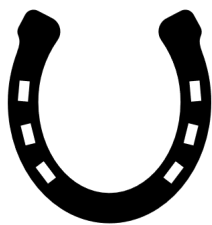


SINGLE-SHOT PFA

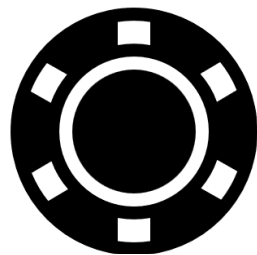
Fattibilità dell'ablazione extra-PVI con un catetere circolare over-the- wire a diametro fisso

Ardito Corrado

ASST Fatebenefratelli - Milano



SINGLE-SHOT PFA



JOURNAL ARTICLE

ACCEPTED MANUSCRIPT

OFFICIAL STATEMENT

Pulsed Field Ablation for the Interventional Treatment of Atrial Fibrillation. A Scientific Statement of the European Heart Rhythm Association (EHRA) of the ESC, the Heart Rhythm Society (HRS), the Asia Pacific Heart Rhythm Society (APHRS), the Latin American Heart Rhythm Society (LAHRS) and the Canadian Heart Rhythm Society (CHRS) 

[Michael Kühne](#) , [Patrick Badertscher](#), [Jason G Andrade](#), [Ante Anic](#), [Julian Chun](#), [Antonio Dello Russo](#), [Pierre Jais](#), [Josef Kautzner](#), [Heiko Lehrmann](#), [Claire Martin](#) ... [Show more](#)

EP Europace, euag080, <https://doi.org/10.1093/europace/euag080>

PFA over-the-wire catheter – fixed diameter

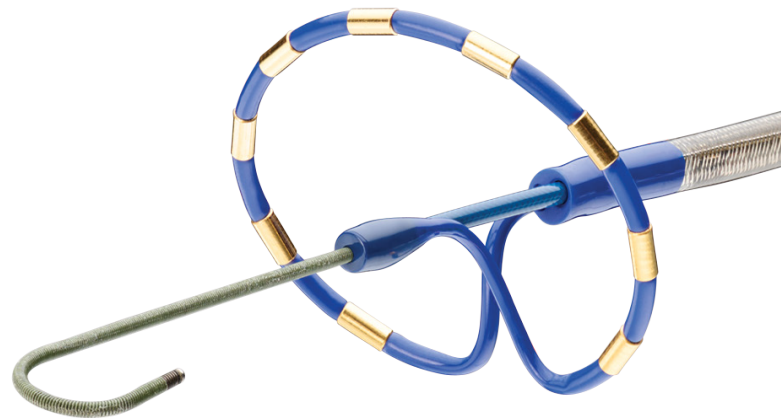
9 electrodes built to
sense, ablate, and pace

25 mm diameter loop

20° forward tilted array

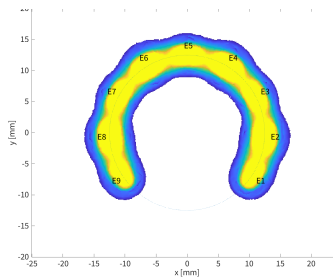
9 Fr shaft with
bidirectional steering

0.032" **over-the-wire**
design

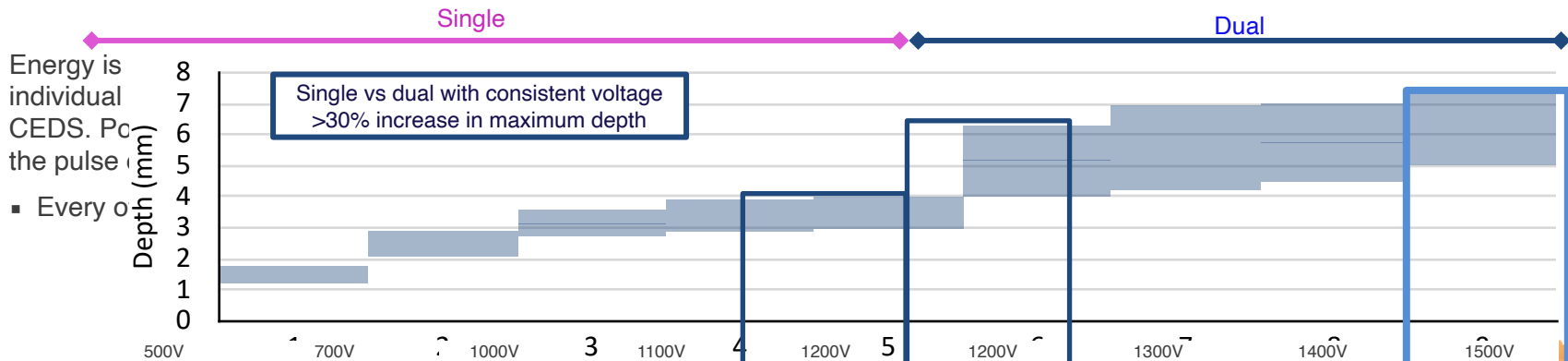
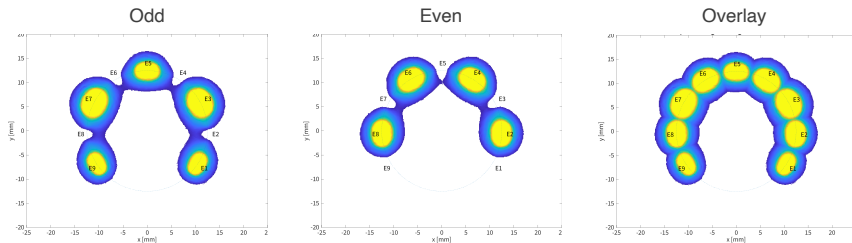


