

TACHICARDIE VENTRICOLARI

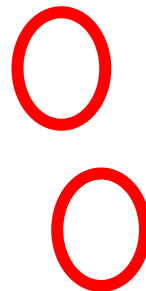
Il ruolo della PFA nell'ablazione delle tachicardie ventricolari: la soluzione CENTAURI tra approccio procedurale e valutazione del follow up.

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Direttore S.S. Elettrofisiologia Interventistica
Fondazione IRCCS San Gerardo dei Tintori, Monza









Centauri™ PFA System

- Allows focal PFA ablation using proprietary waveforms and dosing schemes with approved contact force sensing catheters from Abbott, Biosense Webster, Boston Scientific.
- Utilizes the **custom WAVE1 monopolar biphasic waveform** to deliver transmural PFA lesions while effectively eliminating the potential for microbubbles and muscle stimulation.
- Three selectable monopolar PFA doses offered at **19, 22, and 25 A** for lesion control. Its titratable energy delivery enables lesion depths exceeding 8mm at 25A.



Energy Setting	Complete energy delivery duration @ 60 bpm
19 Amps	4 seconds
22 Amps	7 seconds
25 Amps	10 seconds



Why Amperes?

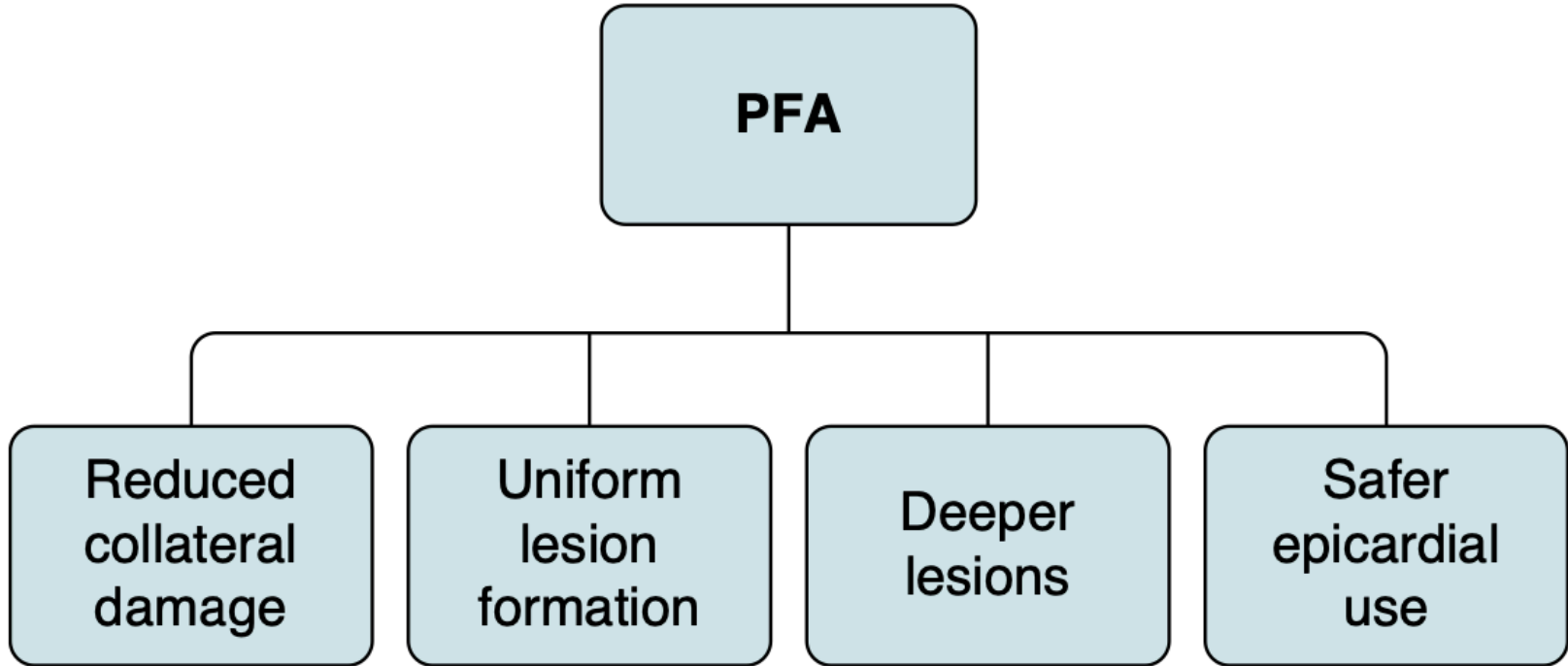
- Il controllo solo in Volt significa che gli Amper erogati dipenderanno dall'impedenza del sangue e dei tessuti in quel momento esatto. Se l'impedenza del paziente cambia, la corrente fluttuerà.
- **Il sistema Centauri, invece, monitora costantemente l'impedenza e regola dinamicamente la tensione per mantenere gli Amper selezionati.**
- **Dosaggio prevedibile**: l'energia fornita rimane costante indipendentemente dal tipo di tessuto incontrato (grasso, fibrosi o sangue).
- **Transmuralità**: garantisce che la densità di corrente sia sufficiente a penetrare tutto lo spessore del miocardio.
- **Sicurezza**: riduce il rischio di formazione di microbolle minimizzando picchi di tensione inutili.

OHM'S LAW:

