OUTFLOW TRACT VENTRICULAR TACHYCARDIA

NOT ALWAYS SIMPLE AS IT SEEMS

40-year-old male with recurred VPC

2016.10.29 VT symposium

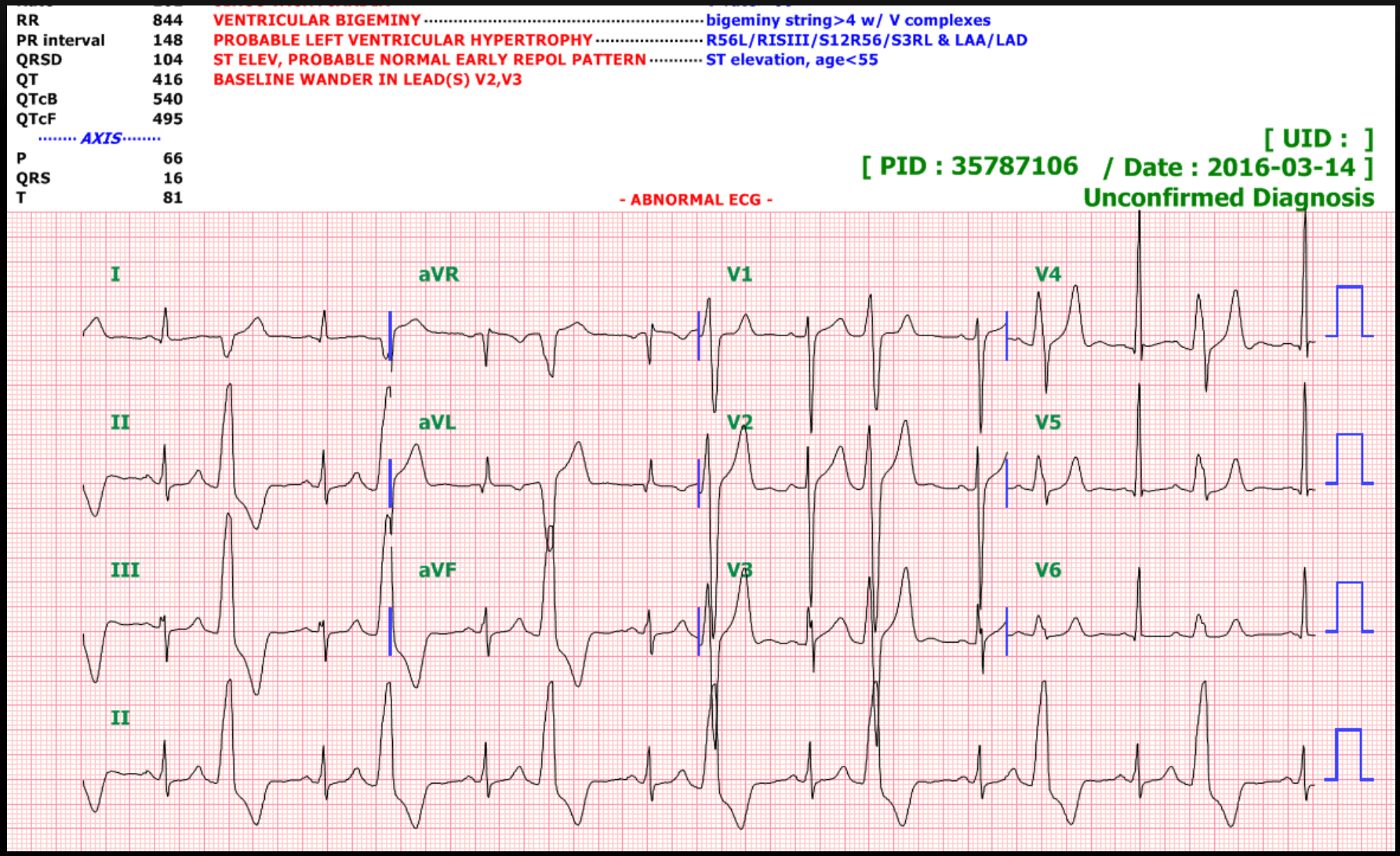
Gwag Hye Bin, MD
Samsung Medical Center

BRIEF HISTORY

- 40 year-old male
- Dec 2014 Follow up every 3 month for symptomatic VPC (palpitation) in local hospital
- Mar 2016 Referred to SMC complaining of dyspnea & palpitation; VPC bigeminy and normal echoCG
- Jun 2016 VPC 34% in 24hr holter (36686 isolated, 42 couplets, 11 triplets, 15397 bigeminies), moderate LV systolic dysfunction (LVEF 35%)

- Jul 2016 — 1st RFCA was done
- Sep 2016 — Slightly improved symptom, but still large burden of VPC (26%, 28138 isolated, 1 couplet, 5 triplets, 15754 bigeminies) in 24hr holter
- Oct 2016 — Admission for 2nd RFCA; improved LV systolic function (LVEF 47.2%) in follow-up echoCG

PRE-1ST RFCA ECG (2016-03-14)

