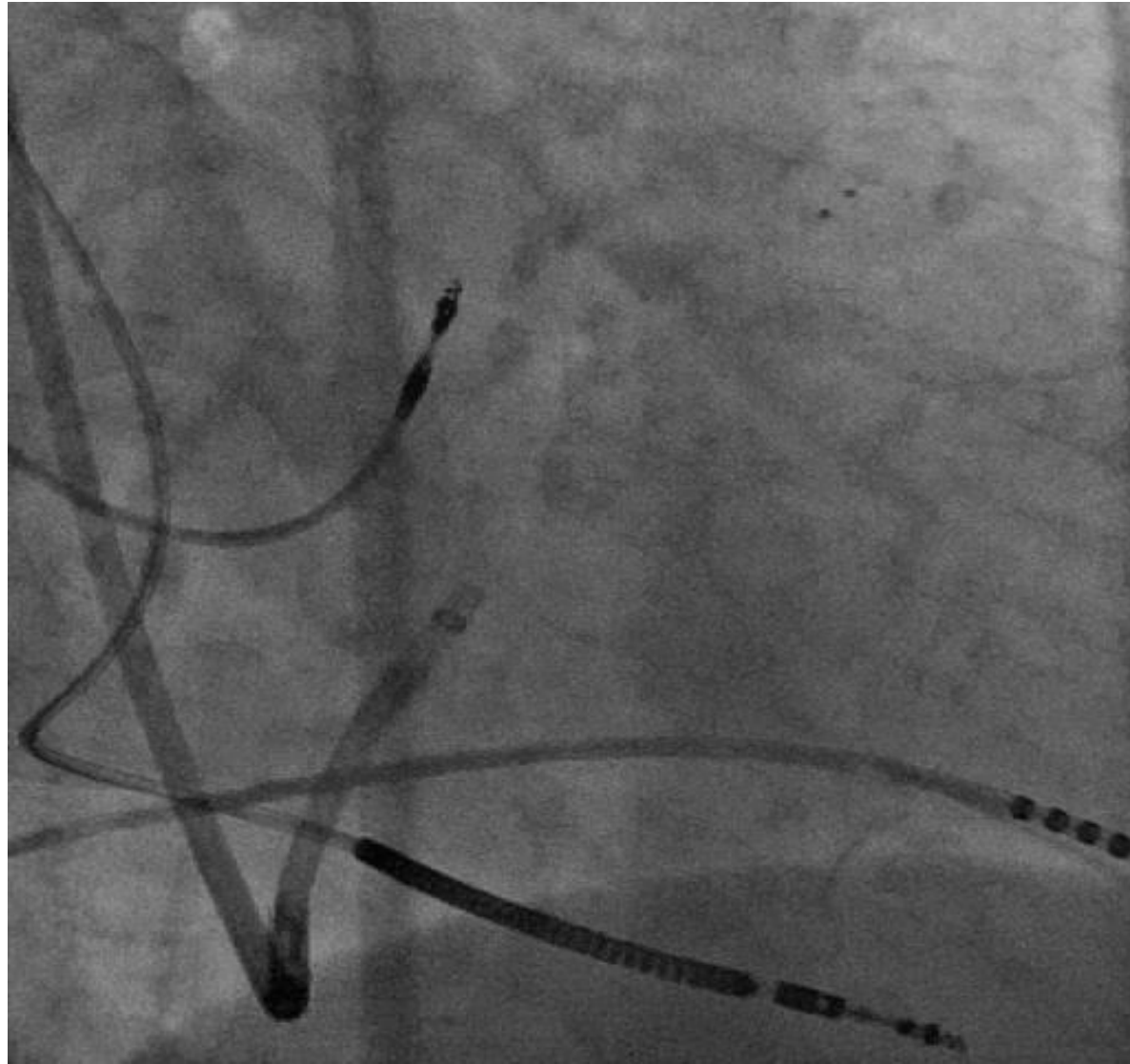
Bandicoot 1.5 mm * 10 mm

LAO 45