$$i = \frac{V}{R}$$



Potential advantages of PFA for VT ablation



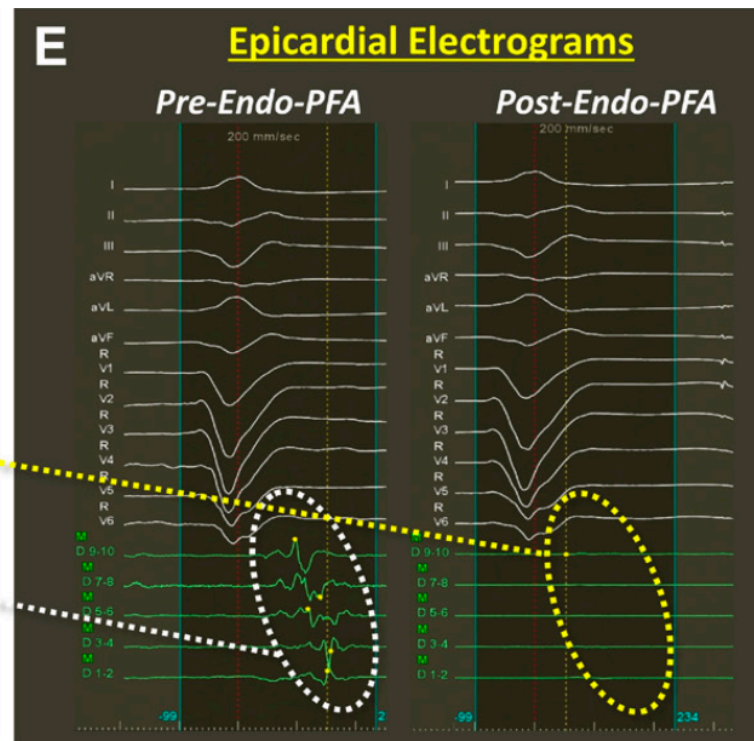
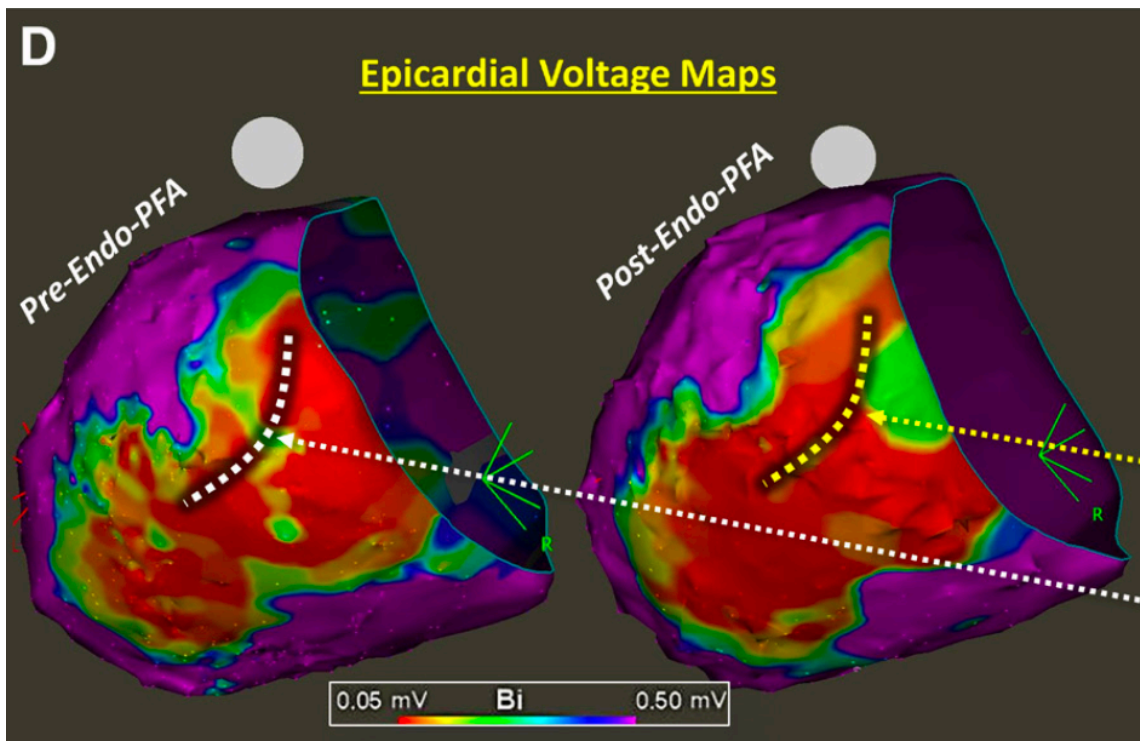
ORIGINAL RESEARCH ARTICLE



High-Voltage Focal Pulsed Field Ablation to Treat Scar-Related Ventricular Tachycardia: The First-in-Human VCAS Trial

Vivek Y. Reddy^{ID}, MD; Jacob S. Koruth^{ID}, MD; Petr Peichl^{ID}, MD; Jan Petru, MD; Moritoshi Funasako^{ID}, MD; Jan Skoda, MD; Keita Watanabe^{ID}, MD; Moritz Nies, MD; Josef Kautzner^{ID}, MD, PhD; Petr Neuzil^{ID}, MD, PhD