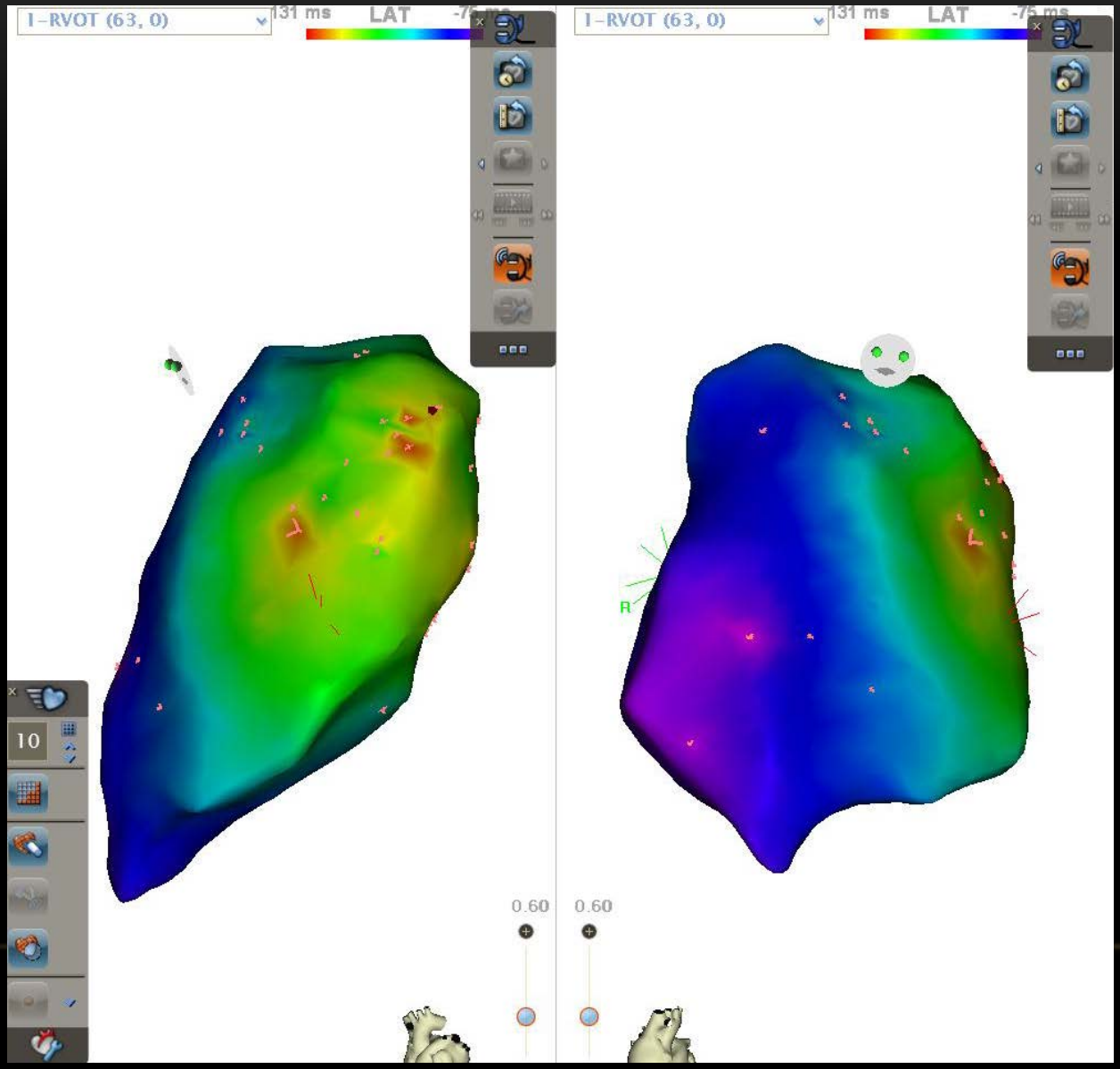


1ST RFCA

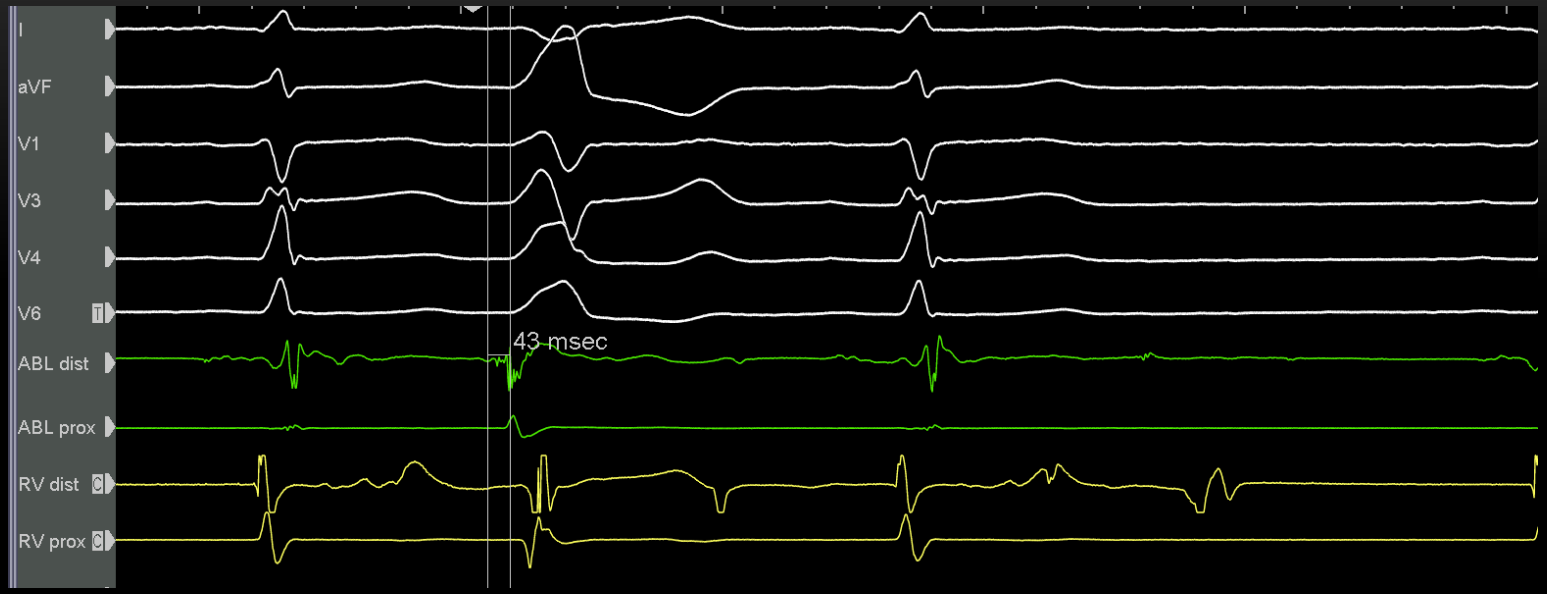
2016-07-11

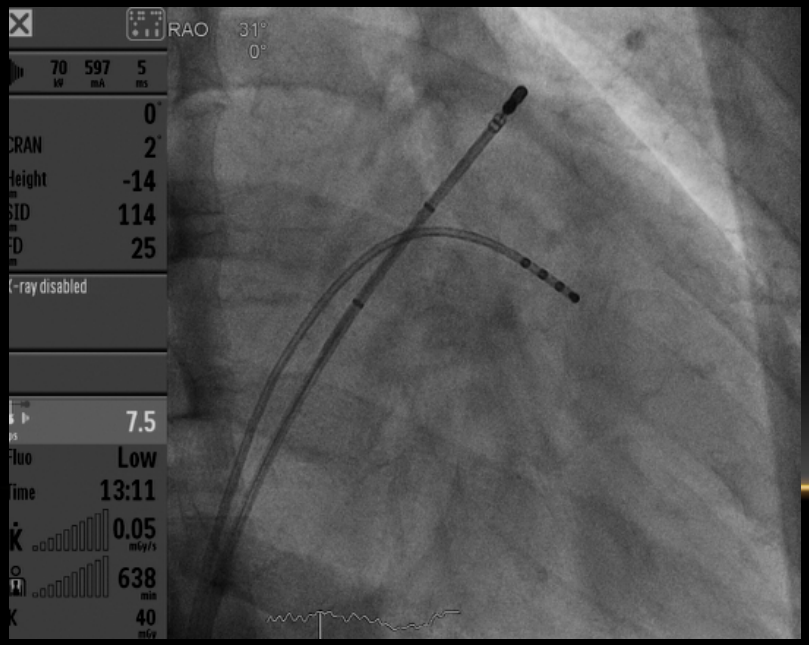
PRE-RFCA 12 LEADS

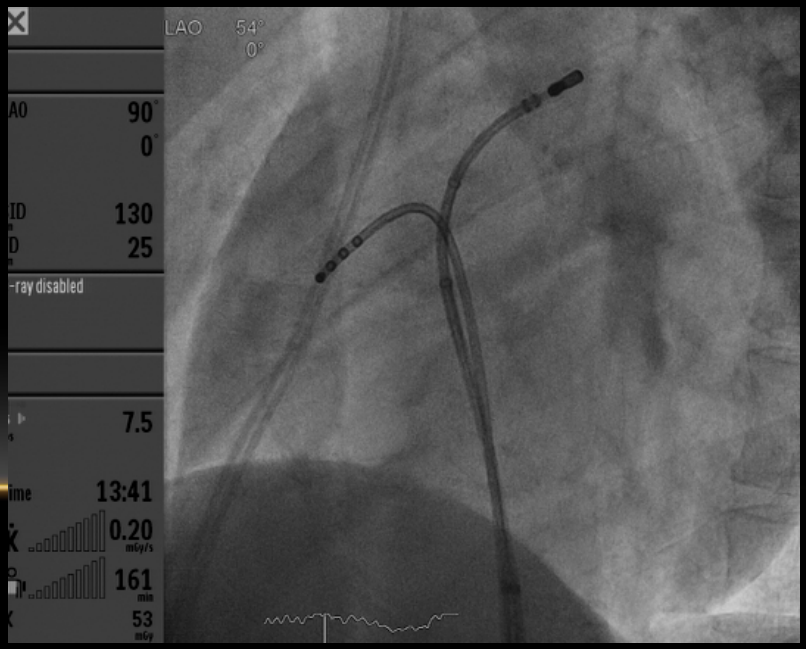
3D ACTIVATION MAP BY CARTOUNIVU (RVOT)



