Catheter Ablation of Ventricular Tachycardia

Case Presentations and suggested readings

This Presentation and its contents are copyright of Arash Arya
© Arash Arya 2020. All rights reserved.

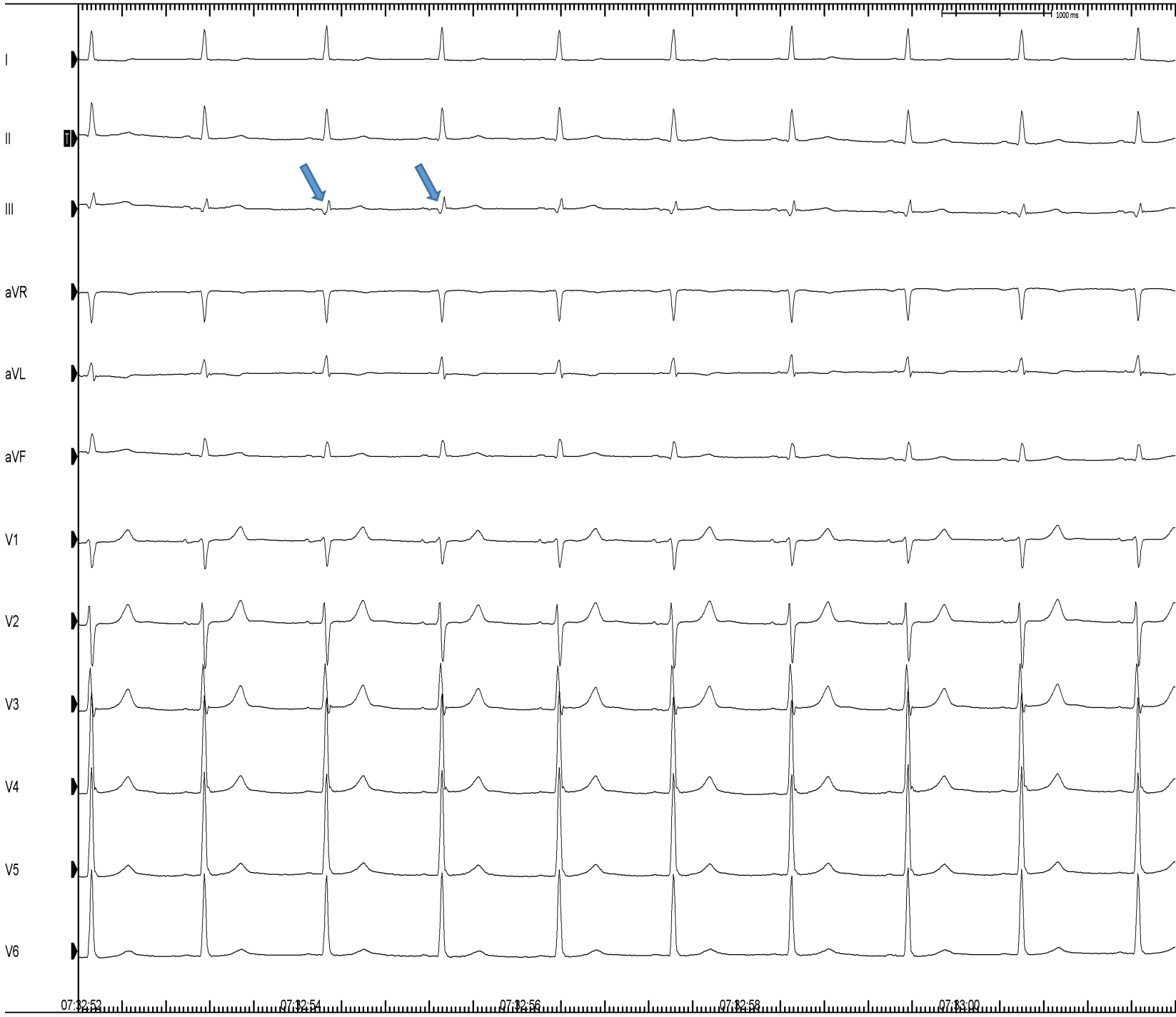
Any redistribution or reproduction of part or all the contents in any form is prohibited other than the following:
(1) you may print or download to a local hard disk extracts for your personal and non-commercial use only
(2) you may copy the content to individual third parties for their personal use, but only if you acknowledge the website as the source of the material

You may not, except with our express written permission, distribute or commercially exploit the content. Nor may you transmit it or store it in any other website or other form of electronic retrieval system.

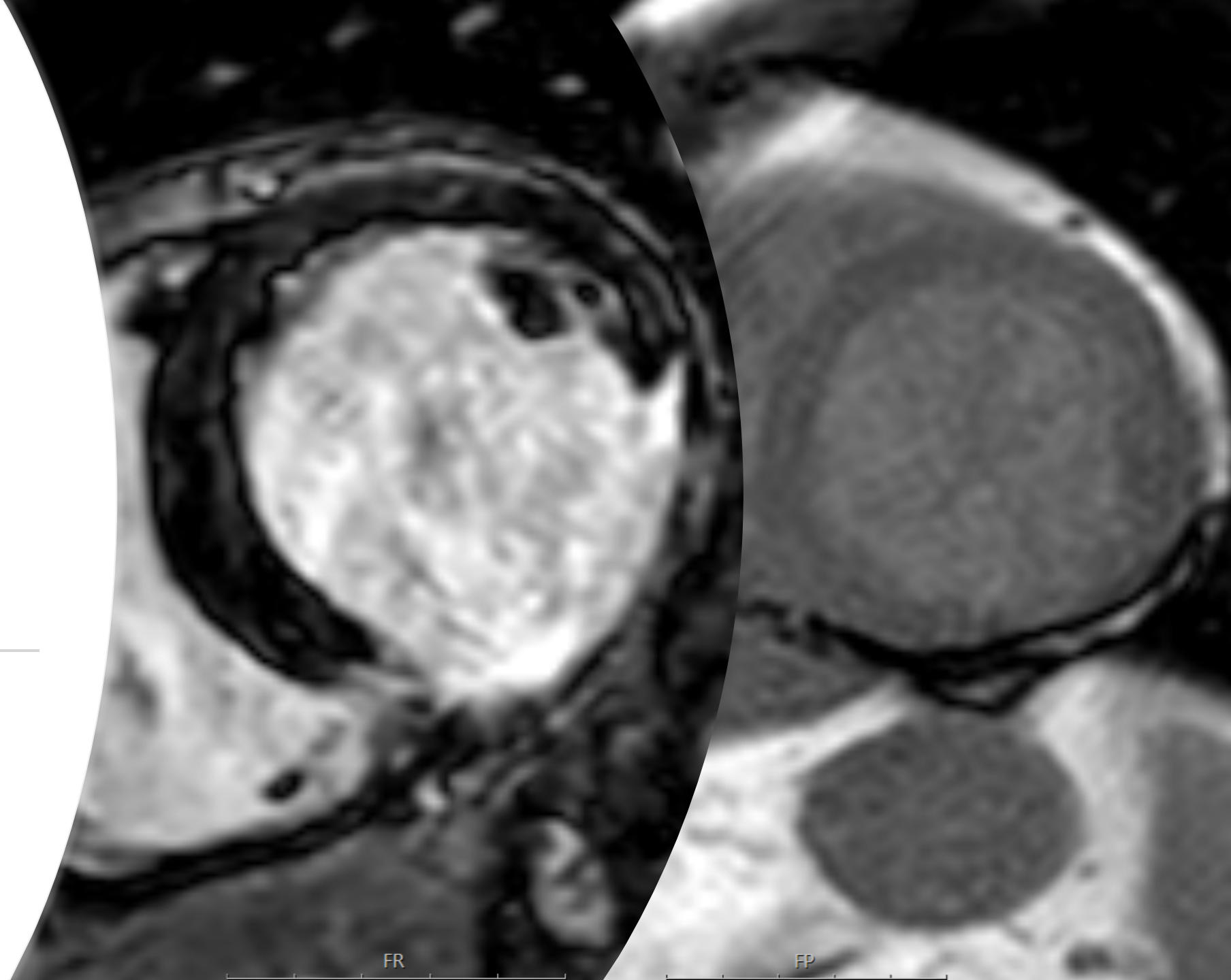
Patient 1:

- 62-year-old male patient
- Old inferior MI
- LV ejection fraction: 40%
- Electrical Storm due to frequent fast monomorphic VT
- Admitted for RF Ablation