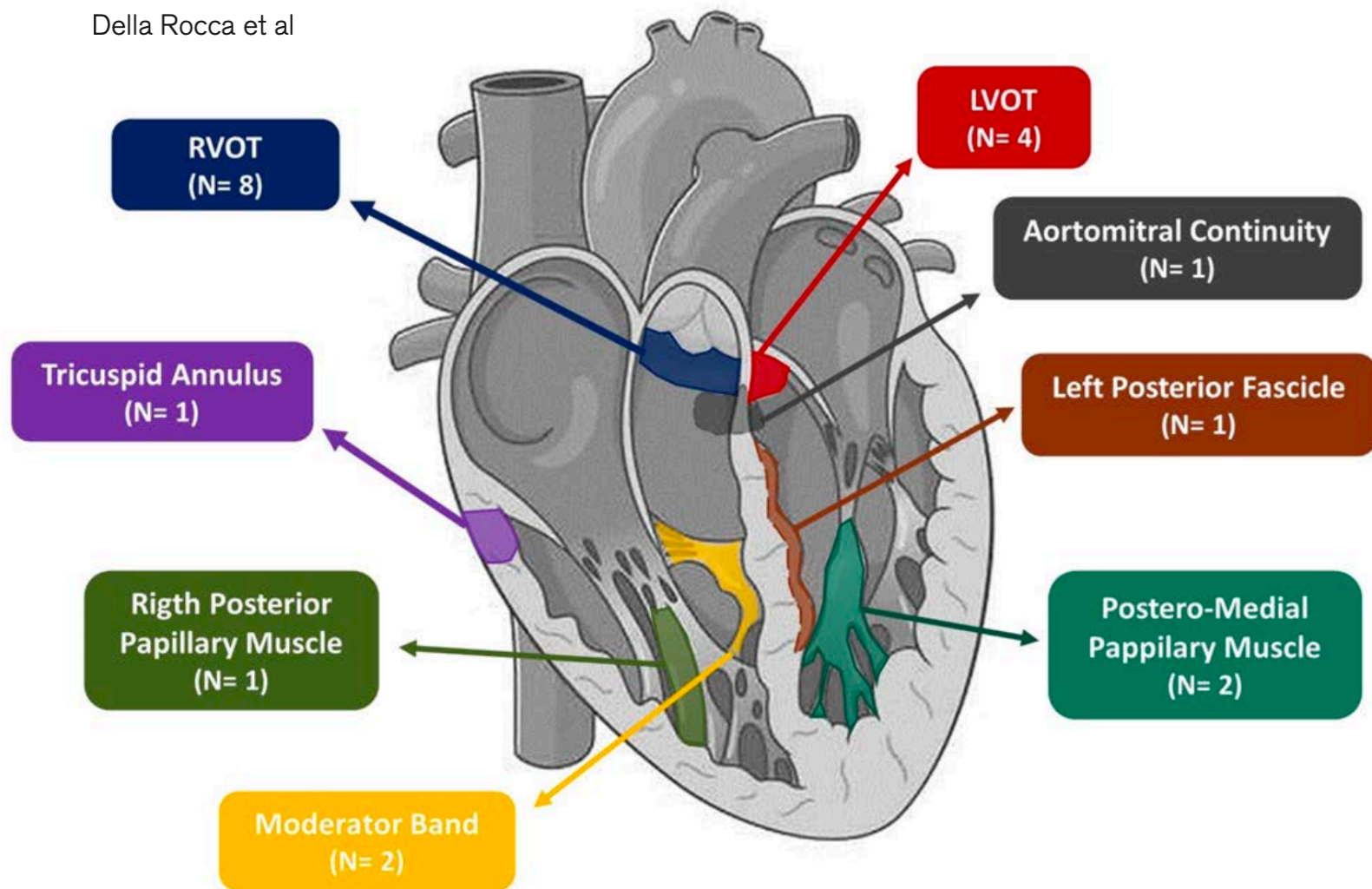




Focal Pulsed Field Ablation for Premature Ventricular Contractions: A Multicenter Experience

Domenico Giovanni Della Rocca^{ID}, MD, PhD*; María Cespón-Fernández^{ID}, MD, PhD*; Ahmad Keelani^{ID}, MD; Santi Raffa^{ID}, MD, PhD; Luigi Pannone^{ID}, MD; Alexandre Almorad^{ID}, MD; Erwin Ströker, MD, PhD; Georgi Borisov, MD; Gezim Bala, MD, PhD; Juan Sieira, MD, PhD; Giampaolo Vetta^{ID}, MD; Obaida Alothman^{ID}, MD; Antonio Sorgente^{ID}, MD, PhD; Charles Audiat^{ID}, MD; Ingrid Overeinder, MD; Markus Frommhold^{ID}, MD; Alvise Del Monte^{ID}, MD; Mark La Meir^{ID}, MD, PhD; Andrea Natale^{ID}, MD; Gian-Battista Chierchia, MD, PhD; J. Christoph Geller^{ID}, MD; Carlo de Asmundis^{ID}, MD, PhD†; Andrea Sarkozy^{ID}, MD, PhD†; on behalf of the HRMC Investigators‡

Procedural details	
PVC burden, %	11 (8.2 to 16)
Earliest activation, ms	−28 (−32 to 25)
Pace-mapping match, %	96 (96 to 97.5)
PFA applications, n	8 (5 to 15)
Contact force, g	10±3.6
Peak current at 22 A, n (%)	11 (55)
Significant muscle contraction, n (%)	1 (5)
Post-PFA irritative firing, n (%)	11 (55)
RF touch-up, n (%)	1 (5)
Sedation regimen	
Light sedation, n (%)	3 (15)
Deep sedation, n (%)	6 (30)
General anesthesia, n (%)	11 (55)
Fluoroscopy time, min	6.6 (0 to 11.4)
Procedural time, min	95.5 (74.3 to 137.8)



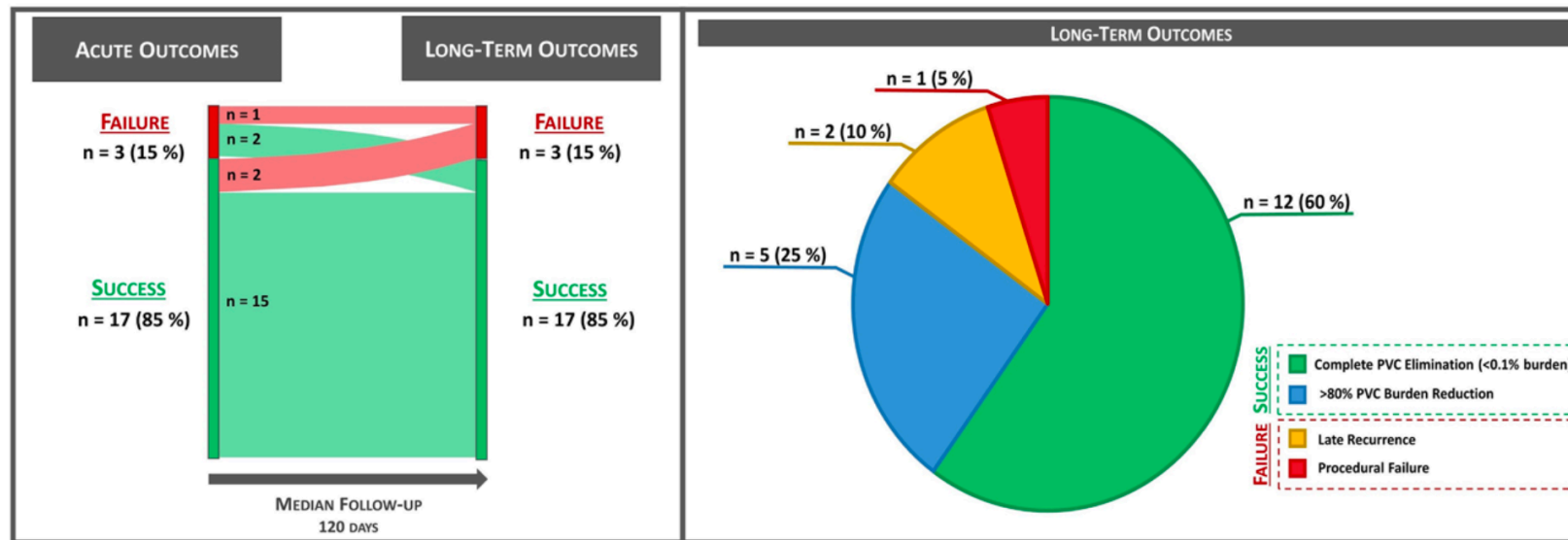


Figure 6. Acute and long-term outcomes.

emature ventricular contraction (PVC) ablation outcomes acutely (considered successful those in which complete PVC abolishment is achieved) and after a median follow-up of 120 days (considered successful those with >80% PVC burden decrease with absence of motoms).



Novel Observation: Ventricular Irritative Firing

One phenomenon observed in our series was the induction of irritative firing after PFA applications, which occurred in a significant proportion of patients and irrespective of the ablation site. In vitro studies have described that reversibly damaged myocytes can display spontaneous contractions, which progressively disappear with time, given the elevated diastolic Ca^{+2} levels after PFA applications, and the transiently increased membrane ionic permeability.^{24,25} Although preclinical data

CONCLUSIONS

PVC ablation using a focal PFA delivery system is feasible, effective, and safe, with promising acute and long-term results especially in the outflow tract and possibly in a variety of other anatomic locations. Light sedation appears feasible and might be critical to prevent the impact of general anesthesia on PVC burden.