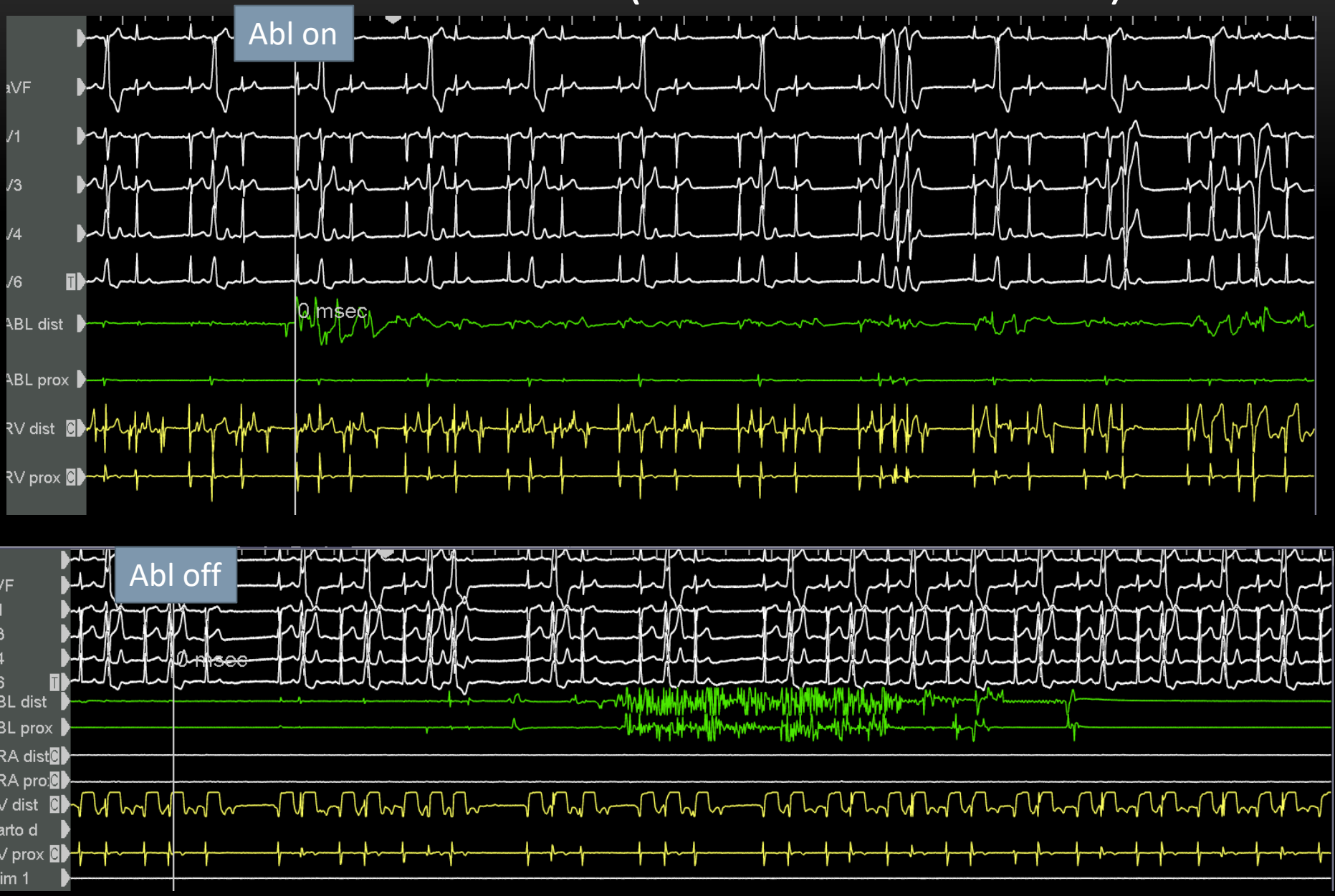
EARLIEST ACTIVATION SITE IN RVOT



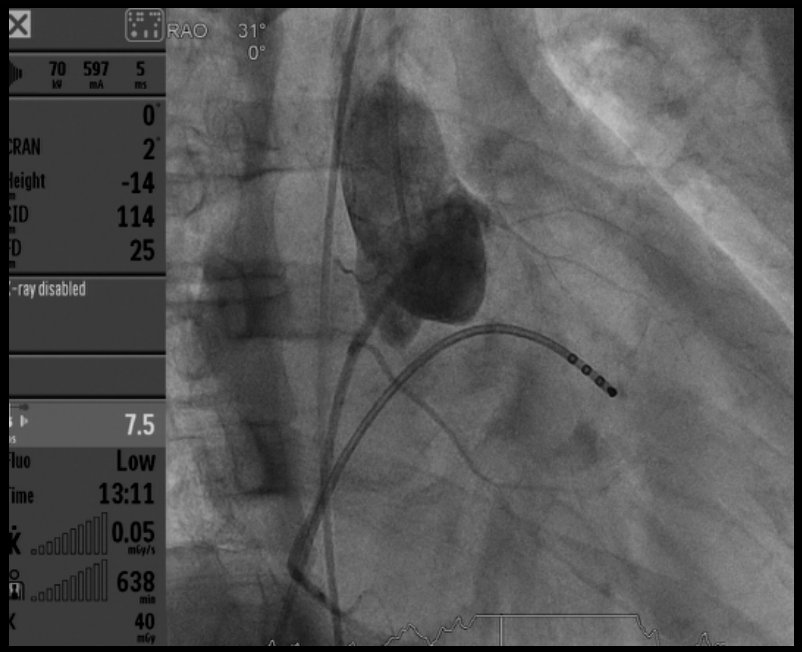


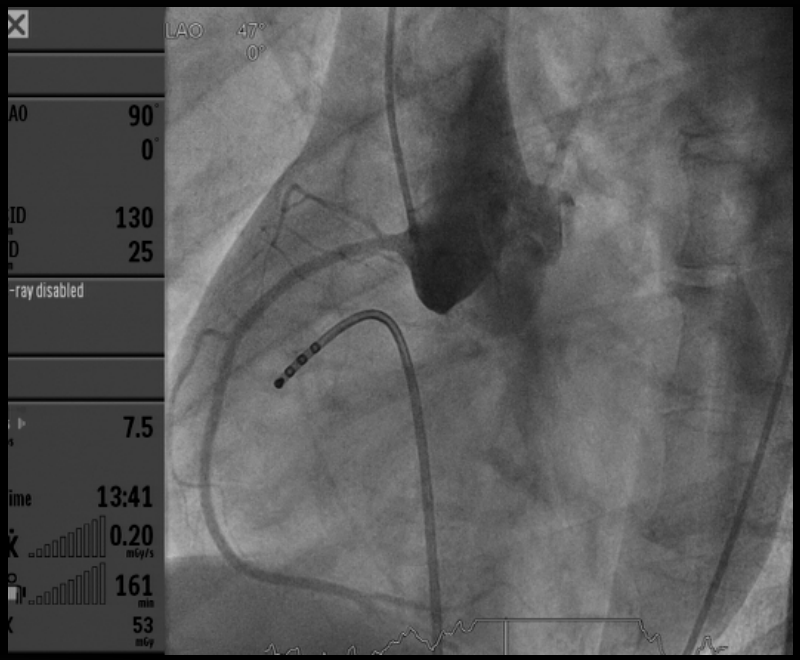


ABLATION IN RVOT (ANTERIOR SEPTUM) #2

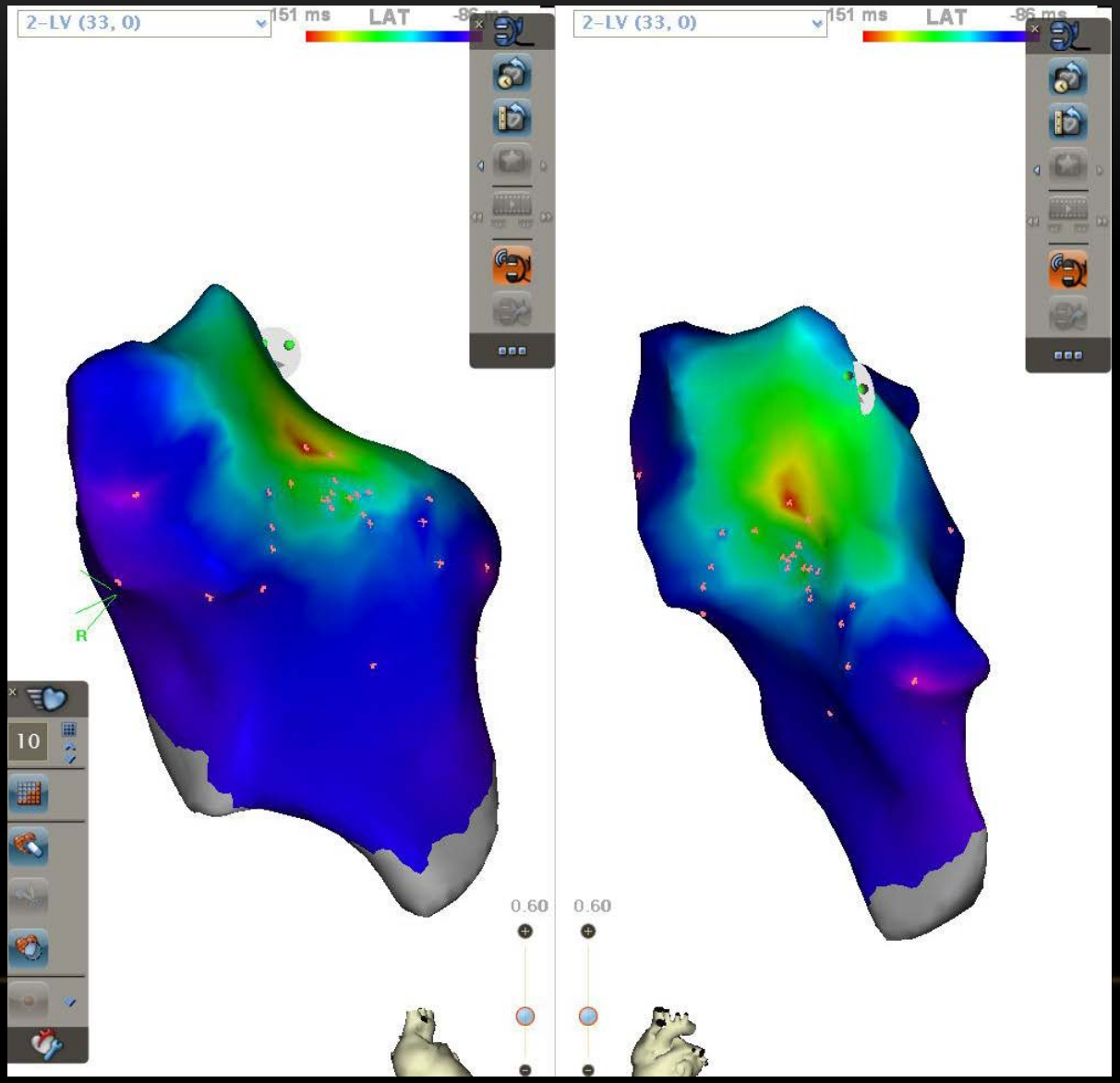


AORTOGRAM

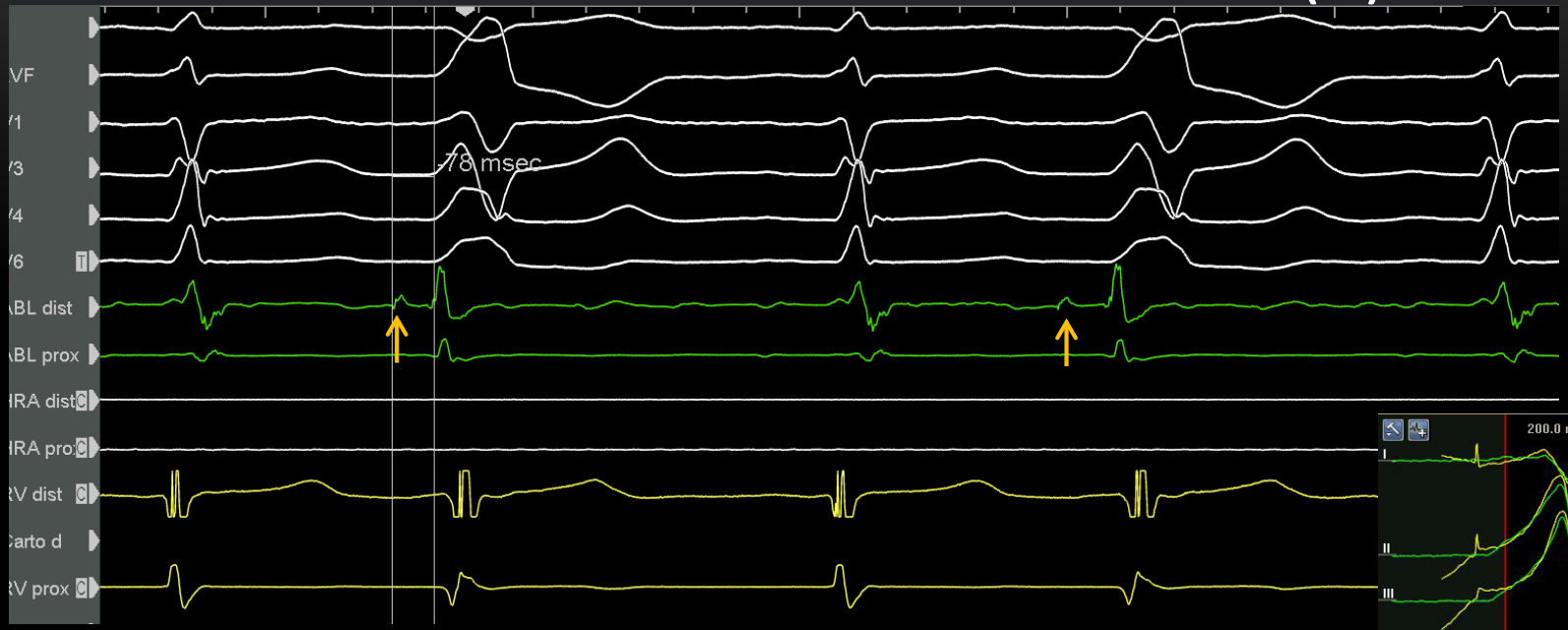

RAO 31°
0°
70 kV 597 mA 5 ms
0
CRAN 2
Height -14
SID 114
D 25
-ray disabled
7.5
Fluo Low
Time 13:11
0.05 mGy/s
638 min
40 mGy

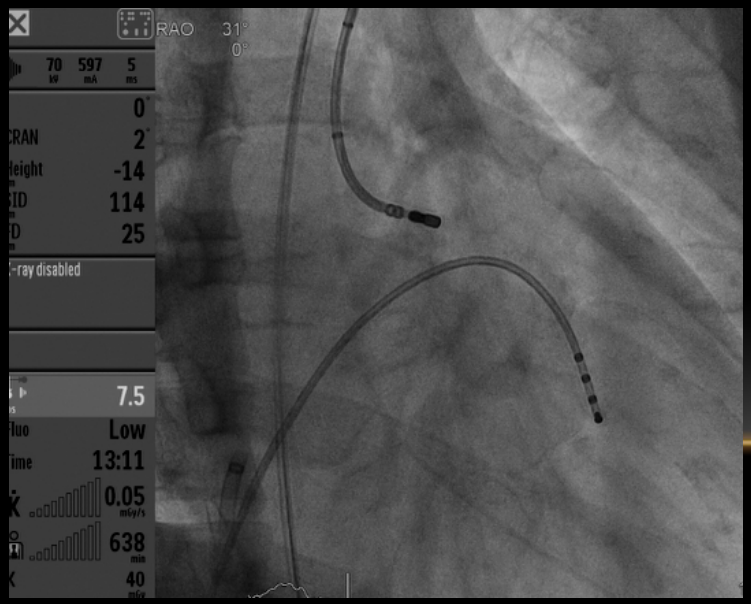

LAO 47°
0°
AO 90
0
SID 130
D 25
-ray disabled
7.5
Time 13:41
0.20 mGy/s
161 min
53 mGy

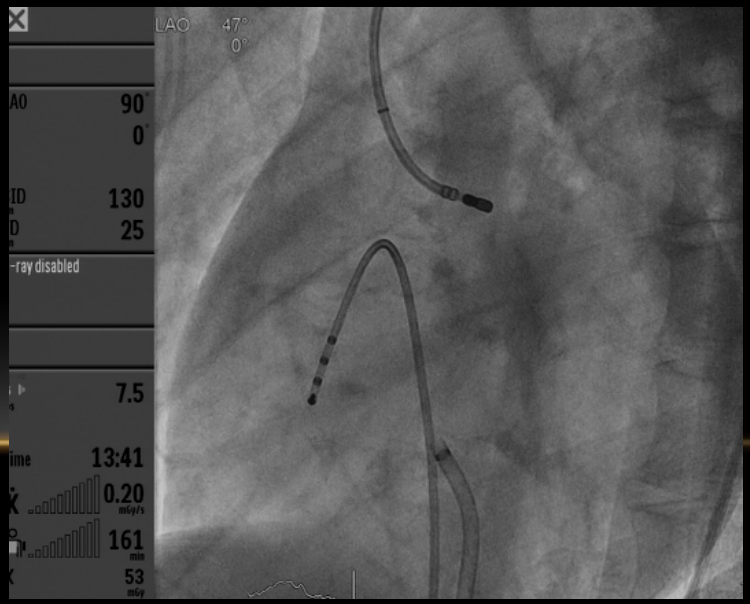
3D ACTIVATION MAP BY CARTOUNIVU (LVOT)

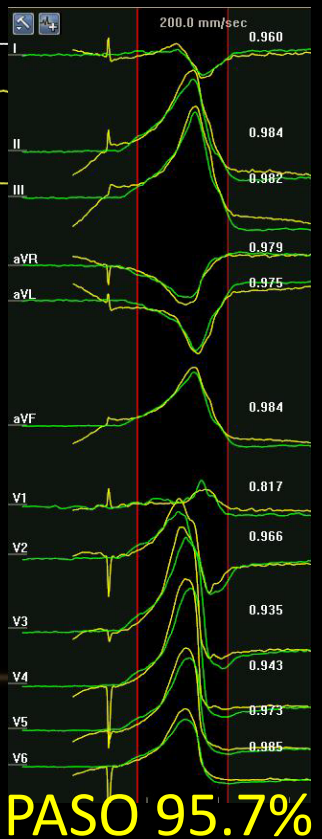


DISCRETE POTENTIAL BELOW LCC (1)



