



HOT TOPICS IN CARDIOLOGIA 2024

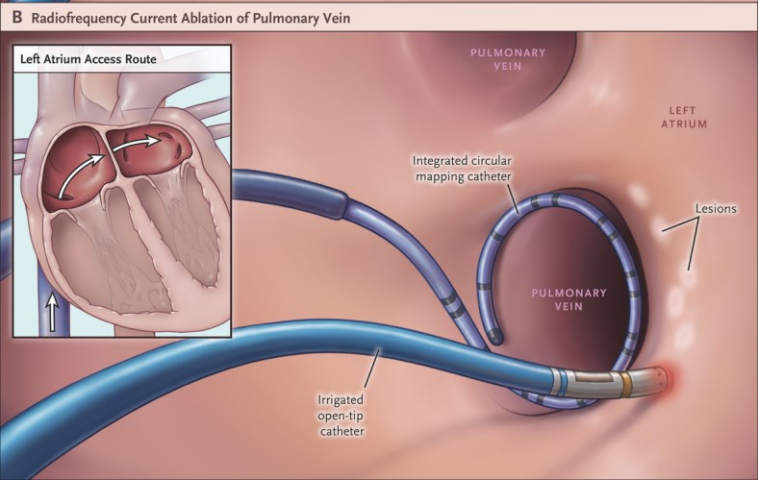
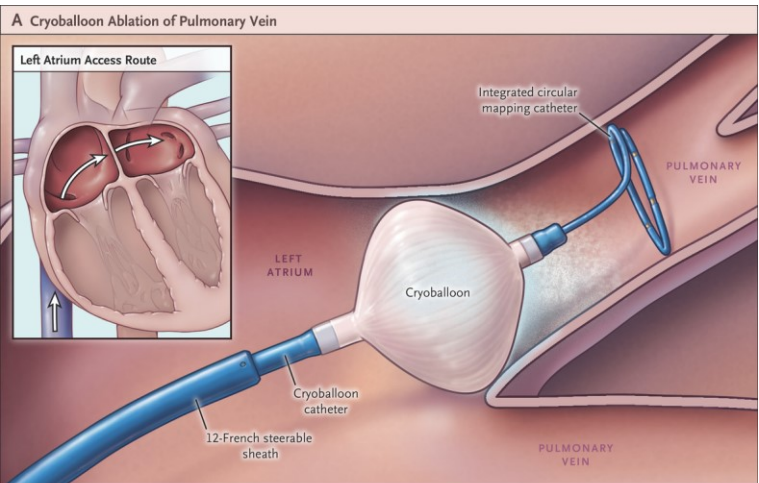
27 e 28 Novembre 2024

Villa Doria D'Angri - Via F. Petrarca 80,
Napoli

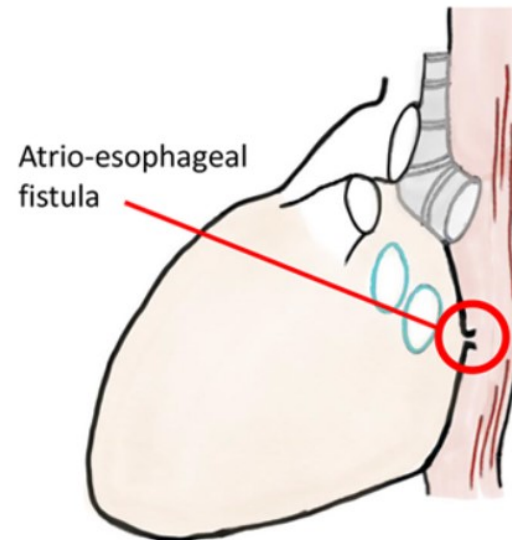
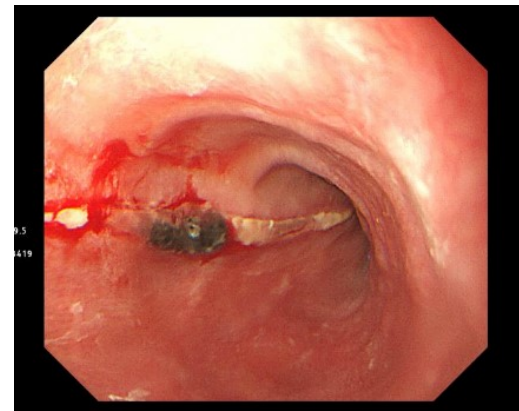
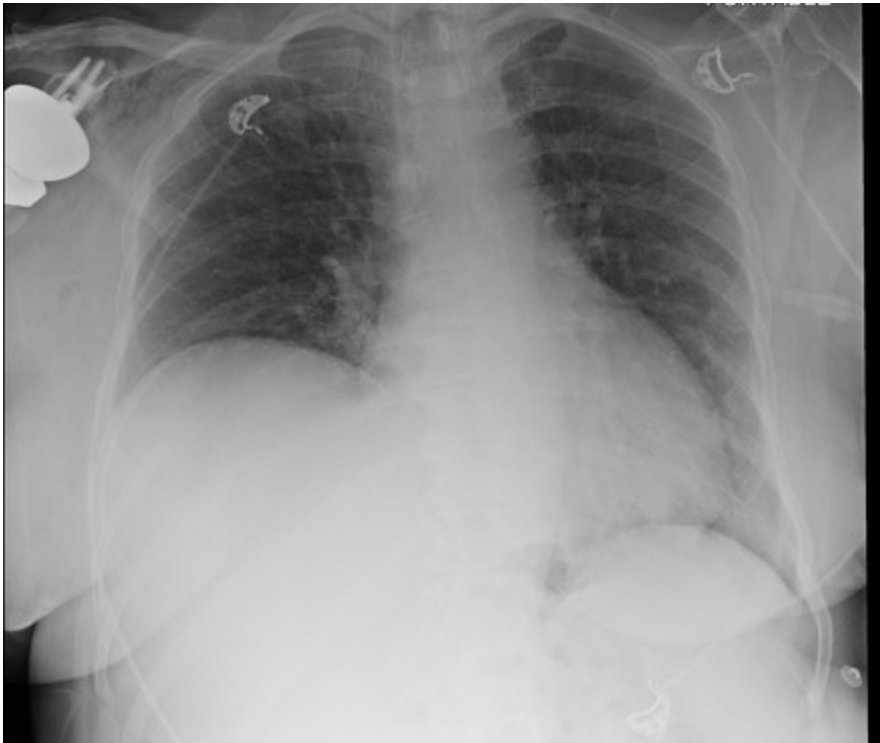
TITOLO: Uno sguardo verso il prossimo
futuro in aritmologia

RELATORE: Dr. Lorenzo Bianchini

IL TRATTAMENTO DELLA FIBRILLAZIONE ATRIALE NELL'ERA PRE-PFA: DALLA RADIOFREQUENZA PUNTO A PUNTO ALLE TECNICHE SINGLE-SHOT PER L'ISOLAMENTO DELLE VENE POLMONARI



Le energie termiche per l'ablazione delle aritmie cardiache:
basso «indice terapeutico» tra efficacia, non-efficacia e
perdita di sicurezza



L'avvento dell'elettroporazione nella pratica clinica aritmologica

- Energia prevalentemente non-termica, basata sull'elettroporazione irreversibile del tessuto cardiaco
- Lunga storia di utilizzo in oncologia
- Nel 1980 venne descritta l'ablazione di aritmie cardiache mediante l'applicazione diretta di correnti di shock sul miocardio, ma la metodica era gravata da importanti limitazioni tecniche e complicanze per cui, anche alla luce del successo della radiofrequenza, venne abbandonata



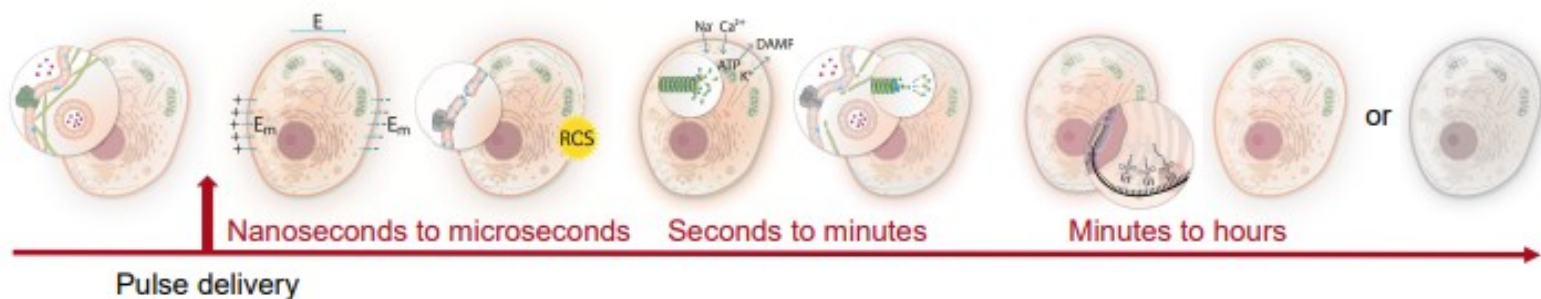
Catheter Technique for Closed-Chest Ablation of the Atrioventricular Conduction System — A Therapeutic Alternative for the Treatment of Refractory Supraventricular Tachycardia

Authors: John J. Gallagher, M.D., Robert H. Svenson, M.D., Jack H. Kasell, Lawrence D. German, M.D., Gust H. Bardy, M.D., Archer Broughton, M.B.B.S., and Giuseppe Critelli, M.D. [Author Info & Affiliations](#)