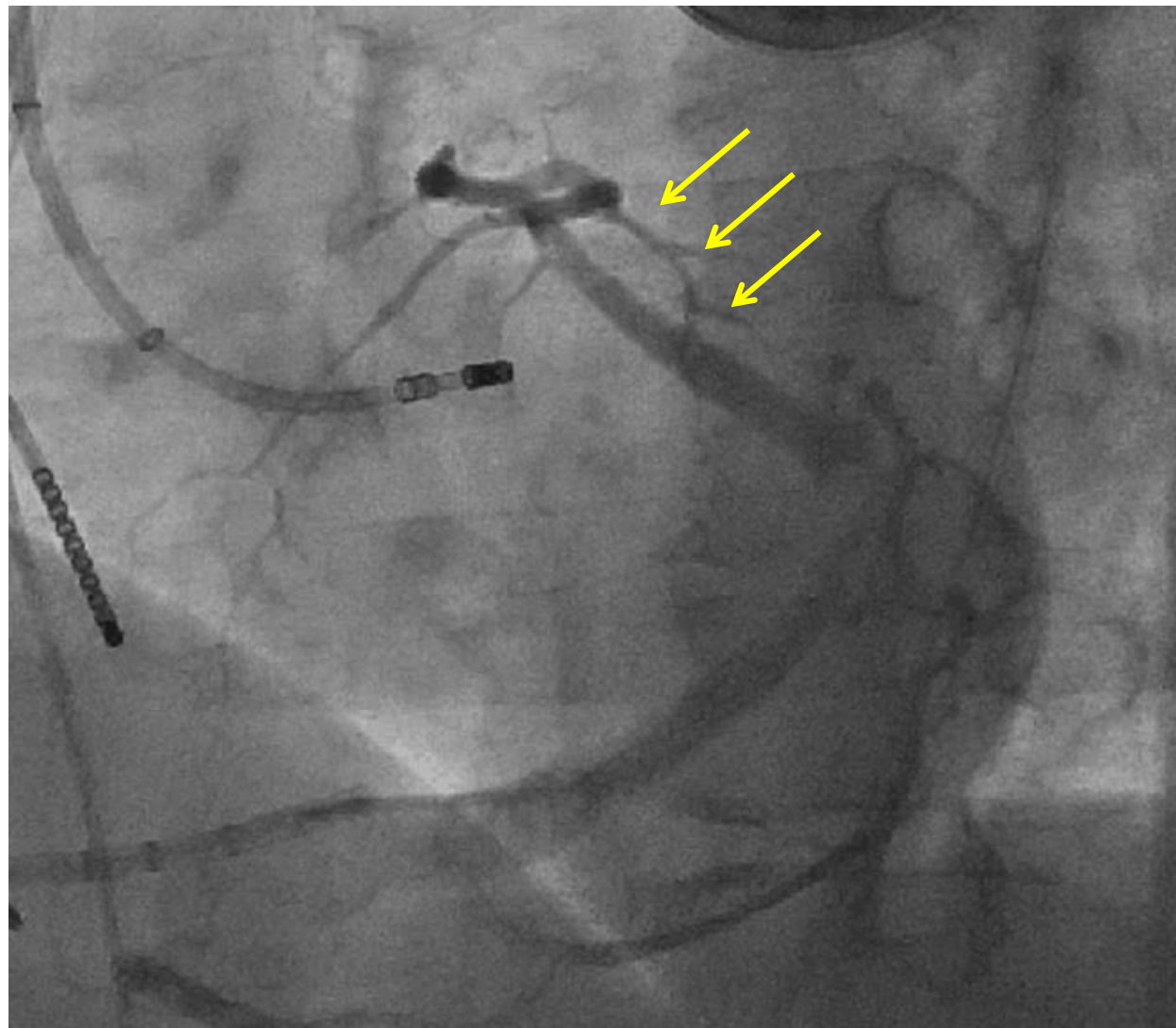
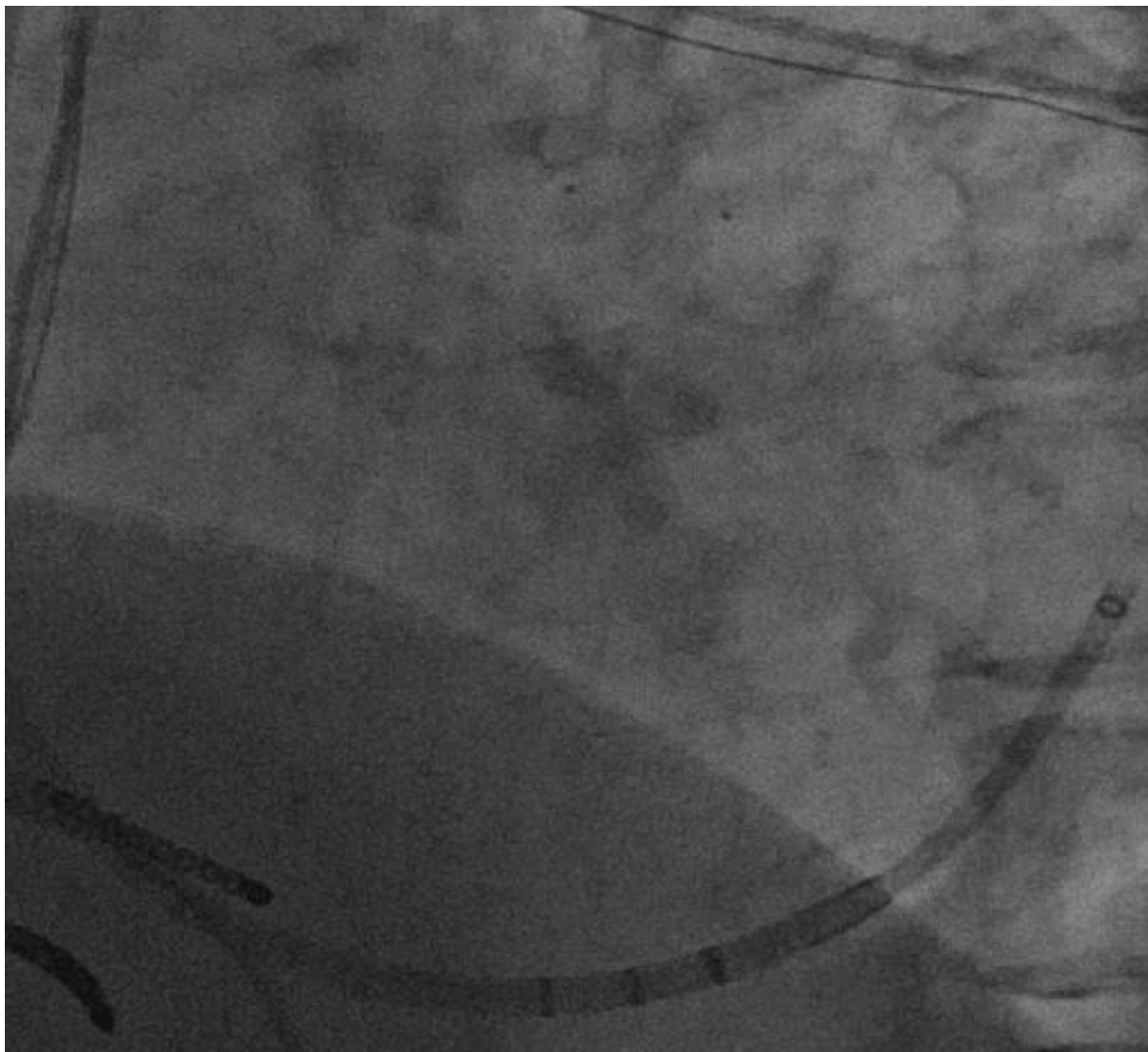
Coronary sinus venography(1)

