



ΣΧΟΛΗ ΕΠΙΣΤΗΜΩΝ ΥΓΕΙΑΣ | ΤΜΗΜΑ ΙΑΤΡΙΚΗΣ | ΤΟΜΕΑΣ ΠΑΘΟΛΟΓΙΑΣ
3η ΚΑΡΔΙΟΛΟΓΙΚΗ ΚΛΙΝΙΚΗ Α.Π.Θ.
ΔΙΕΥΘΥΝΤΗΣ: ΚΑΘΗΓΗΤΗΣ ΒΑΣΙΛΕΙΟΣ Π. ΒΑΣΙΛΙΚΟΣ

ΕΛΛΗΝΙΚΗ
ΔΗΜΟΚΡΑΤΙΑ
ΑΡΙΣΤΟΤΕΛΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ



ΠΑΡΟΥΣΙΑΣΗ ΠΕΡΙΣΤΑΤΙΚΩΝ

**Ασθενής με Εμμένουσα Κολπική Μαρμαρυγή και
Κατάλυση των Πνευμονικών Φλεβών με την μέθοδο του
PFA (Pulsed Field Ablation)**

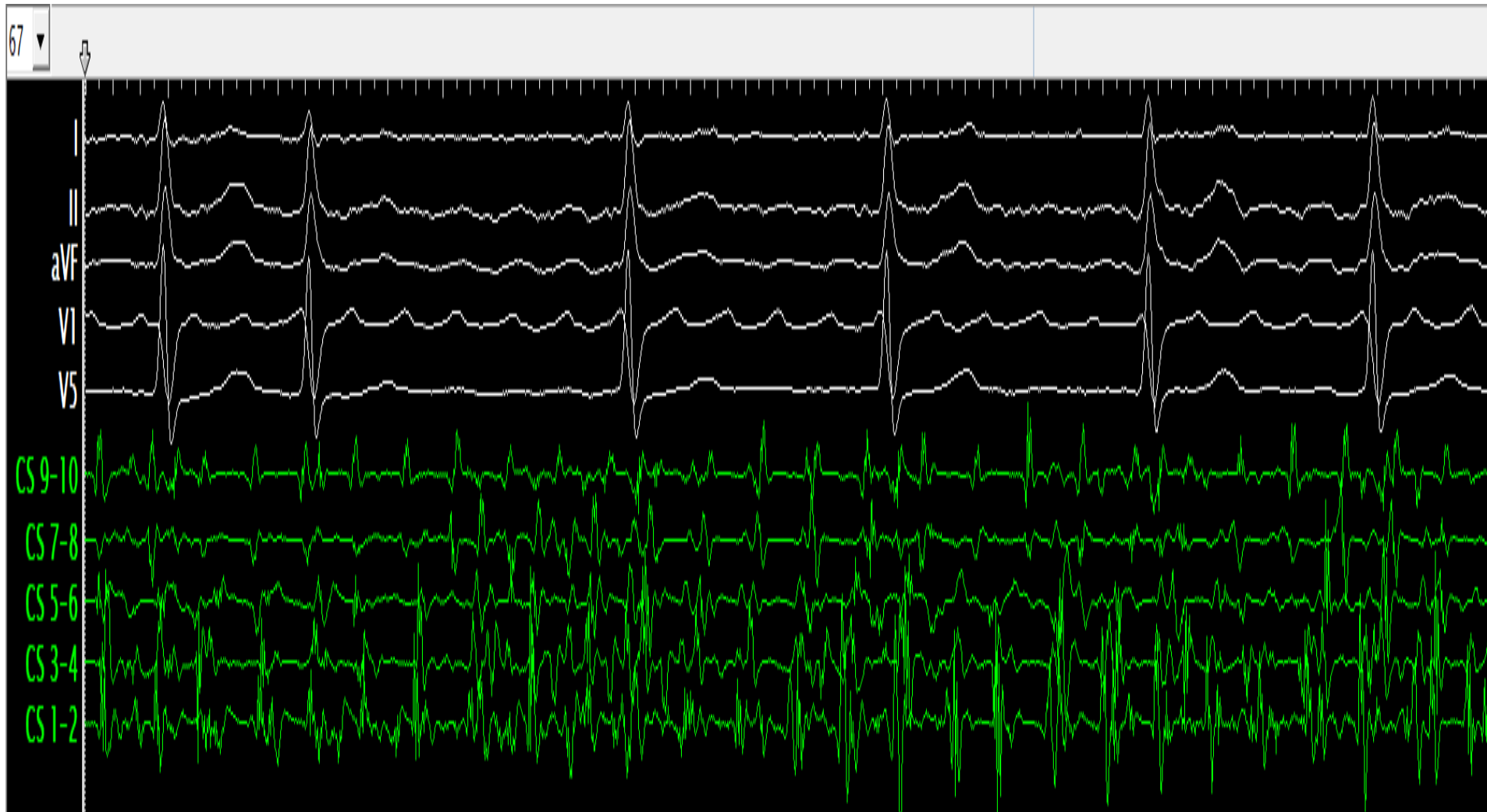
Ευαγγελίου Αλέξανδρος

Ειδικευόμενος Καρδιολογίας

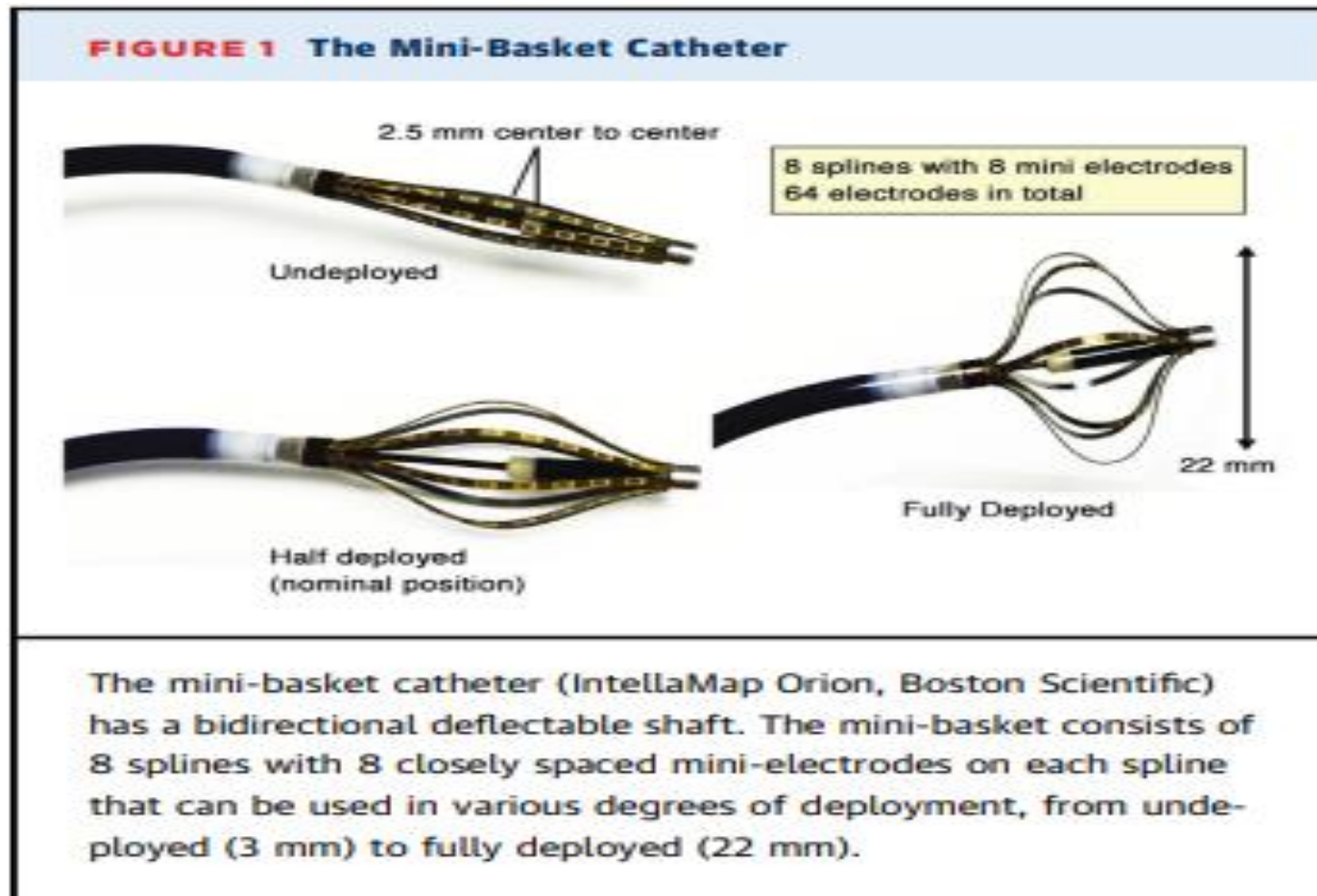
Γ' Καρδιολογική Κλινική ΑΠΘ, ΓΝΘ Ιπποκράτειο

- Άνδρας - 44 ετών
- **Hx:** 1) Παροξυσμική κοιλιακή μαρμαρυγή από 5ετίας περίπου με ενδιάμεσα επεισόδια εμμένουσας ΚΜ. [11/2021 υπεβλήθη σε κατάλυση απομόνωσης των πνευμονικών φλεβών με κρυοκατάλυση (CryoBalloon)].
2) ΑΥ υπό αγωγή
- **Φ/Α:** 1) tb Xarelto 20mg s:1x1, 2) tb Flecarythm 100mg s:1x2, 4) tb Copalia160/10/12.5mg s:1x1
- Παρά την λήψη αντιαρρυθμικής αγωγής - υποτροπή των επεισοδίων κοιλιακής μαρμαρυγής το τελευταίο 6μηνο – παρουσία εμμένουσας ΚΜ τον τελευταίο μήνα.

1. Εισαγωγή στο ηλεκτροφυσιολογικό εργαστήριο.
2. Γενική αναισθησία του ασθενούς
3. Κολπική διαφραγματοστομία με τη χρήση ΤΟΕ



- Σκιαφράφηση των πνευμονικών φλεβών για έλεγχο της θέσης και της ανατομίας αυτών
- Ηλεκτροανατομική χαρτογράφηση του LA και των PV με τη βοήθεια του πολυπολικού καθετήρα ORION.