Published January 28, 1982 | N Engl J Med 1982;306:194-200 | DOI: 10.1056/NEJM198201283060402

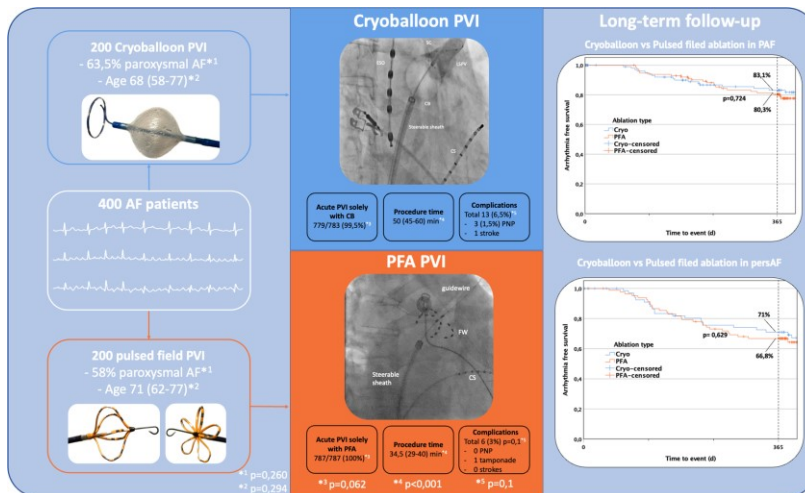
Meccanismo d'azione dell'elettroporazione

Elettroporazione indica un **aumento della permeabilità di membrana cellulare** dovuta al gradiente elettrico transmembrana innescato dall'applicazione di impulsi elettrici di alto voltaggio al tessuto. Questo aumento della permeabilità può essere transitorio, con sopravvivenza della cellula, o **irreversibile** (morte della cellula). L'irreversibilità ha destato enorme attenzione in quanto, unita a rapidità e sicurezza, ha aperto la strada all'utilizzo di questa tecnologia per l'ablazione delle aritmiche cardiache.



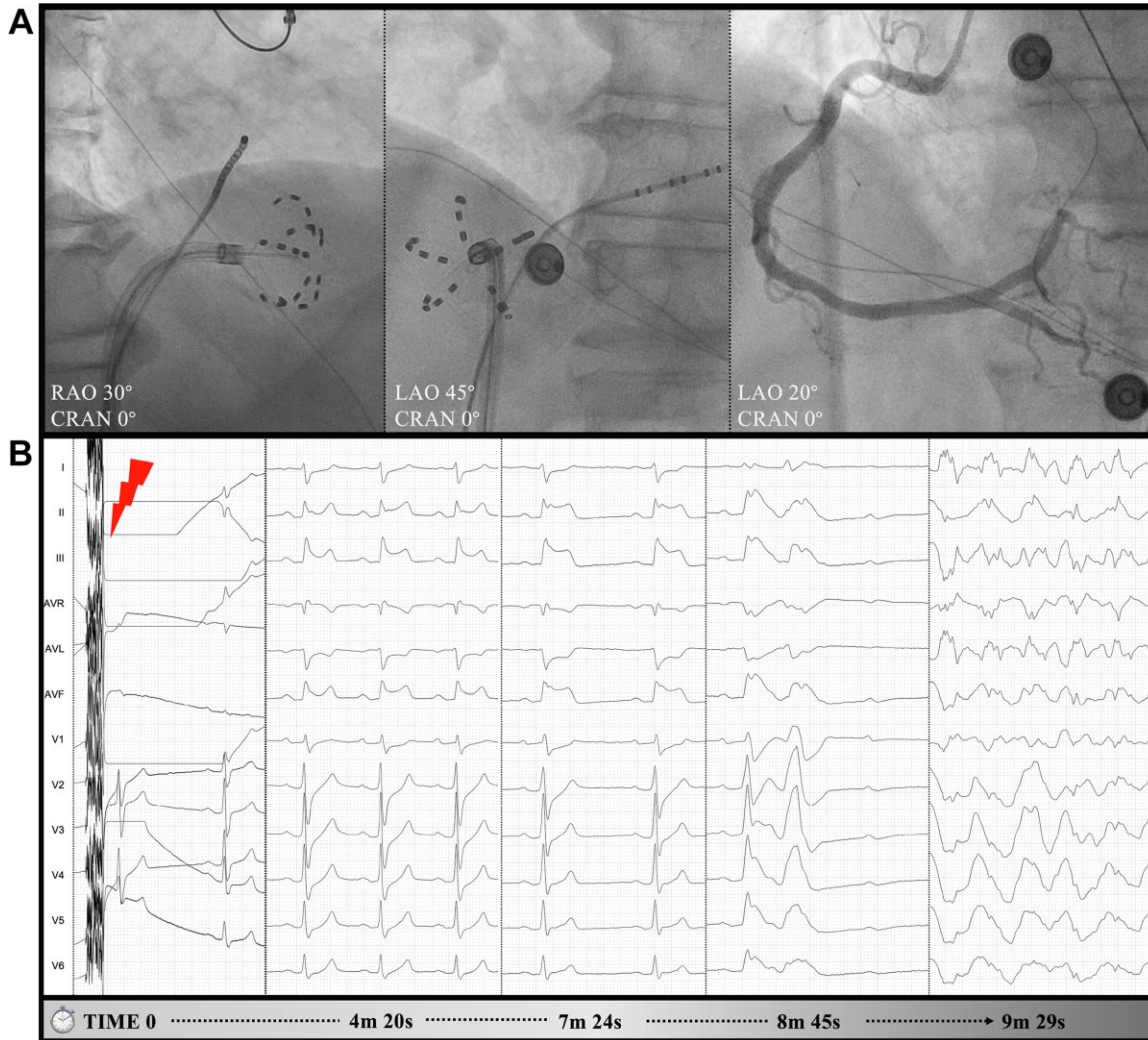
L'avvento dell'elettroporazione nella pratica clinica aritmologica

- Nell'ultima decade , gli studi pre-clinici hanno mostrato come la PFA, nella sua tecnologia attuale, ha il potenziale di creare una lesione **miocardio-selettiva** evitando quindi il danno sui tessuti vicini
- I primi studi sull'utilizzo della PFA nell'uomo per l'ablazione della fibrillazione atriale hanno dimostrato **efficacia in acuto** nell'isolamento delle vene polmonari, **durabilità** delle lesioni alle procedure di remapping, **sicurezza** per esofago e nervo frenico, **libertà da recidive** aritmiche non inferiore alle energie termiche



Urbanek L, Bordignon S, Schaack D, et al. Pulsed Field Versus Cryoballoon Pulmonary Vein Isolation for Atrial Fibrillation: Efficacy, Safety, and Long-Term Follow-Up in a 400-Patient Cohort. *Circ Arrhythm Electrophysiol.* 2023 Jul;16(7):389-398.

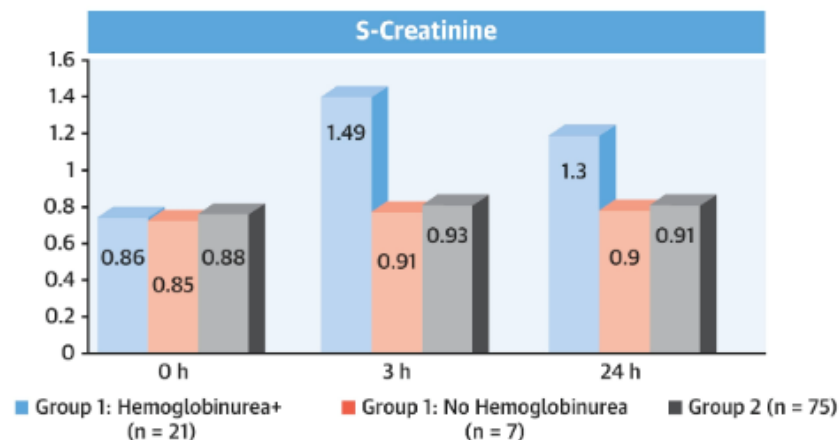
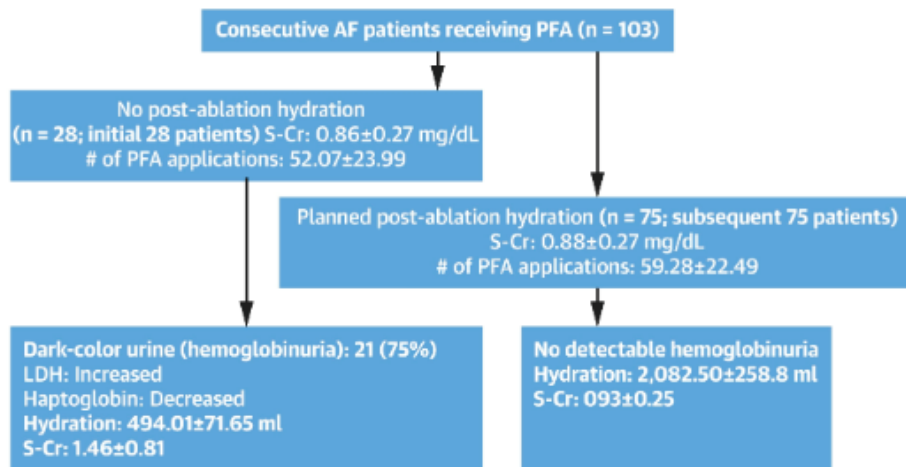
I principali effetti avversi emersi dall'esperienza clinica: **VASOSPASMO CORONARICO**



Della Rocca
DG, Del Monte
A, Bala G, et
al. Transient
Inferior ST-
Segment
Elevation and
Ventricular
Fibrillation After
Cavotricuspid
Isthmus Pulsed-
Field Ablation.
JACC Clin
Electrophysiol.
2023 May.