RAO 30



Coronary sinus venography(2)

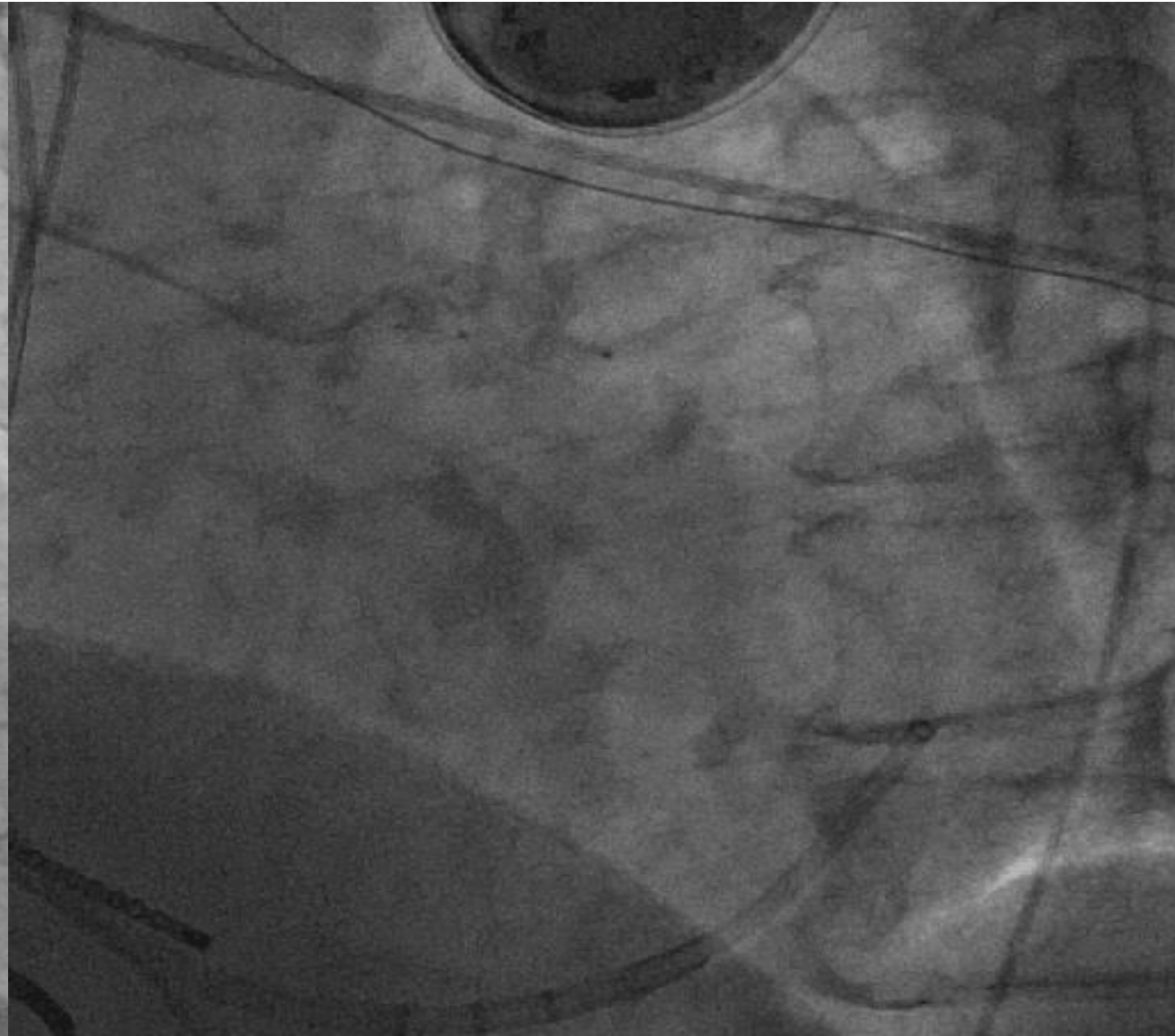
LAO 60