Baseline ECG

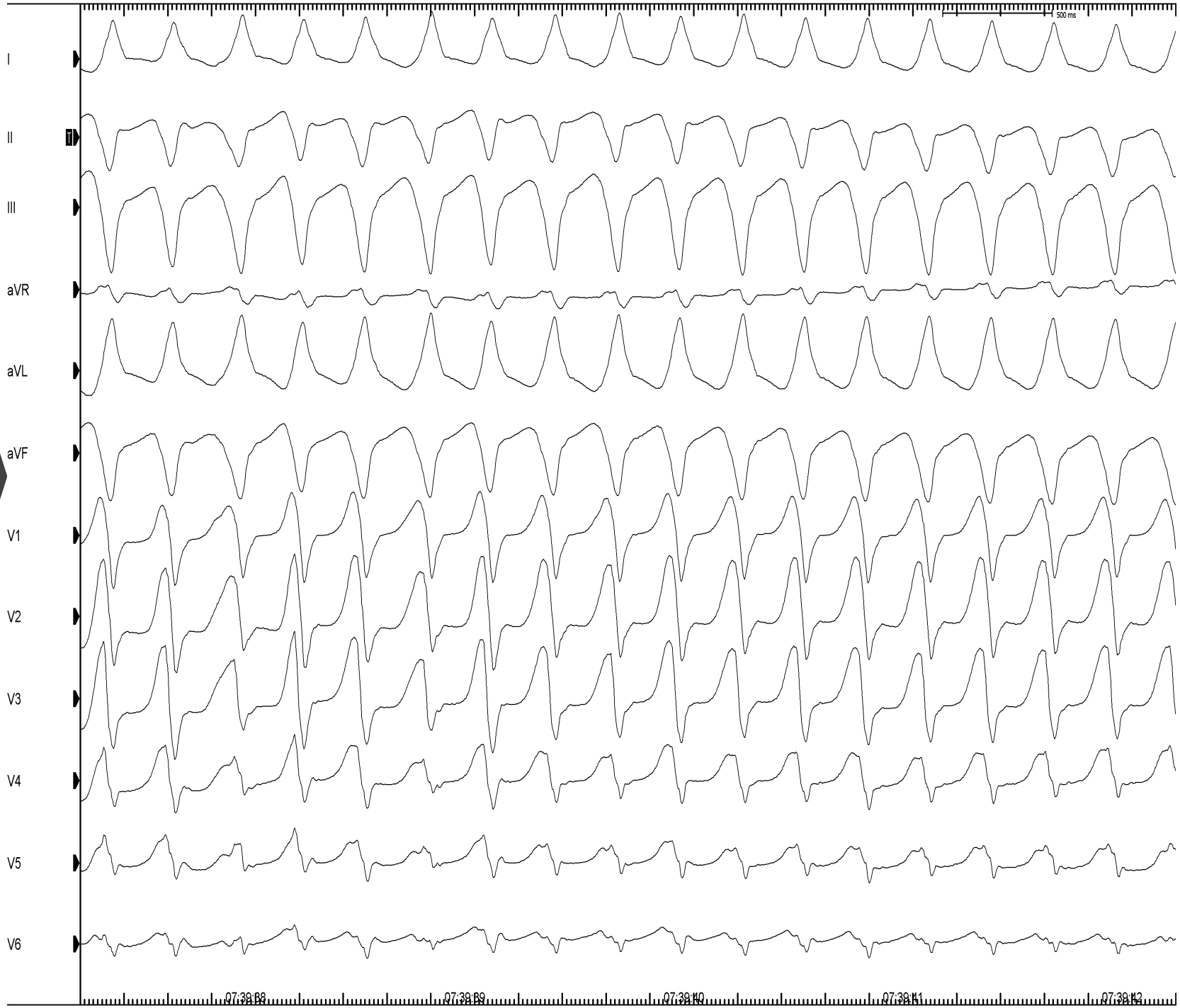


Cardiac MR

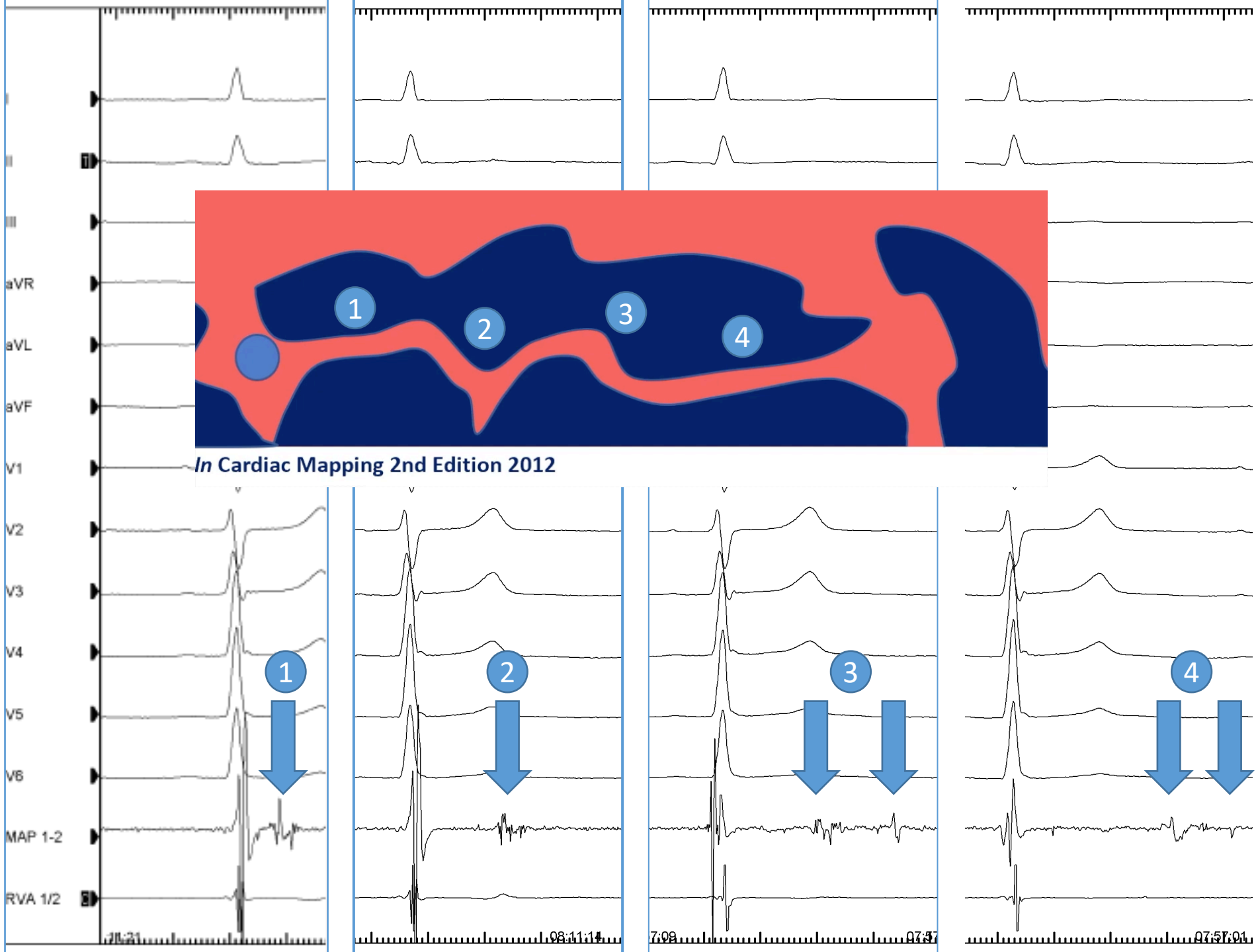


Clinical VT

CL: 290 - 300 ms



Late Potentials:

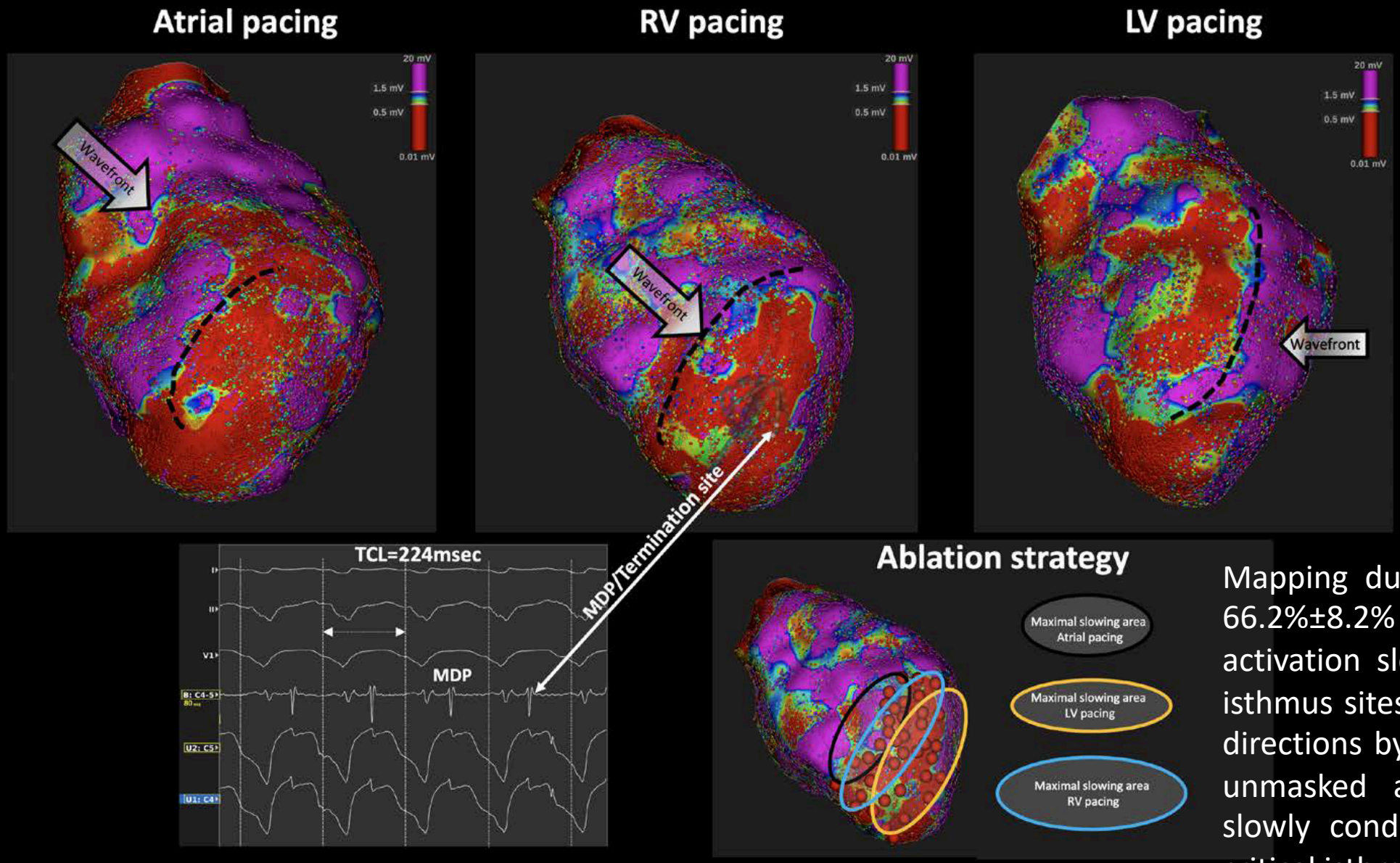


Ablation of Reentry-Vulnerable-Zones Determined by Left Ventricular Activation from Multiple Directions: A Novel Approach for Ventricular Tachycardia Ablation: A Multicenter Study (PHYSIO-VT)

Running title: *Anter et al.; Ablation of reentry vulnerable zones*

Elad Anter, MD[1]; Petr Neuzil, MD, PhD[2]; Vivek Y. Reddy, MD[2,3]; Jan Petru, MD[2]; Kyoung-Min Park, MD[4]; Jakub Sroubek, MD, PhD[5]; Eran Leshem, MD, MPH[5]; Peter J. Zimetbaum, MD[5]; Alfred E. Buxton, MD[5]; Andre G. Kleber, MD[5]; Changyu Shen, PhD[6]; Andrew L. Wit, PhD[7]