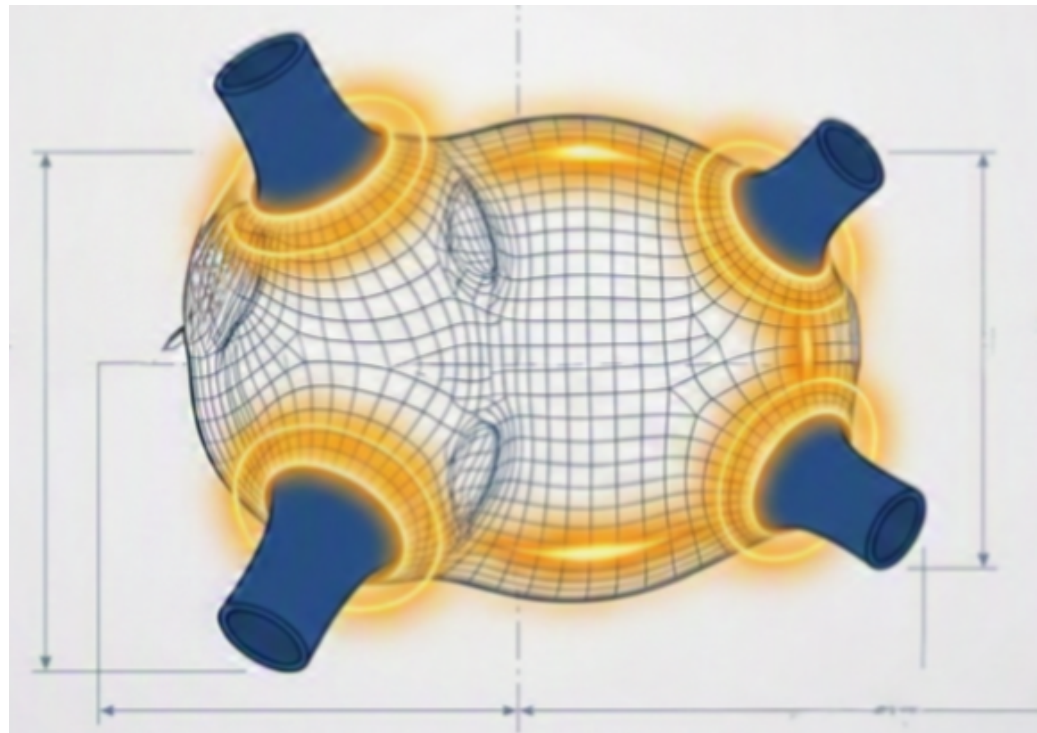
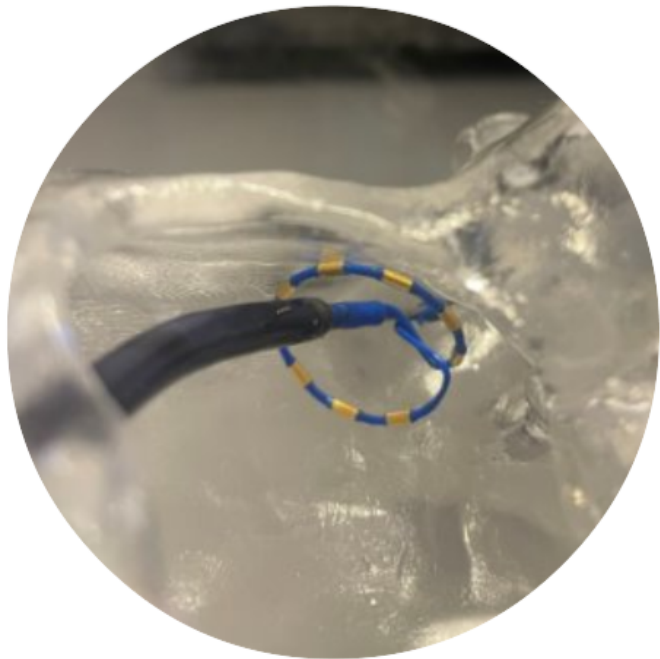
Vectoring technology enhances field depth while limiting required voltage