ΕΙΣΑΓΩΓΗ ΤΟΥ ΚΑΘΗΤΗΡΑ ΚΑΤΑΛΥΣΗΣ FARAPULSE

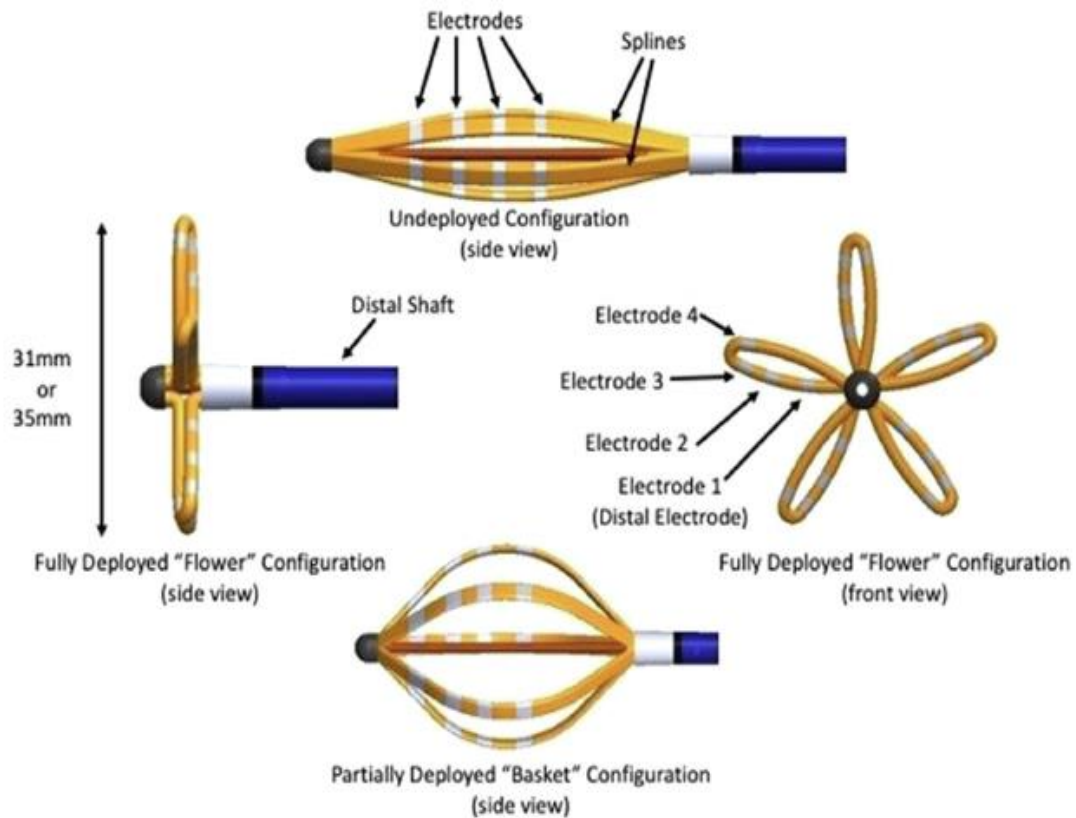
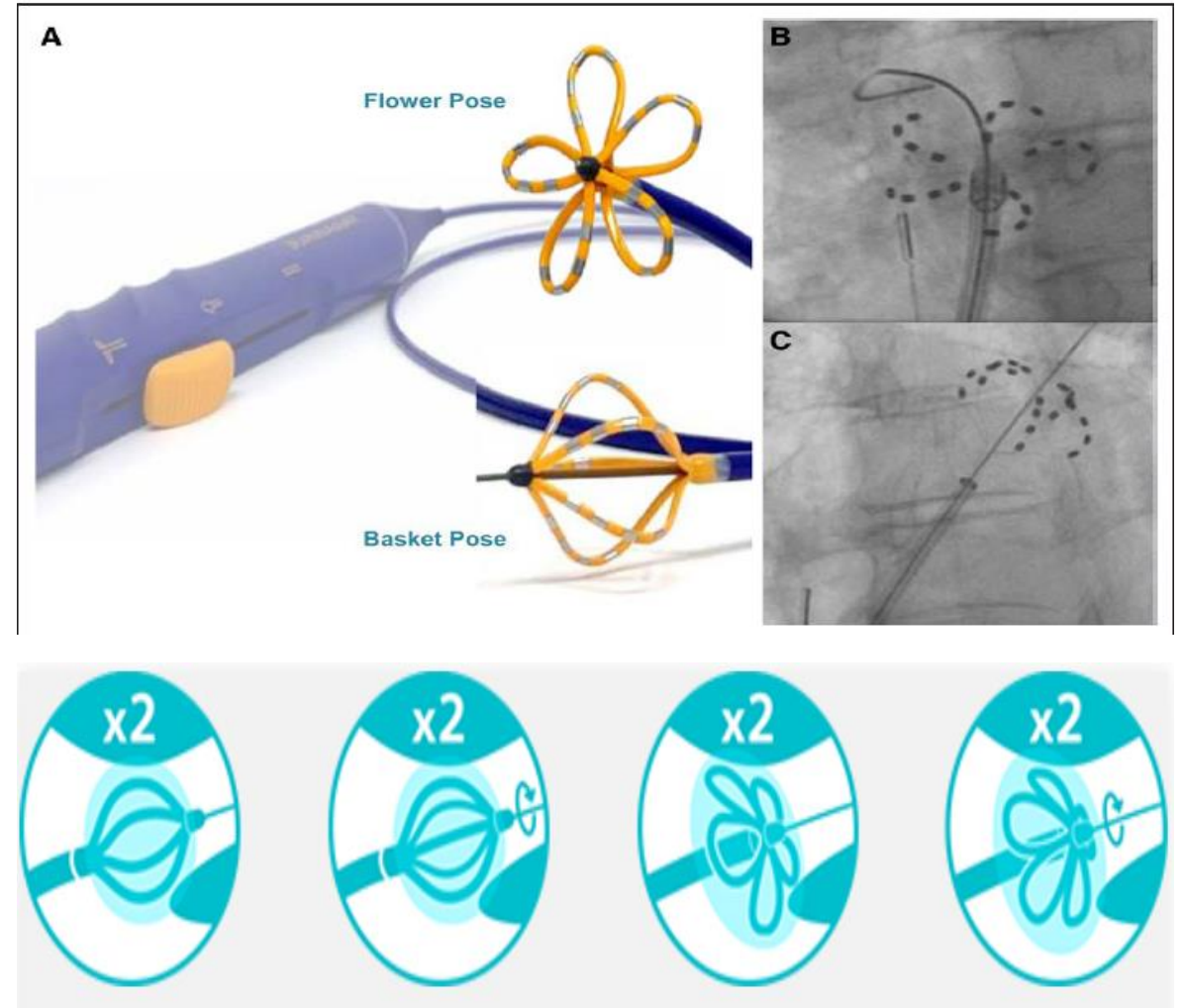
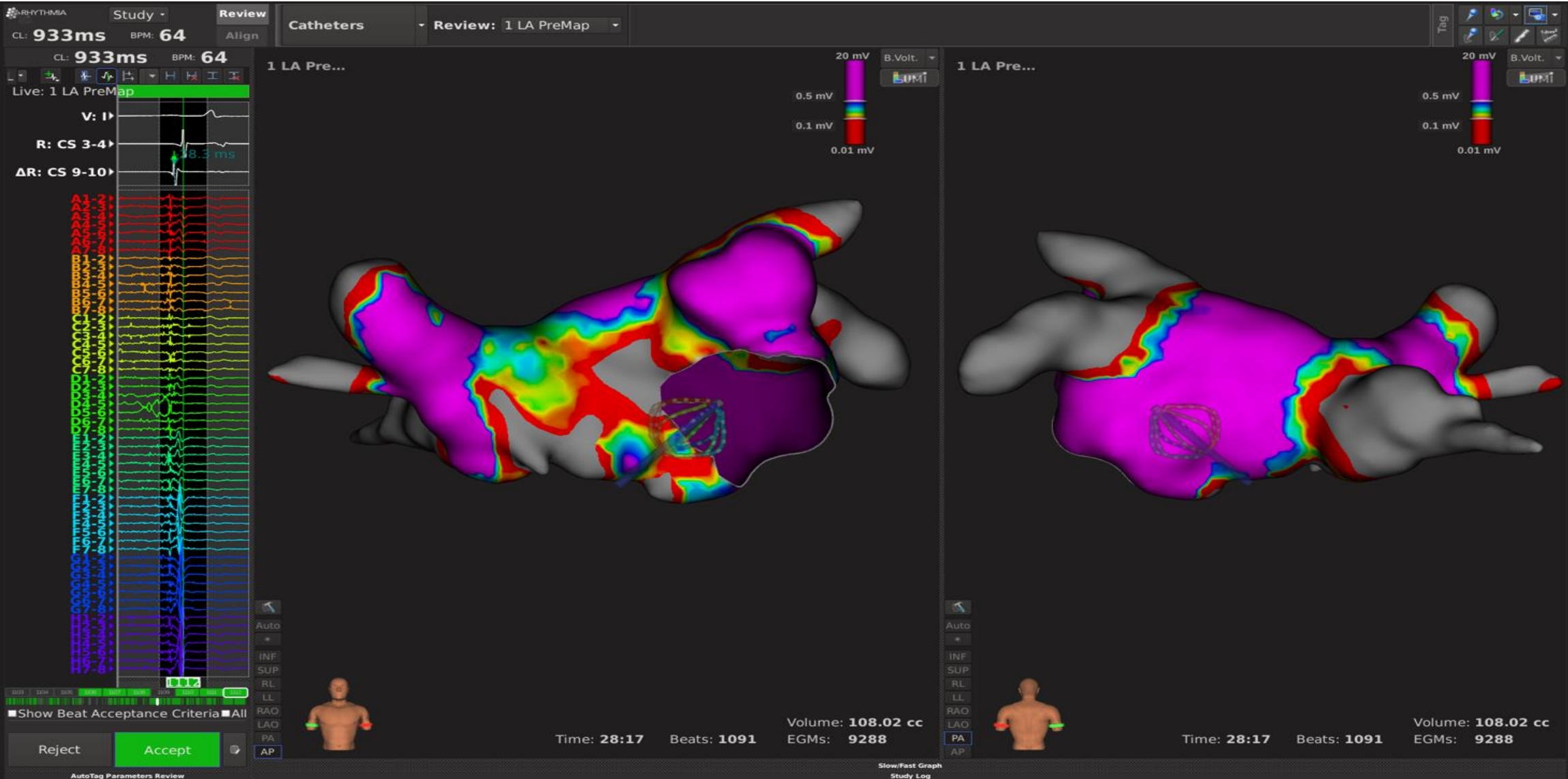