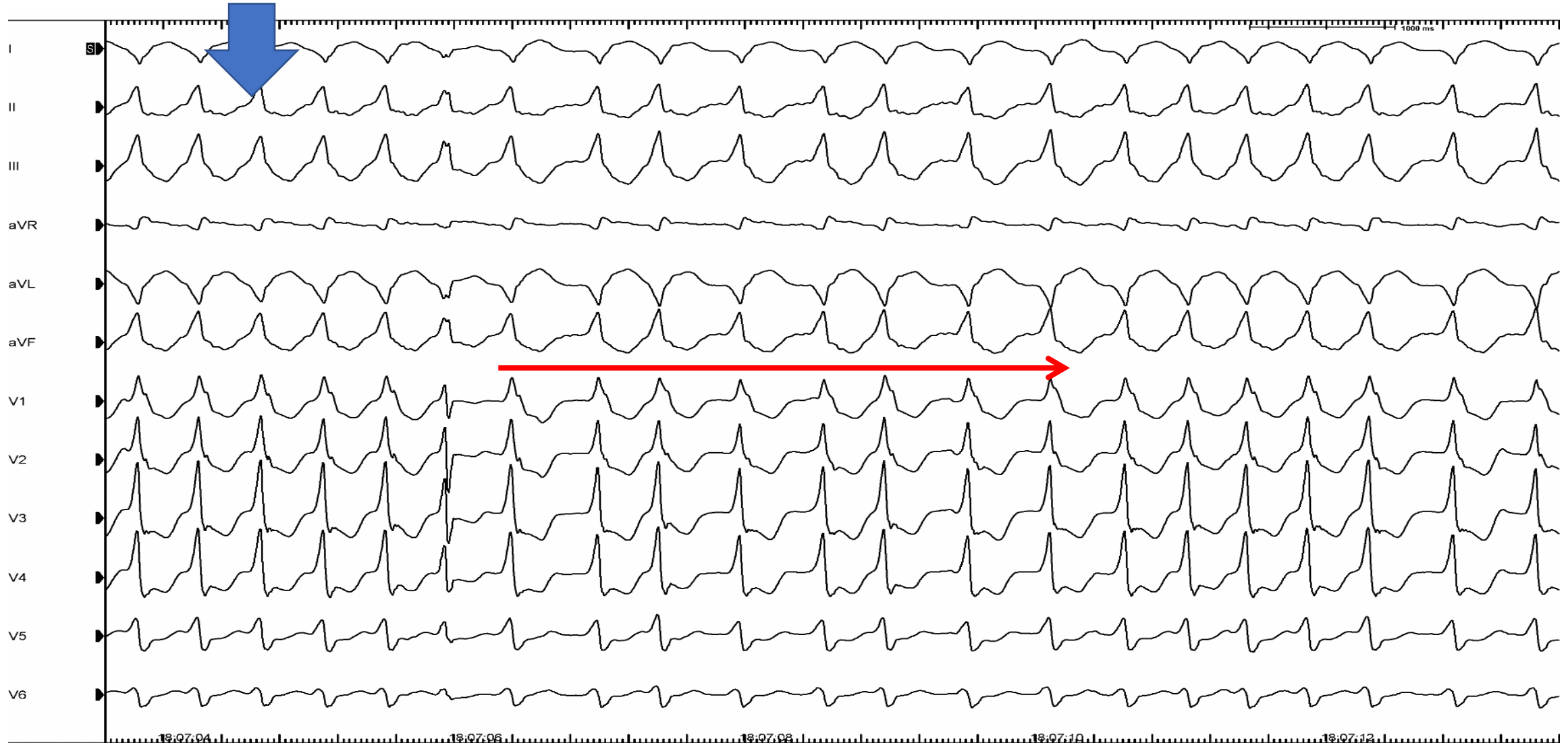
Coronary angiography

RAO 30

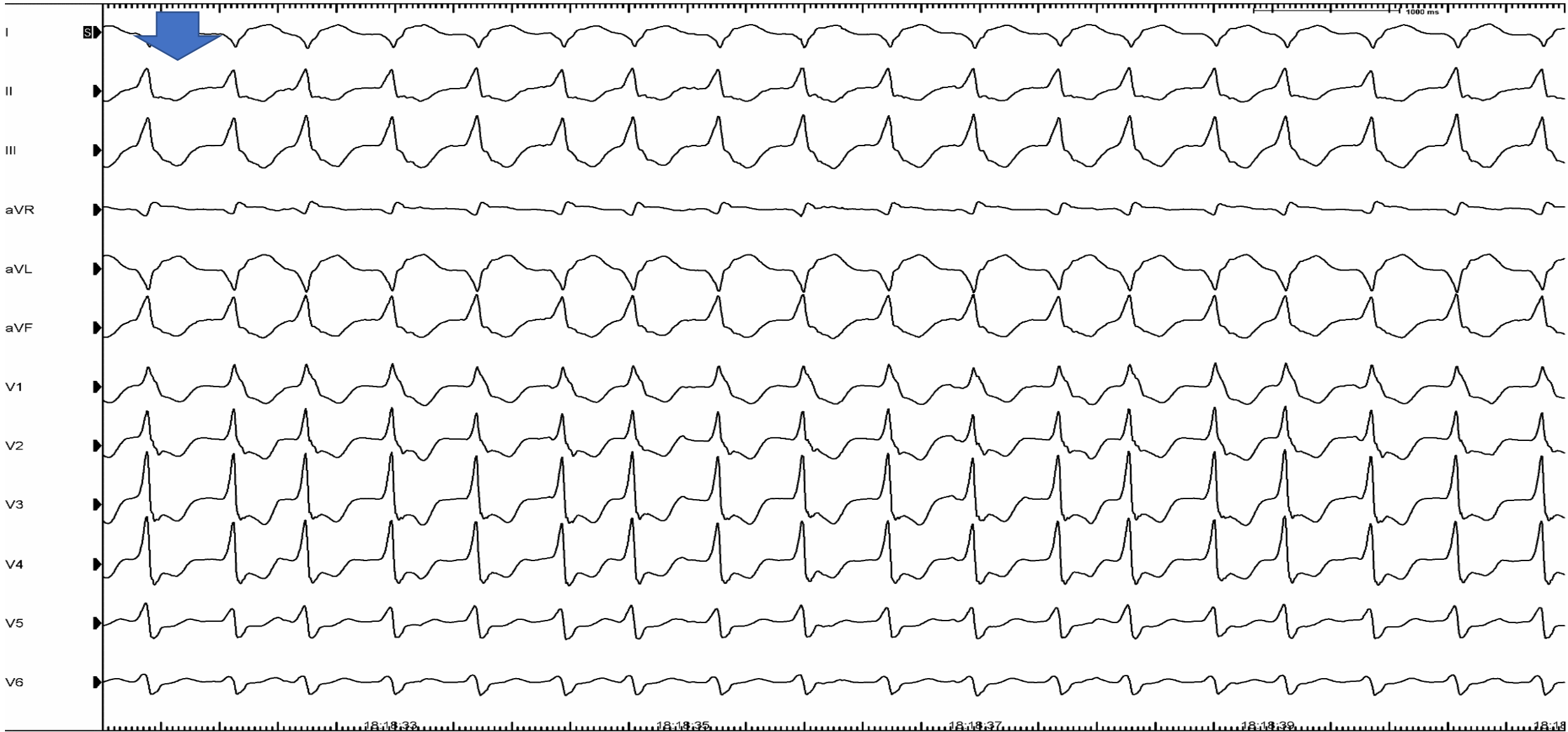
LAO 60