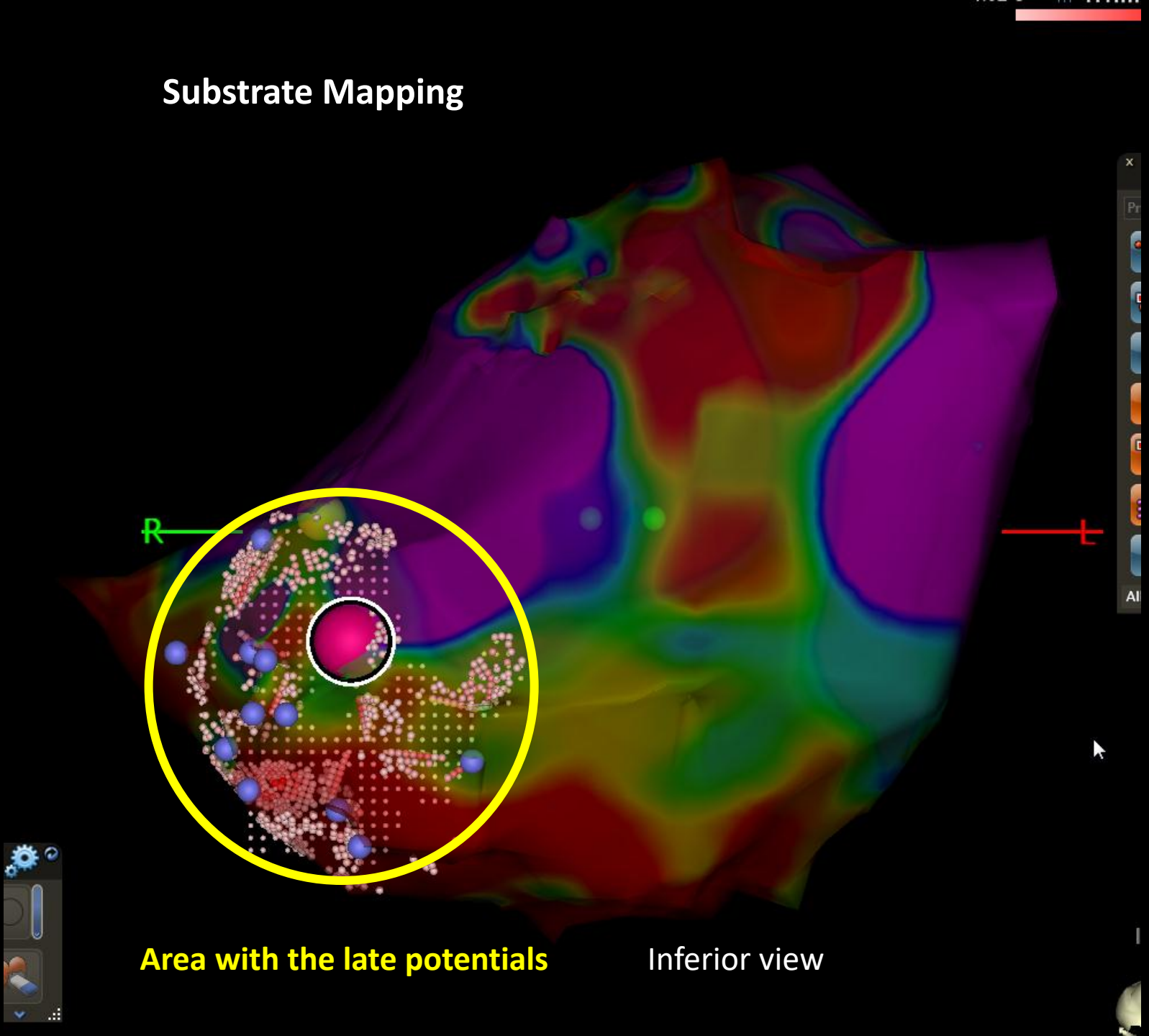
Originally published 6 May 2020
https://doi.org/10.1161/CIRCEP.120.008625
Circulation: Arrhythmia and Electrophysiology



Mapping during SR identified only 66.2%±8.2% of the entire area of activation slowing and 58% critical isthmus sites. Activation from other directions by RV and LV stimulation unmasked an additional 33% of slowly conducting zones and 25% critical isthmus sites.

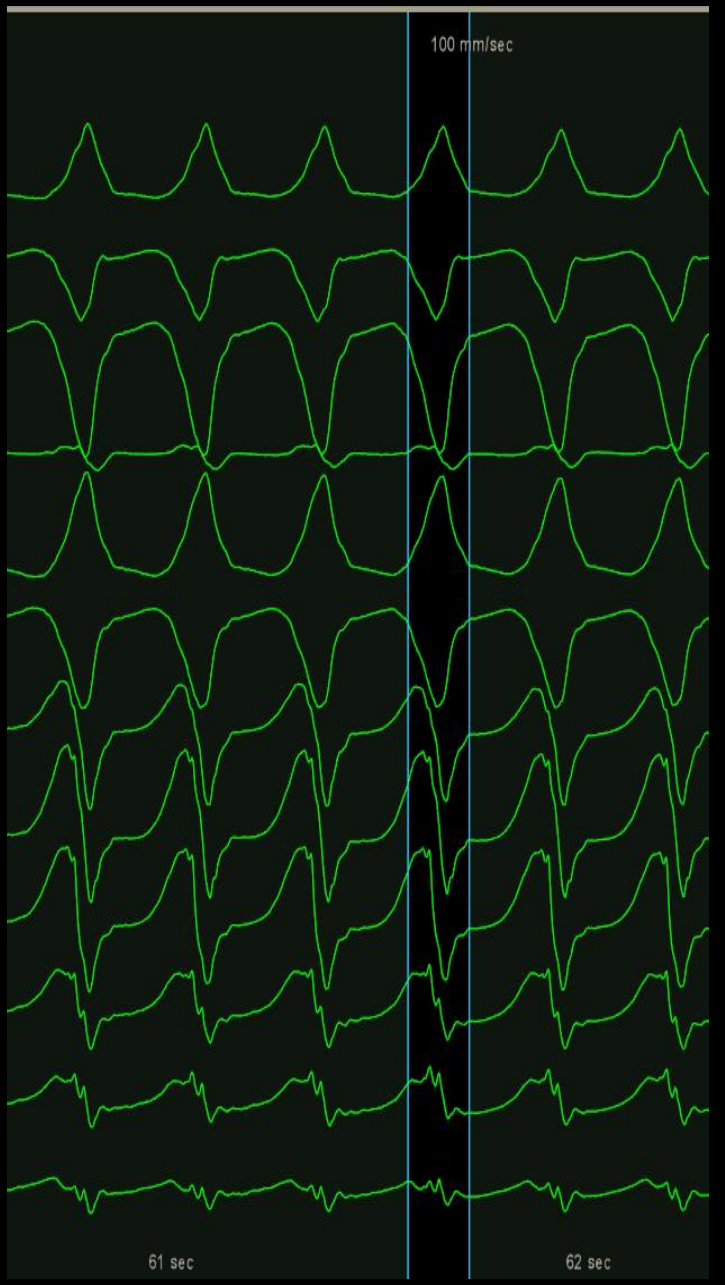
Originally published 6 May 2020
https://doi.org/10.1161/CIRCEP.120.008625
Circulation: Arrhythmia and Electrophysiology