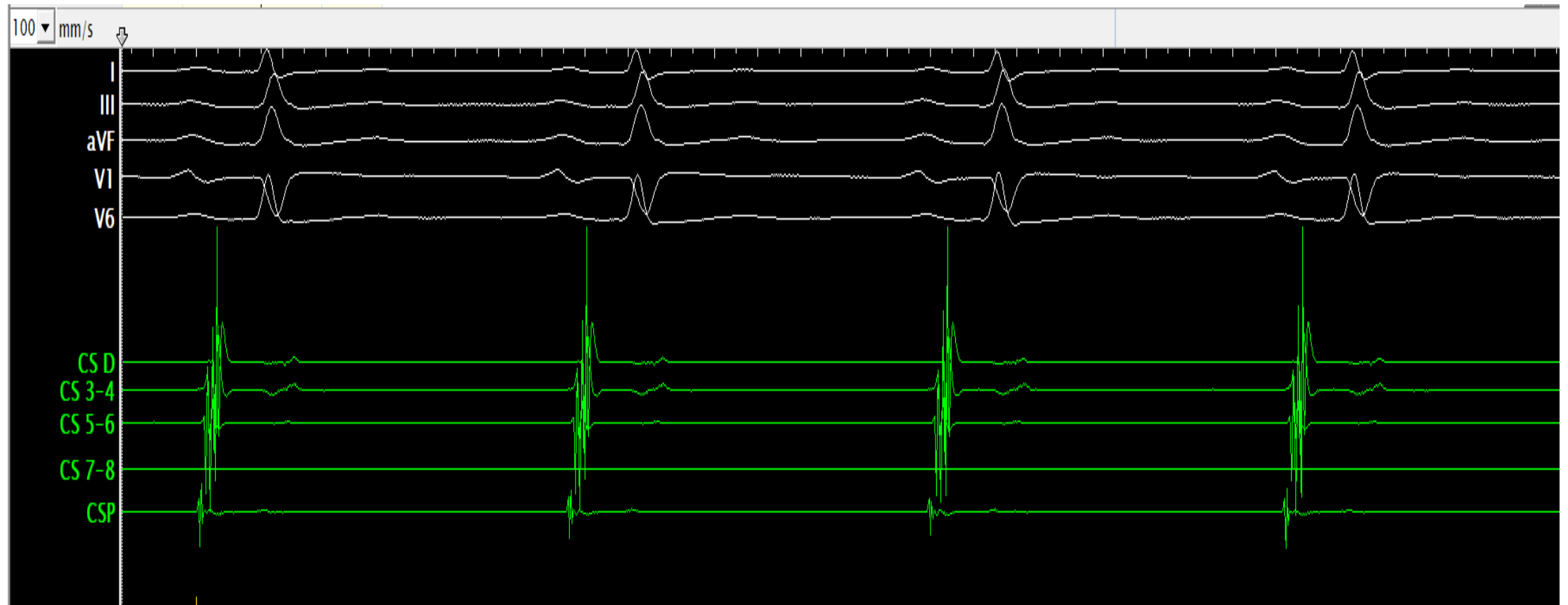
Figure 2 Pentaspine pulsed field ablation catheter.



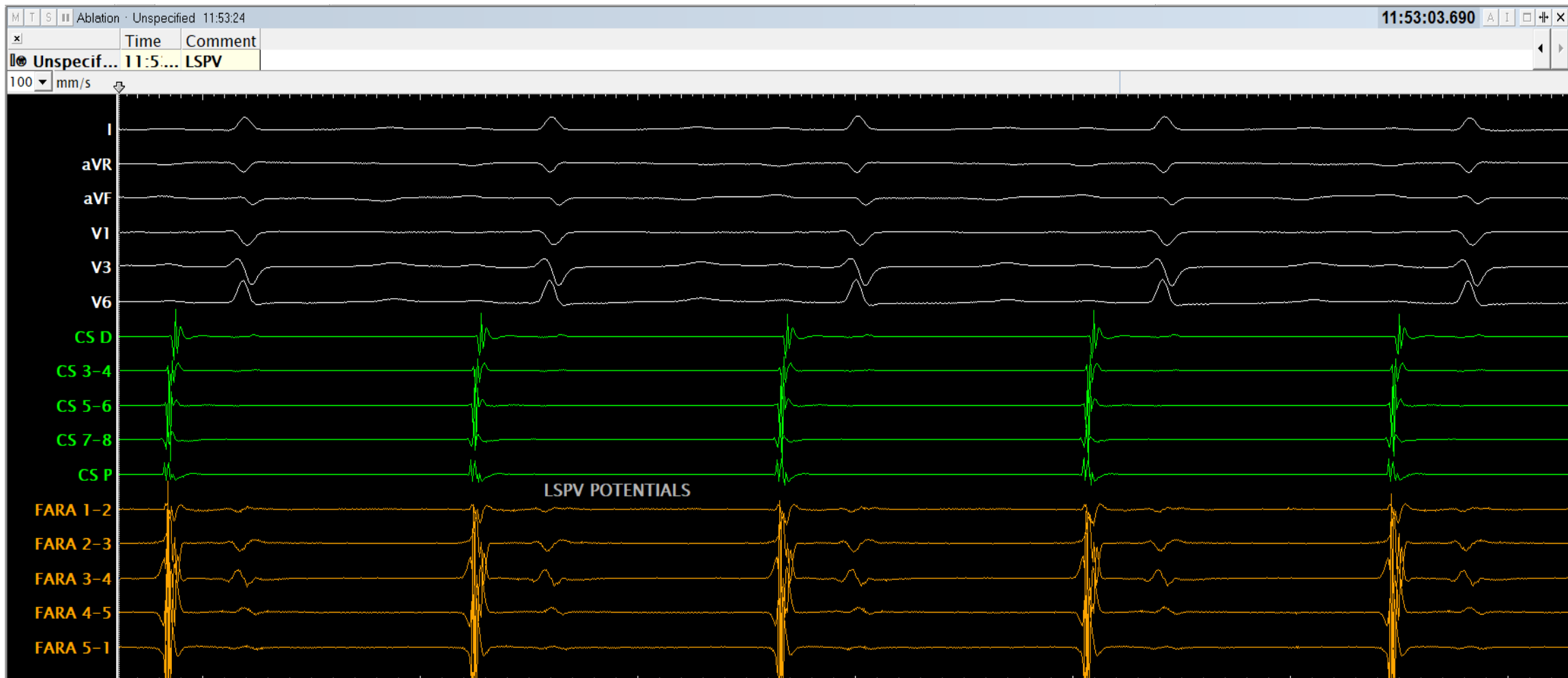
Ηλεκτρική επανασύνδεση των Δεξιών PV και της LSPV