Efficacy and safety of focal pulsed-field ablation for ventricular arrhythmias: two-centre experience

Petr Peichl ^{1*}, Alan Bulava ², Dan Wichterle ¹, Filip Schlosser ¹,
Predrag Stojadinović ¹, Eva Borišincová ¹, Peter Štiavnický ¹,
Jana Hašková ¹, and Josef Kautzner ¹



Efficacy and safety of focal pulsed-field ablation for ventricular arrhythmia: two-centre experience

Study design



2 centre study

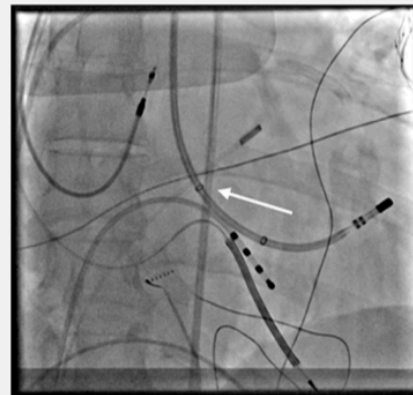


44 patients with VAs
- 21 with VPCs
- 23 with scar-related VTs

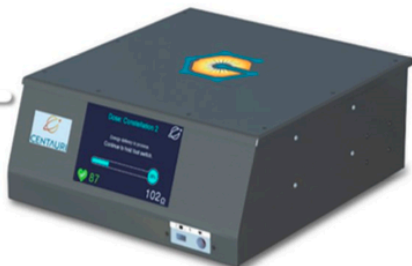
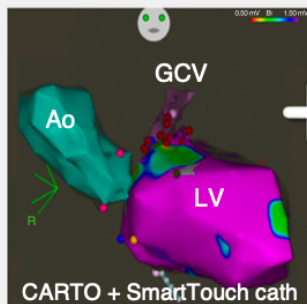
Safety issues

In 3 patients (7%) transient conduction system damage occurred during PF applications due to current leakage from the shaft-visualizing ring electrode in contact with the septum (arrow)

No spasms of coronary noted artery despite PF application in the distal coronary sinus in 11 patients

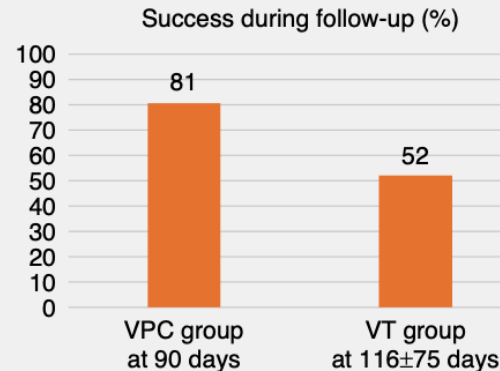
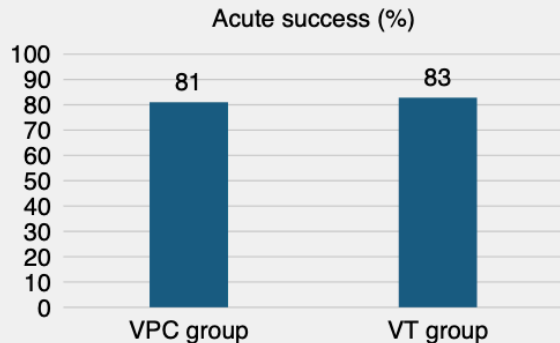


Methods



Centauri PF Generator

Outcome



Identification

Records identified through databases (n=113)
PubMed/Medline: 22
Embase: 64
Web of Science: 17
Scopus: 10



Records after duplicates removed (n=71)



Title and abstract of records
screened
(n=71)



Full-text articles assessed
for eligibility
(n=18)



Studies included
(n=6)



Excluded irrelevant
(n=53)



Excluded irrelevant (n=12)
Reason for exclusion:
Reviews (4)
Conference abstracts (4)
Animal models (4)

Screening

Eligibility

Included

icular
orts and

³ | Majid Haghjoo^{4,5}

Clinical Cardiology, 2024

4 | Discussion

Our systematic review reveals that PFA demonstrates a high procedural success rate of 87.5% with no reported procedural complications across the included studies. This promising success rate underscores the potential of PFA as a viable alternative to traditional ablation methods. However, it is essential to acknowledge the limitations of the current studies, including small sample sizes and short follow-up durations.

5 | Conclusions

A high rate of success along with absence of complications make the PFA an optimal method for VT catheter ablation. Nevertheless, there is a scarcity of studies assessing the safety and effectiveness of PFA for the management of VT. Therefore, there is an urgent need for larger studies to be conducted on this particular subject.

3.2 | Procedural Details and Outcomes

A variety of cardiac mapping and ablation delivery systems were utilized. Electroanatomic mapping systems (CARTO 3, Orion) paired with multi-electrode mapping catheters (PENTARAY, OCTARAY) were used to guide and target ablation lesions in three studies [18, 20, 23]. Dedicated pulsed-field ablation generators, catheters, and sheaths manufactured by Farapulse (FARASTAR, FARADRIVE, FARAWAVE) were used in five studies [18–22], with one study using the CENTAURI pulsed field system by Galaxy Medical paired with a THERMOCOOL SMARTTOUCH™ ablation catheter [23].