Substrate Mapping



Area with the late potentials

Inferior view

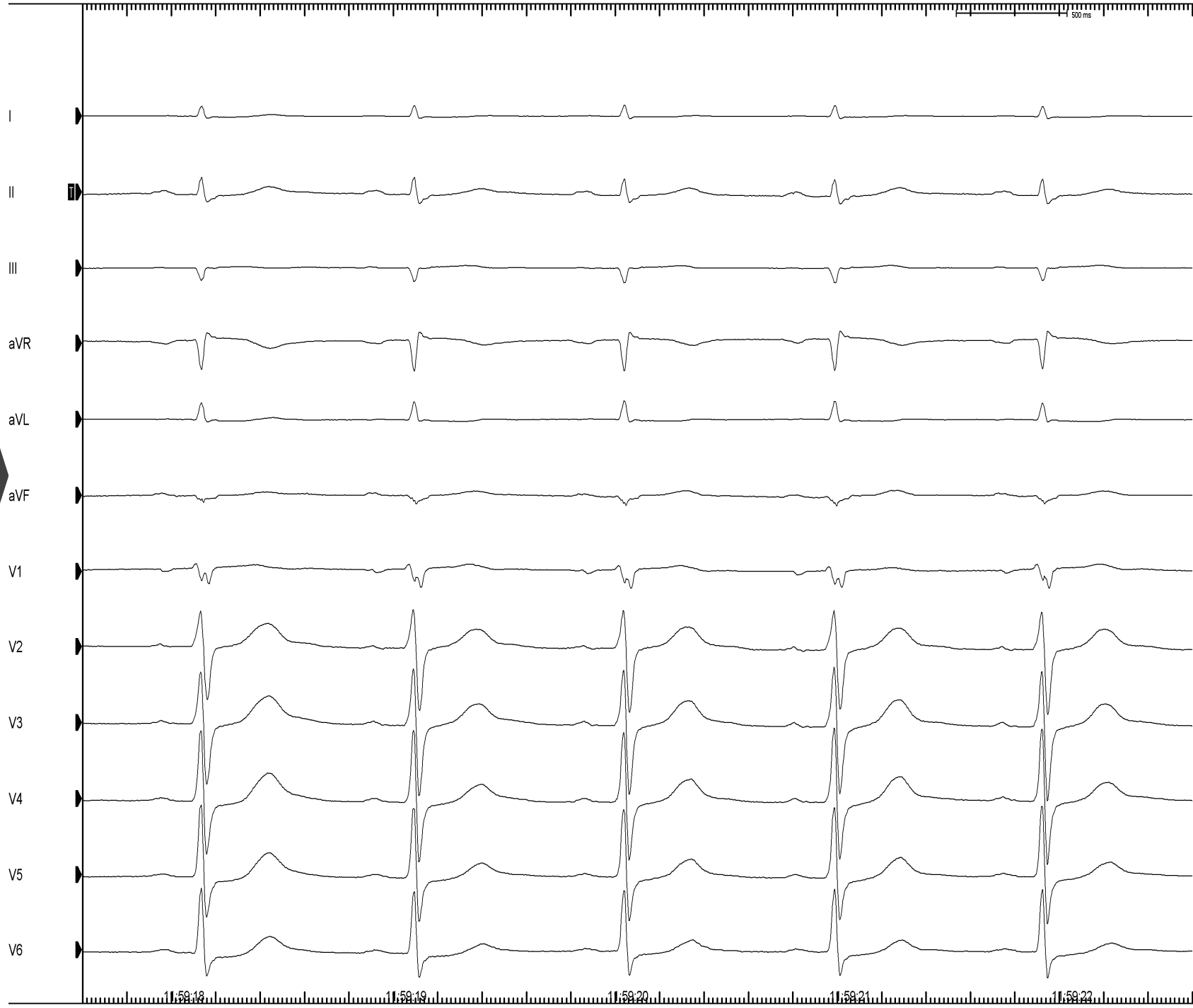


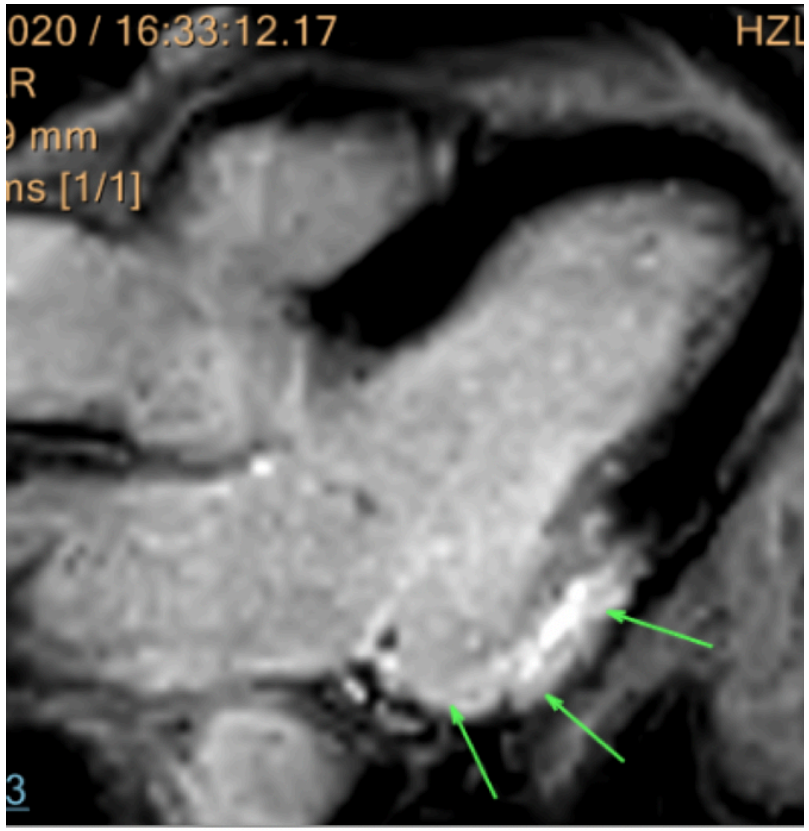
Clinical VT

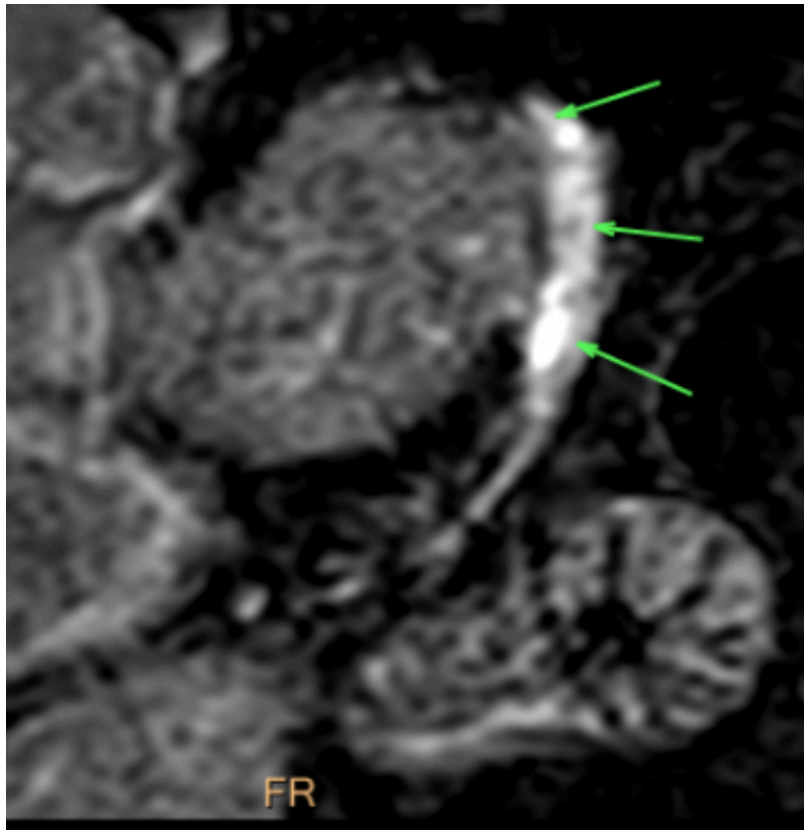
Patient 2:

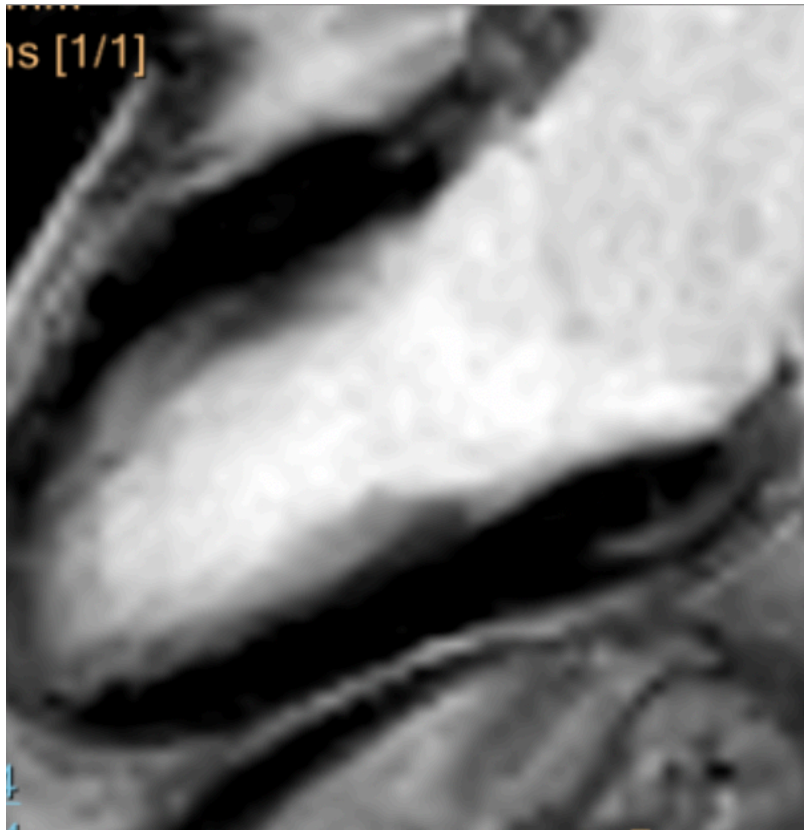
- 68-year-old male patient
- Old inferior MI
- LV ejection fraction: 45%
- Electrical Storm due to frequent monomorphic VT
- Admitted for RF Ablation

Baseline ECG









Cardiac MR

Circulation: Arrhythmia and Electrophysiology