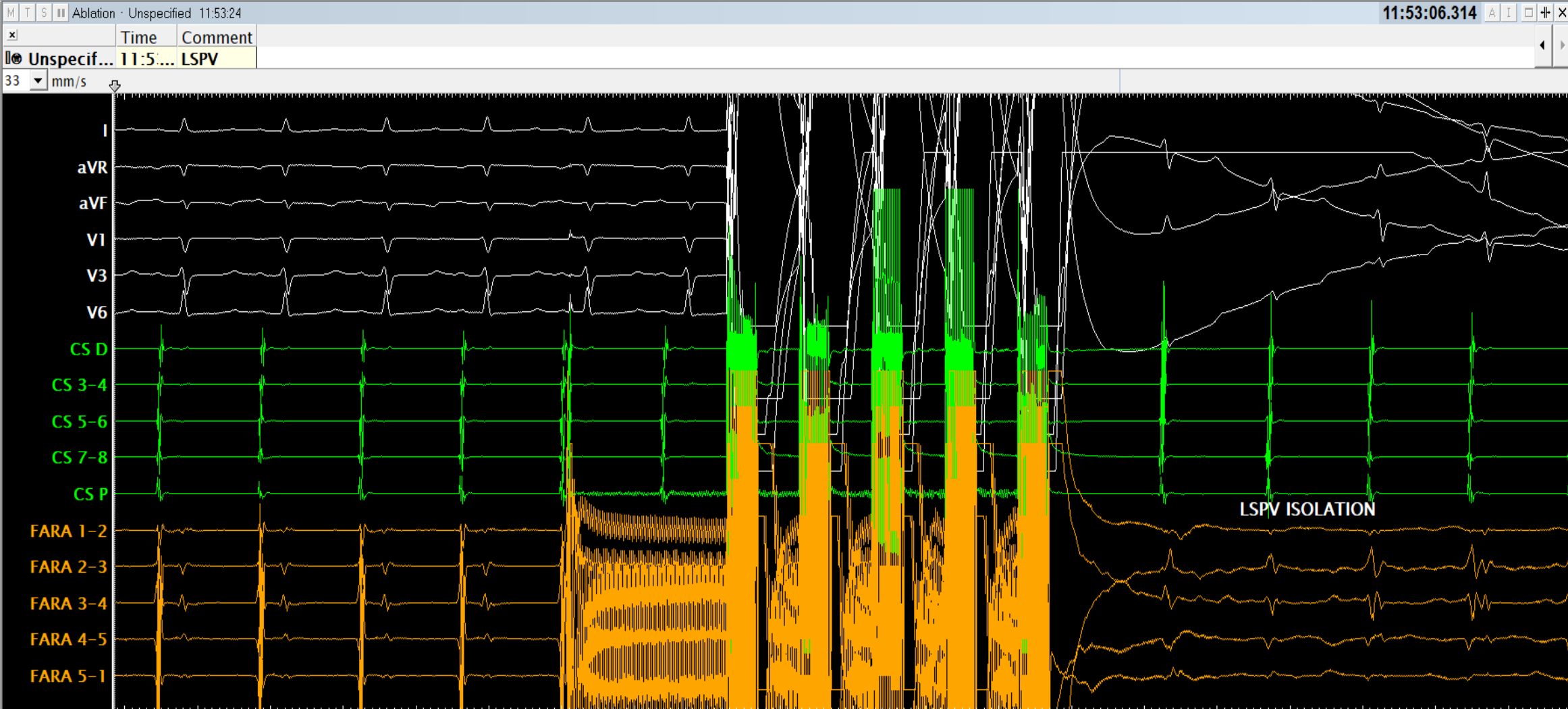
ΚΑΤΑ ΤΗΝ ΧΟΡΗΓΗΣΗ ΒΛΑΒΩΝ ΣΤΙΣ ΡV ΠΑΡΑΤΗΡΗΘΗΚΕ ΑΝΑΤΑΞΗ ΣΕ SR



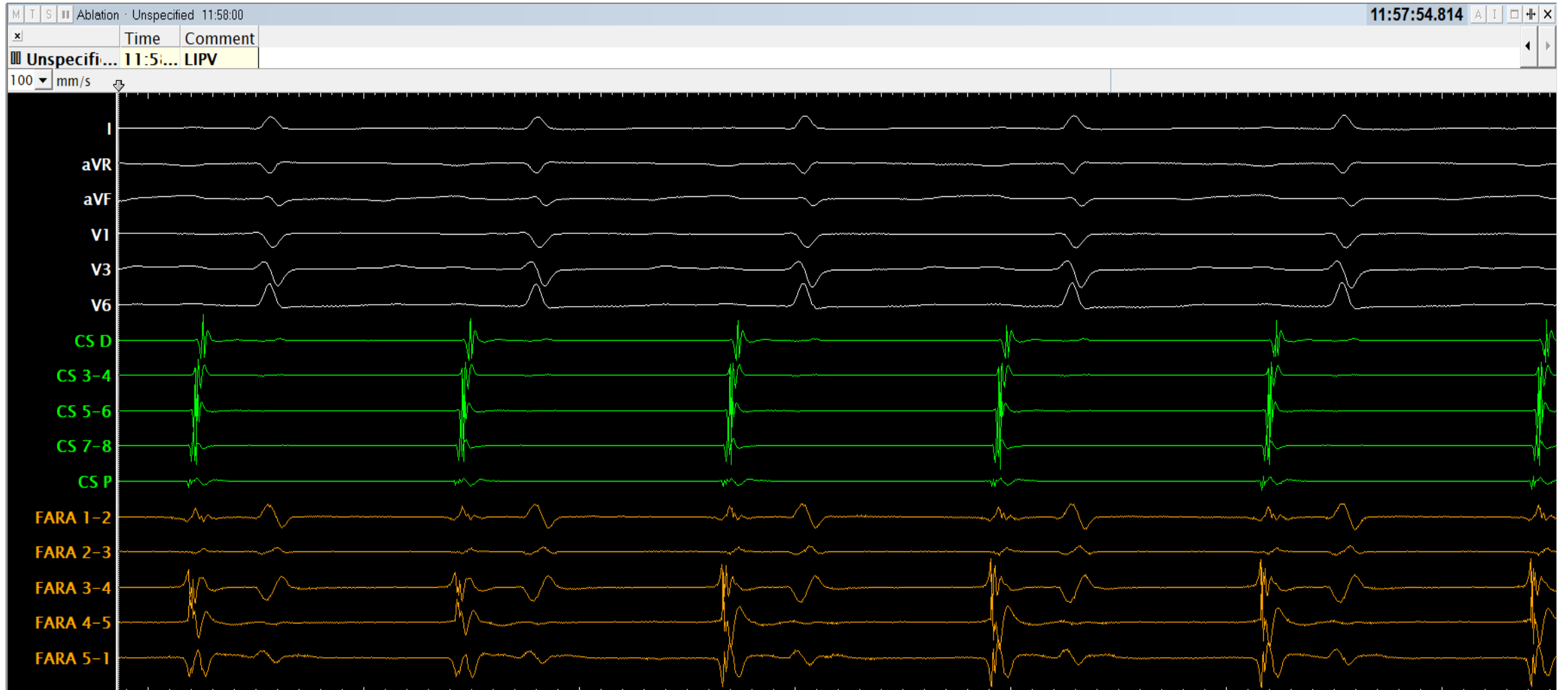
LSPV POTENTIALS



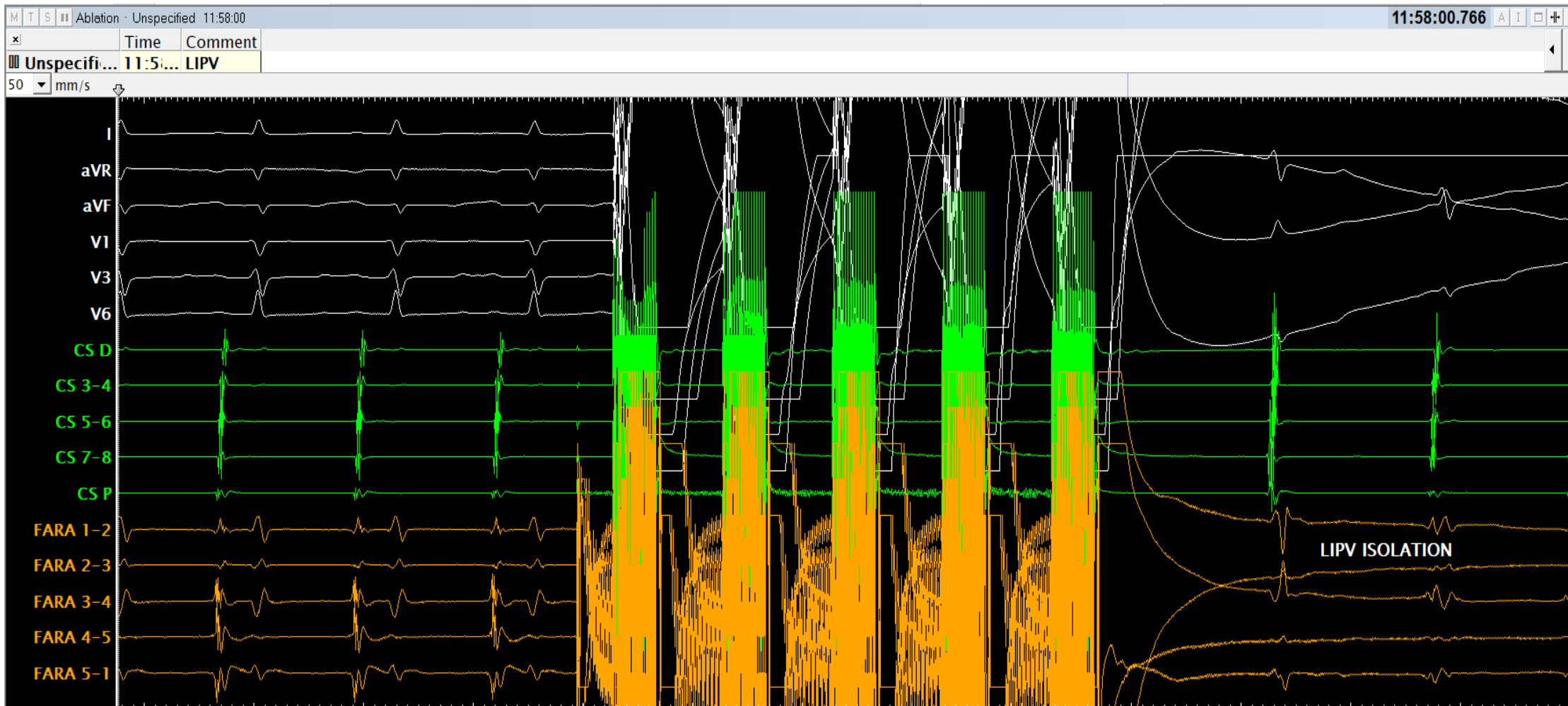
LSPV ISOLATION



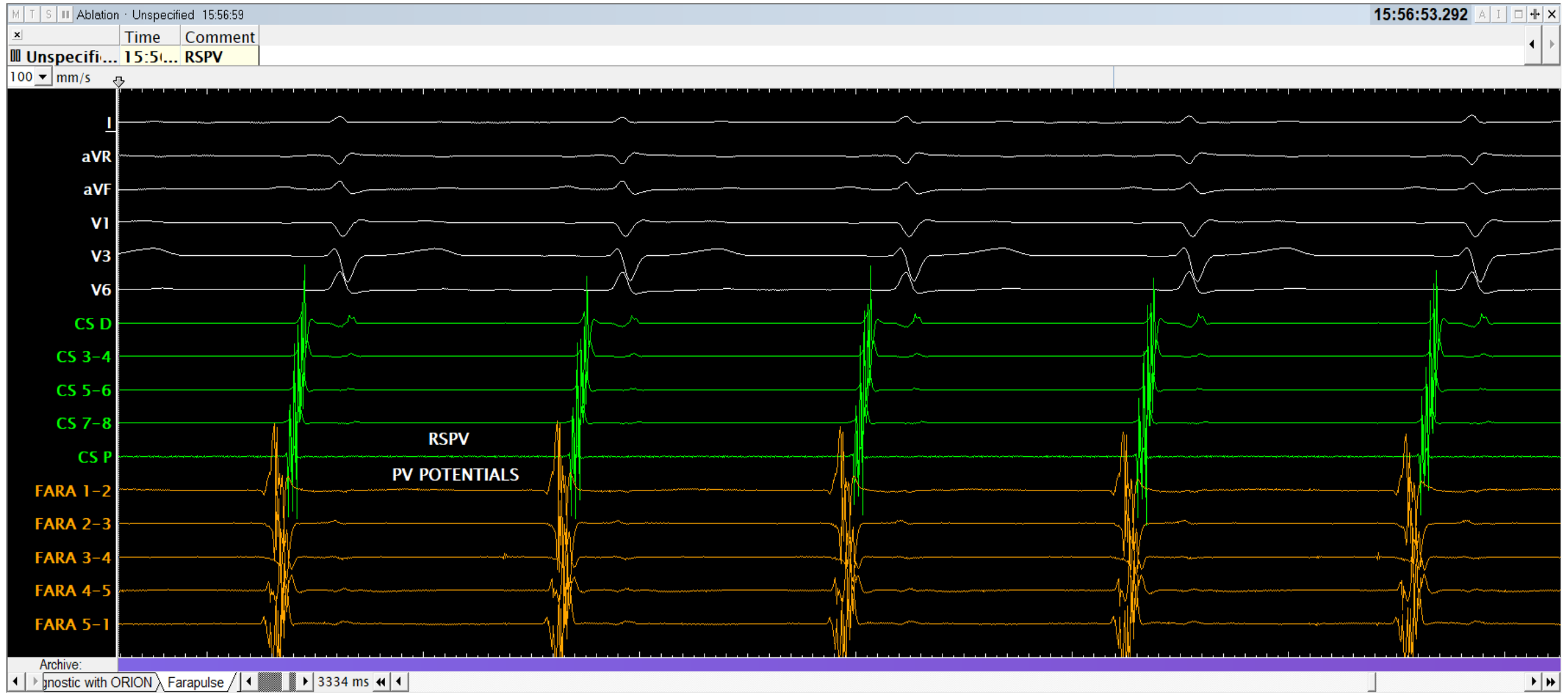
LIPV POTENTIALS



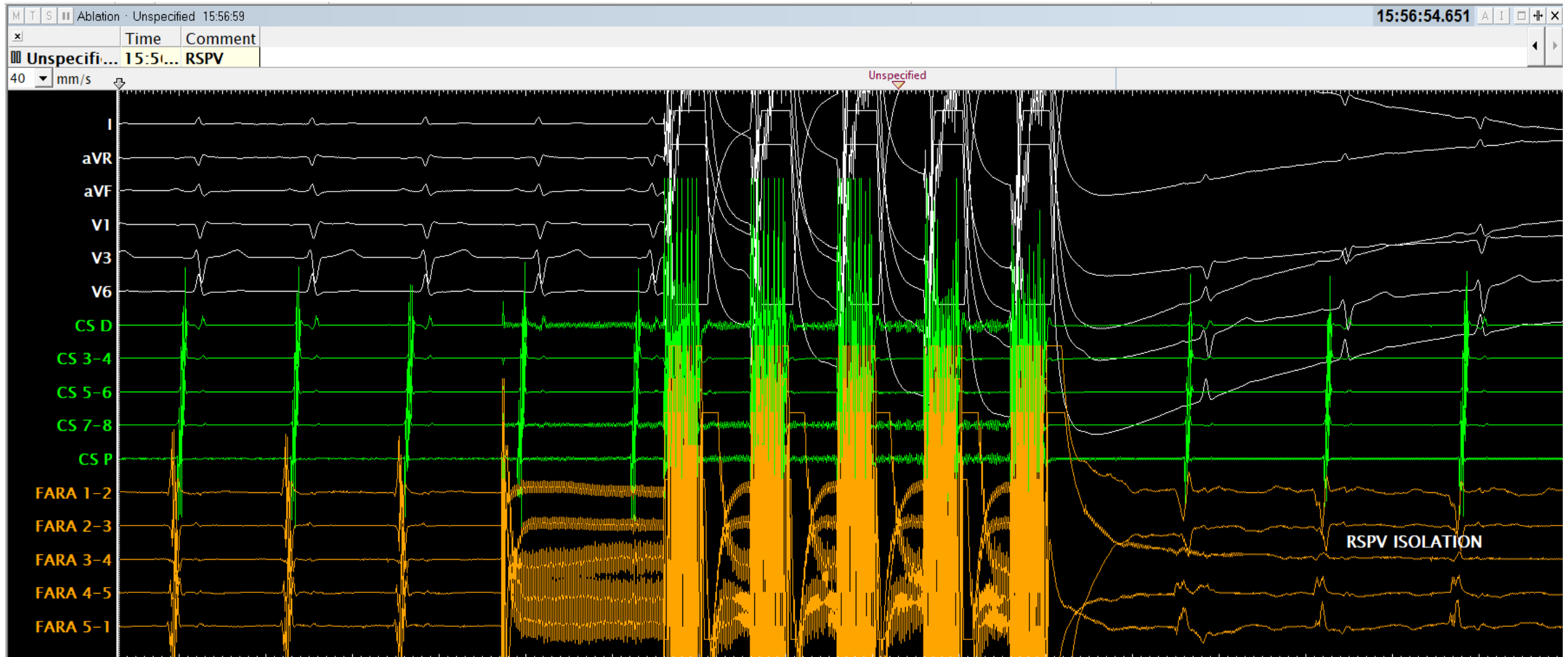