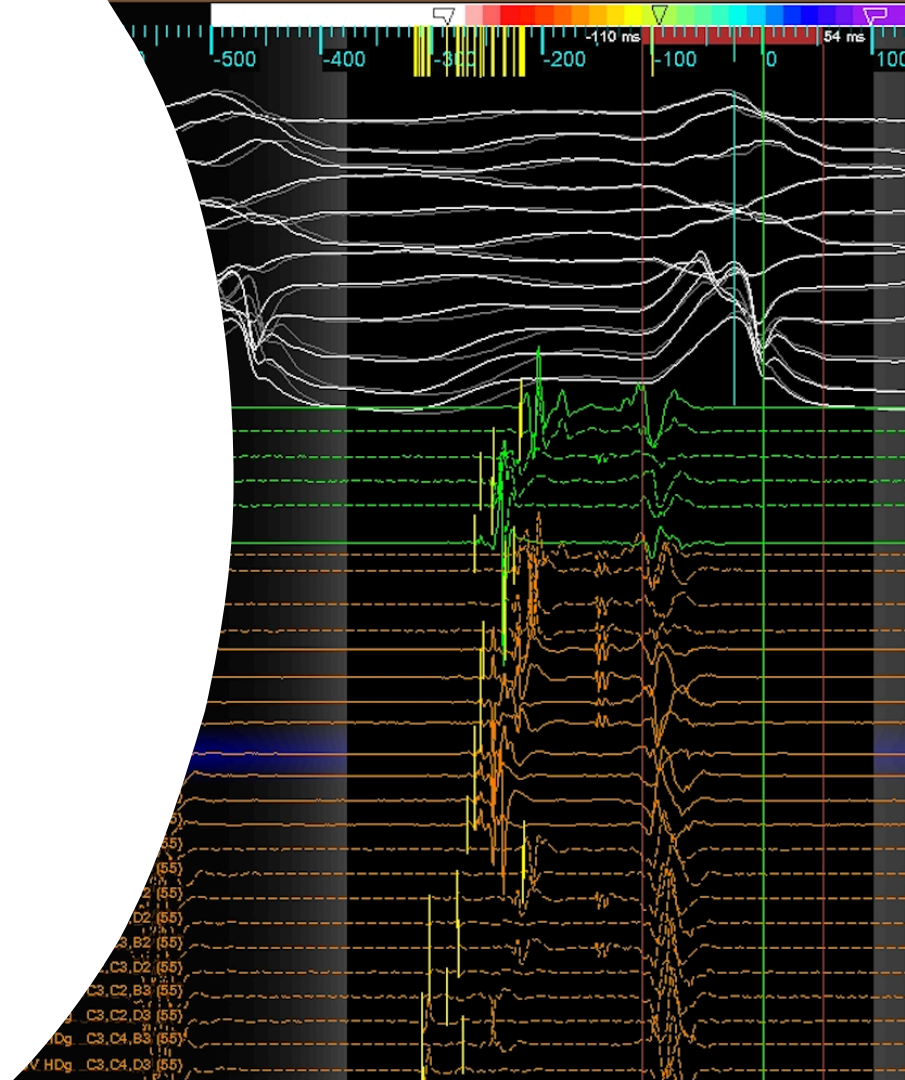
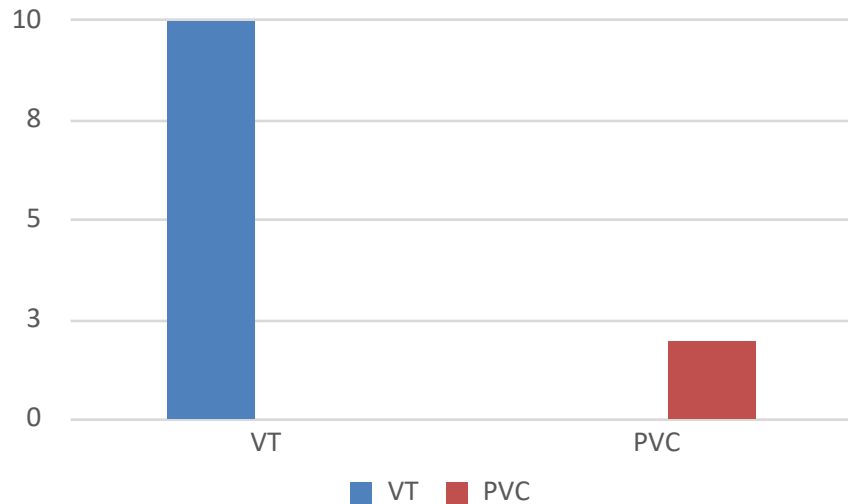
Clinical Cardiology, 2024



ESPERIENZA DEL CENTRO



PFA CENTAURI



CASO CLINICO 1

Paziente di 77 anni

Cardiopatía ischemica: pregresso IMA anteriore 1991

CABG 1996

FE 40->37%

ACC extraospedaliero da FV/TV

ICD 2020

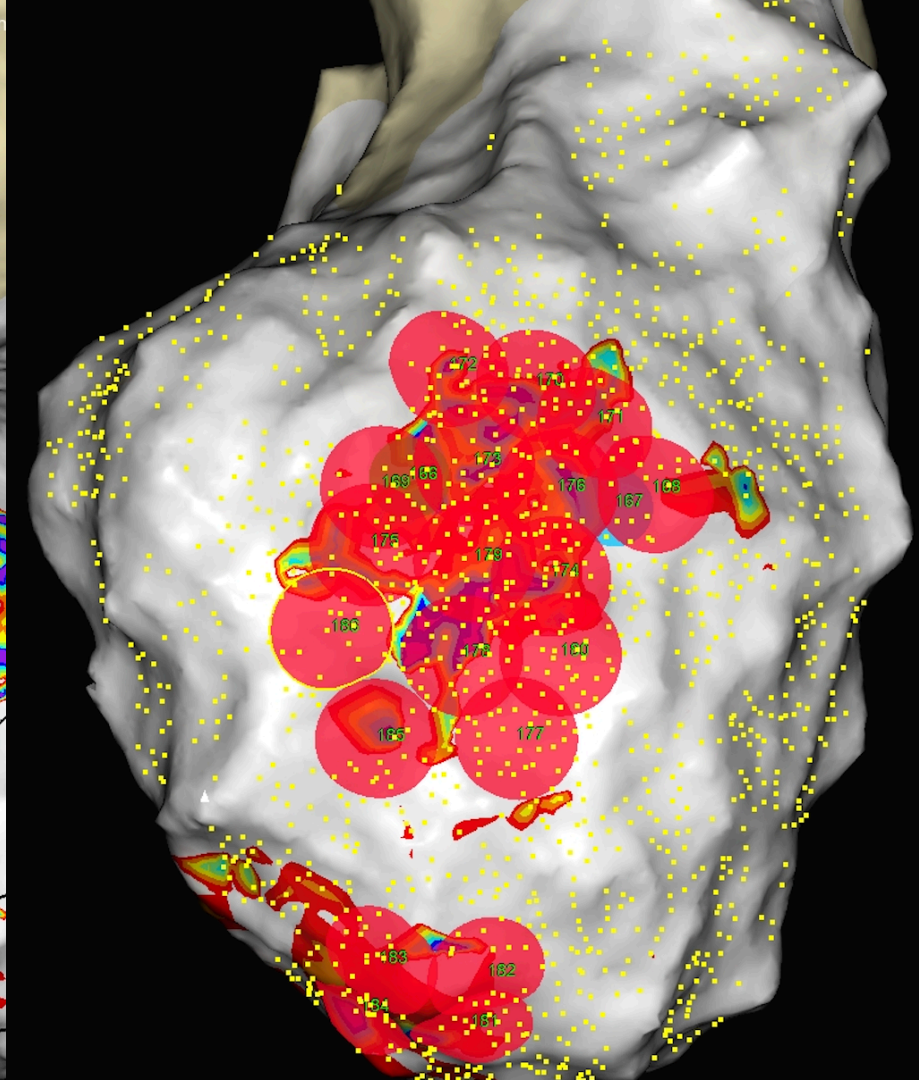
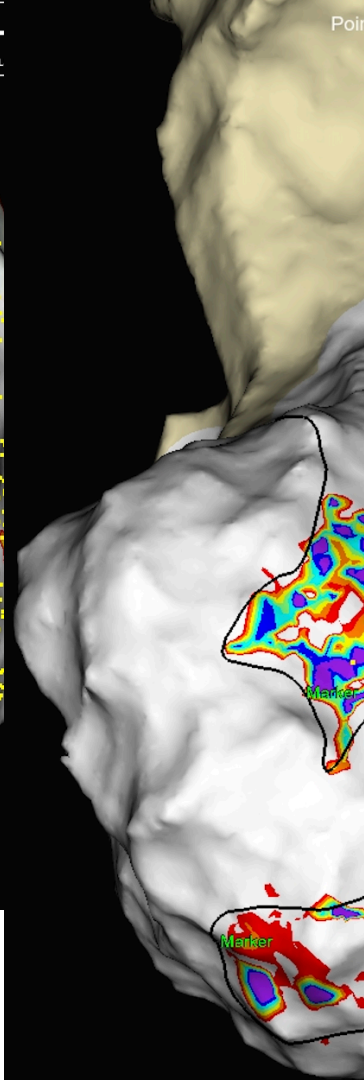
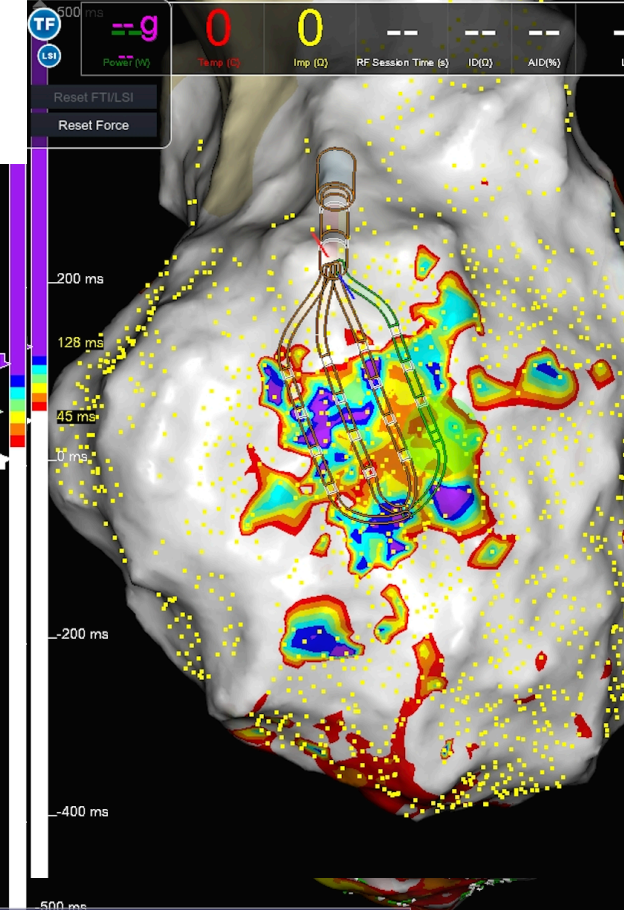
Dal 2021 ripetuti episodi di TVS; sottoposto a PTCA