ORIGINAL ARTICLE

Substrate Spatial Complexity Analysis for the Prediction of Ventricular Arrhythmias in Patients With Ischemic Cardiomyopathy

David R. Okada, MD; Jason Miller, MA; Jonathan Chrispin, MD; Adityo Prakosa, PhD; Natalia Trayanova, PhD; Steven Jones, MD; Mauro Maggioni, PhD; Katherine C. Wu, MD

Circ Arrhythm Electrophysiol. 2020;13:e007975. DOI: 10.1161/CIRCEP.119.007975

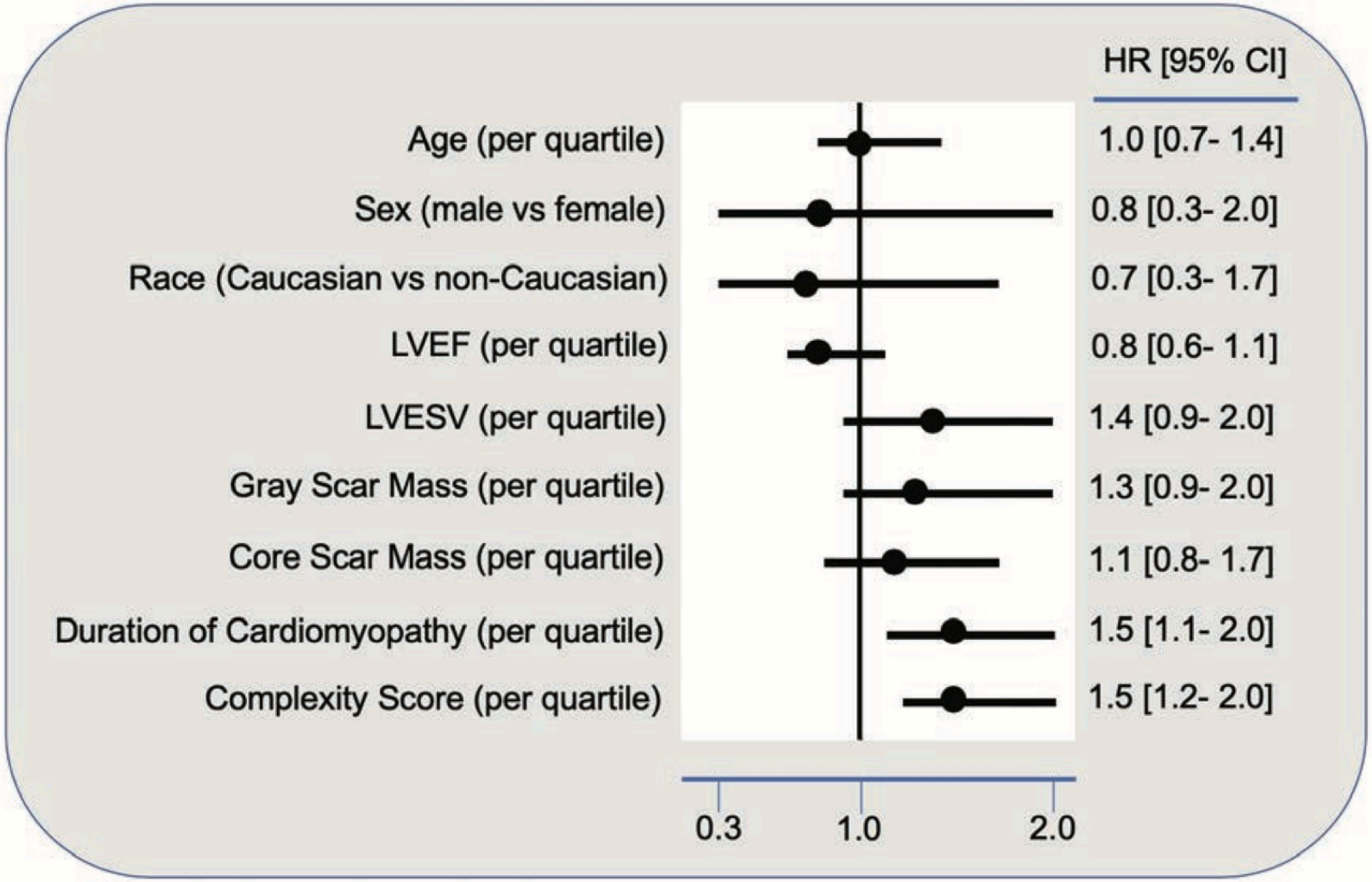
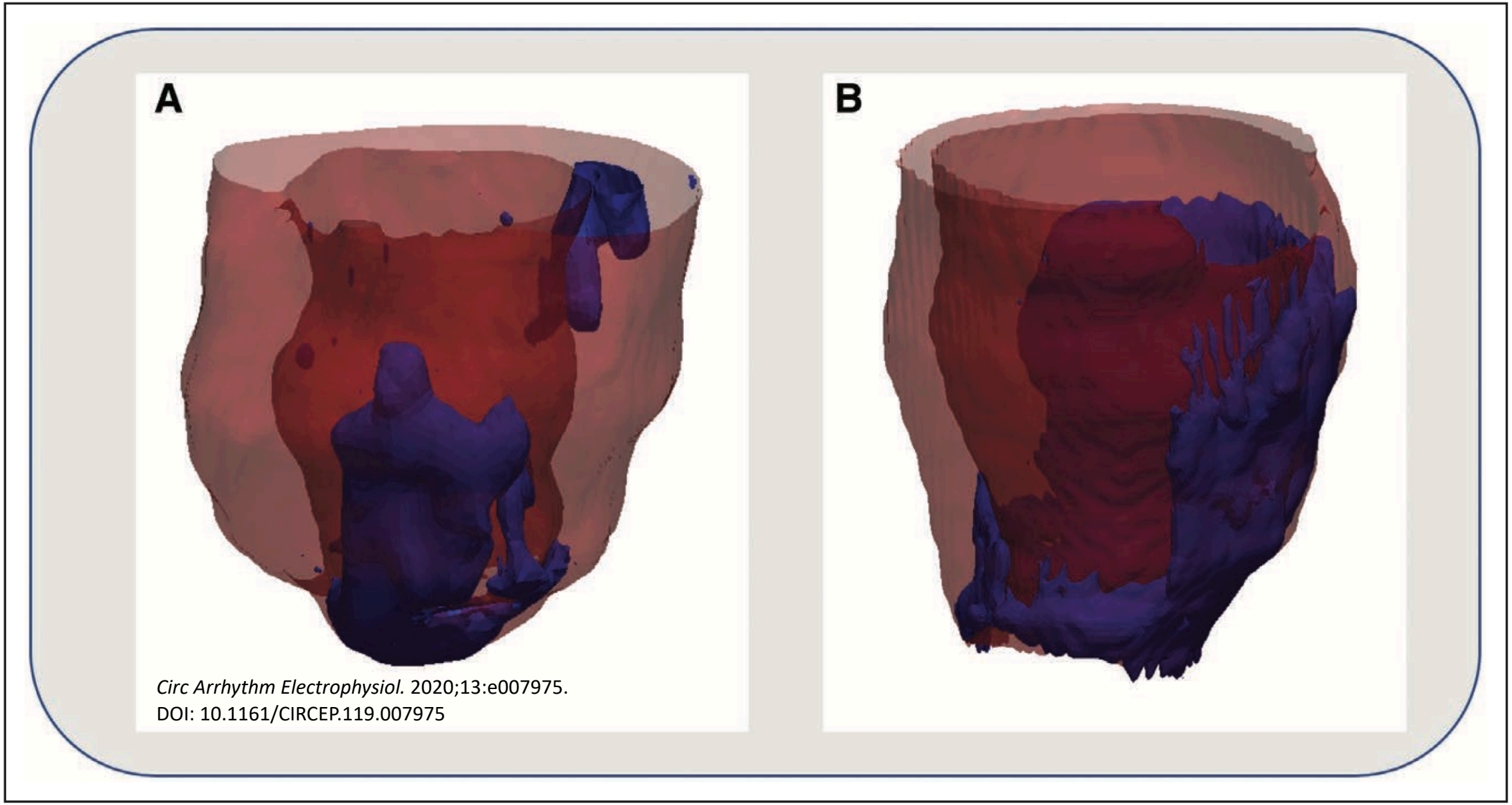