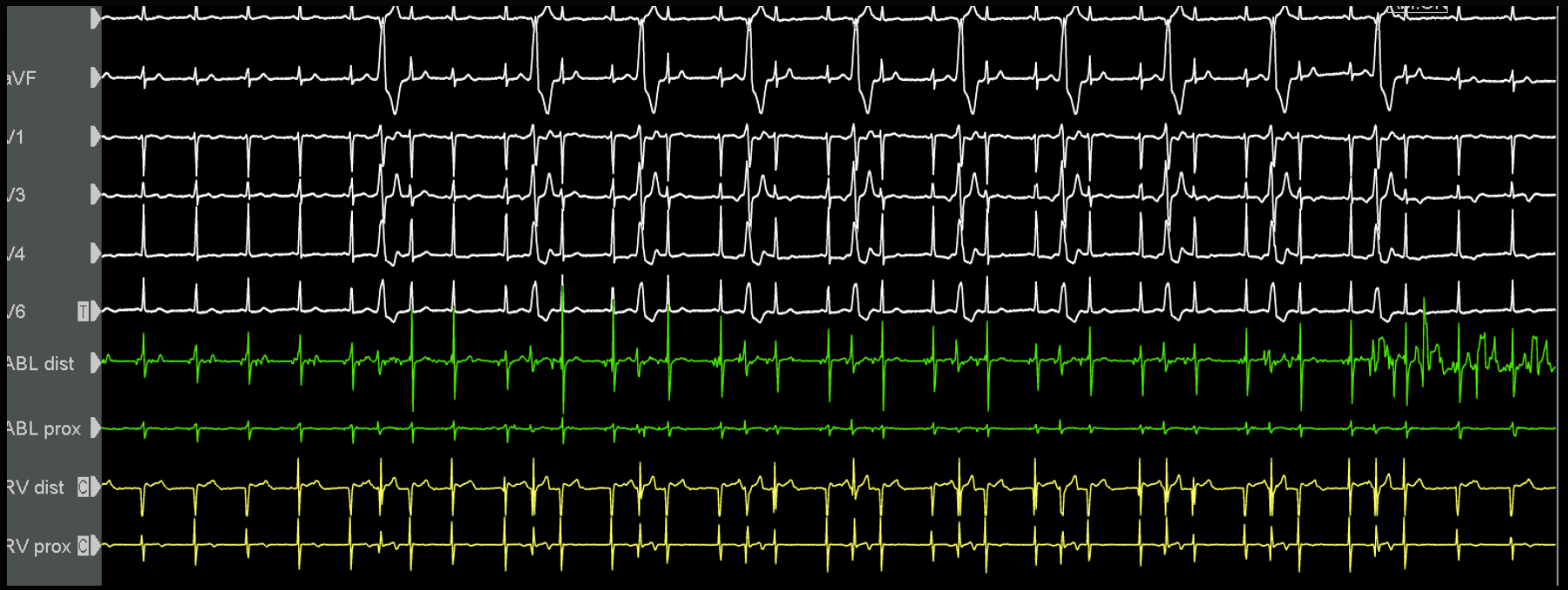




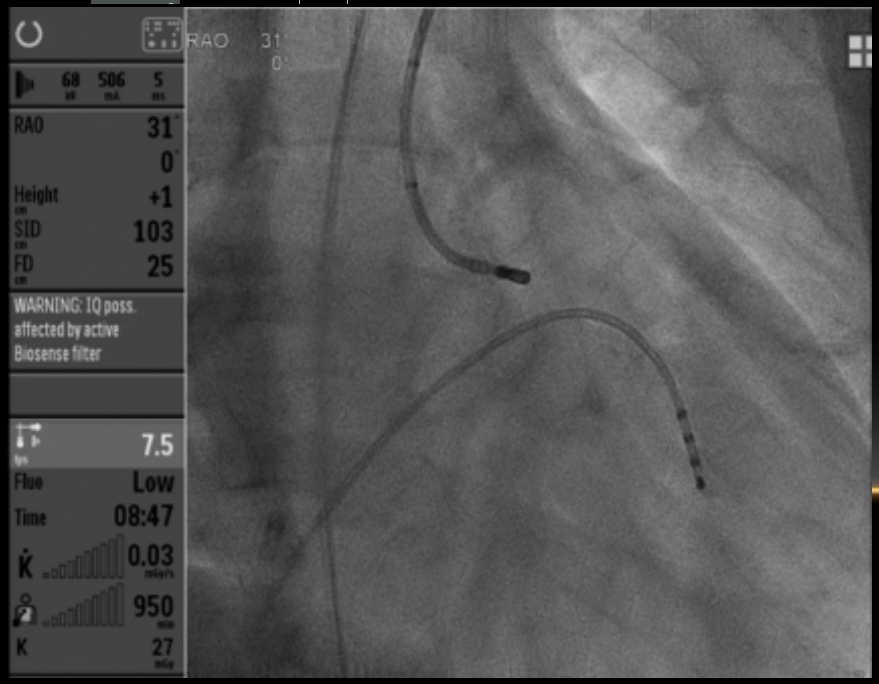


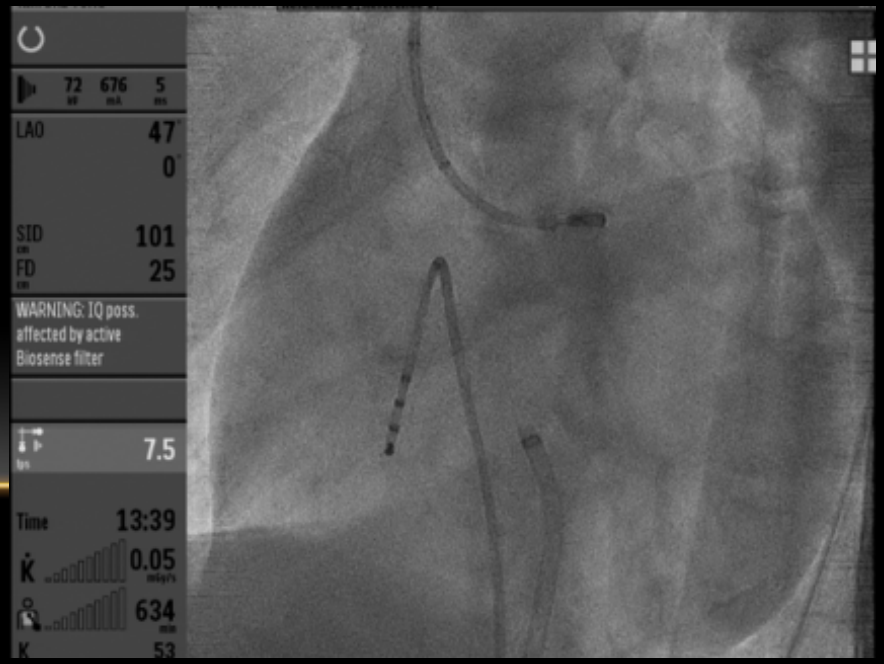
PASO 95.7%

POST-ABLATION #8 BELOW LCC

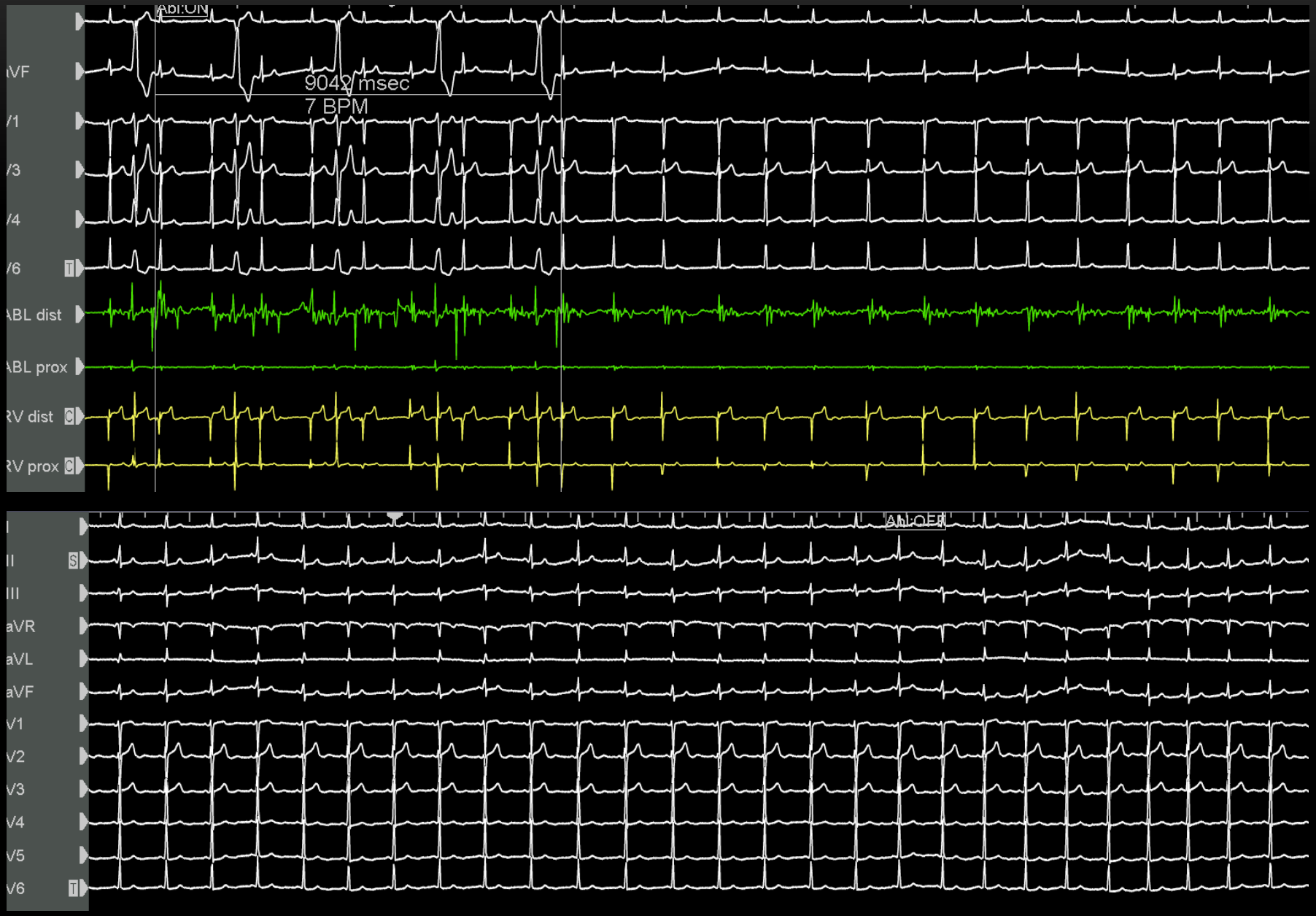


DISCRETE POTENTIAL BELOW LCC (2)

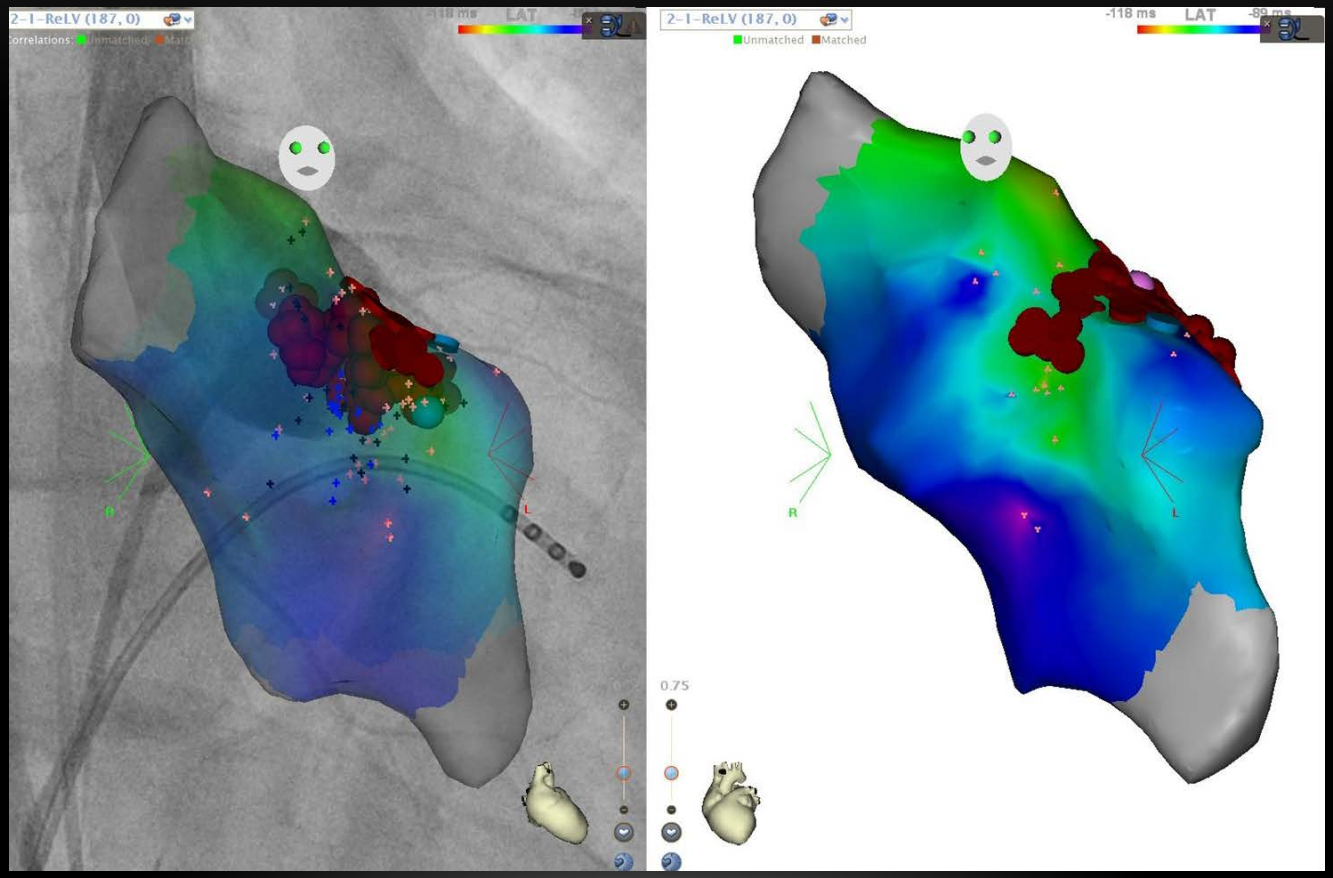




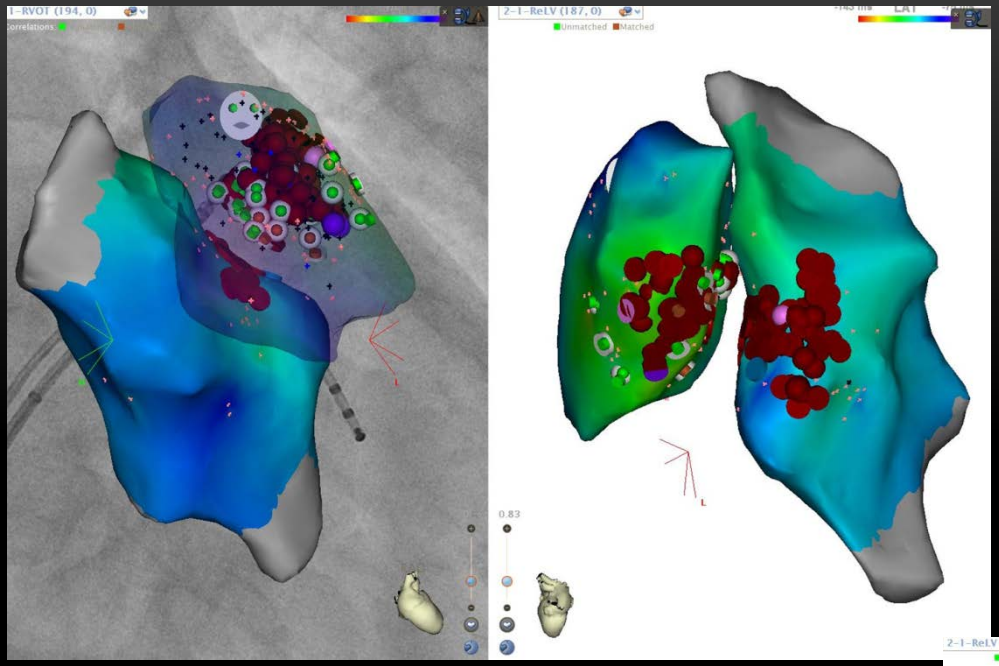
ABLATION IN EARLIEST ACTIVATION SITE(2)