Ultima TVS 11/25

Sottoposto ad ablazione:

ENSITE X + CENTAURI





CASE 1

CASO CLINICO 1I

Paziente di 54 anni

Cardiopatía ischemica:

PTCA su CX 2011

STEMI inferiore 2015

FE 32%

S-ICD

Ripetuti episodi di TVS

Sottoposto ad ablazione:

ENSITE X + CENTAURI

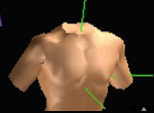




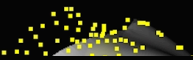
15g

Points: 3455 used / 30033 total

VoXel PRE MAP SR HD ABL
LAT Isochronal (omni)

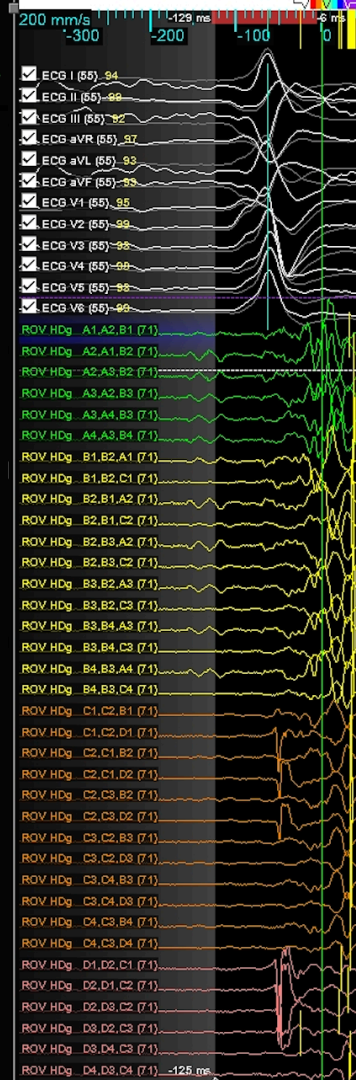
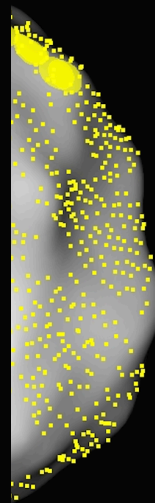
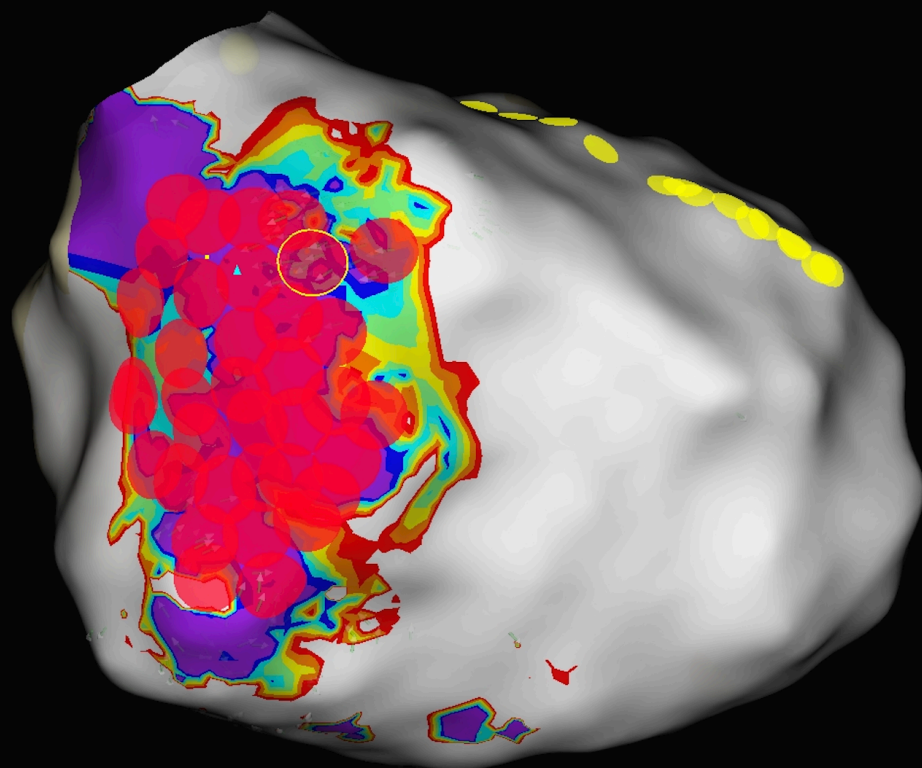
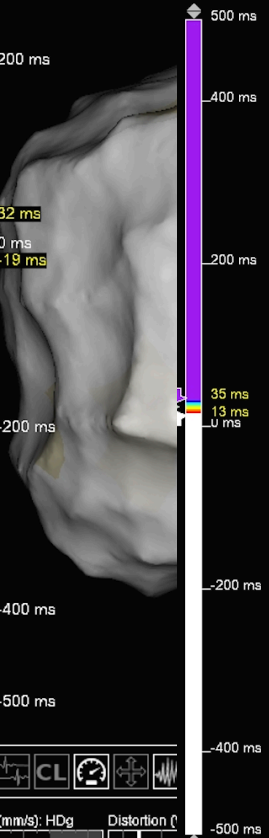