Figure 3. Results of multivariable cox regression model.
In a multivariable Cox regression analysis, the complexity score was independently associated with VA events on a time-to-event basis and showed a stronger association than any other variable.
HR indicates hazard ratio; LVEF; left ventricular ejection fraction; and LVESV, left ventricular end systolic volume.

Circ Arrhythm Electrophysiol. 2020;13:e007975. DOI: 10.1161/CIRCEP.119.007975

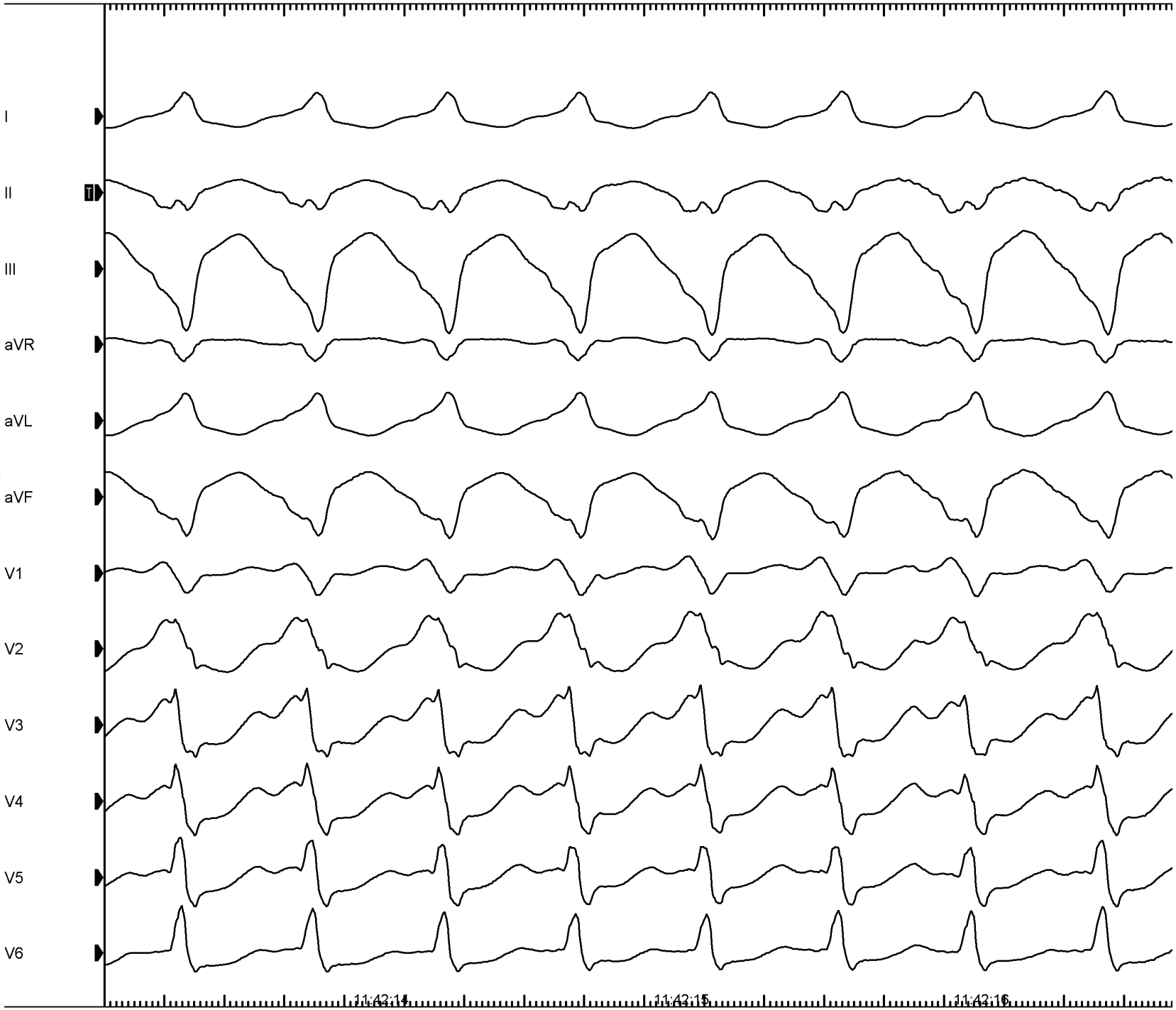


Circ Arrhythm Electrophysiol. 2020;13:e007975.
DOI: 10.1161/CIRCEP.119.007975

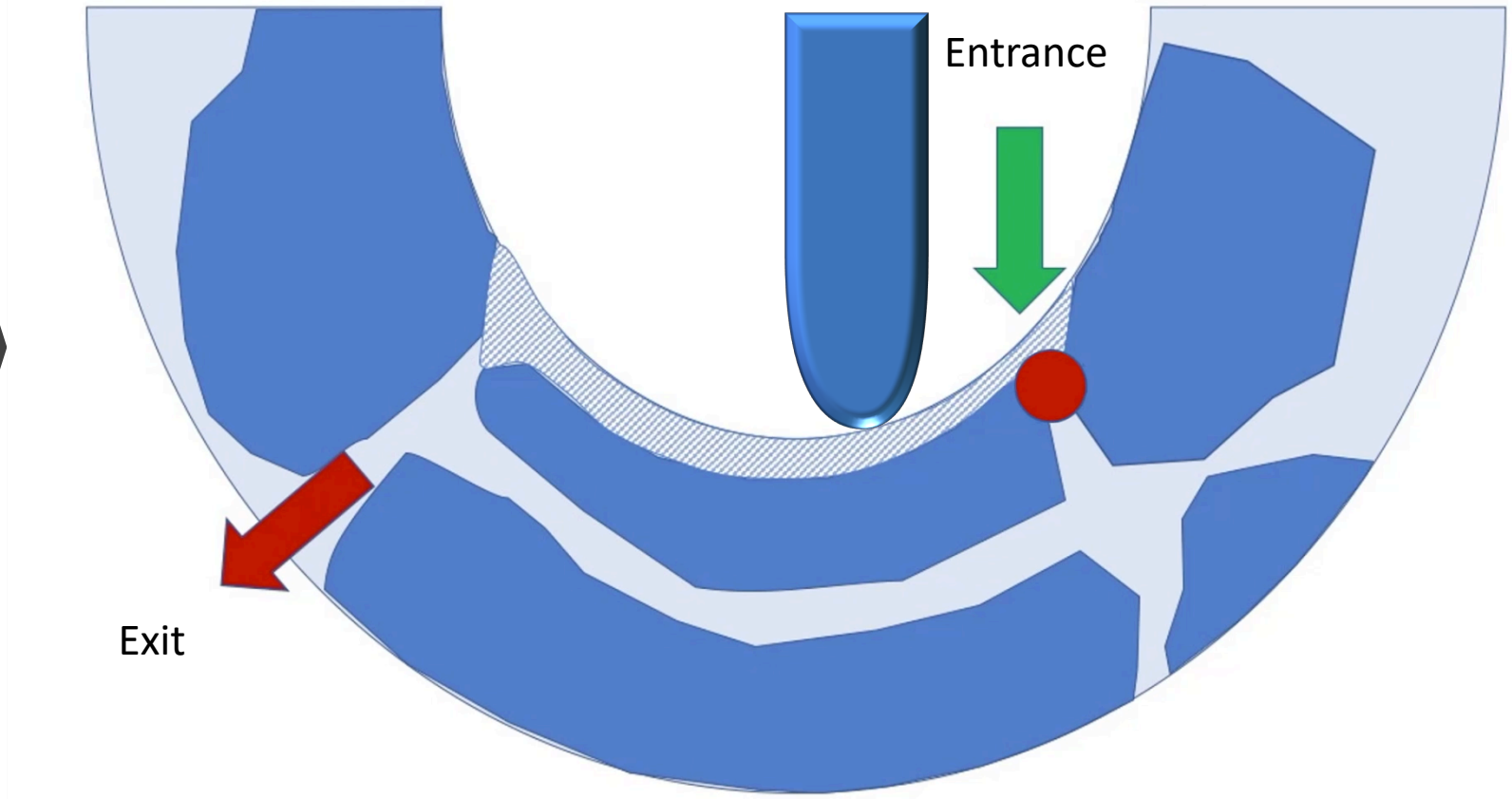
Figure 4. Example of substrate spatial complexity analysis from 2 patients.
A, Shows the cardiac magnetic resonance imaging technique of late gadolinium enhancement (LGE-CMR)-derived scar pattern from a patient with a low scar burden (12.1 g) but a high complexity score (CS; 0.99) who ultimately had a VA event. **B**, Shows the LGE-CMR-derived scar pattern from a patient with a high scar burden (84 g) but a low CS (0.00) who did not have a VA event.