I principali effetti avversi emersi dall'esperienza clinica: EMOLISI intravascolare e rischio di IRA

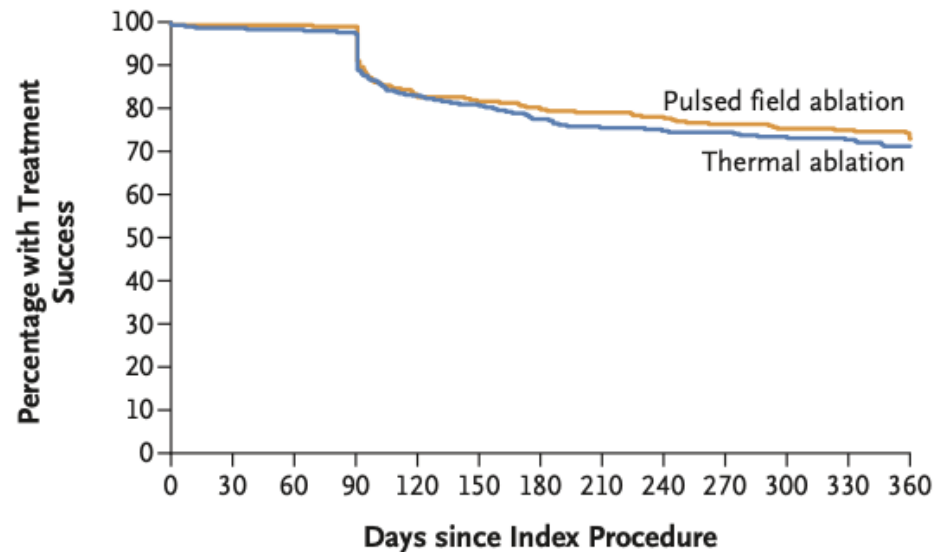
CENTRAL ILLUSTRATION: Flow Chart of the Study With Main Findings



Mohanty S, et al. J Am Coll Cardiol EP. 2024;10(4):709-715.

ORIGINAL ARTICLE

Pulsed Field or Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation



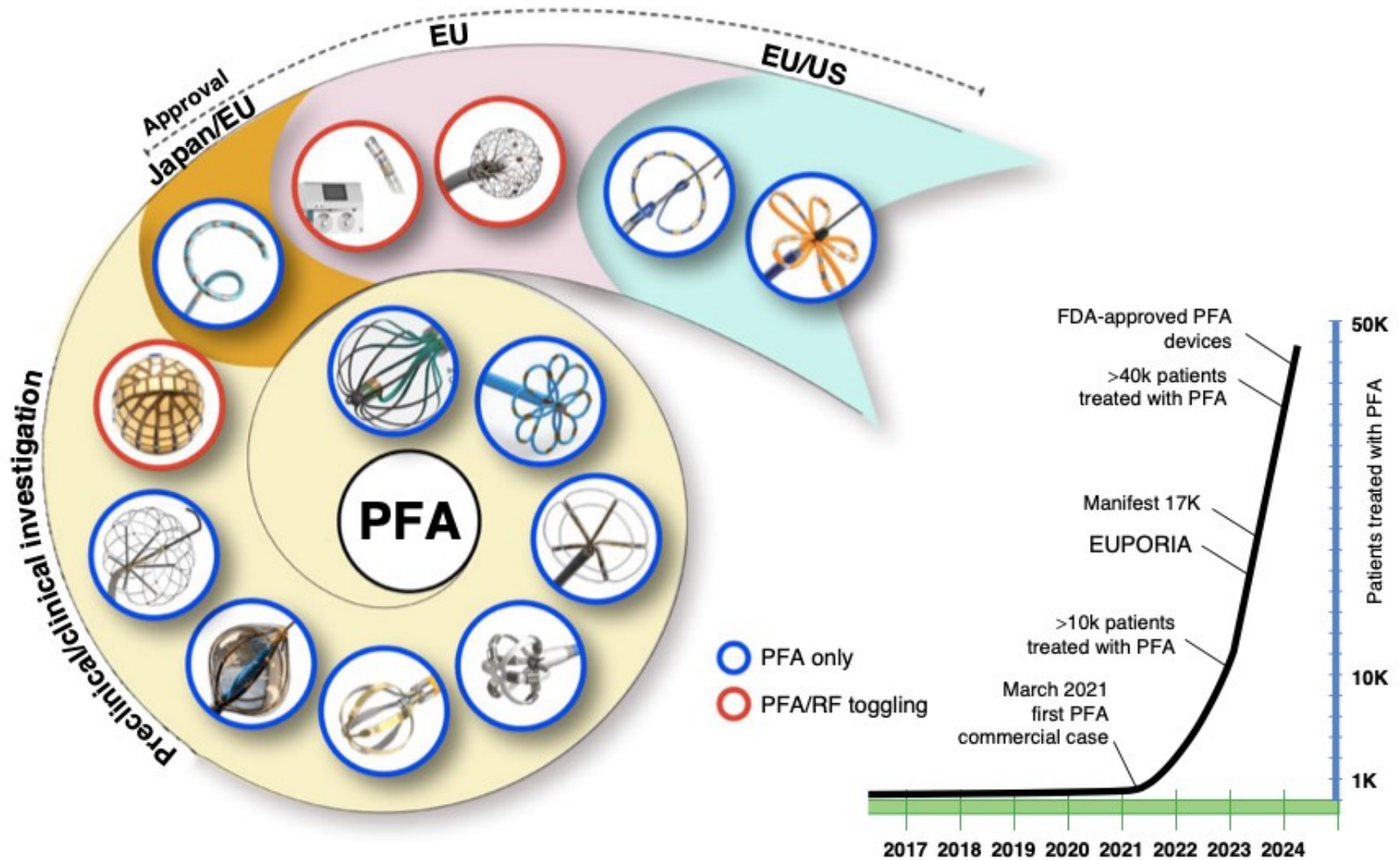
No. at Risk

Pulsed field ablation	301	298	238	228	176
Thermal ablation	296	292	228	219	150

Treatment Success (%)

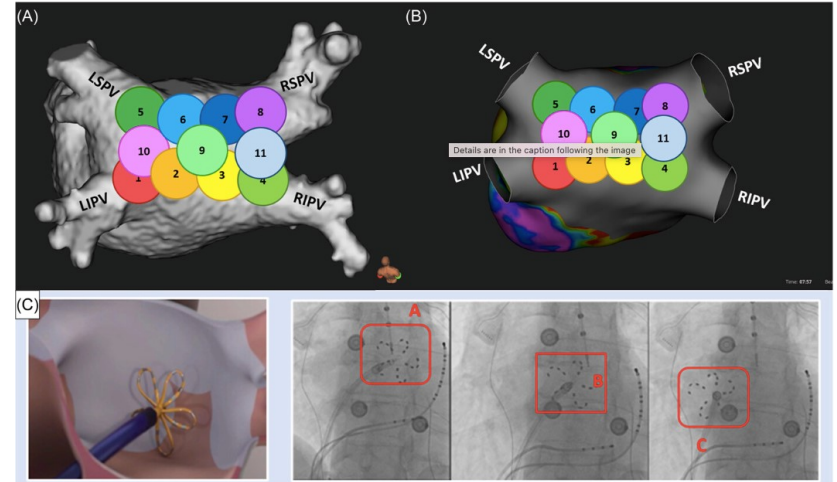
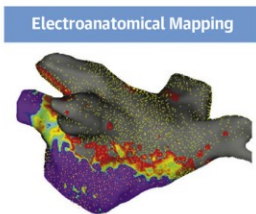
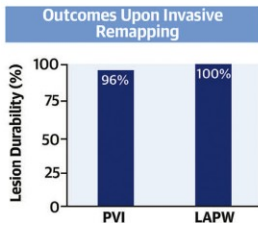
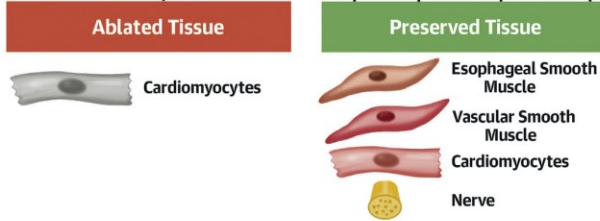
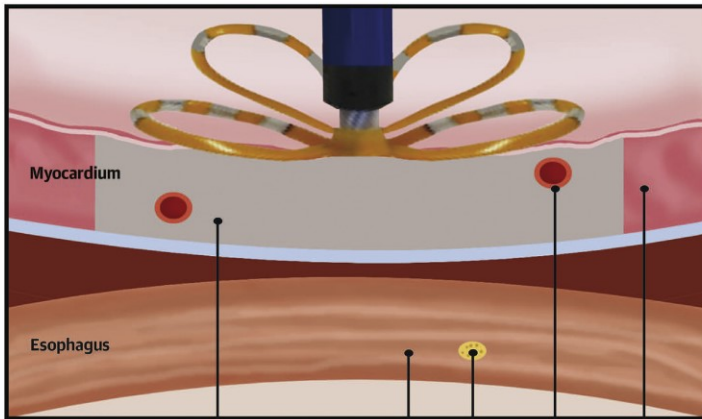
Pulsed field ablation	99.3	99.0	79.7	76.4	73.1
Thermal ablation	98.7	97.3	77.5	74.5	71.3