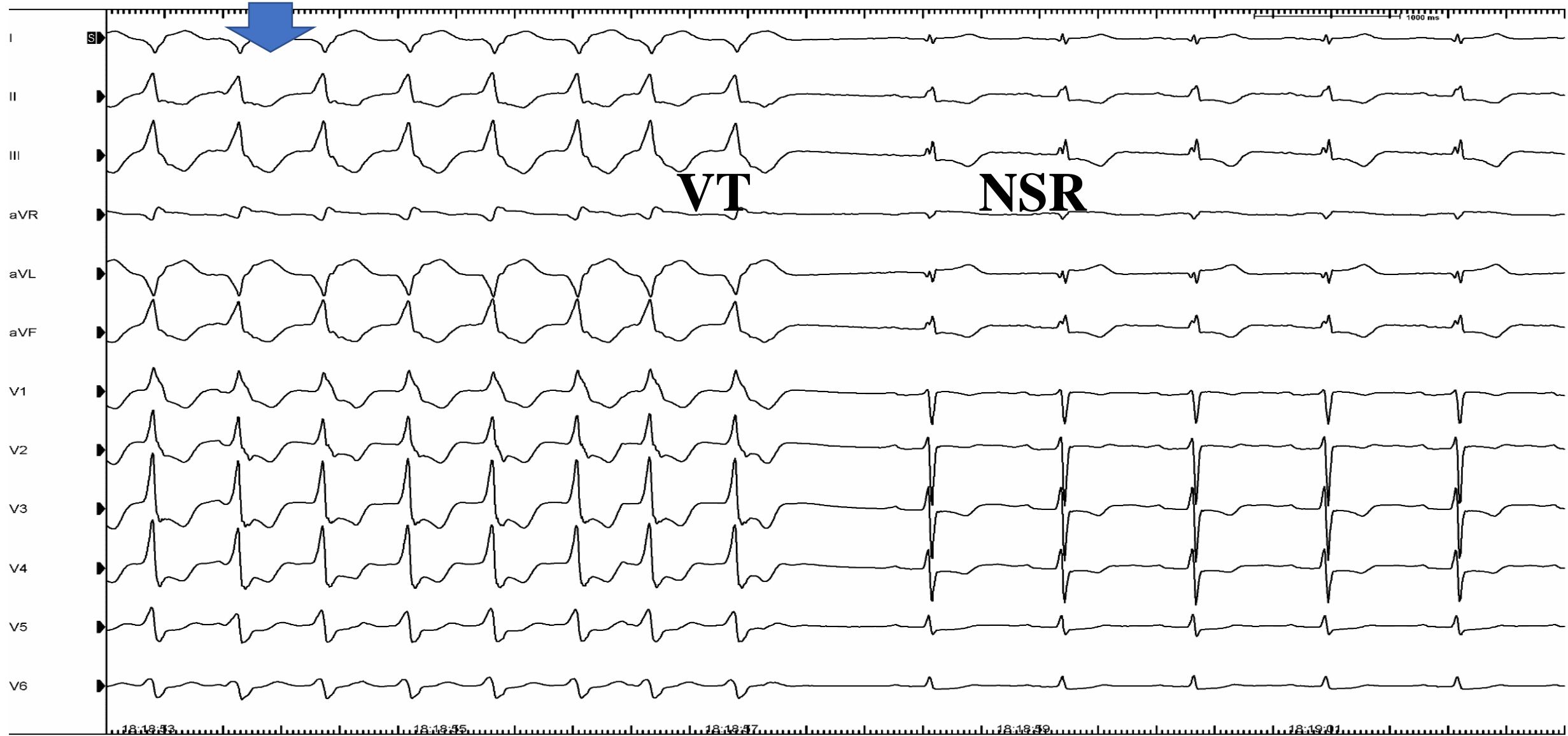
Saline infusion into the cardiac vein (communicating vein)