Clinical VT

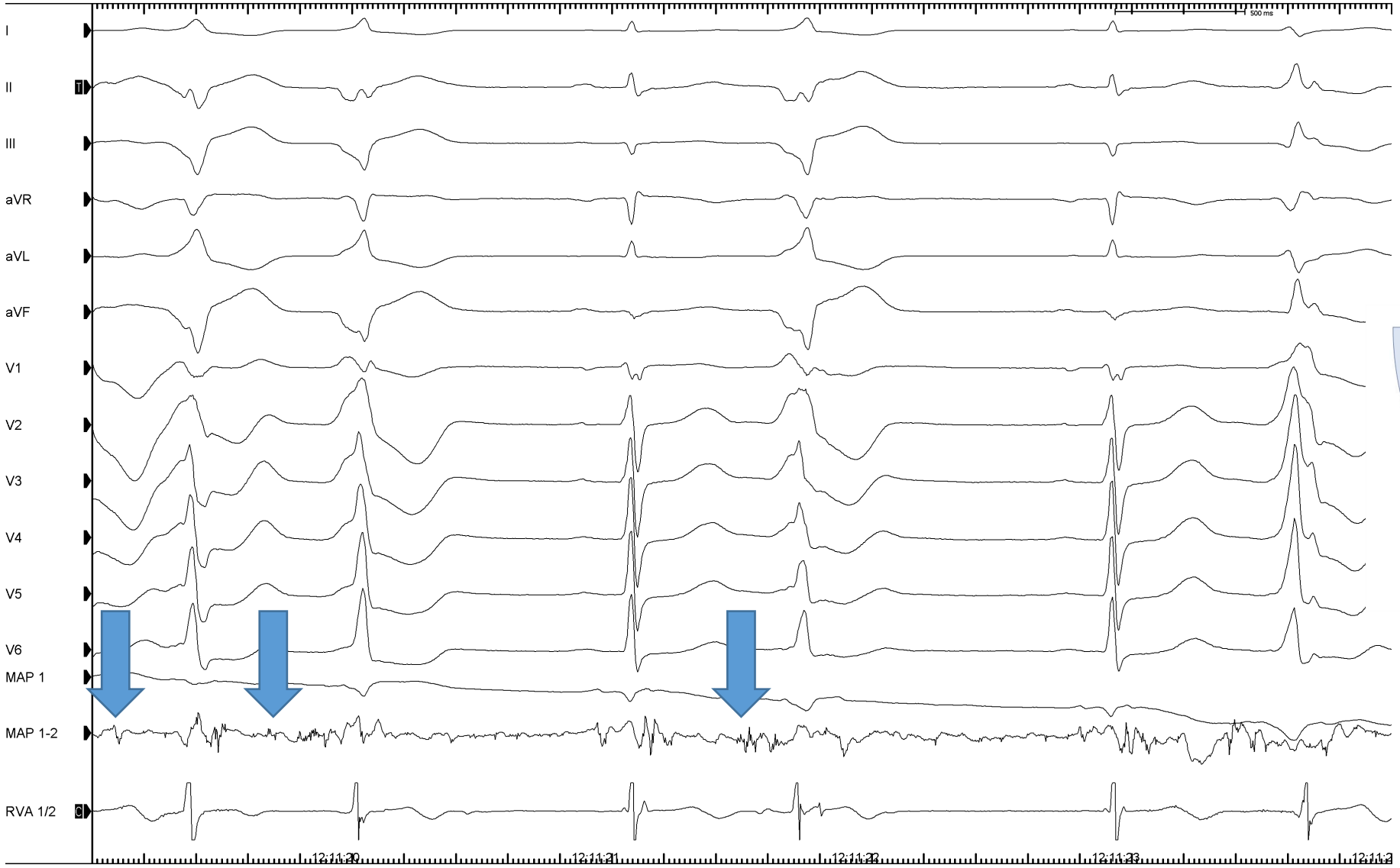
CL: 430 ms

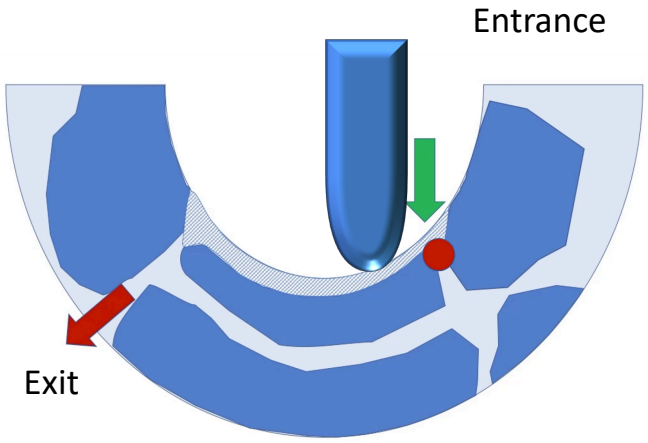


VT Circuit

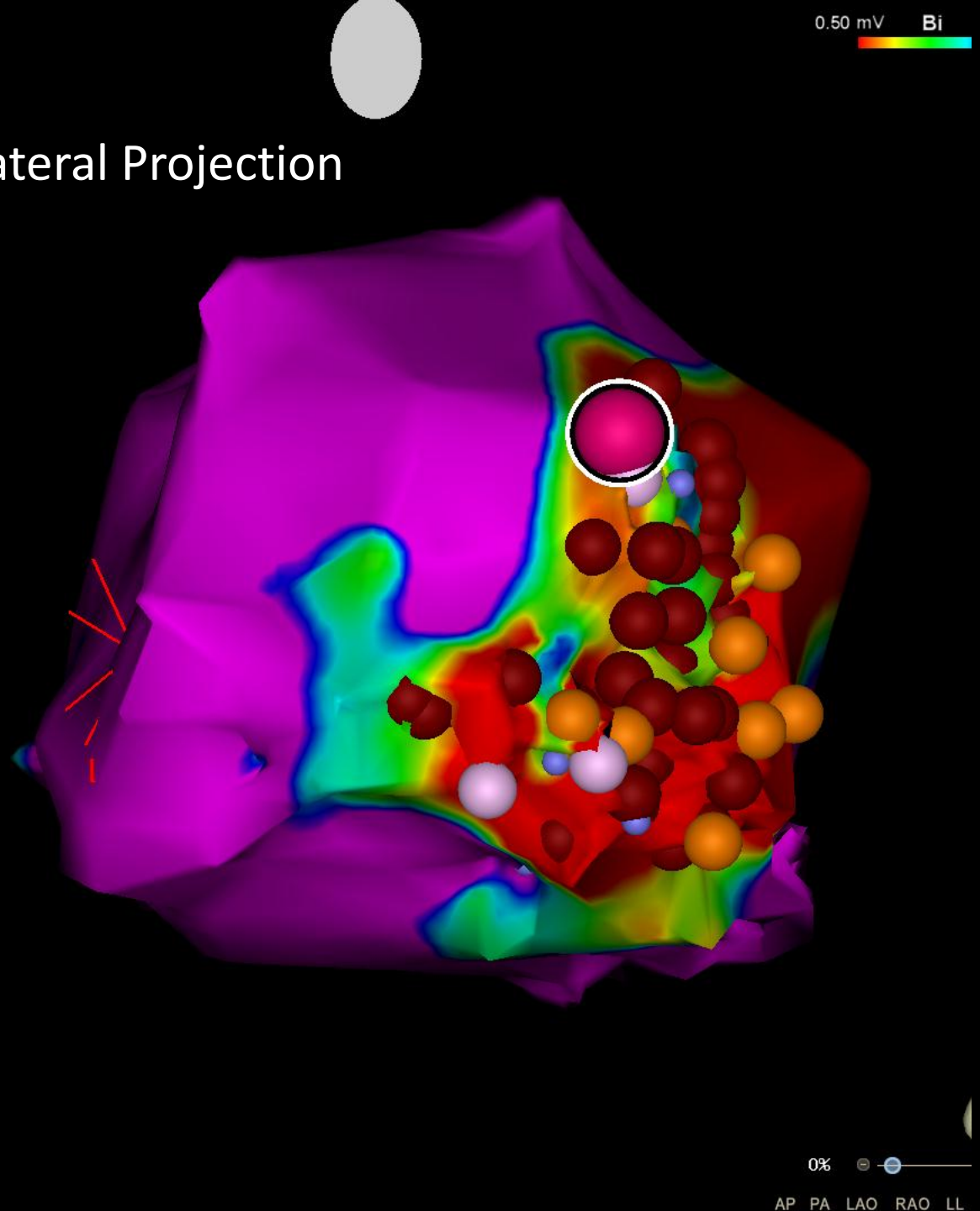


PVCs similar to clinical VT



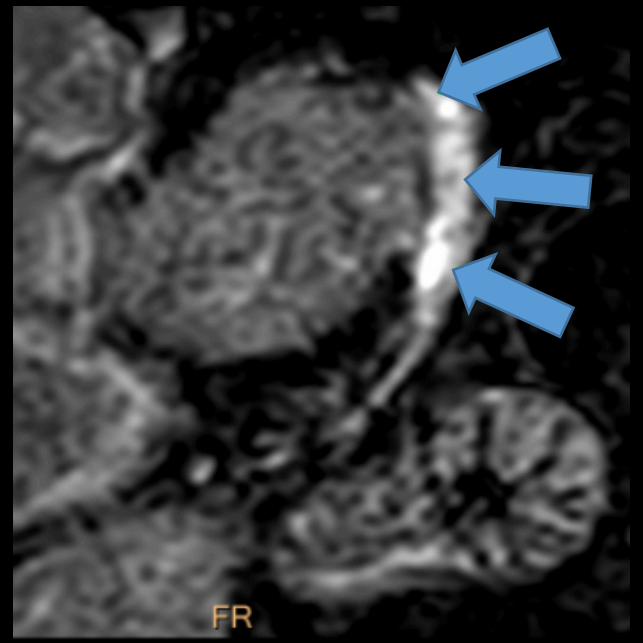


Left Lateral Projection



Late Potentials

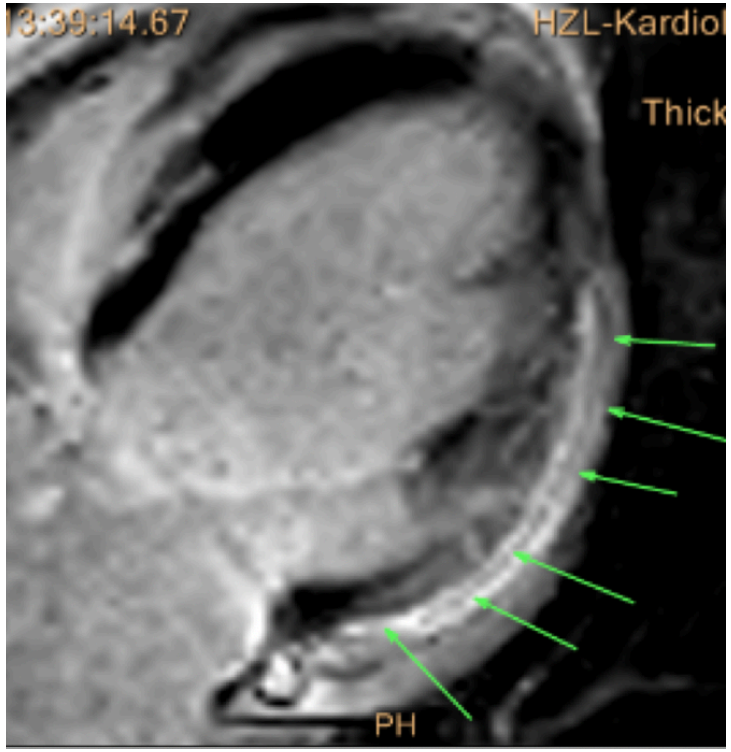
Ablation Points

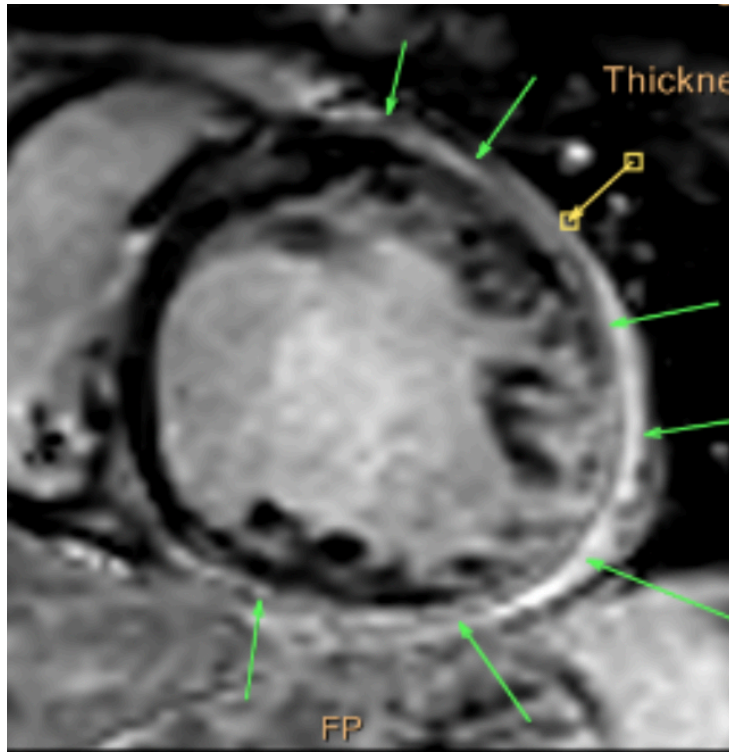


Patient 3:

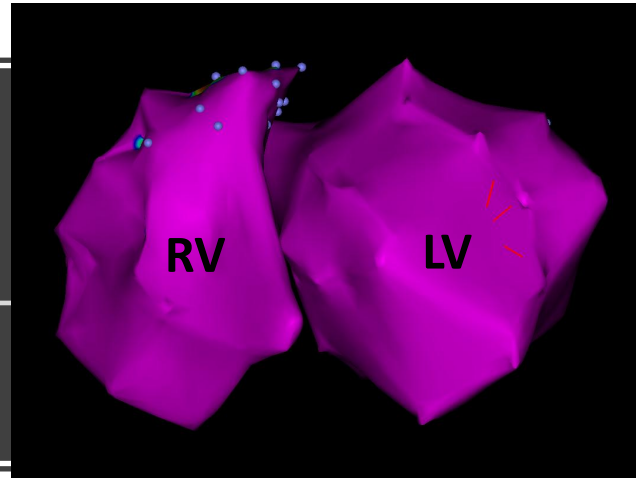
- 64-year-old male patient
- Non-ischemic CMP
- LV ejection fraction: 35%
- Electrical Storm due to frequent monomorphic VT
- Admitted for RF Ablation