LA DIFFUSIONE DELLA PFA NELLA PRATICA CLINICA



Kyoung-Ryul Julian Chun, Damijan Miklavčič, Konstantinos Vlachos, Stefano Bordignon, Daniel Scherr, Pierre Jais, Boris Schmidt, State-of-the-art pulsed field ablation for cardiac arrhythmias: ongoing evolution and future perspective, *EP Europace*, Volume 26, Issue 6, June 2024, euae134

IL TRATTAMENTO DELLA **FIBRILLAZIONE ATRIALE PERSISTENTE**: PFA NELL'ABLAZIONE AL DI FUORI DELLE VENE POLMONARI

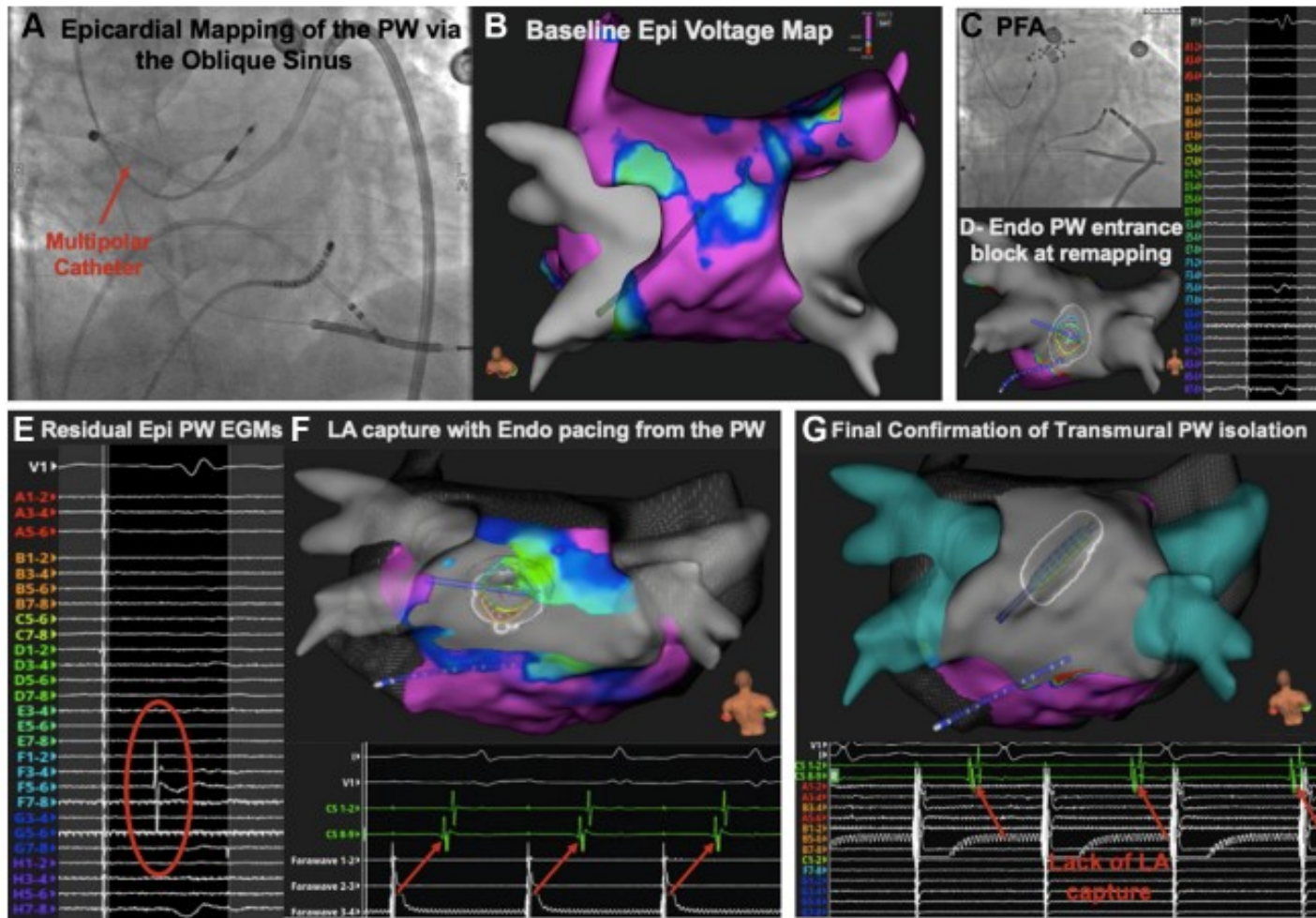


Schiavone M, Solimene F, Moltrasio M, et al.. Pulsed field ablation technology for pulmonary vein and left atrial posterior wall isolation in patients with persistent atrial fibrillation. *J Cardiovasc Electroanat.* 2024 Jun;.

Reddy, V.Y. et al. *J Am Coll Cardiol.* 2020;76(9):1068-80.

LESION TRANSMURALITY

FIGURE 1 Direct Epicardial Validation of PFA of the PW

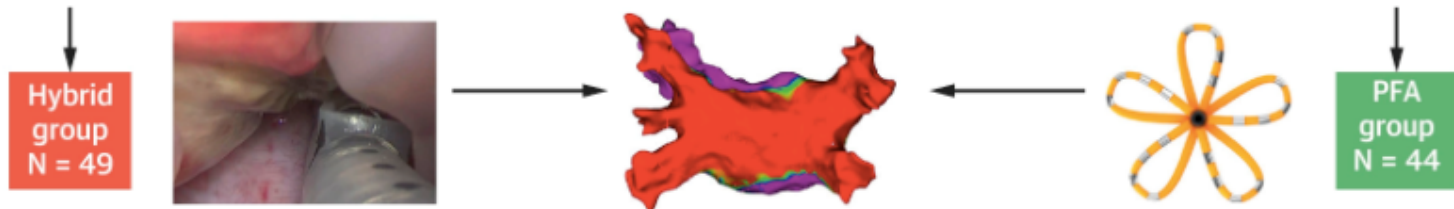


Solimene F, Compagnucci P, Tondo C, La Fazia VM, Schillaci V, Mohanty S, Cipolletta L, Fassini GM, Chiariello P, Mottola G, Schiavone M, Casella M, Dello Russo A, Natale A. Direct Epicardial Validation of Posterior Wall Electroporation in Persistent Atrial Fibrillation. *JACC Clin Electrophysiol*. 2024 Jun;10(6):1200-1202. doi: 10.1016/j.jacep.2024.04.003. Epub 2024 Apr 10. PMID: 38678453.

COMPARISON WITH HYBRID CONVERGENT ABLATION

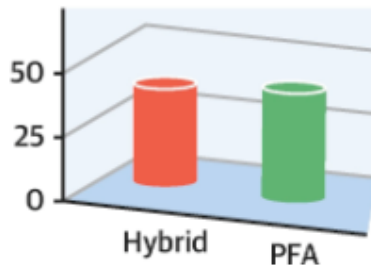
CENTRAL ILLUSTRATION: Hybrid-Convergent Procedure or Pulsed Field Ablation in Long-Standing Persistent Atrial Fibrillation

93 Consecutive LSPAF Patients Undergoing AF Ablation (PVI + LAPWI)



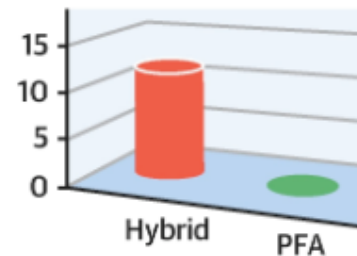
Outcomes of Interest

Efficacy outcome:
ATAs recurrence after the 3-month blanking-period over 12-month follow-up



log-rank at survival analysis
 $P = 0.539$
(y-values as percentage)

Safety outcome:
Periprocedural adverse events and late complications during follow-up

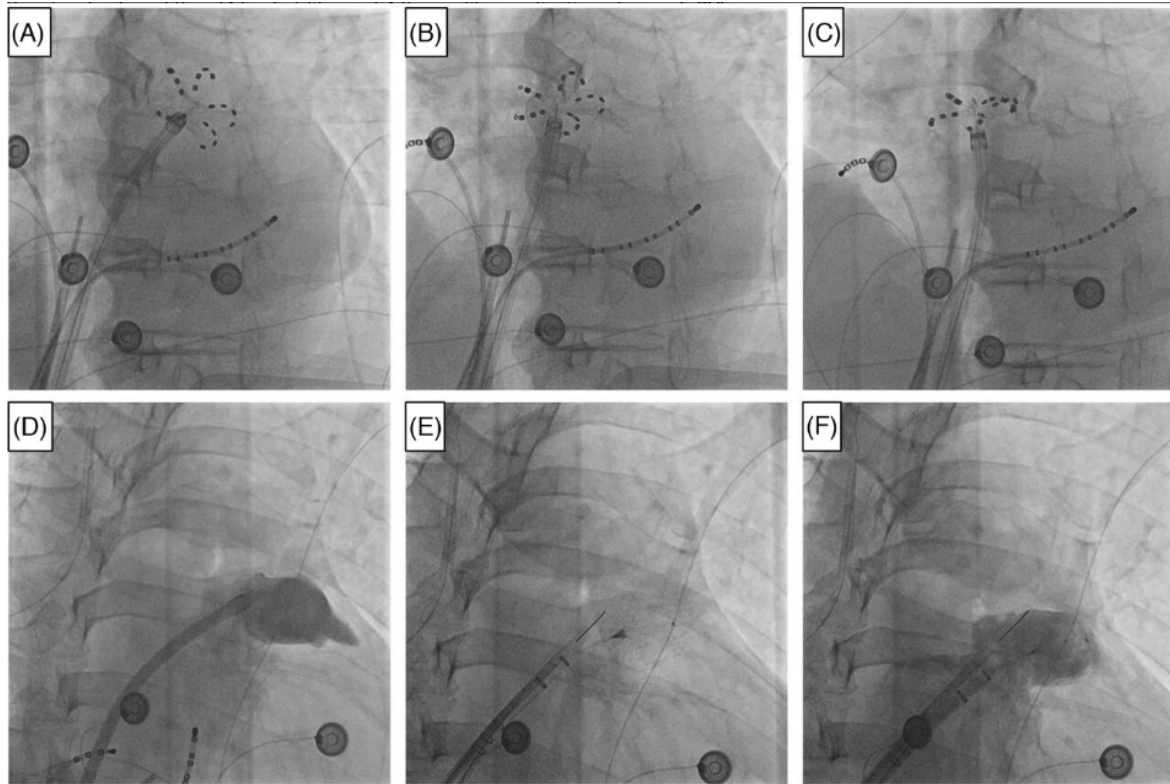


$P = 0.028$
(y-values as percentage)

Outcome predictors:
LA volume and recurrences during the blanking period were predictors of ATAs recurrences after ablation, regardless of procedural technique employed

Bianchini L, et al. J Am Coll Cardiol EP. 2024;10(7):1700-1710.