LIPV ISOLATION



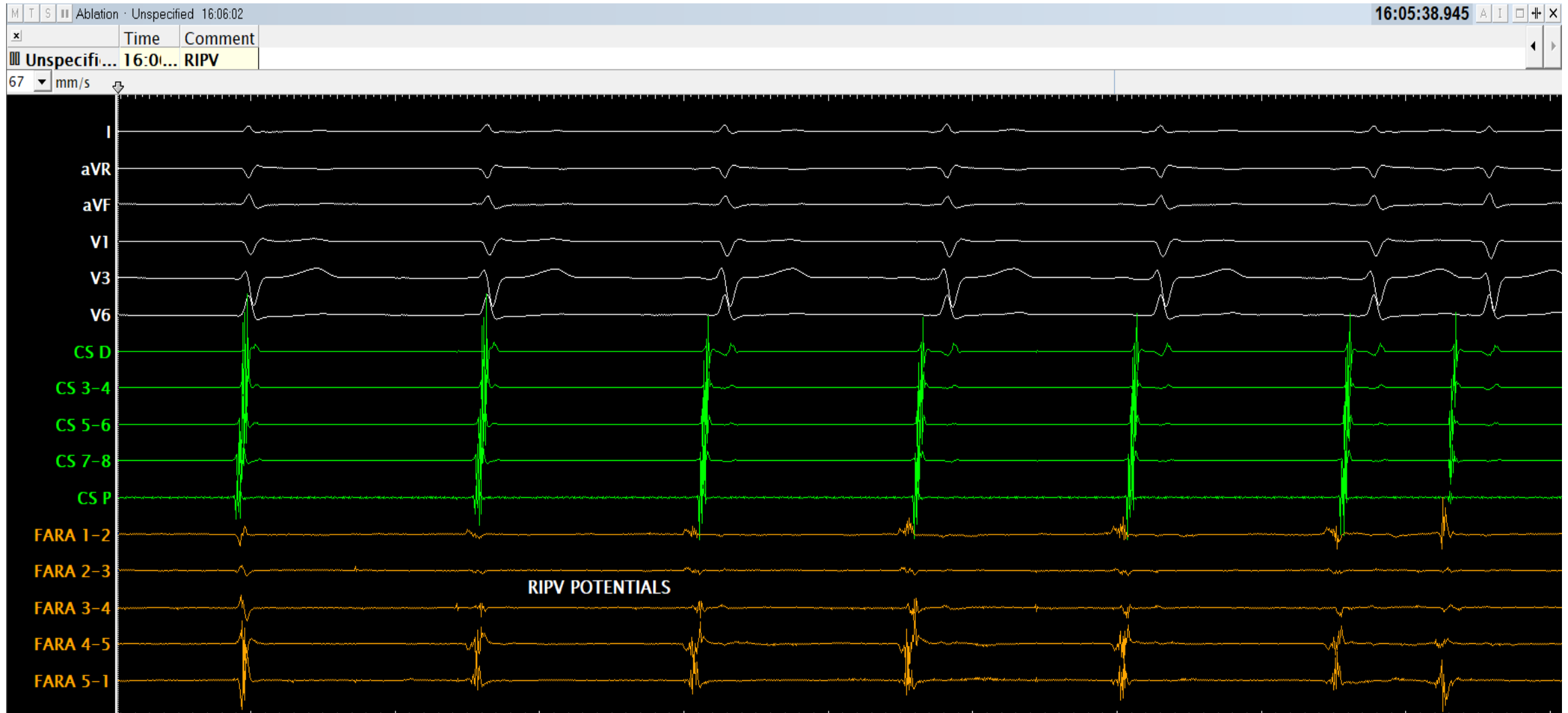
RSPV POTENTIALS



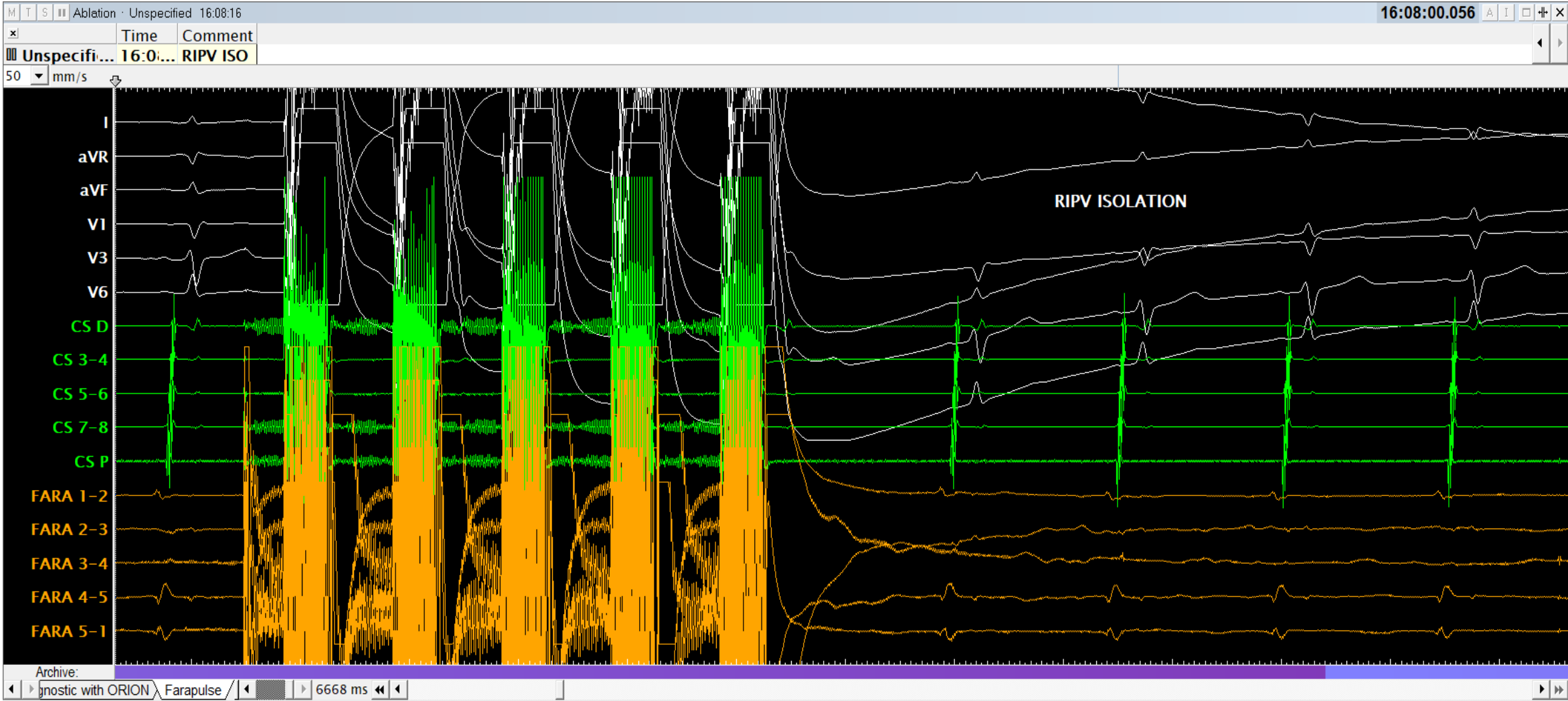
RSPV ISOLATION



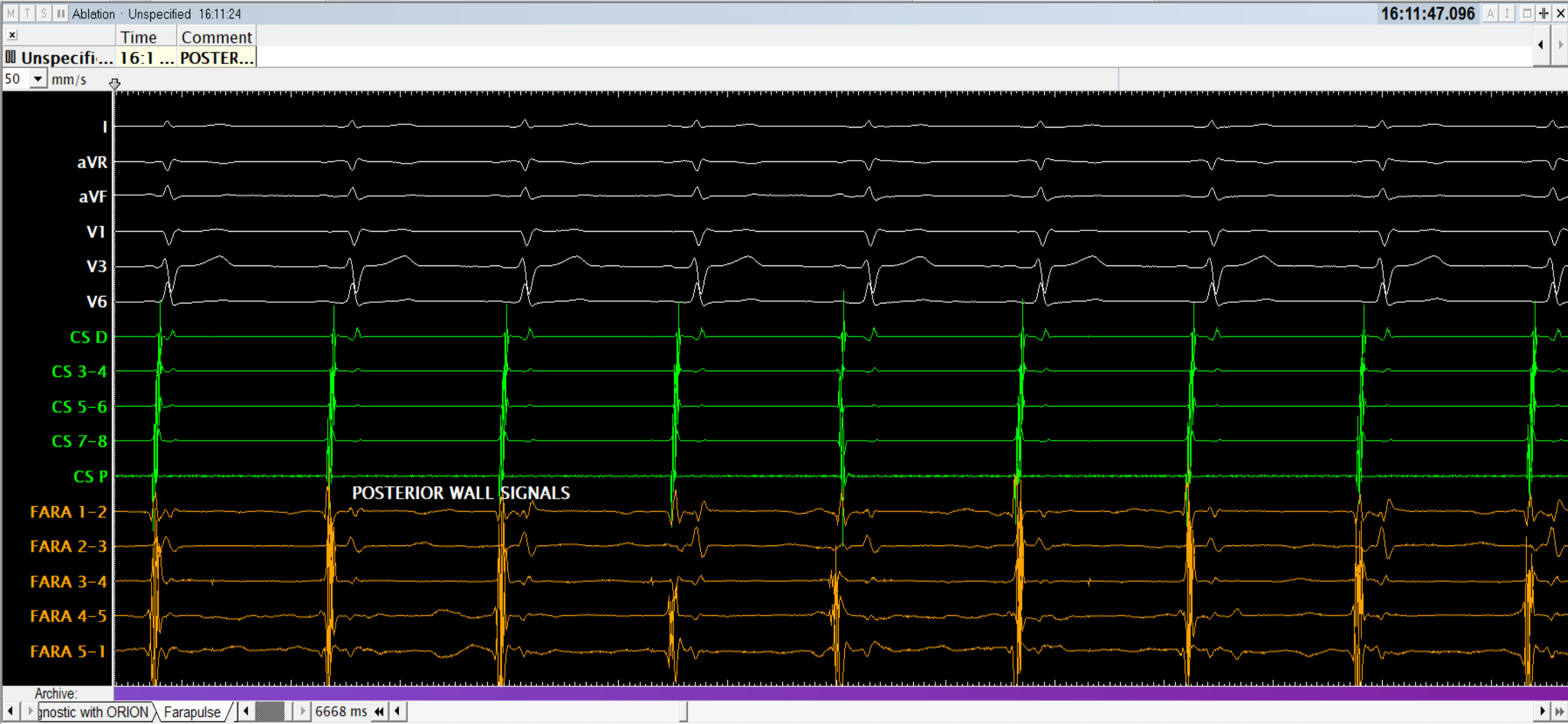
RIPV POTENTIALS



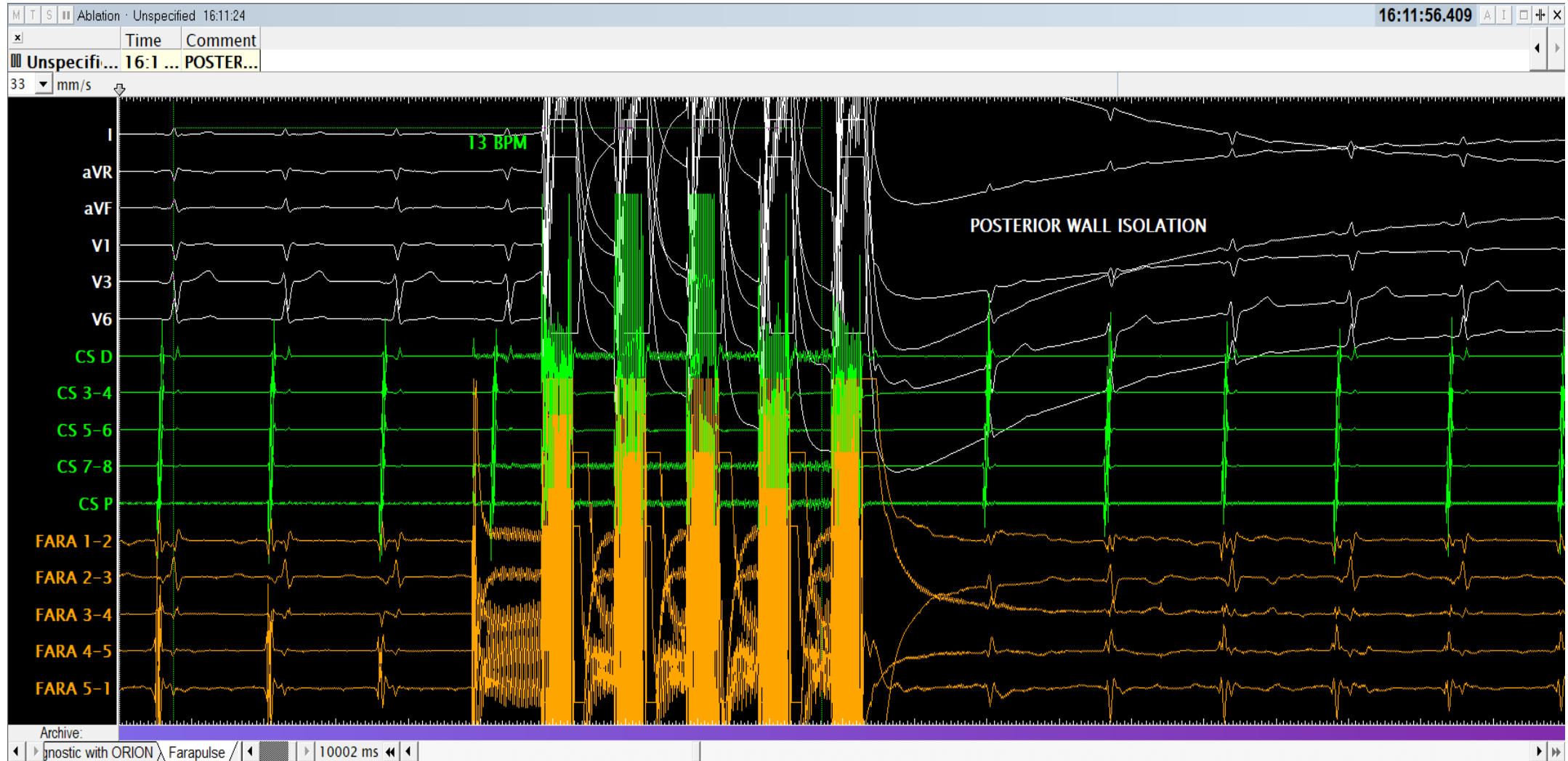
RIPV ISOLATION



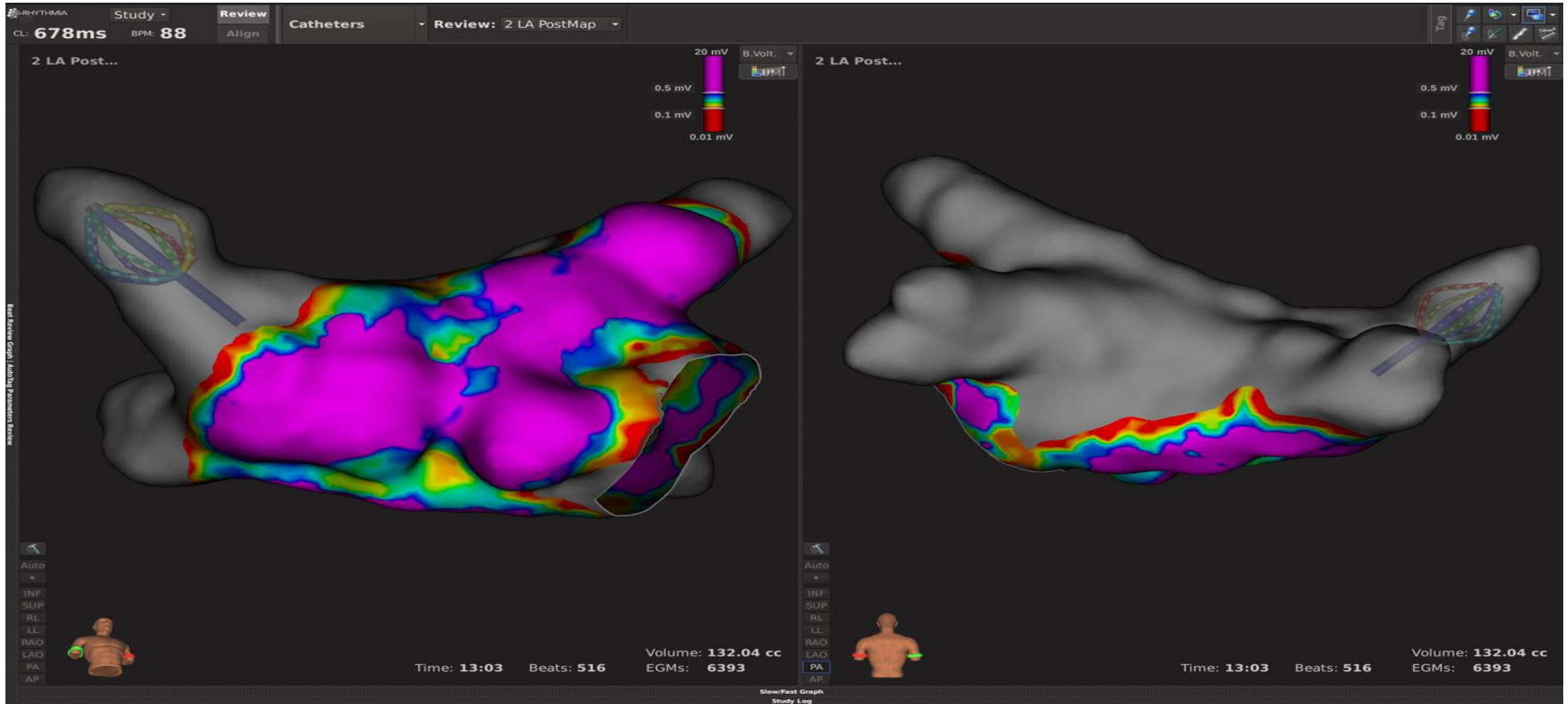
POSTERIOR WALL POTENTIALS