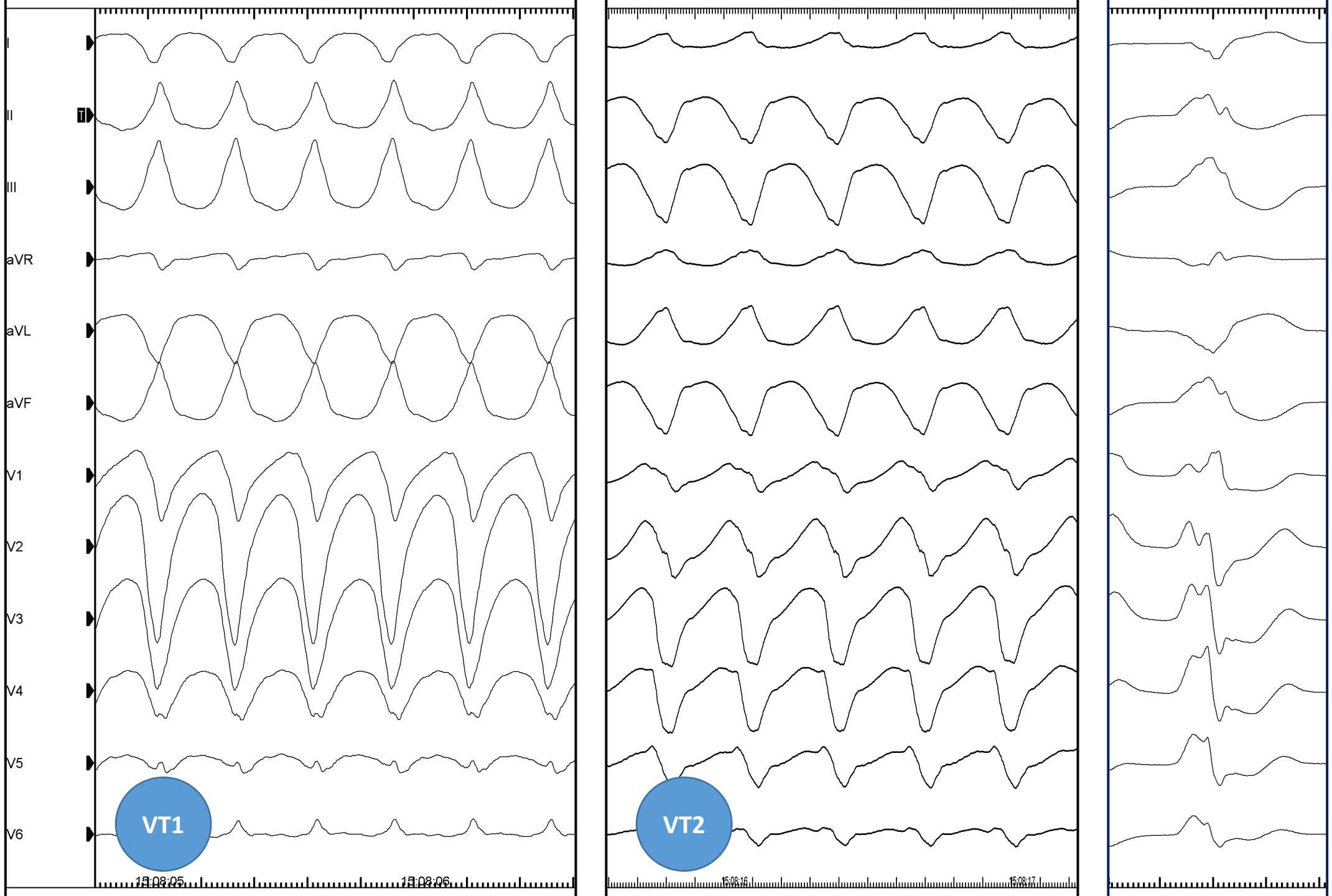
Baseline ECG

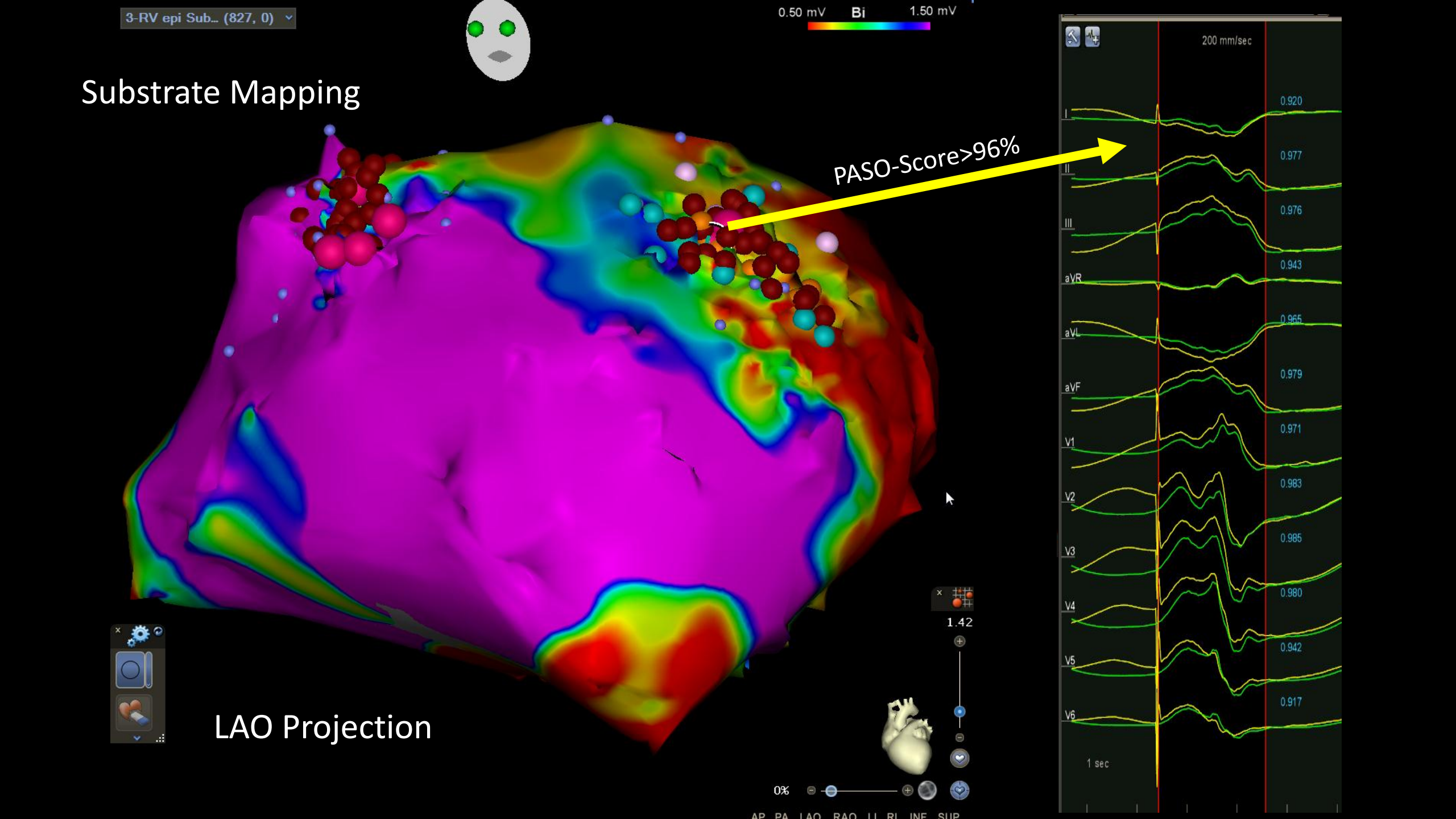


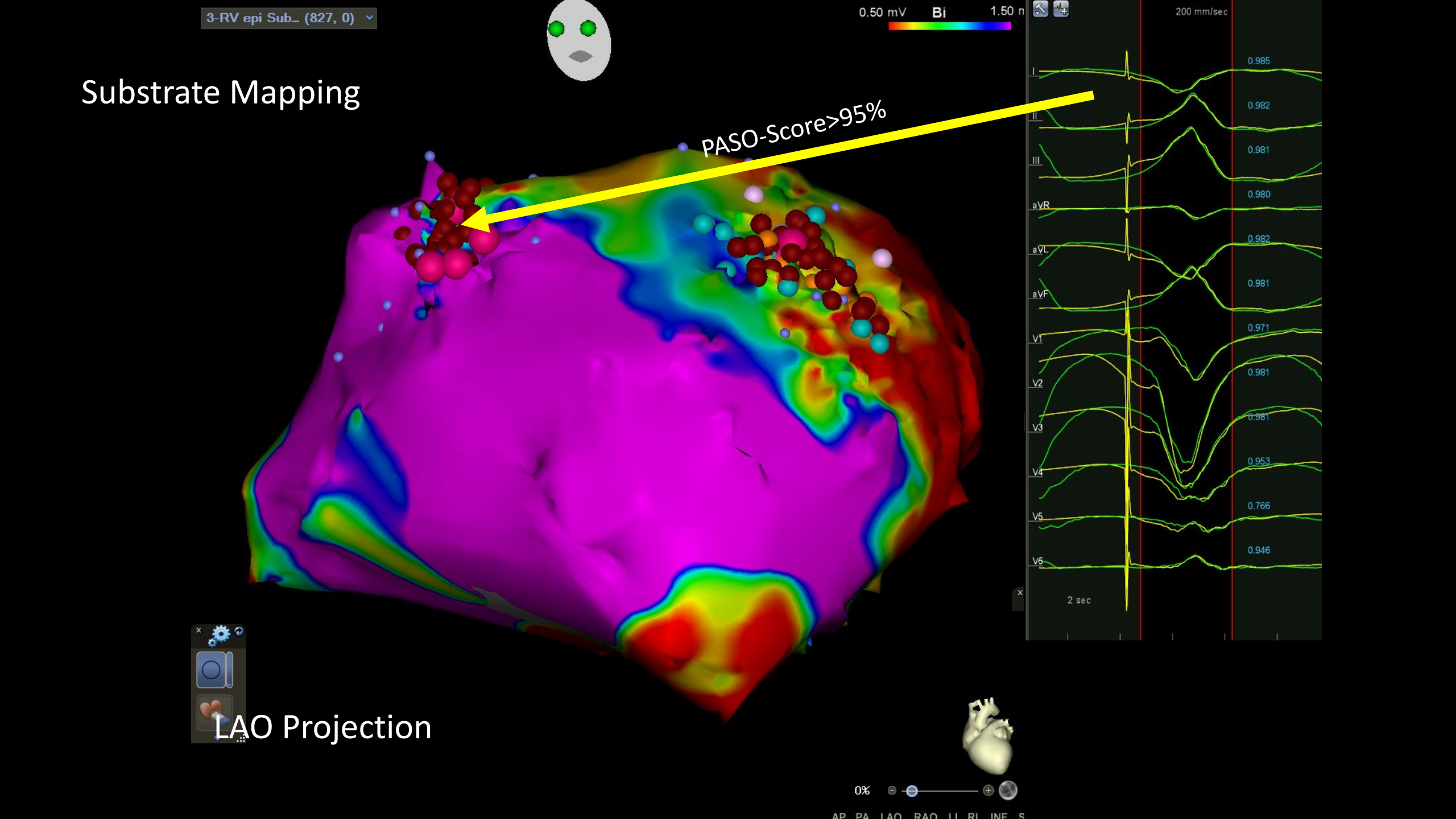


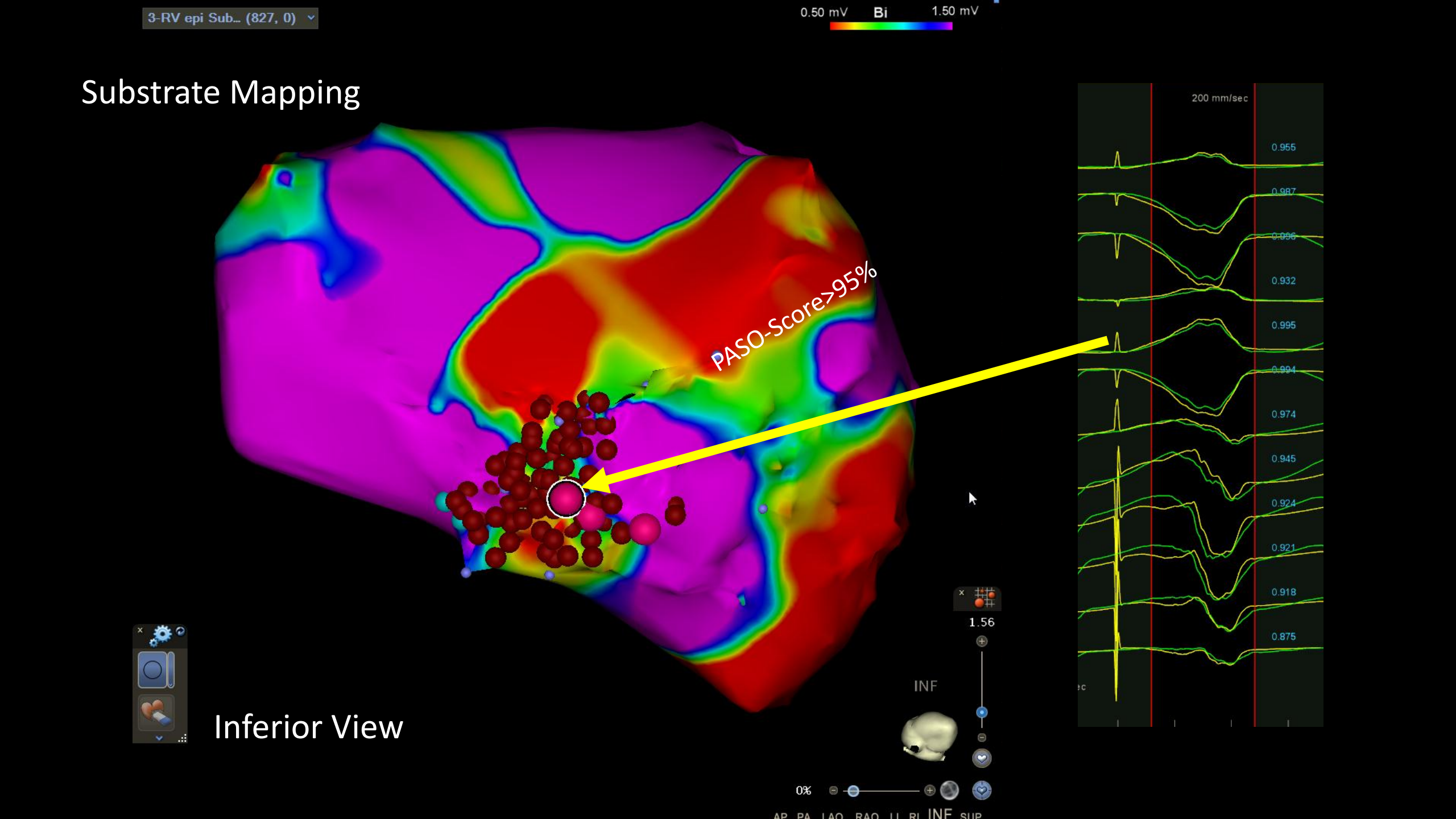
Cardiac MR




I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
VT1
VT2


3-RV epi Sub... (827, 0)
0.50 mV
Bi
1.50 mV
Substrate Mapping
PASO-Score>96%
200 mm/sec
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
0.920
0.977
0.976
0.943
0.965
0.979
0.971
0.983
0.985
0.980
0.942
0.917
1 sec
1.42
0%
AP PA LAO RAO LL RL INF SUP
LAO Projection


Substrate Mapping
PASO-Score>95%
LAO Projection
3-RV epi Sub... (827, 0)
0.50 mV
Bi
1.50 n
200 mm/sec
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
0.985
0.982
0.981
0.980
0.982
0.981
0.971
0.981
0.981
0.953
0.766
0.946
2 sec
0%
AP PA LAO RAO LL RL INF S


3-RV epi Sub... (827, 0)
0.50 mV
Bi
1.50 mV
Substrate Mapping
PASO-Score>95%
200 mm/sec
0.955
0.987
0.996
0.932
0.995
0.994
0.974
0.945
0.924
0.921
0.918
0.875
1.56
INF
0%
AP PA LAO RAO LL RL INF SUP
Inferior View

Thank you for your attention!