COMBINED PROCEDURE: PVI + LAPWI + LAA CLOSURE



Bianchini L, Moltrasio M, Fassini G, et al., Pulsed-field ablation of pulmonary vein and left atrial posterior wall combined with left atrial appendage occlusion as single procedure. *Pacing Clin Electrophysiol.* 2024 May;47(5)

ORIGINAL ARTICLE

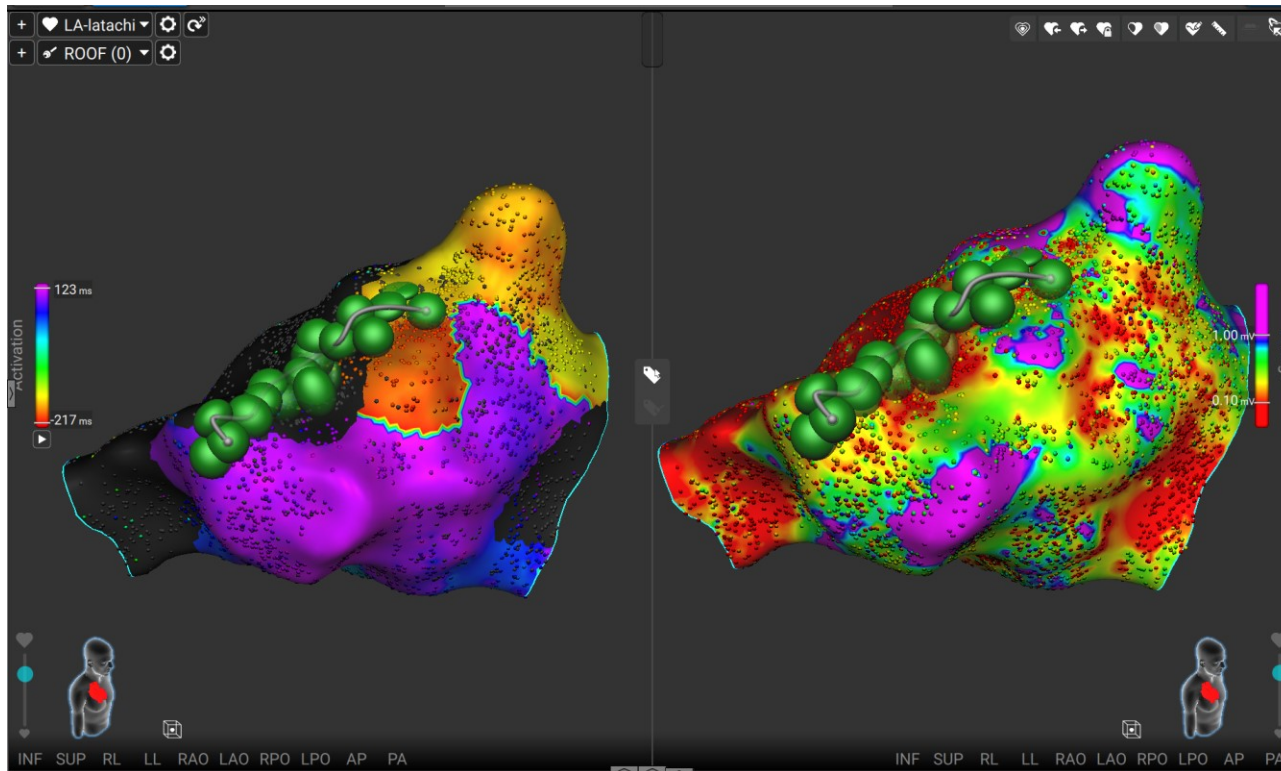


Left Atrial Appendage Closure after Ablation for Atrial Fibrillation

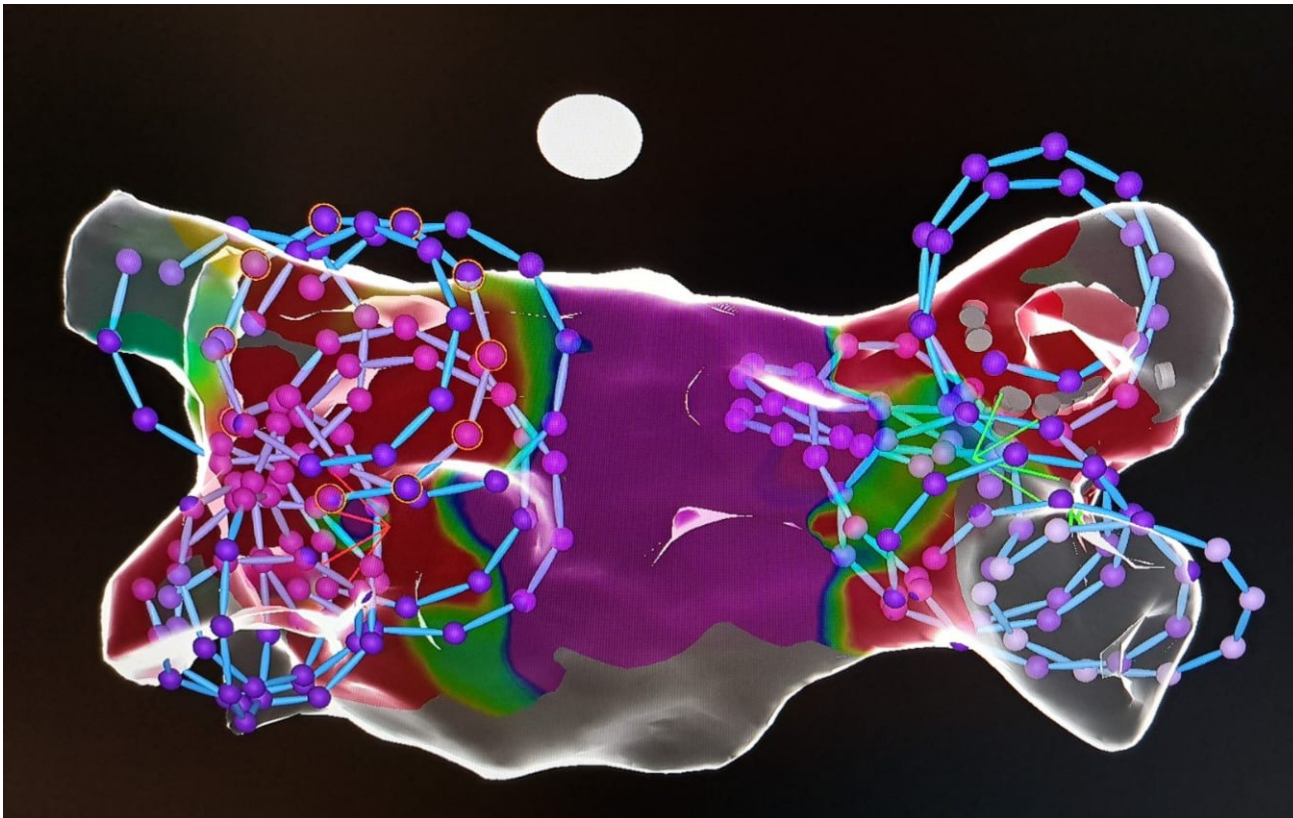
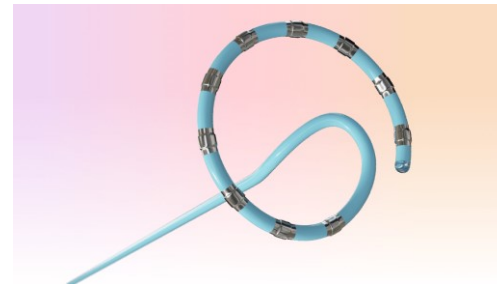
Authors: Oussama M. Wazni, M.D., Walid I. Saliba, M.D., Devi G. Nair, M.D., Eloi Marijon, M.D., Ph.D., Boris Schmidt, M.D., Troy Hounshell, D.O., Henning Ebel, M.D., [+22](#), for the OPTION Trial Investigators* [Author Info & Affiliations](#)

Published November 16, 2024 | DOI: 10.1056/NEJMoa2408308 | [Copyright © 2024](#)