POSTERIOR WALL ISOLATION



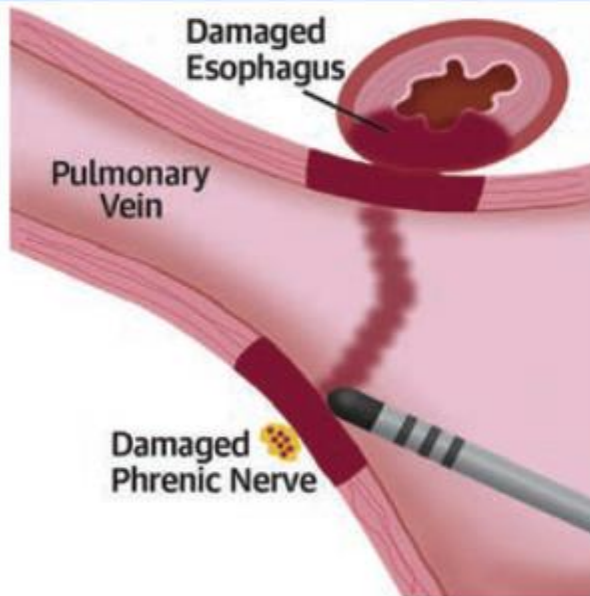
ΧΑΡΤΟΓΡΑΦΗΣΗ ΕΚ ΝΕΟΥ ΤΟΥ LA ΚΑΙ ΤΩΝ PV ΗΛΕΚΤΡΙΚΗ ΑΠΟΜΟΝΩΣΗ ΟΛΩΝ ΤΩΝ PV ΚΑΙ ΤΟΥ PW



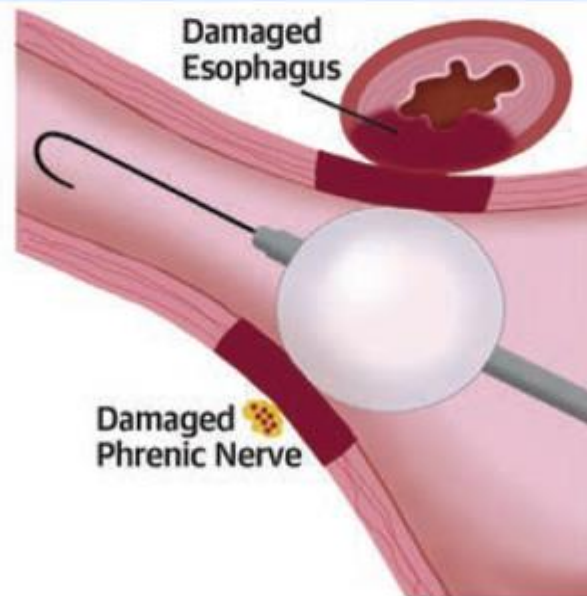
Μέθοδοι απομόνωσης των PV

CENTRAL ILLUSTRATION Pulmonary Vein Isolation For Atrial Fibrillation By Pulsed Field Ablation