Points: 3640 used / 29995 total



Points: 3640 used / 29995 total

Reset FT/LSI
Reset Force



resp
core 97
L 836ms
T 31

CASO CLINICO III

Paziente di 66 anni

Cardiopatía ischemica: pregresso IMA anteriore

CABG 1996

FE 45%

In PS con TVS

Dal 2021 ripetuti episodi di TVS; sottoposto a PTCA

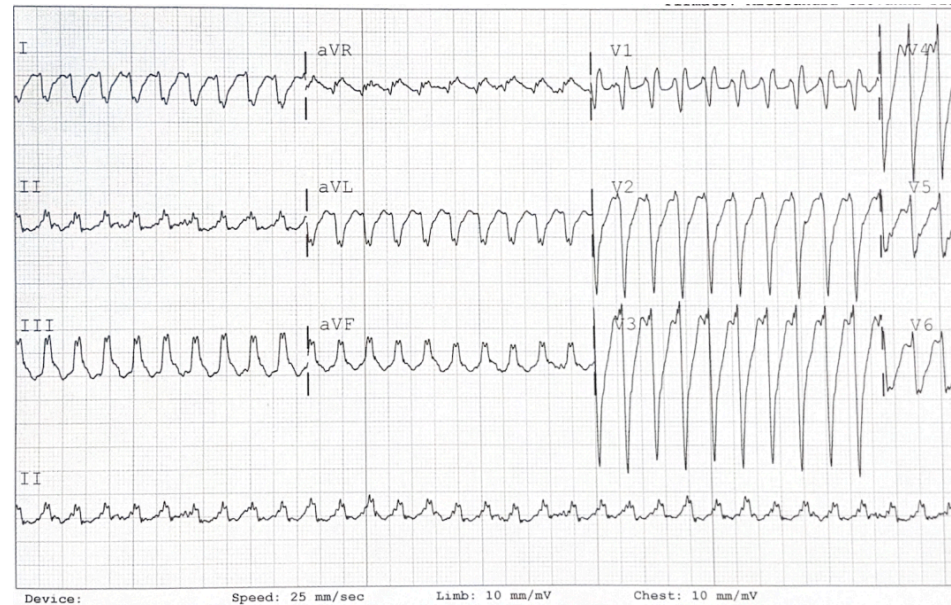
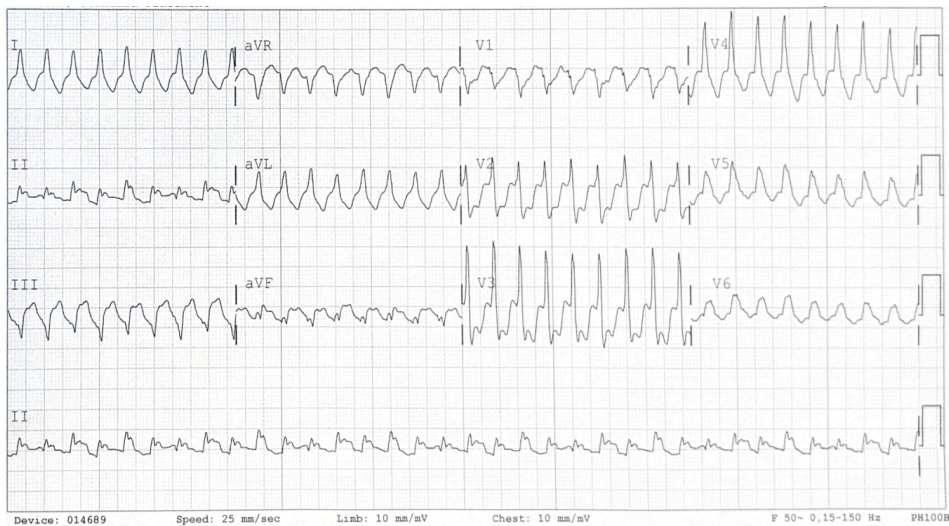
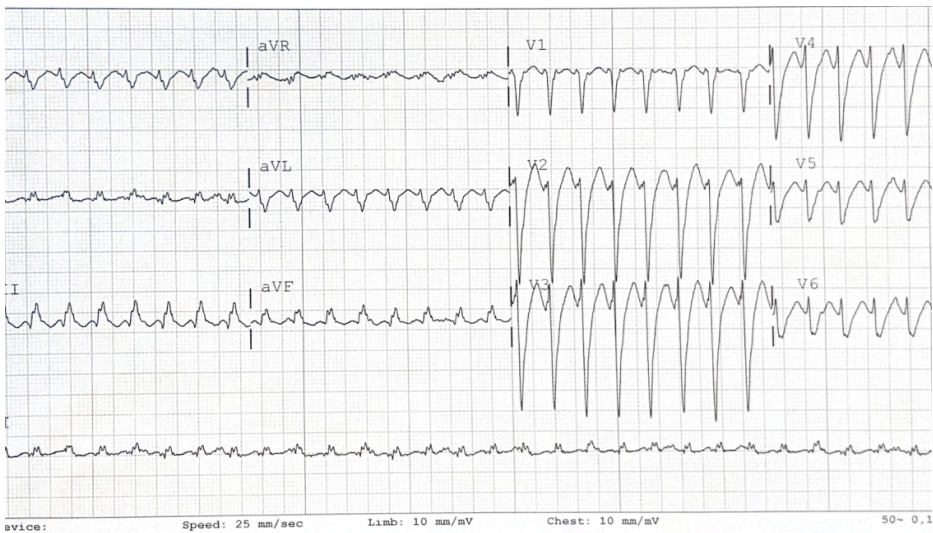
Ultima TVS 11/25