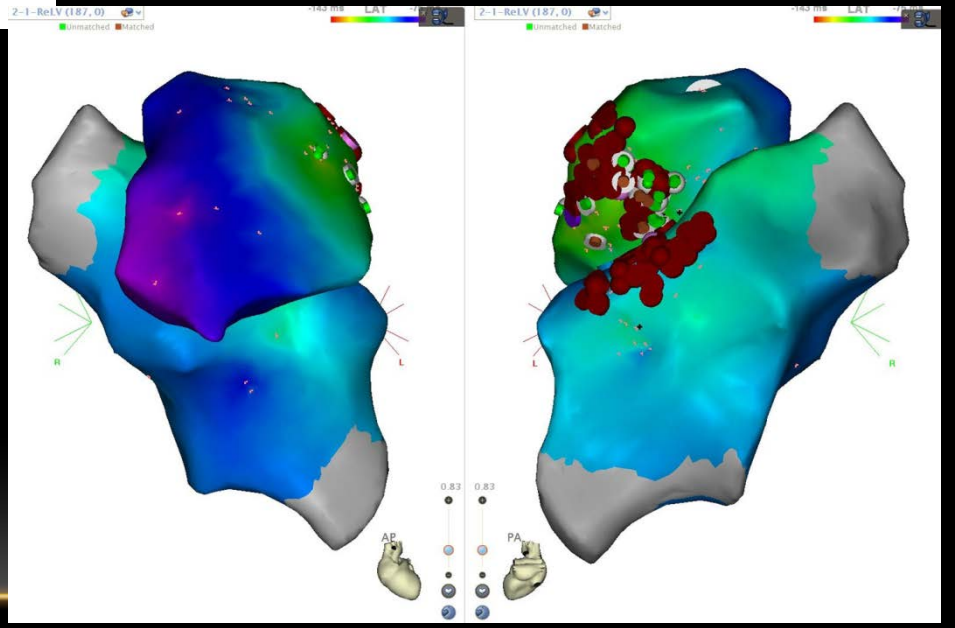


ABLATION SITES IN CARTOUNIV 3D IMAGES



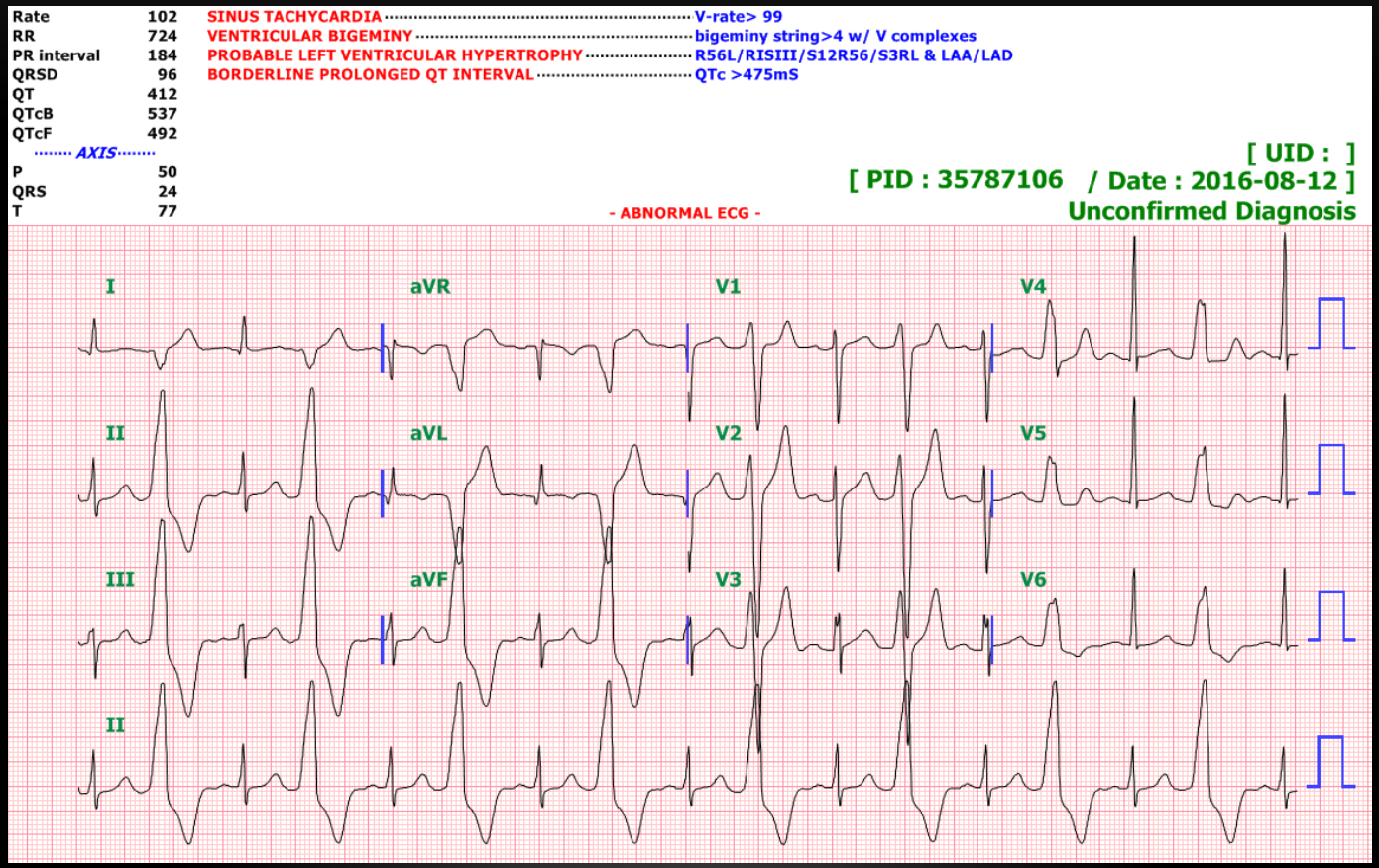
RVOT anterior septum





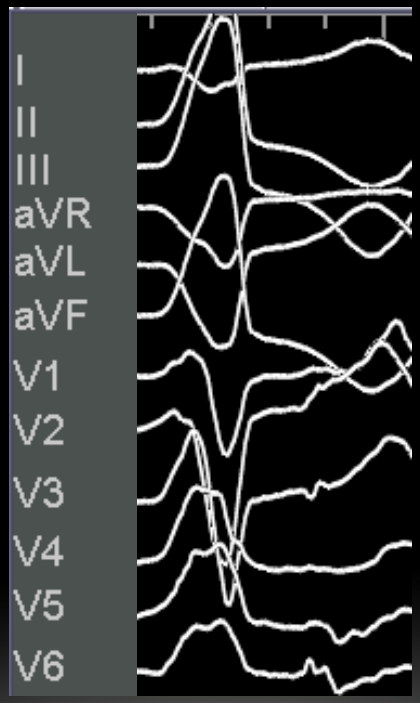
RVOT anterior septum and opposing LVOT septum