Mexiletine of 5mg into cardiac vein

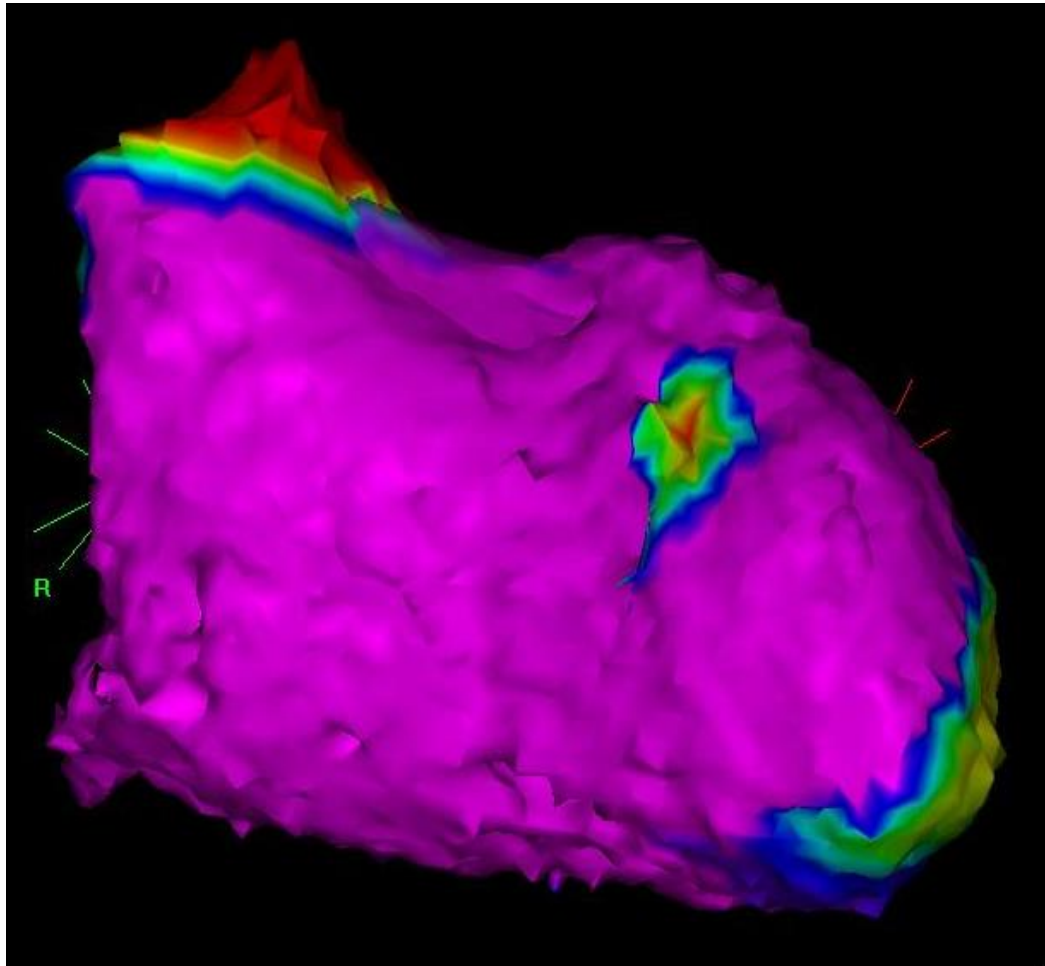


Ethanol infusion into cardiac vein

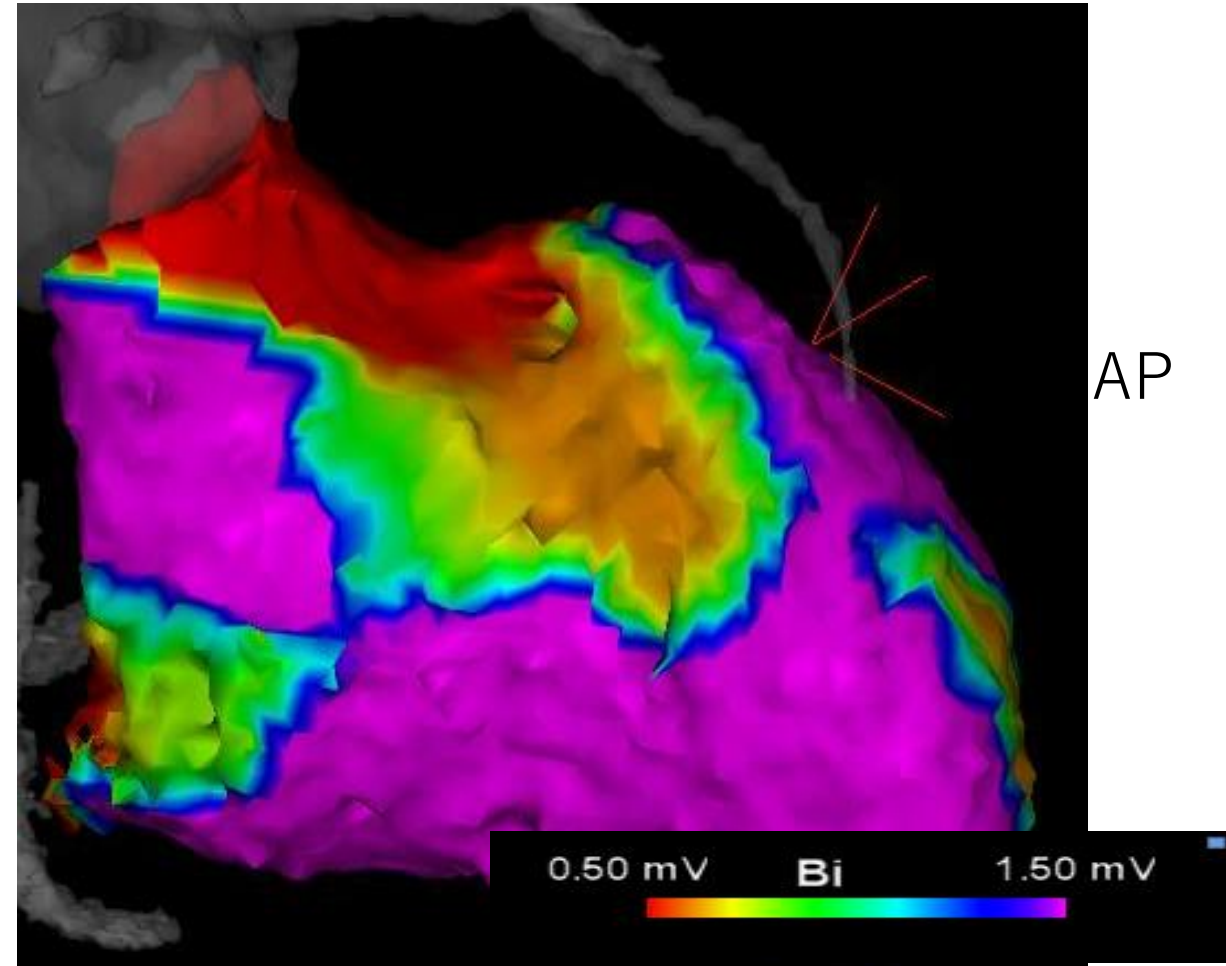


Endocardial voltage map after ethanol infusion

Before ethanol



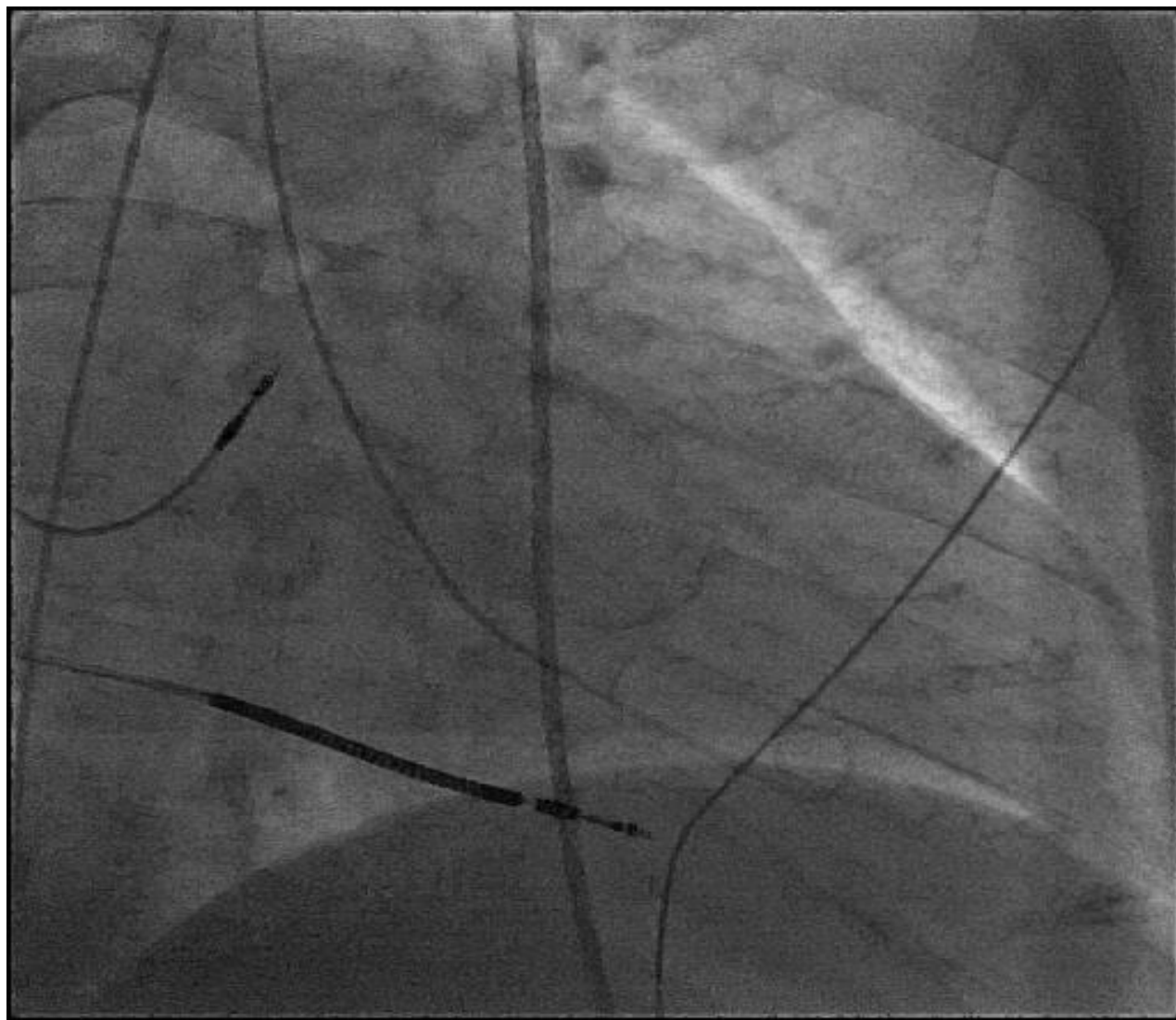
After ethanol



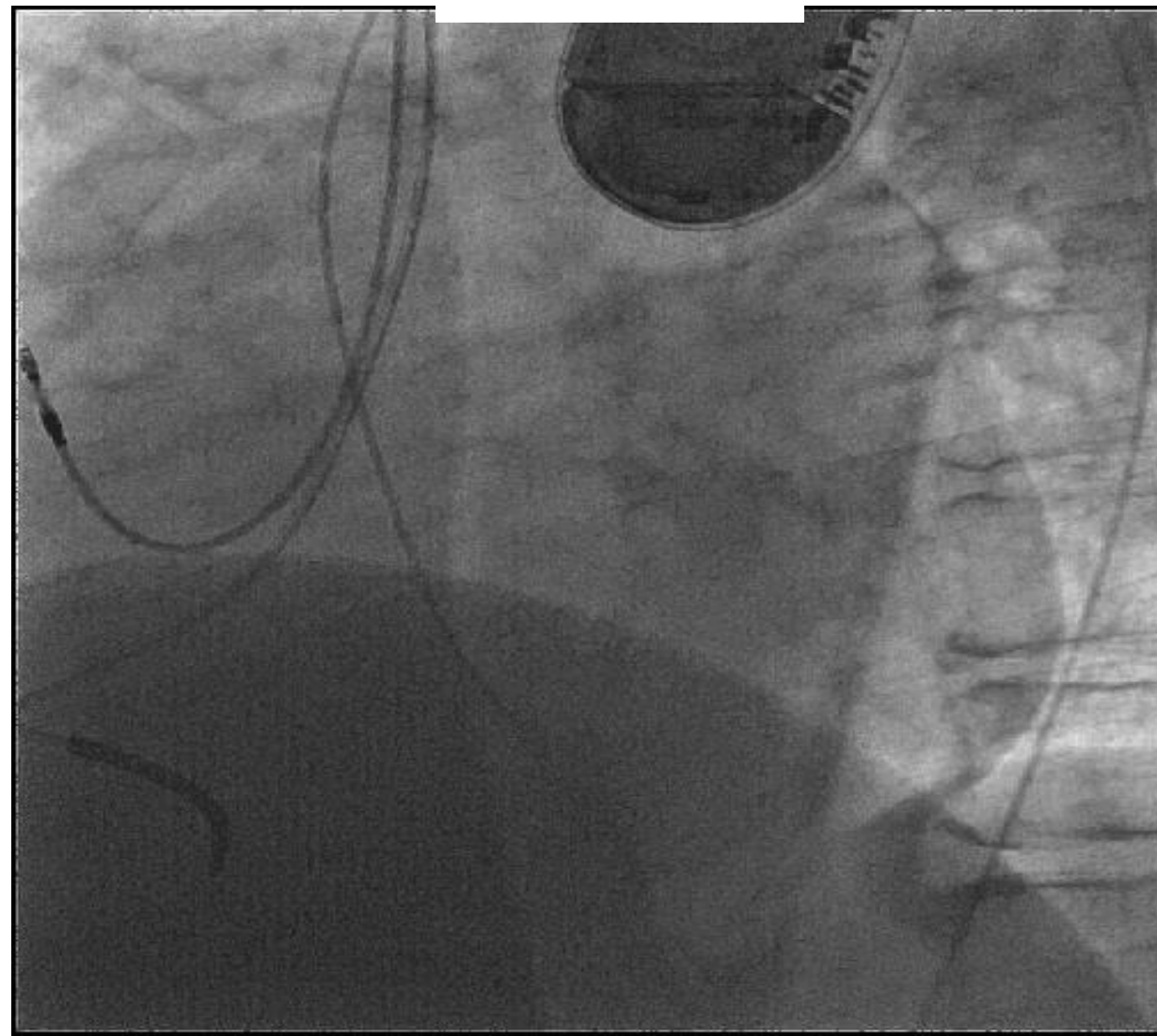
Non-inducible of any VT

Left ventriculography

RAO 30



LAO 60





Acute and Long-Term Scar Characterization of Venous Ethanol Ablation in the Left Ventricular Summit

Stephanie C. Fuentes Rojas, MD,^a Maan Malahfji, MD,^a Liliana Tavares, MD,^a Apoor Patel, MD,^a