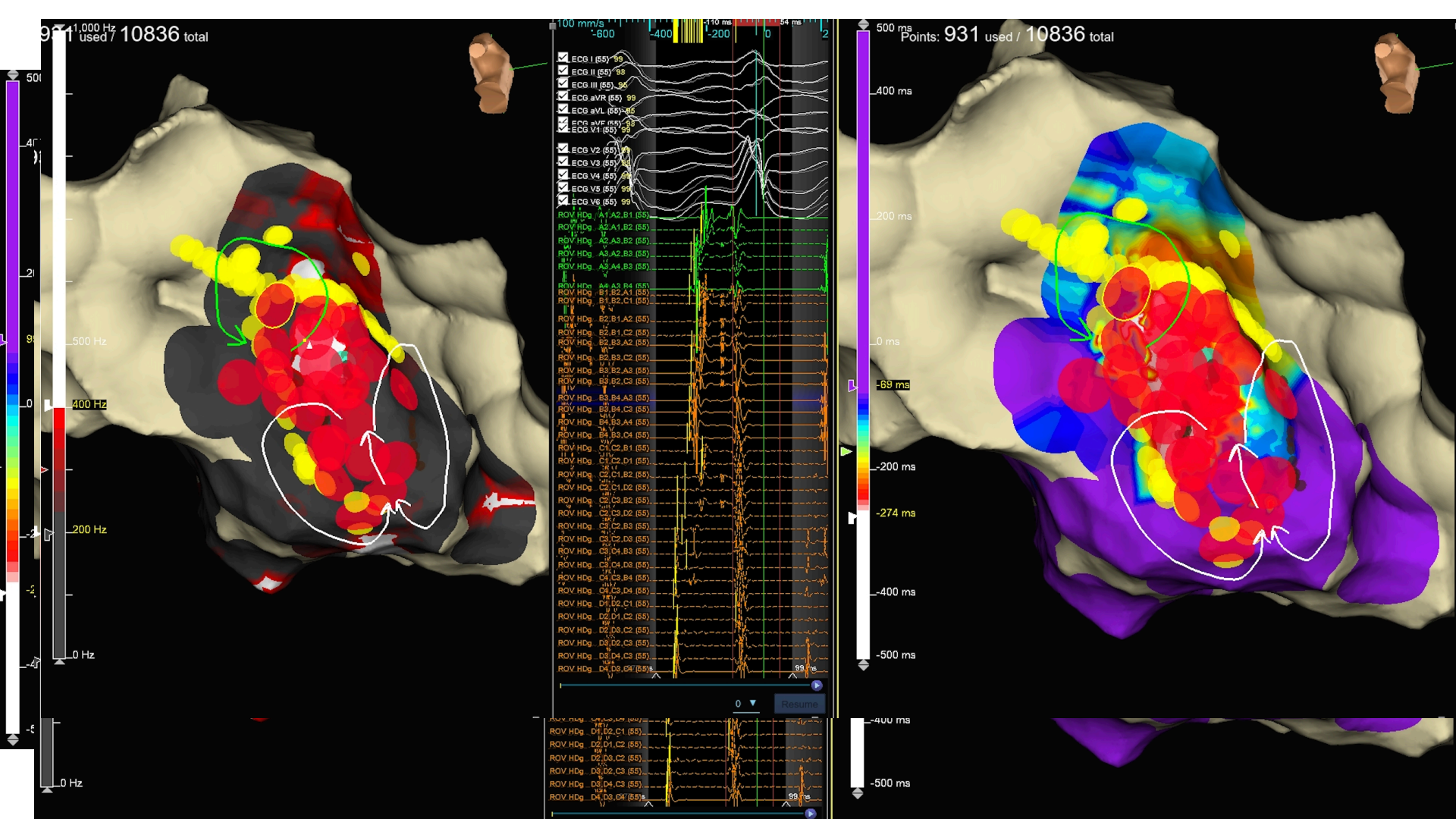
Sottoposto ad ablazione:

ENSITE X + CENTAURI



CASO CLINICO III





	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12	Case 13	Mean±SD
Arrhythmia Type	VT	VT	VT	VT	VT	VT	VT	VT	VT	PVCs	PVCs	PVCs	VT	
Age	74	72	67	70	77	72	75	69	53	77	71	73	66	70.5 ± 6.3
Sex	M	M	M	M	M	M	M	M	M	M	M	M	M	
Device	CRT-D	ICD	ICD	ICD	ICD	CRT-D	ICD	ICD	S-ICD	/	/	CRT-D	ICD	
Target Site	ICM	ICM	ICM	ICM	ICM	ICM	ICM	ICM	ICM	PVC R	PVC L	PVC L	ICM	
RF Applications *	10	32	8	29	19	43	21	10	35	1	12	8	18	19±13
RF Applications	No	No	No	No	No	No	No	No	No	120"	339"	283"	No	
Procedure Duration (min)	120	120	120	120	150	120	120	200	120	90	90	120	160	127 ± 31
Acute Success	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Complications	No	No	No	No	No	No	No	No	No	Transient AV Block	No	Complete AV Block	Pericardial effusion	
Follow-Up	13 mo Negative	11 mo Negative	10 mo Negative	9 mo Negative	7 mo Negative	7 mo Negative	6 mo Negative	6 mo Negative	6 mo Negative	5 mo Negative	1 episode two weeks after ablation	3 mo Negative	2 mo Negative	6.84±3.11

CONCLUSIONI

1) Vantaggio della PFA:

la PFA offre la formazione di LESIONI SELETTIVE del miocardio con MAGGIORE PENETRANZA nel tessuto ventricolare cicatriziale rispetto all'ablazione termica (RF).

RIDOTTO RISCHIO di lesioni alle strutture adiacenti.

2) Evoluzione tecnologica in prospettiva:

le nuove piattaforme per la PFA con diverse configurazioni di elettrodi e l'integrazione con sistemi di mappaggio consentono sempre di più di migliorare la performance procedurale.

3) Potenziale clinico emergente:

i primi studi clinici dimostrano una maggiore sicurezza e efficacia in acuto per l'ablazione delle PVCs, mentre per il trattamento delle TV ischemiche è necessaria una ottimizzazione delle energie in termini di durata della lesione.