1 MONTH AFTER RFCA (2016-08-12)

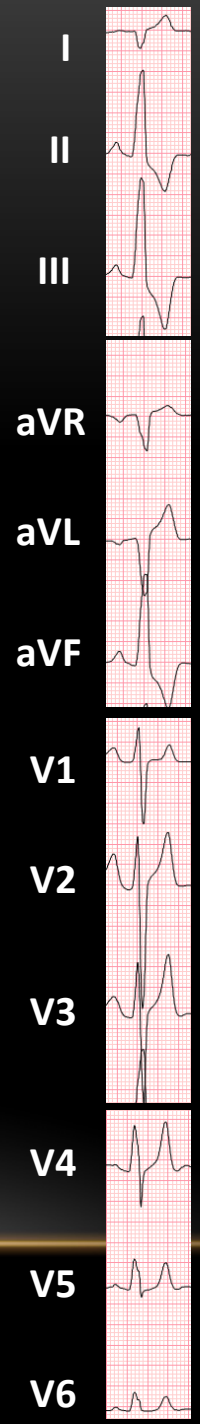


Q. WHICH LOCATION WOULD YOU PREFER TO MAP FIRST IN THIS PATIENT?

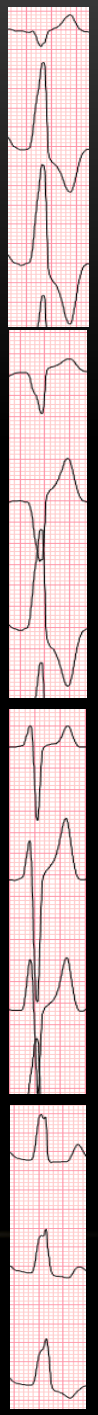
1. RVOT
2. LVOT
3. Epicardial side



Before redo RFCA



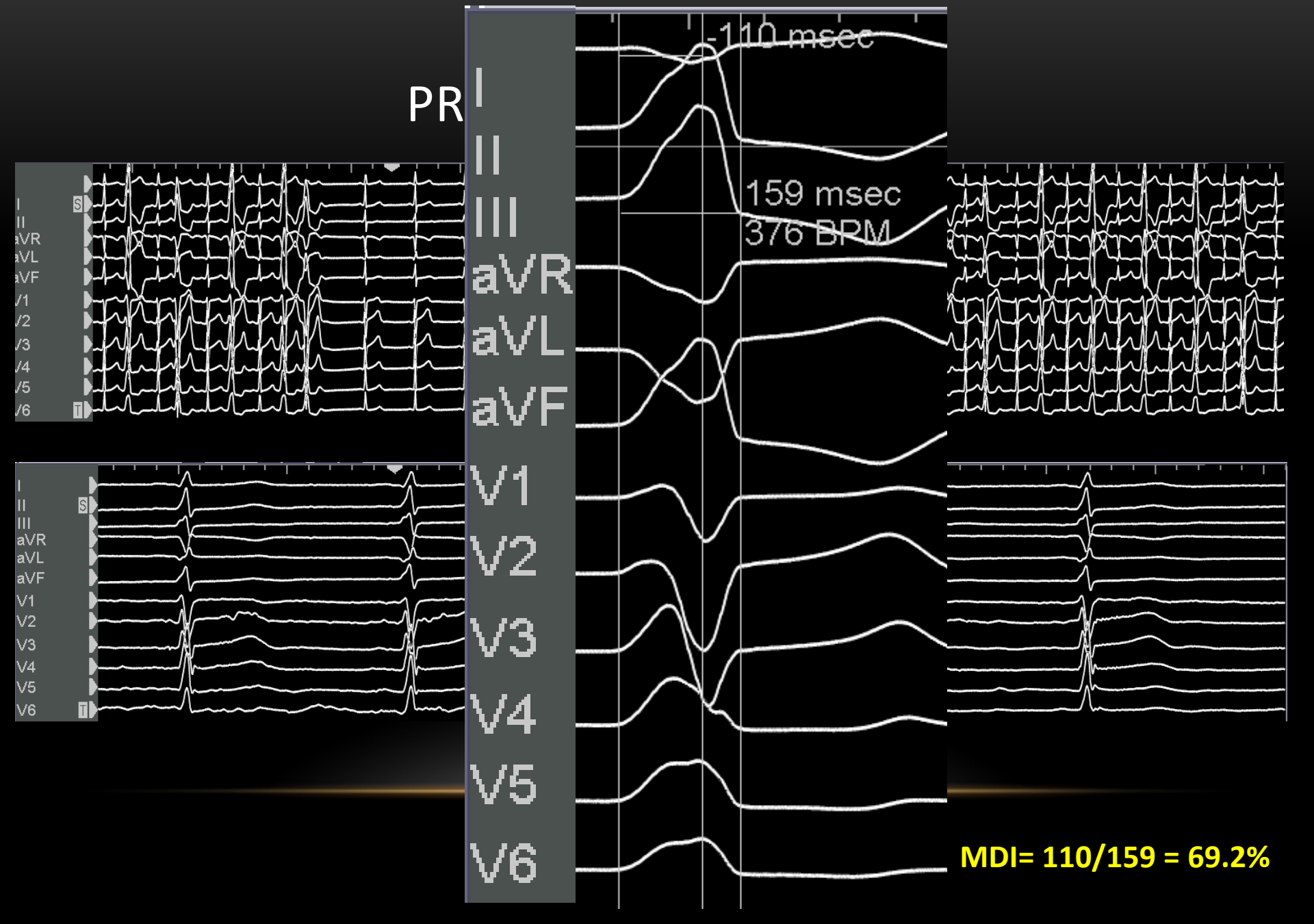
Before 1st RFCA



Recur

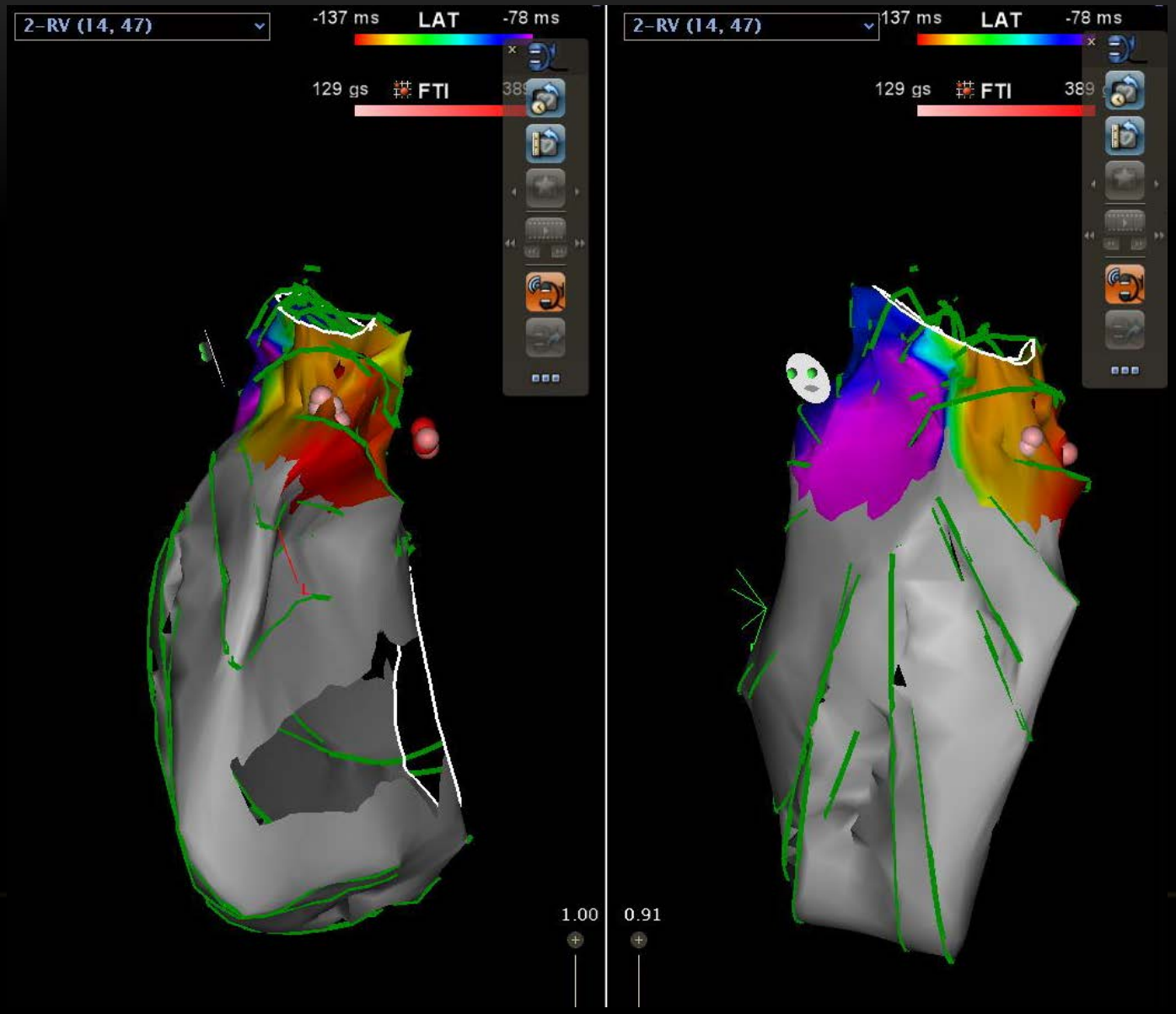
2ND RFCA

Recurred VPCs

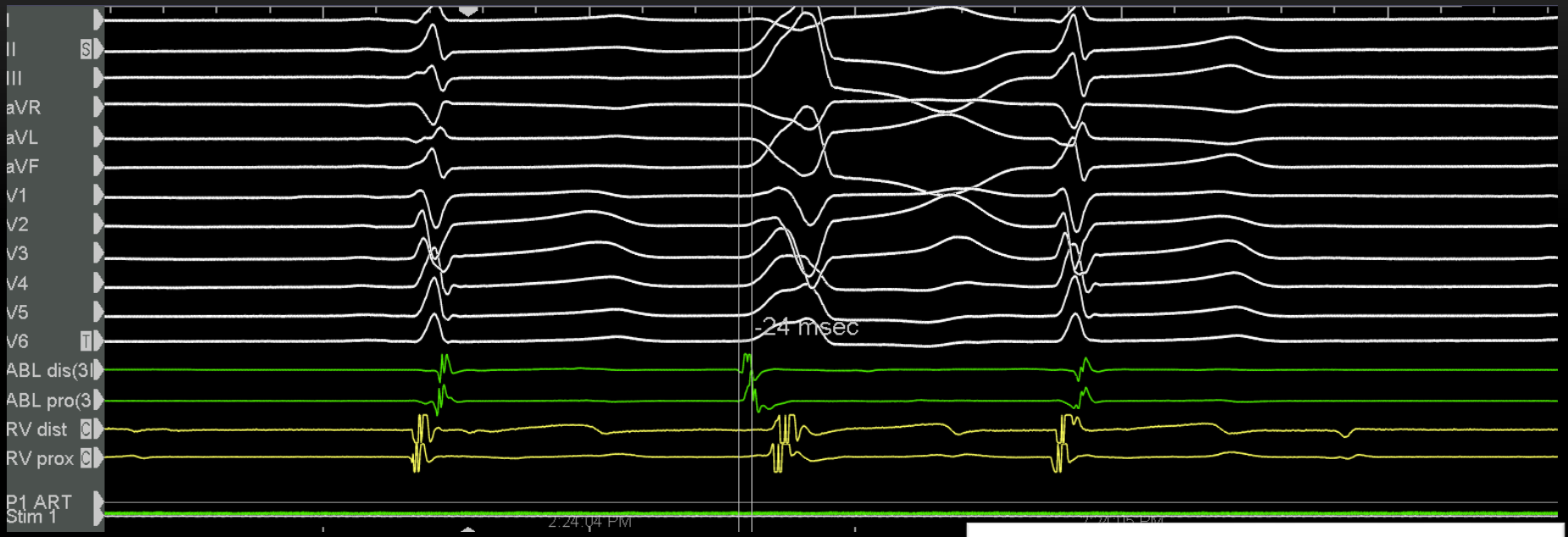

PR
110 msec
159 msec
376 BPM
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
MDI= 110/159 = 69.2%

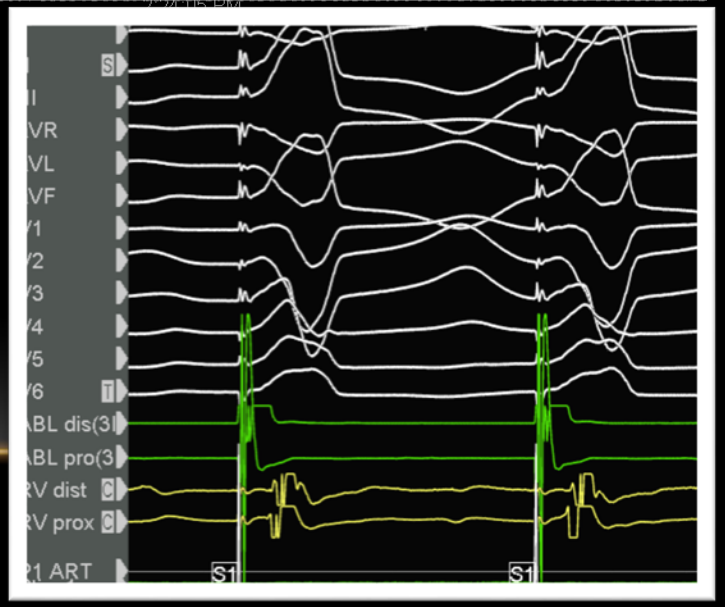
ANATOMICAL MAPPING USING THE SOUNDSTAR™ CATHETER

3D ACTIVATION MAP BY CARTOSOUND (RV)