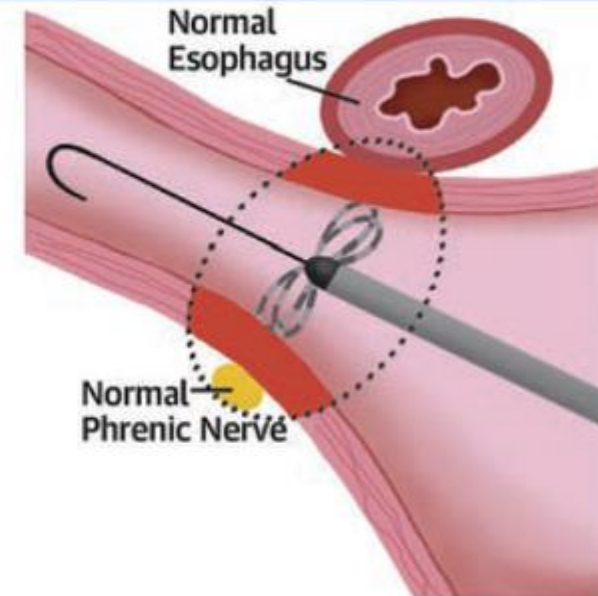
Radiofrequency Ablation



Cryoballoon Ablation



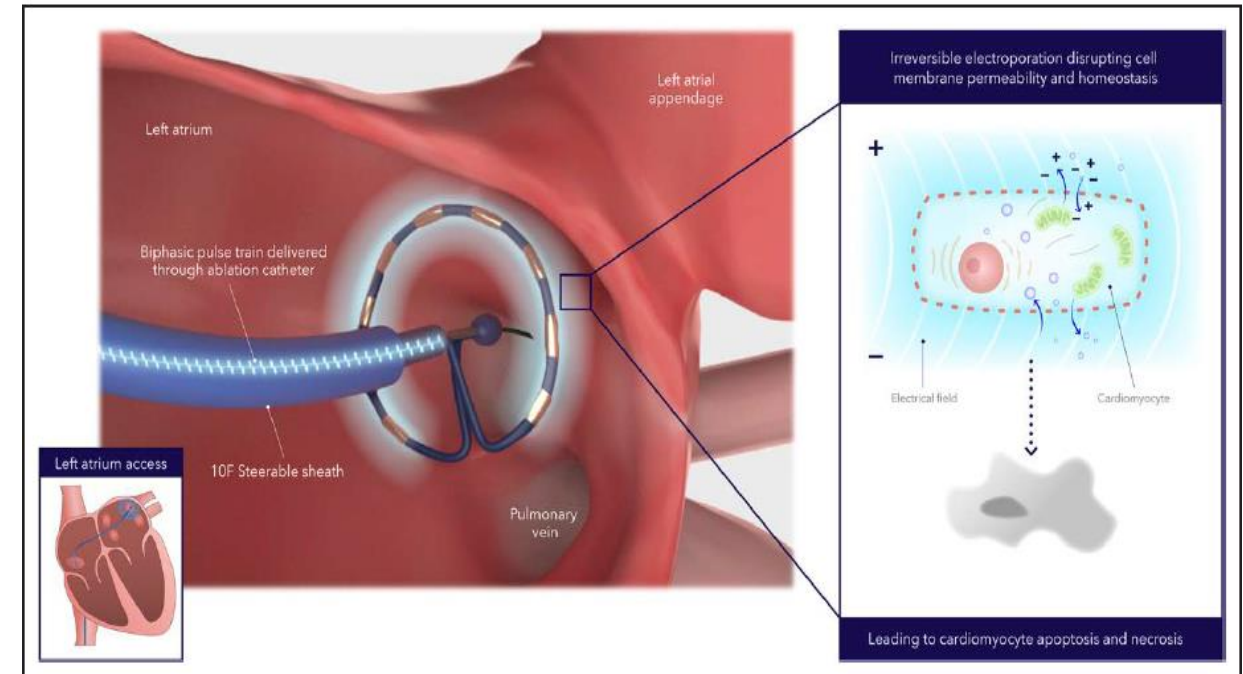
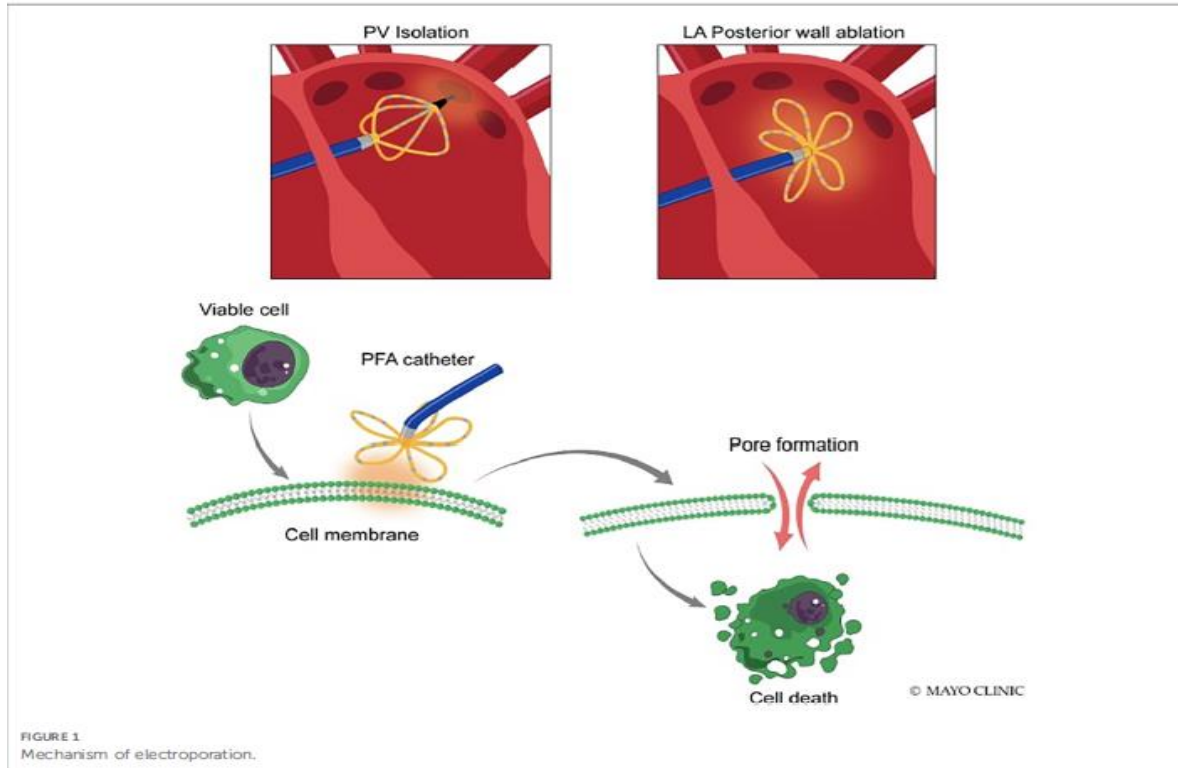
Pulsed Field Ablation



Reddy VY, et al. *J Am Coll Cardiol* 2019;74:315-26.

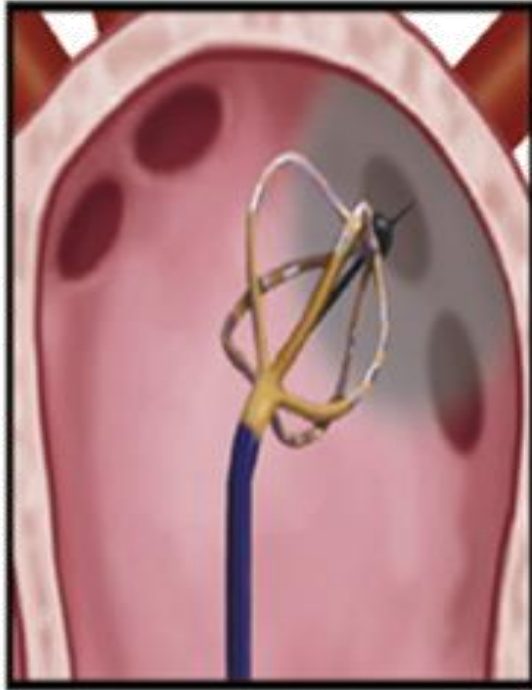
Pulse Field Ablation (PFA)

- **PFA:** is a novel nonthermal method of tissue ablation technology that involves the use of **microsecond-scale, high voltage electrical fields** to cause **irreversible electroporation (IRE)** in tissues.
- Unlike traditional thermal ablation technologies, **PFA does not rely on heating to damage and destroy tissue.**
- Instead, PFA **creates nanopores in cell membranes** due to transient, high-voltage exposure that disrupts cell wall integrity which **leads to cell death.**



CENTRAL ILLUSTRATION Pulsed Field Ablation for Persistent Atrial Fibrillation

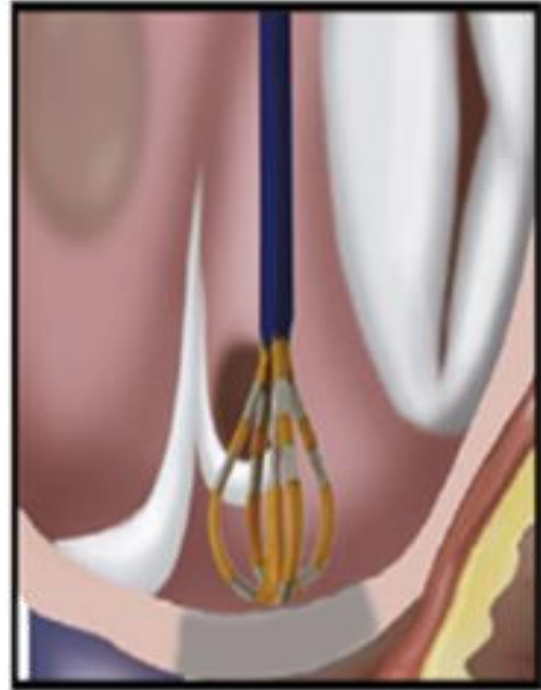
PV Isolation



LA Posterior Wall Ablation



RA Flutter Line



ADVENT TRIAL

ABSTRACT

BACKGROUND

Catheter-based pulmonary vein isolation is an effective treatment for paroxysmal atrial fibrillation. Pulsed field ablation, which delivers microsecond high-voltage electrical fields, may limit damage to tissues outside the myocardium. The efficacy and safety of pulsed field ablation as compared with conventional thermal ablation are not known.

METHODS

In this randomized, single-blind, noninferiority trial, we assigned patients with drug-refractory paroxysmal atrial fibrillation in a 1:1 ratio to undergo pulsed field ablation or conventional radiofrequency or cryoballoon ablation. The primary efficacy end point was freedom from a composite of initial procedural failure, documented atrial tachyarrhythmia after a 3-month blanking period, antiarrhythmic drug use, cardioversion, or repeat ablation. The primary safety end point included acute and chronic device- and procedure-related serious adverse events.

n engl j med 389;18 nejm.org November 2, 2023

RESULTS

A total of 305 patients were assigned to undergo pulsed field ablation, and 302 were assigned to undergo thermal ablation. At 1 year, the primary efficacy end point was met (i.e., no events occurred) in 204 patients (estimated probability, 73.3%) who underwent pulsed field ablation and 194 patients (estimated probability, 71.3%) who underwent thermal ablation (between-group difference, 2.0 percentage points; 95% Bayesian credible interval, -5.2 to 9.2; posterior probability of noninferiority, >0.999). Primary safety end-point events occurred in 6 patients (estimated incidence, 2.1%) who underwent pulsed field ablation and 4 patients (estimated incidence, 1.5%) who underwent thermal ablation (between-group difference, 0.6 percentage points; 95% Bayesian credible interval, -1.5 to 2.8; posterior probability of noninferiority, >0.999).