Paul A. Schurmann, MD,^a Amish S. Dave, MD, PhD,^a Carlos Tapias, MD,^b Diego Rodríguez, MD,^b
Luis Carlos Sáenz, MD,^b Sergey Korolev, MD,^c Giorgi Papiashvili, MD, PhD,^d Petr Peichl, MD,^e Josef Kautzner, MD,^e
Krzysztof Blaszyk, MD, PhD,^f Katarzyna Malaczynska-Rajpold, MD, PhD,^g Tiffany Chen, MD,^h
Pasquale Santangeli, MD,^h Dipan J. Shah, MD,^a Miguel Valderrábano, MD^a

J Am Coll Cardiol EP 2023;9:28-39



Venous ethanol



- *Early cardiac MRI (CMRI) showed microvascular obstruction (MVO) after ethanol infusion.
- *Follow-up CMRI exhibited evolution of MVO to scar.
- *Scar volumes correlated with ethanol volume.
- *These scar volume does not compromise septal integrity or ventricular function.

Rationale

- *Unobstructed vascular access to targeted myocardium, unaffected by disease processes.
- *Welcoming anatomy free of arterial complications.
- *Familiarity with and tools for CS venous catheterization.

Conclusion

Ethanol infusion into the cardiac vessel seems to be one of the best therapeutic options to treat ventricular arrhythmias arising from the LV summit in terms of the safety and efficacy.

Thank you for your attention!



Yokohama City View