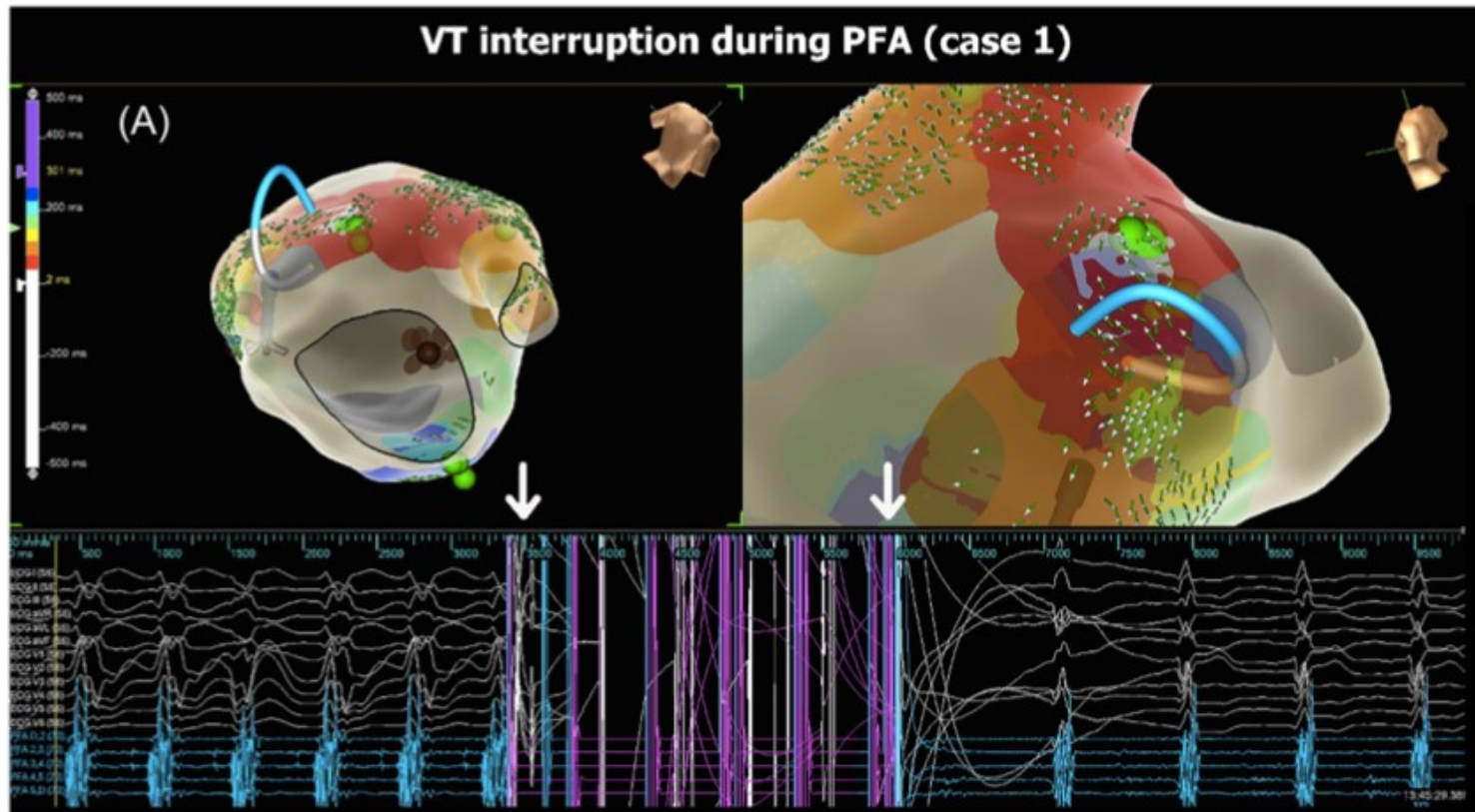
SPHERE-9: CATETERE FOCALE A IMPRONTA LARGA (9 MM), DEFLETTIBILE, A DUPLICE ENERGIA RF E PFA E INTEGRATO IN SISTEMA DI MAPPAGGIO AD ALTA DENSITÀ



VARIPULSE: CATETERE PFA SINGLE-SHOT PER ISOLAMENTO DELLE VENE POLMONARI, INTEGRATO IN SISTEMA DI MAPPAGGIO AD ALTA DENSITÀ, DEFLETTIBILE



PFA nelle aritmie ventricolari?



PFA NELLE ARITMIE VENTRICOLARI

Potenziati vantaggi:

- Maggiore dipendenza dalla prossimità piuttosto che dal contatto elettrodo-tessuto (aree trabecolate, muscoli papillari)
- Evidenza, in atrio, di processi riparativi post-ablazione caratterizzati da minore fibrosi, con recupero di compliance e funzione contrattile nelle aree trattate con PFA maggiore rispetto alle aree trattate con RF
- Velocità nell'applicazione dei polsi (zone di difficile stabilità del catetere, minore durata procedurale)

PFA NELLE ARITMIE VENTRICOLARI: EVIDENZA PRE-CLINICA

Endocardial ventricular pulsed field ablation: a proof-of-concept preclinical evaluation

Jacob S. Koruth ^{1*}, Kenji Kuroki ¹, Jin Iwasawa ¹, Raju Viswanathan ², Richard Brose ², Eric D. Buck ², Elina Donskoy ³, Srinivas R. Dukkupati ¹, and Vivek Y. Reddy ¹

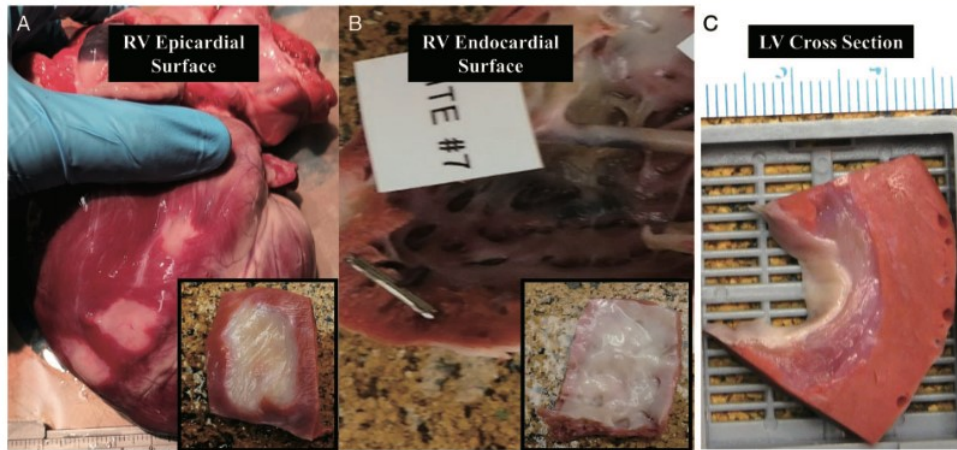
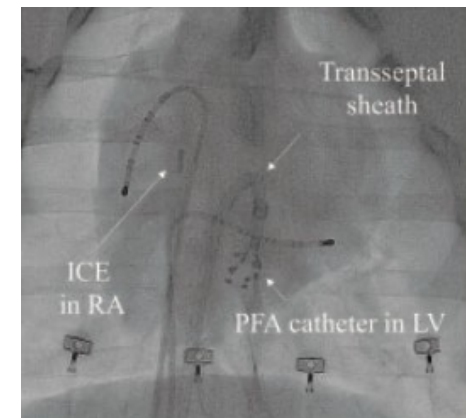
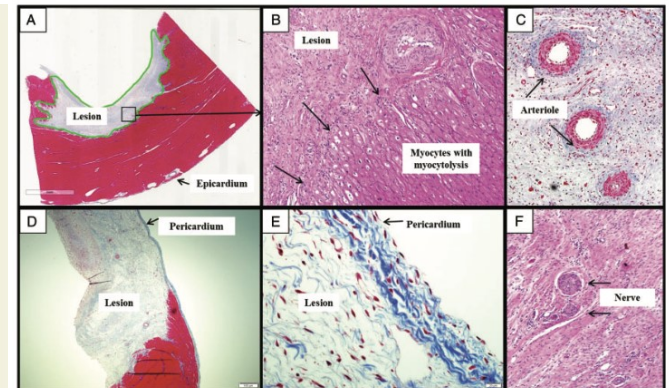


Figure 4 (A) Epicardial aspect of transmural lesions in the RV, inset-zoomed view of a single lesion. (B) Endocardial aspect of the same lesions in the RV, inset-zoomed view of a single lesion. (C) Section demonstrating non-transmurular lesions in the LV. LV, left ventricle; RV, right ventricle.



In the PFA lesions, fibrous tissue homogeneously replaced myocytes with a narrow zone of surrounding myocytolysis and no overlying thrombus. When present, nerve fascicles and vasculature were preserved within surrounding fibrosis.