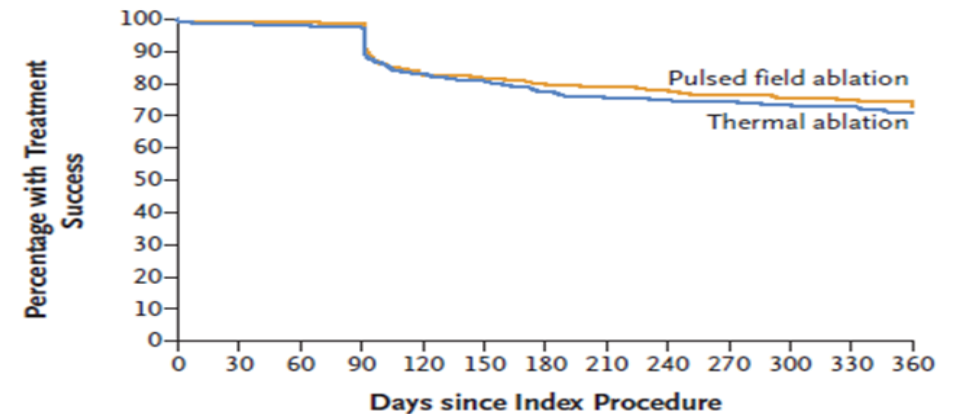
CONCLUSIONS

Among patients with paroxysmal atrial fibrillation receiving a catheter-based therapy, pulsed field ablation was noninferior to conventional thermal ablation with respect to freedom from a composite of initial procedural failure, documented atrial tachyarrhythmia after a 3-month blanking period, antiarrhythmic drug use, cardioversion, or repeat ablation and with respect to device- and procedure-related serious adverse events at 1 year. (Funded by Farapulse–Boston Scientific; ADVENT ClinicalTrials.gov number, NCT04612244.)

ORIGINAL ARTICLE

Pulsed Field or Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation

Vivek Y. Reddy, M.D., Edward P. Gerstenfeld, M.D., Andrea Natale, M.D., William Whang, M.D., Frank A. Cuoco, M.D., Chinmay Patel, M.D., Stavros E. Mountantonakis, M.D., Douglas N. Gibson, M.D., John D. Harding, M.D., Christopher R. Ellis, M.D., Kenneth A. Ellenbogen, M.D., David B. DeLurgio, M.D., Jose Osorio, M.D., Anitha B. Achyutha, M.Tech., M.S.E., Christopher W. Schneider, M.Eng., Andrew S. Mugglin, Ph.D., Elizabeth M. Albrecht, Ph.D., Kenneth M. Stein, M.D., John W. Lehmann, M.D., M.P.H., and Moussa Mansour, M.D., for the ADVENT Investigators*



No. at Risk

Pulsed field ablation	301	298	238	228	176
Thermal ablation	296	292	228	219	150
Treatment Success (%)					
Pulsed field ablation	99.3	99.0	79.7	76.4	73.1
Thermal ablation	98.7	97.3	77.5	74.5	71.3

Figure 2. Efficacy Outcomes of Pulsed Field Ablation as Compared with Thermal Ablation.

Pulsed Field Ablation of Paroxysmal Atrial Fibrillation

1-Year Outcomes of IMPULSE, PEFCAT, and PEFCAT II

ΠΛΕΟΝΕΚΤΗΜΑ PFA

PULSED FIELD ABLATION

Normal Esophagus

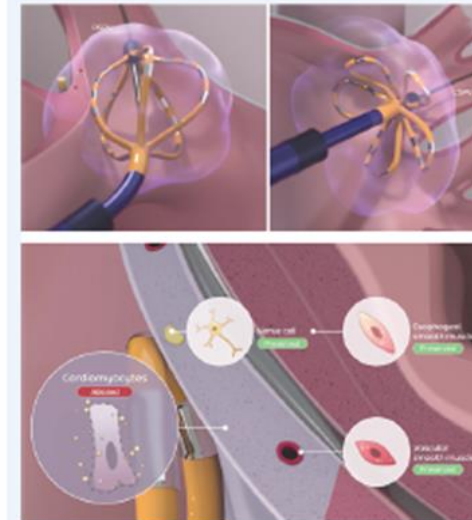
Normal Phrenic Nerve

Cardiomyocytes have low thresholds to PFA

Other tissue/cell types are more resistant to PFA and remained uninjured despite exposure to the field

CENTRAL ILLUSTRATION PFA for Paroxysmal AF

PFA Catheter & Mechanism of Ablation



Safety

• Esophageal Damage	0%
◦ Esophageal Dysmotility	0%
◦ Atrioesophageal Fistula	0%
• Pulmonary Vein Stenosis	0%
• Phrenic Nerve Injury	0%
• Stroke	0%
◦ Transient Ischemic Attack	0.9%
• Pericardial Effusion	0.8%
• Vascular injury	1.7%
• Death	0%

Reddy, V.Y. et al. J Am Coll Cardiol EP. 2021;7(5):614-27.

Safety and Effectiveness of Pulsed Field Ablation to Treat Atrial Fibrillation: One-Year Outcomes From the MANIFEST-PF Registry

BACKGROUND: Pulsed field ablation is a novel nonthermal cardiac ablation modality using ultra-rapid electrical pulses to cause cell death by a mechanism of irreversible electroporation. Unlike the traditional ablation energy sources, pulsed field ablation has demonstrated significant preferentiality to myocardial tissue ablation, and thus avoids certain thermally mediated complications. However, its safety and effectiveness remain unknown in usual clinical care.

METHODS: MANIFEST-PF (Multi-National Survey on the Methods, Efficacy, and Safety on the Post-Approval Clinical Use of Pulsed Field Ablation) is a retrospective, multinational, patient-level registry wherein patients at each center were prospectively included in their respective center registries. The registry included all patients undergoing postapproval treatment with a multielectrode 5-spline pulsed field ablation catheter to treat atrial fibrillation (AF) between March 1, 2021, and May 30, 2022. The primary effectiveness outcome was freedom from clinical documented atrial arrhythmia (AF/atrial flutter/atrial tachycardia) of ≥ 30 seconds on the basis of electrocardiographic data after a 3-month blanking period (on or off antiarrhythmic drugs). Safety outcomes included the composite of acute (<7 days postprocedure) and latent (>7 days) major adverse events.

RESULTS: At 24 European centers (77 operators) pulsed field ablation was performed in 1568 patients with AF, age 64.5 ± 11.5 years, female 35%, paroxysmal/persistent AF 65%/32%, CHA₂DS₂-VASc 2.2 ± 1.6 , median left ventricular ejection fraction 60%, and left atrial diameter 42 mm. Pulmonary vein isolation was achieved in 99.2% of patients. After a median (interquartile range) follow-up of 367 (289–421) days, the 1-year Kaplan-Meier estimate for freedom from atrial arrhythmia was 78.1% (95% CI, 76.0%–80.0%); clinical effectiveness was more common in patients with paroxysmal AF versus persistent AF (81.6% versus 71.5%; $P=0.001$). Acute major adverse events occurred in 1.9% of patients.

CONCLUSIONS: In this large observational registry of the postapproval clinical use of pulsed field technology to treat AF, catheter ablation using pulsed field energy was clinically effective in 78% of patients with AF.

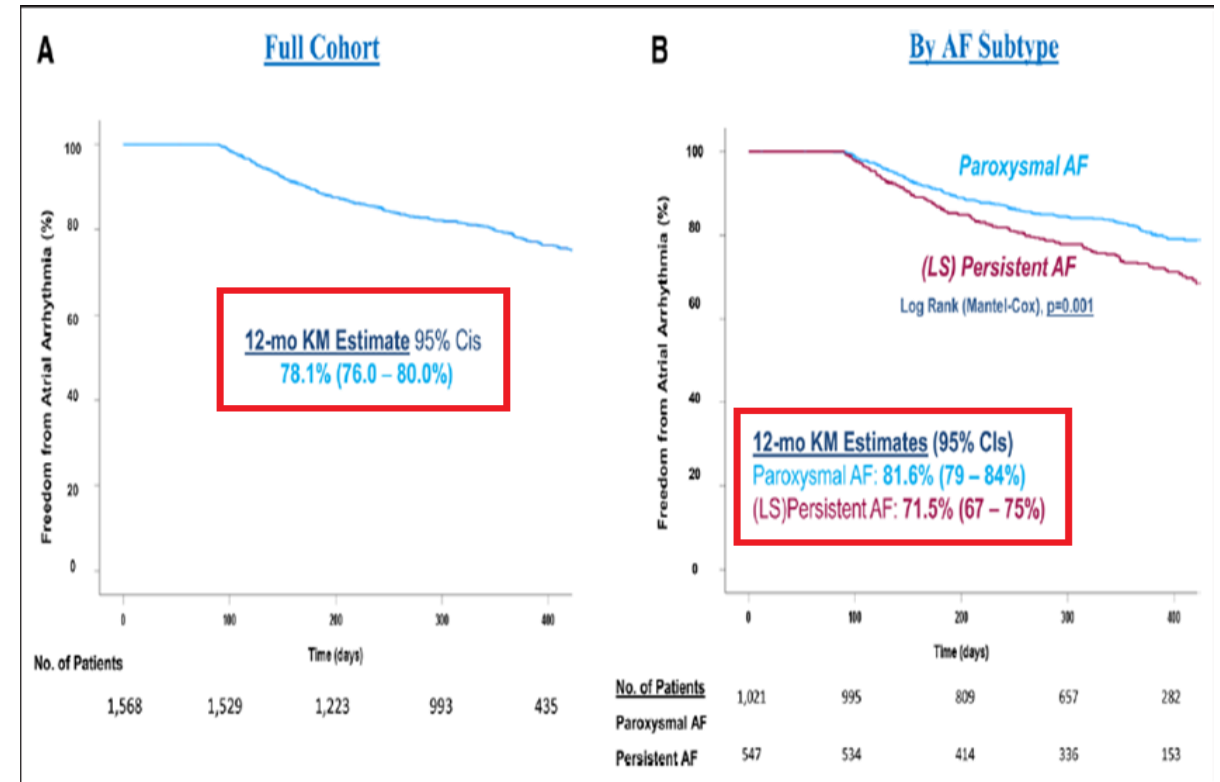


Figure 2. Primary effectiveness outcome.

Kaplan-Meier analysis demonstrating 1-year freedom from arrhythmia in either the full cohort (A) or by AF subtype: paroxysmal AF vs (long-standing) persistent AF (B). AF indicates atrial fibrillation; KM, Kaplan-Meier; and LS, long-standing.



Ευχαριστώ για την προσοχή σας