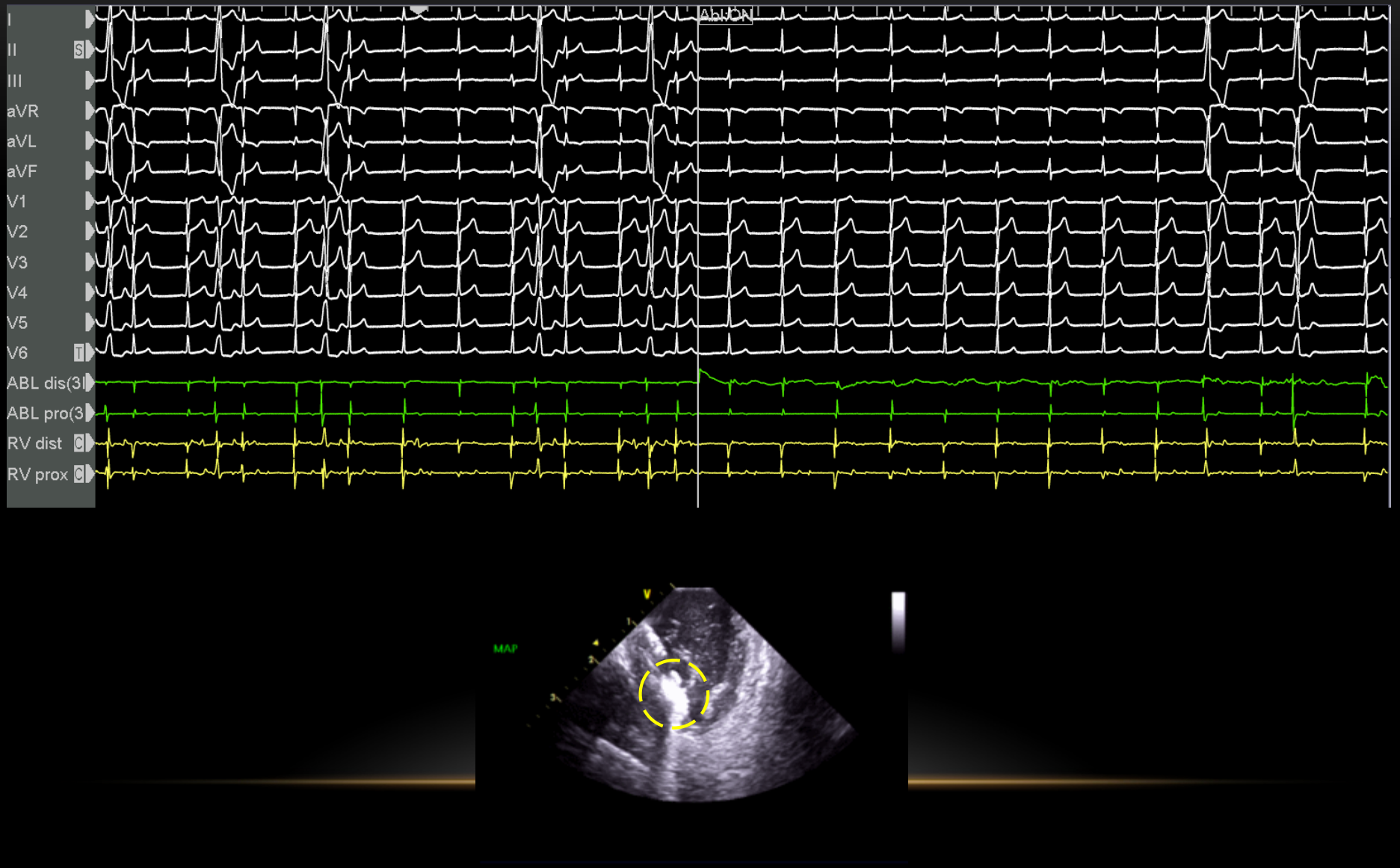
EARLIEST ACTIVATION SITE IN RVOT



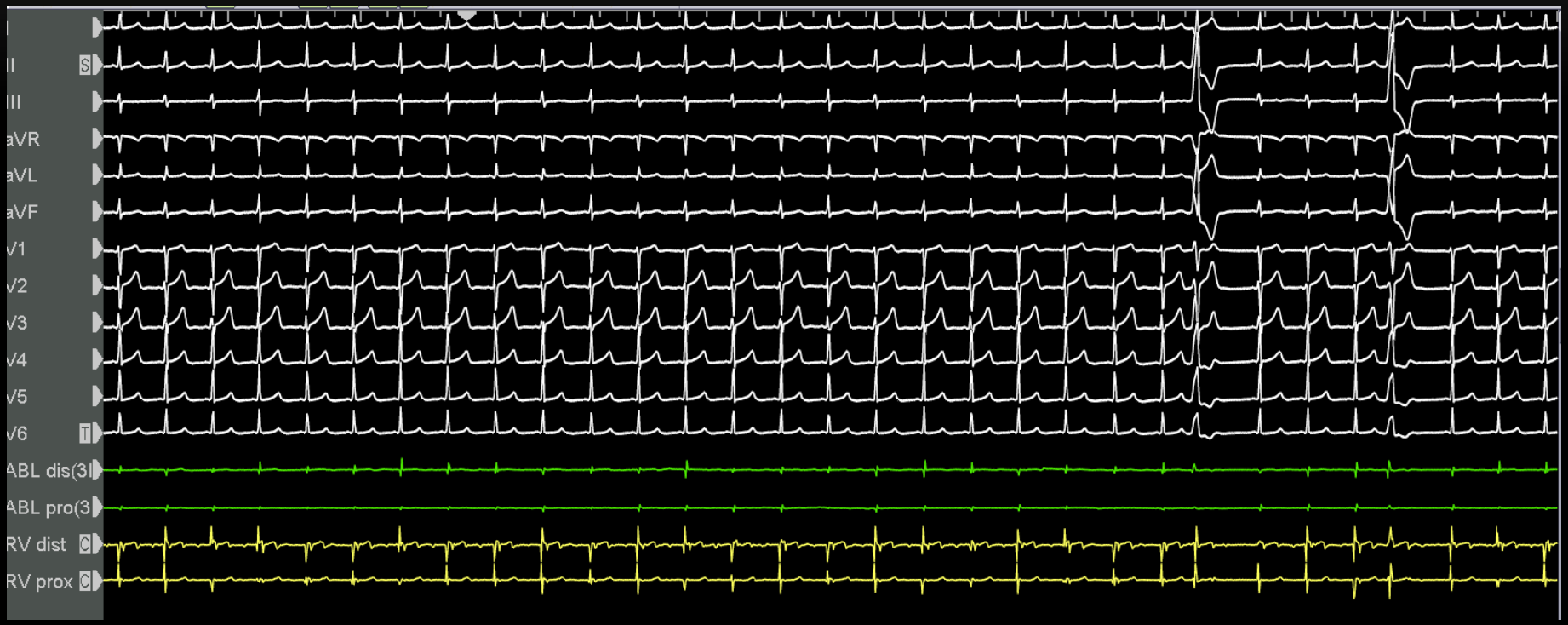


PASO 98.7%

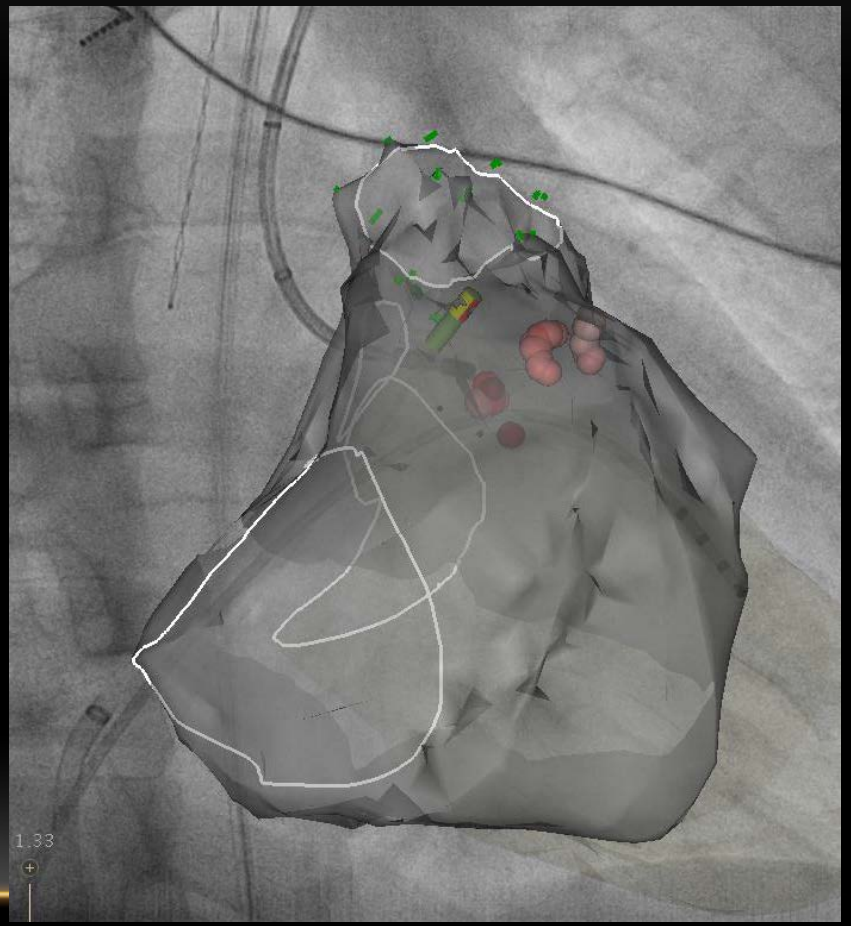
ABLATION IN RVOT (ANTERIOR SEPTUM)



POST-RFCA #14 IN RVOT

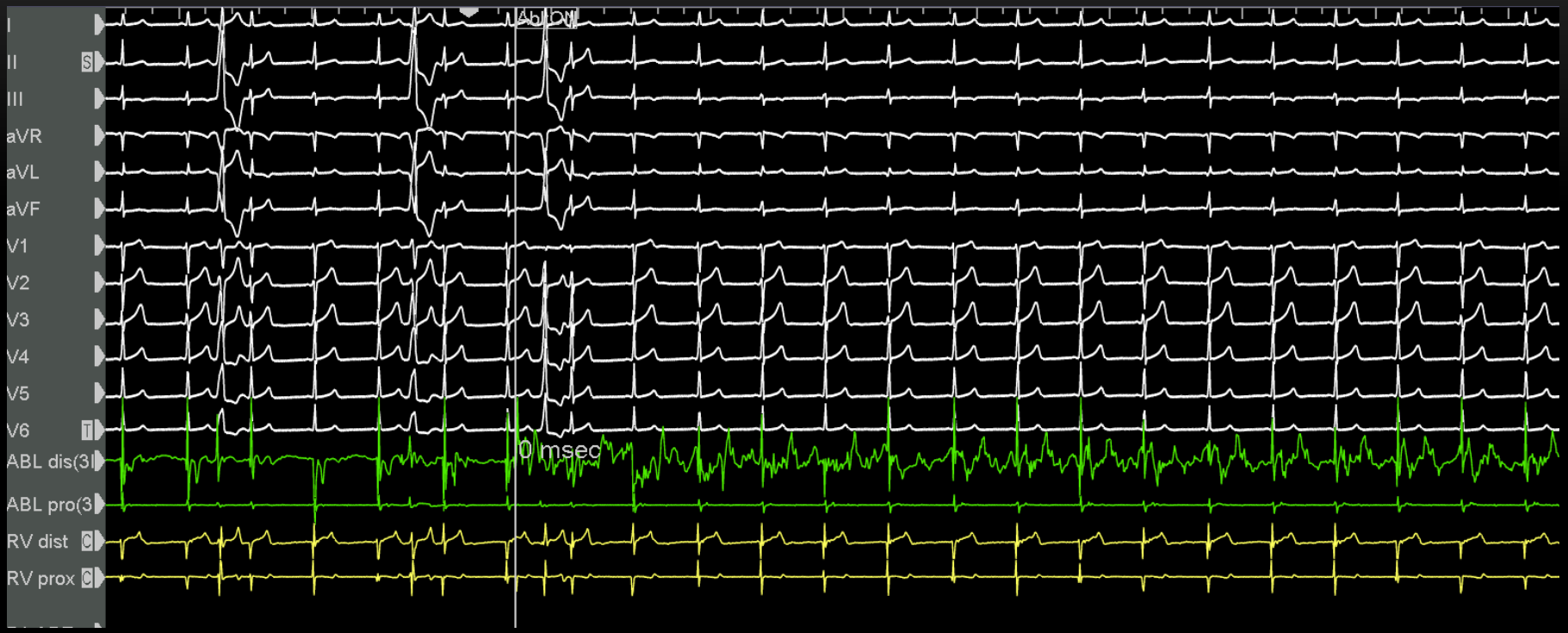


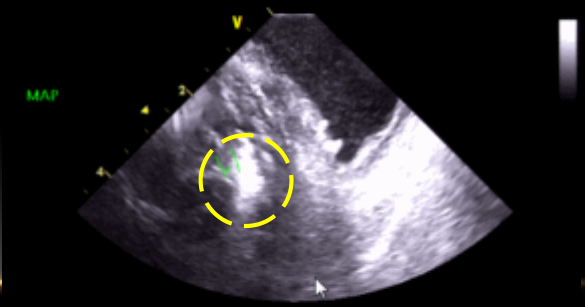
3D ACTIVATION MAP BY CARTOSOUND (LV)



EARLIEST ACTIVATION SITE IN LVOT

SUCCESSFUL ABLATION IN LVOT SEPTUM (BELOW LCC)