PFA NELLE ARITMIE VENTRICOLARI: EVIDENZA PRE-CLINICA

CENTRAL ILLUSTRATION Comparative Efficacy and Safety of PFA vs RFA in Common Idiopathic LV-VAs Locations



10 Pigs were randomized to RFA vs PFA using an investigational RFA/PFA CF/LI measuring focal ablation catheter



LV Septum (LV-IVS)



Papillary Muscle (PAP)



LV Summit (LVS)

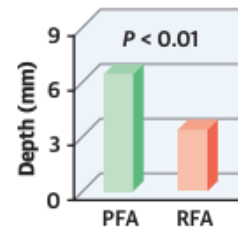
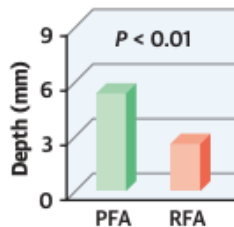
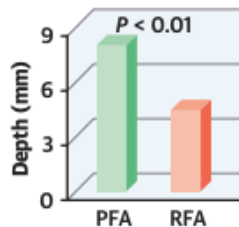
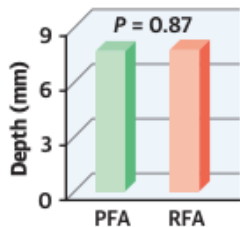


Epicardium (EPI)



7 Days Survival: Angiography, Echo, and Euthanasia

Efficacy Results



Safety Results

No safety events were reported for both modalities

	PFA	RFA
VF	0%	50%

	PFA	RFA
VF	0%	30%
Pop	0%	16%

	PFA	RFA
ST-Segment Elevation/Depression	80%	0%

Younis A, et al. JACC Clin Electrophysiol. 2024;10(9):1998-2009.

ICE = intracardiac echocardiography; EPI = epicardial; LV-IVS = left ventricular interventricular septum; LVS = left ventricular summit; PAP = papillary muscle; PFA = pulsed field ablation; RFA = radiofrequency ablation.

In this swine study, compared with RFA, PFA of common idiopathic LV-VAs locations produced deeper lesions with fewer steam pops. However, PFA was associated with higher rates of transient ST-segment elevations and depressions with direct epicardium ablation.

Pulsed Field Ablation Index–Guided Ablation for Lesion Formation: Impact of Contact Force and Number of Applications in the Ventricular Model

Luigi Di Biase, MD, PhD , Jacopo Marazzato, MD, PhD , Assaf Govari, PhD,

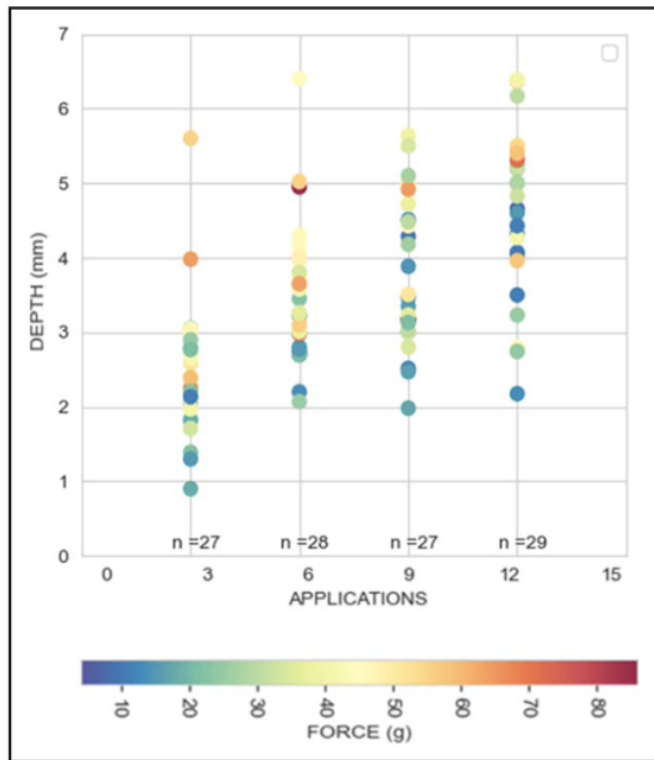


Figure 2. Study characterization data set.

Impact of contact force (CF) and pulsed field ablation (PFA) on the lesion depth. A significant increase in the lesion size was recorded from very-low-dose PFA (×3) to high-dose PFA (×12) provided that CF >5 g was warranted.

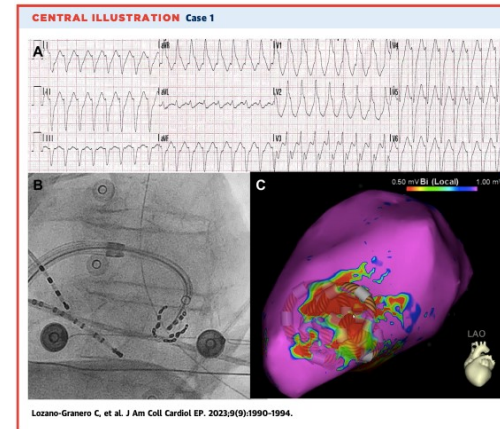
the combined effect of PFA dose and CF during PFA provides a synergistic impact on the ventricular lesion size in swine. The PF index—a new parameter of lesion quality implementing PFA dose and CF—seems to predict the actual lesion size in these animals.

PRIMI REPORT DI PFA CON FARAPULSE NELLE TACHICARDIE VENTRICOLARI

Case Series of Ventricular Tachycardia Ablation With Pulsed-Field Ablation

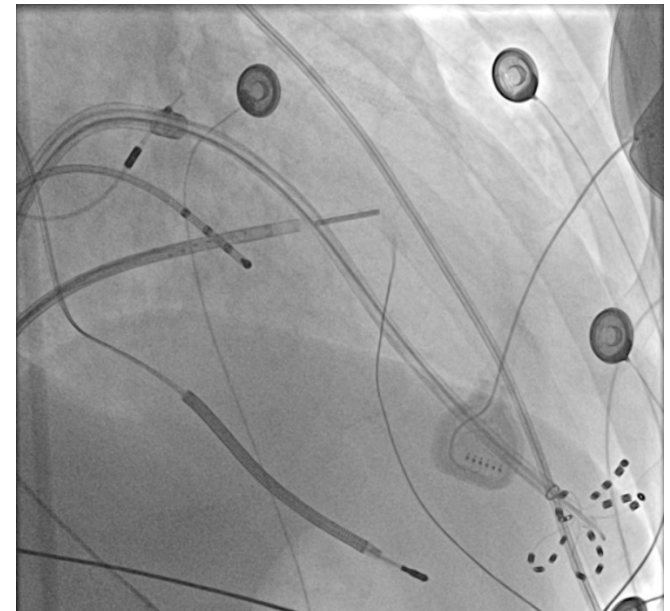
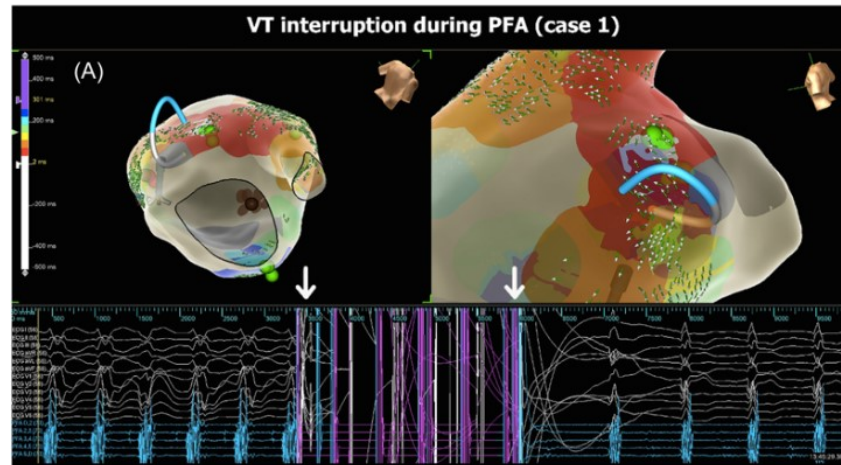
Pushing Technology Further (Into the Ventricle)

Cristina Lozano-Granero, MD,^{a,b,*} Jun Hirokami, MD,^{c,*} Eduardo Franco, MD, PhD,^{a,b} Shota Tohoku, MD,^c Roberto Matía-Francés, MD, PhD,^a Boris Schmidt, MD,^c Antonio Hernández-Madrid, MD, PhD,^a José Luis Zamorano Gómez, MD, PhD,^{a,b} Javier Moreno, MD, PhD,^{a,b} Julian Chun, MD^c