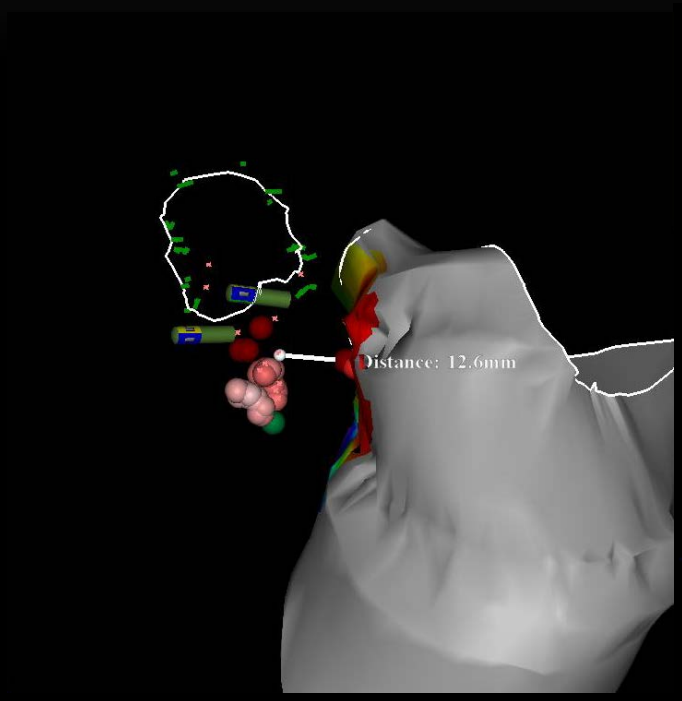


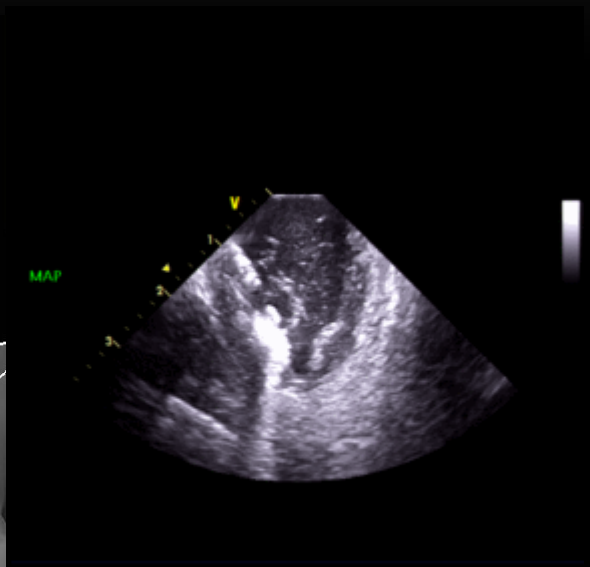


ABLATION WITH SMARTTOUCH CATHETER

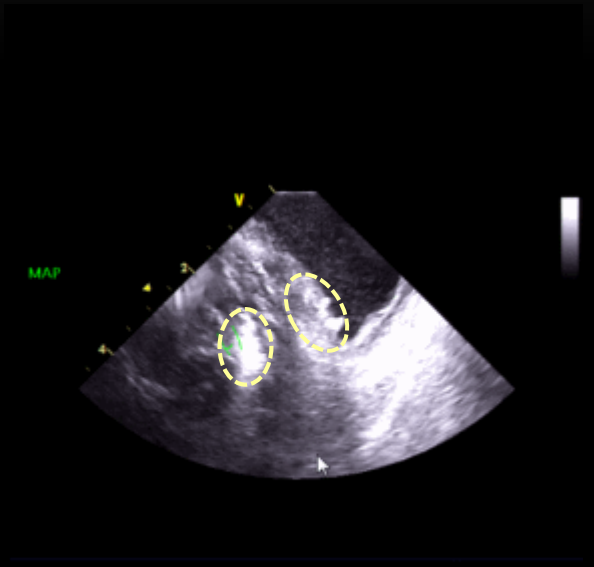
Maximal power 40W, duration 160s

LESION FORMATION VISUALIZED BY ICE





RVOT Lesion Formation

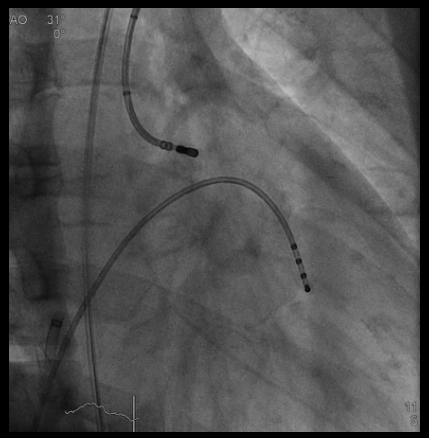


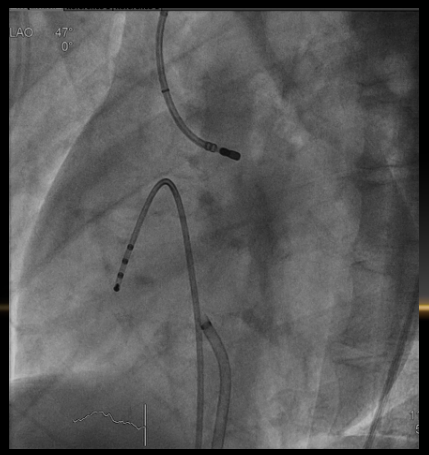
LV Lesion Formation

COMPARISON OF THE TWO PROCEDURES

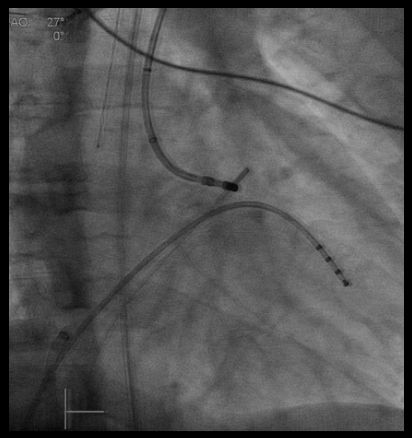
Location by fluoroscopy

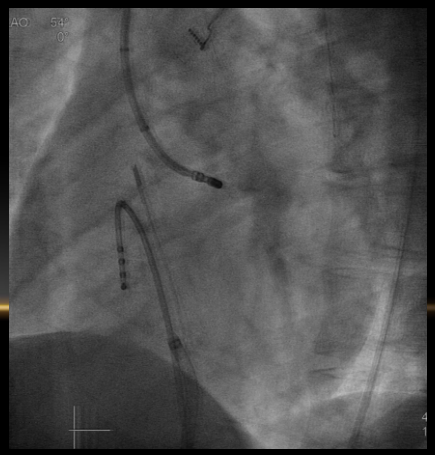
- 1st procedure





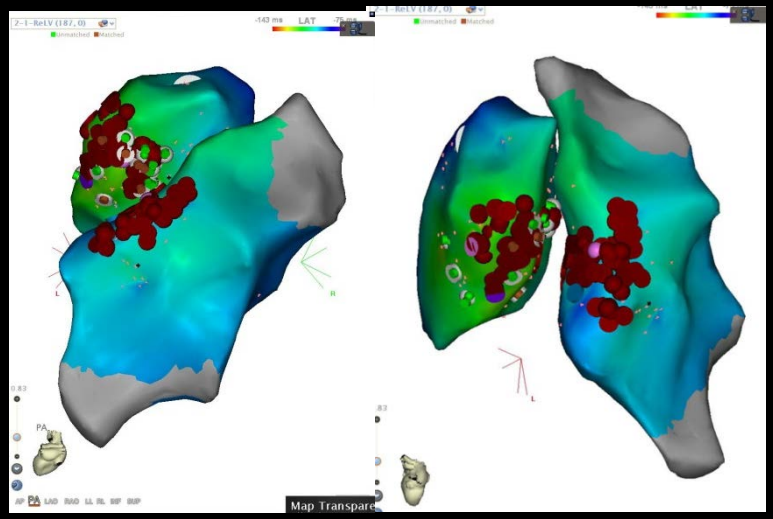
- Redo prodedure



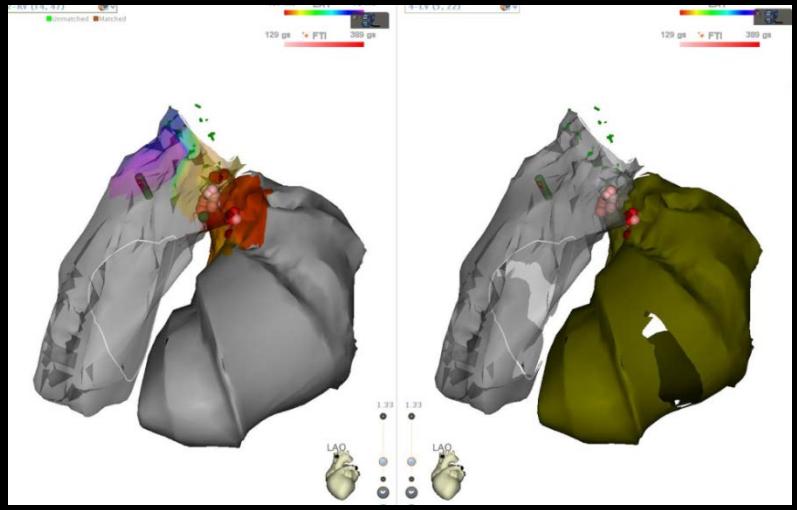


Location by 3D mapping

- 1st procedure



- Redo procedure



Mapping and ablation

	1st	Redo
System	CartoUnivu	CartoSound
Catheter	J&J Thermocool	SmartTouch

RF energy

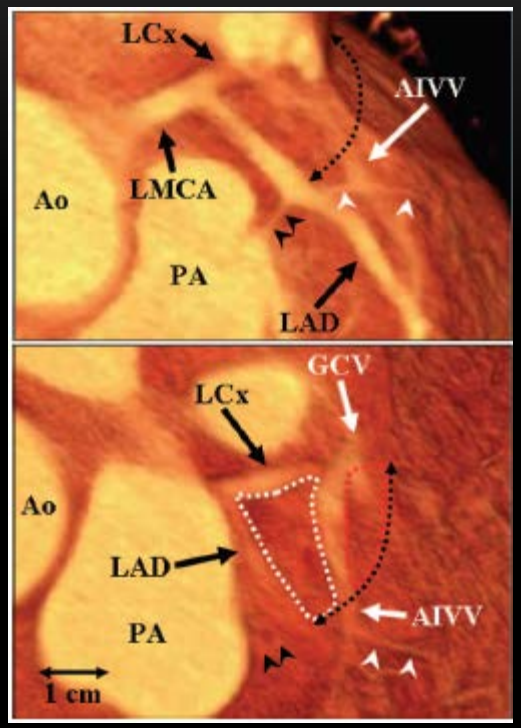
	1st	Redo
Max power	30W	40W
Duration	60s	160s
Number	RVOT #6 LVOT #21	RVOT #14 LVOT #4

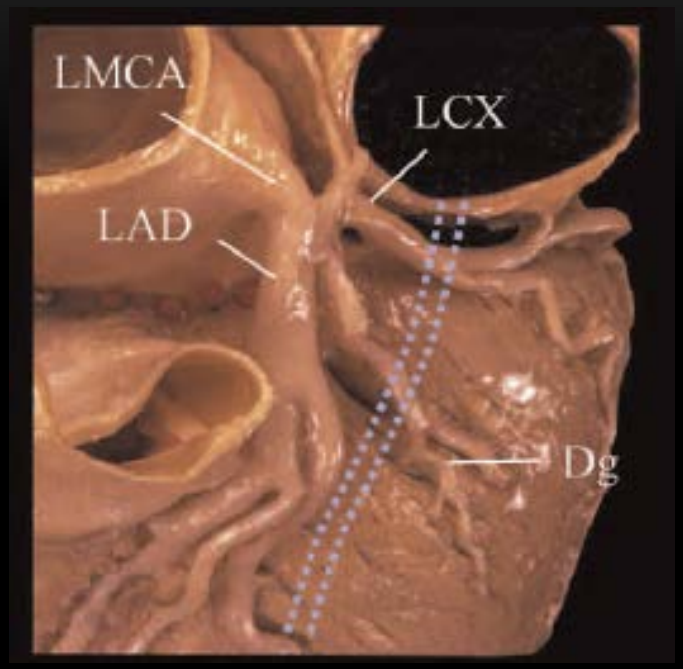
Deep lesion could be made with higher power, longer duration, and stable contact by assistance of ICE and SmartTouch catheter.

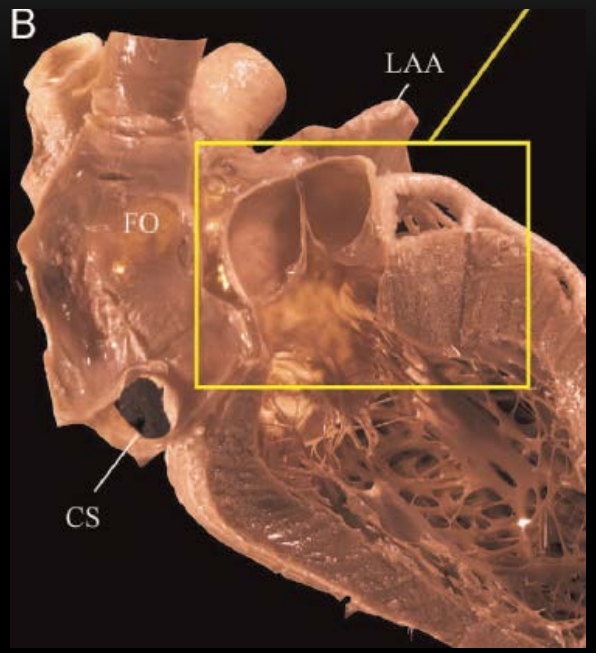
Earliest activation by EGM

	1st	Redo
RVOT	-43 msec	-24 msec
LVOT	Discrete potential	-24 msec

LV SUMMIT







Definition: LV epicardial surface bounded by LAD and LCx; superior to the aortic portion of LV ostium; most superior part of LV

Endocardial LV below LCC represents the opposite aspect of the LV summit

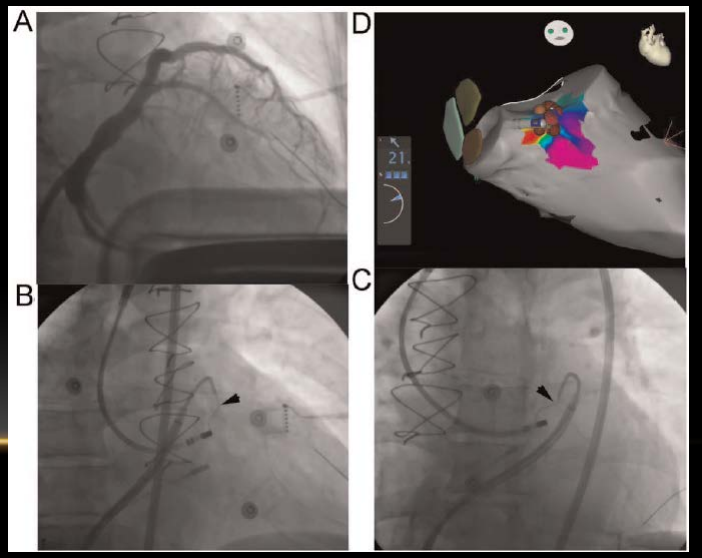
Idiopathic Ventricular Arrhythmias Originating From the Left Ventricular Summit ***Circ Arrhythm Electrophysiol 2010***
How to map andablate left ventricularsummit arrhythmias ***Heart Rhythm Society 2016***

How to map and ablate left ventricular summit arrhythmias

Andres Enriquez, MD,[*] Federico Malavassi, MD,[†] Luis C. Saenz, MD,[†] Gregory Supple, MD,[*] Pasquale Santangeli, MD,[*] Francis E. Marchlinski, MD,[*] Fermin C. Garcia, MD[*]

From the [*]Section of Cardiac Electrophysiology, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, and [†]Centro Internacional de Arritmias Andrea Natale, Fundacion Cardioinfantil, Bogota, Colombia.

- If the distance from the coronary arteries is not judged to be safe, ablation within the GCV/AIV is not technically feasible, or the earliest activation is recorded at a septal venous perforator, a first ablation attempt is performed from the LCC or LV endocardium, whichever is earliest and/or opposite to the earliest epicardial site marked by the catheters in the venous system.



Ablation of ventricular arrhythmias arising near the anterior epicardial veins from the left sinus of Valsalva region: ECG features, anatomic distance, and outcome

Miguel E. Jauregui Abularach, MD, Bieito Campos, MD, Kyoung-Min Park, MD, Cory M. Tschabrunn, CEPS, David S. Frankel, MD, Robert E. Park, MD, FRCAP, Edward P. Gerstenfeld, MD, Stavros Mountantonakis, MD, Fermin C. Garcia, MD, Sanjay Dixit, MD, FHRS, Wendy S. Tzou, MD, Mathew D. Hutchinson, MD, FHRS, David Lin, MD, Michael P. Riley, MD, PhD, Joshua M. Cooper, MD, Rupa Bala, MD, David J. Callans, MD, FHRS, Francis E. Marchlinski, MD, FHRS

From the Electrophysiology Section, Cardiovascular Division, Department of Medicine, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania.

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Heart Rhythm Disorders

Ablation of Left Ventricular Epicardial Outflow Tract Tachycardia From the Distal Great Cardiac Vein

Owen A. Obel, MD,* Andre d'Avila, MD,† Petr Neuzil, MD,‡ Eduardo B. Saad, MD,† Jeremy N. Ruskin, MD,* Vivek Y. Reddy, MD*

Boston, Massachusetts; Rio de Janeiro, Brazil; and Prague, Czech Republic

LESSONS FROM THIS CASE

- The ablation of outflow VT is not always successful with 3D mapping and fluoroscopy.

- ICE can enhance the safety and efficacy of RF ablation by visualizing anatomical details, stable catheter placement, and lesion formation.

THANK YOU!