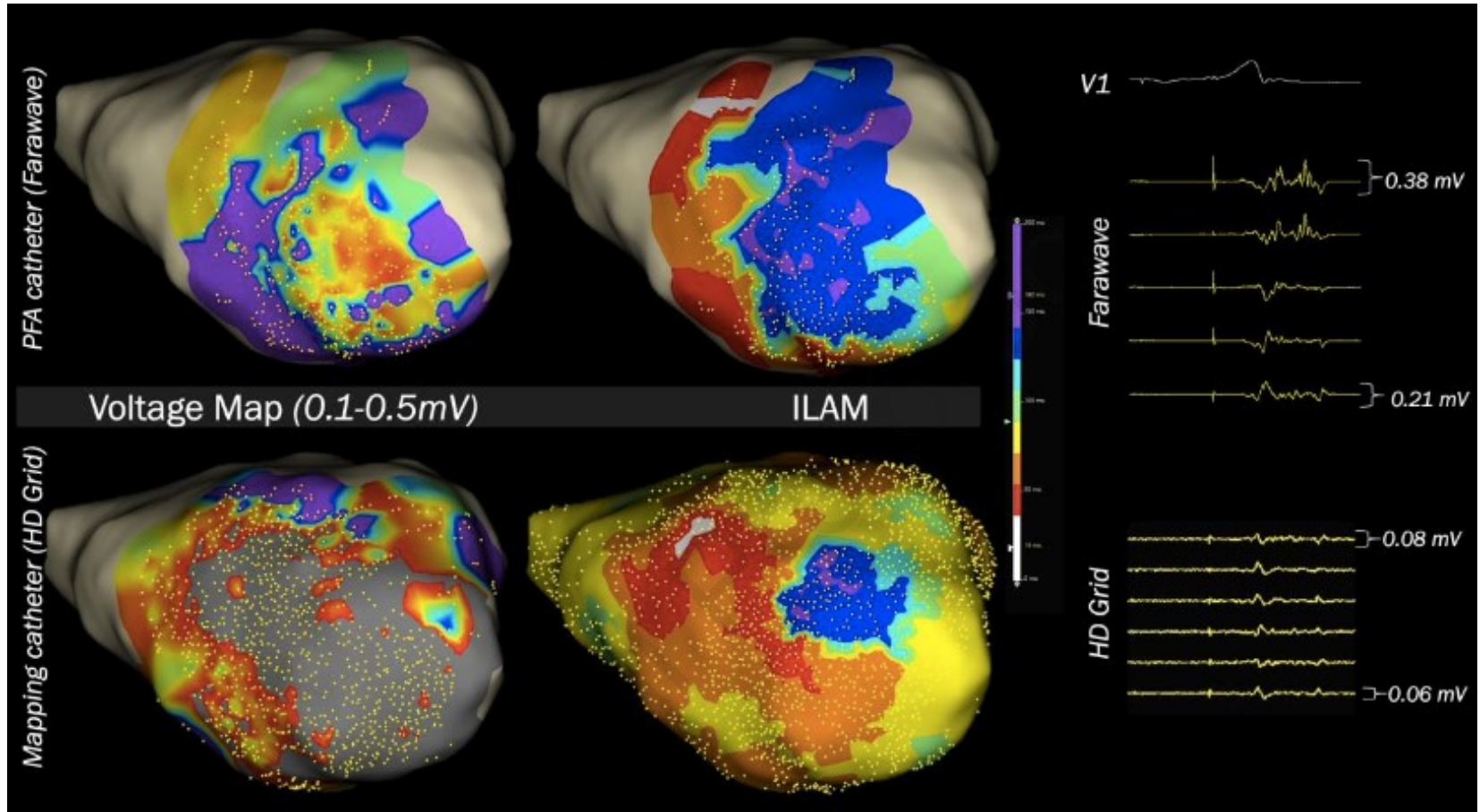
Ventricular tachycardia ablation with pentaspline pulsed field technology in two patients with ischemic cardiomyopathy

Gaetano Fassini MD, Elio Zito MD, Lorenzo Bianchini MD, Fabrizio Tundo MD, PhD, Claudio Tondo MD, PhD, Marco Schiavone MD ✉





Pulsed field ablation for incessant scar-related ventricular tachycardia: First US report

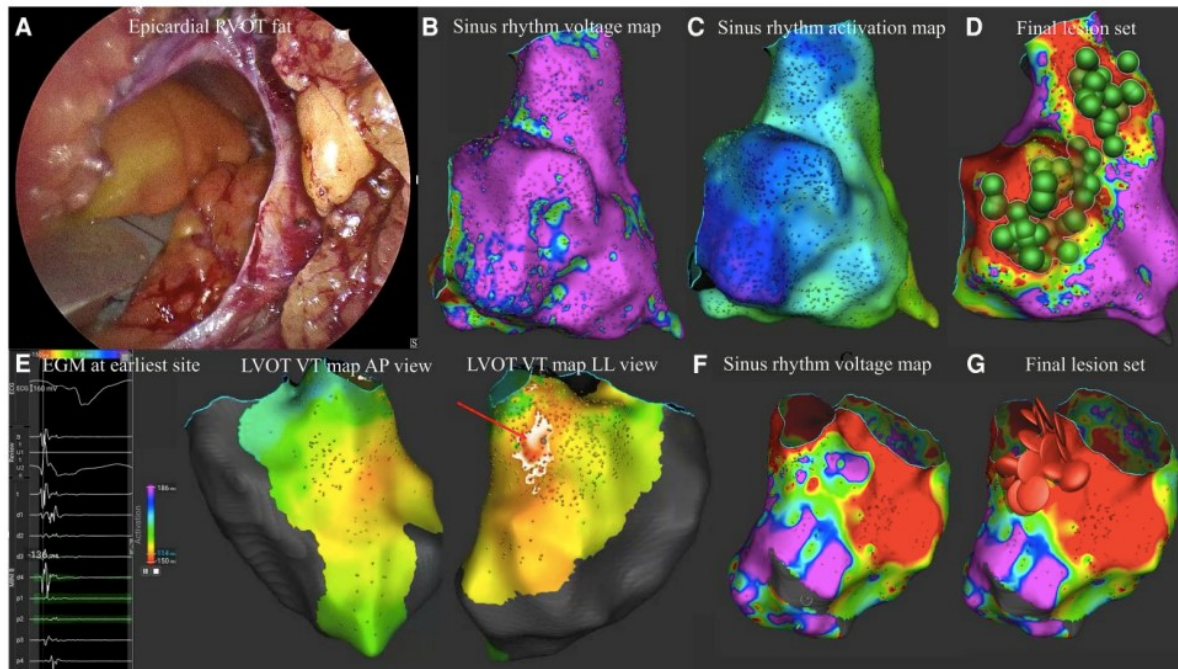
Praneeth Katrapati, MD · J. Peter Weiss, MD, FHRS · David Baning, BS, RT(R)(VI) · Michael Zawaneh, MD · Wilber Su, MD, FHRS
· Roderick Tung, MD, FHRS



CASE SERIES DI ABLAZIONE DI TV CON CATETERE SPHERE-9

A large footprint focal catheter toggling between pulsed field and radiofrequency energy: first clinical experience for ventricular tachycardia ablation

Luigi Pannone ^{1†}, Ioannis Doundoulakis ^{1†}, María Cespón-Fernández ¹,
Ivan Eltsov ², Gian Battista Chierchia ¹, Carlo de Asmundis ¹, and
Andrea Sarkozy ^{1*}



NOVITÀ IN ELETTROSTIMOLAZIONE

AVEIR™ DR Dual Chamber Leadless Pacemaker System

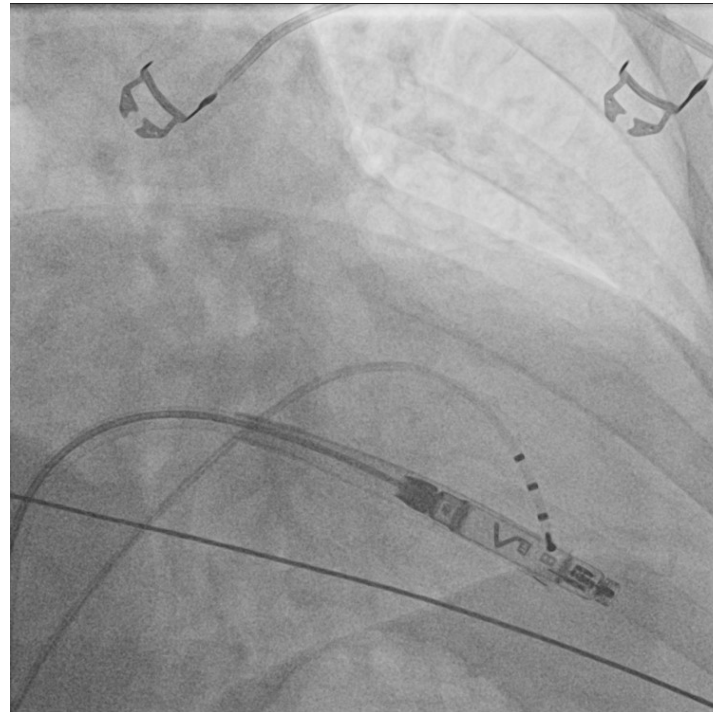
Setting the Pace with Dual Chamber Leadless Pacing

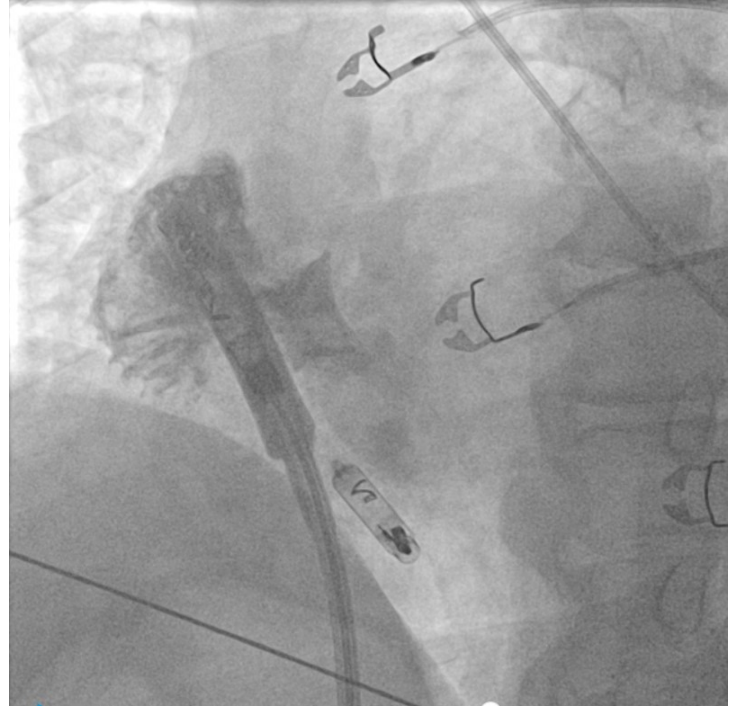
BEAT-TO-BEAT SYNCHRONY | UPGRADEABLE SYSTEM | LONG-TERM RETRIEVAL

NOW FDA APPROVED



Giugno 2024 marchio CE











Centro Cardiologico Monzino, Milano
12-13 giugno 2025