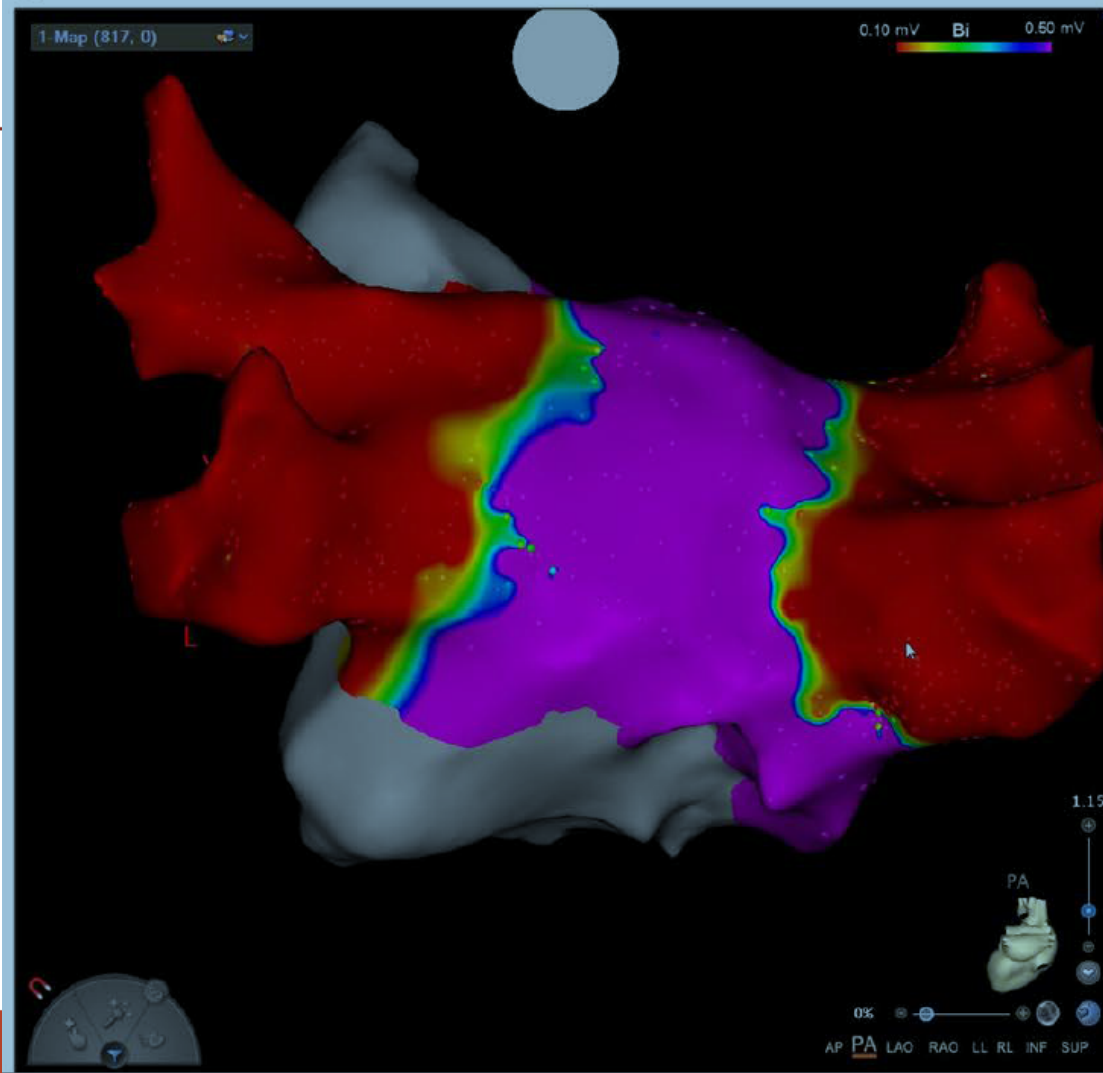
Single field mode



Dual field mode







**Target 1: Left Atrial
Posterior Wall (LAPWI)**

**Target 4: Mitral
Isthmus (MI)**



**Target 3: Superior
Vena Cava (SVC)**

**Target 2: Cavotricuspid
Isthmus (CTI)**



Methods and techniques to optimize energy delivery using the circular array pulsed field ablation catheter

Stavros Mountantonakis, MD, FHRS,^{1,2} Nicholas Beccarino, MD,^{1,2} Mark Abrams, MD,^{1,2}
Nikhil Sharma, MD,^{1,2} Nicholas Skipitaris, MD,^{1,2} Neil Bernstein, MD,^{1,2} Kelly Jia, MD,^{1,2}
Kabir Bhasin, MD,^{1,2} Takashi Kanda, MD,³ Athanasios Kordalis, MD,⁴ Dimitris Tsiachris, MD,⁴
Kristie Coleman, MPH, RN^{1,2}

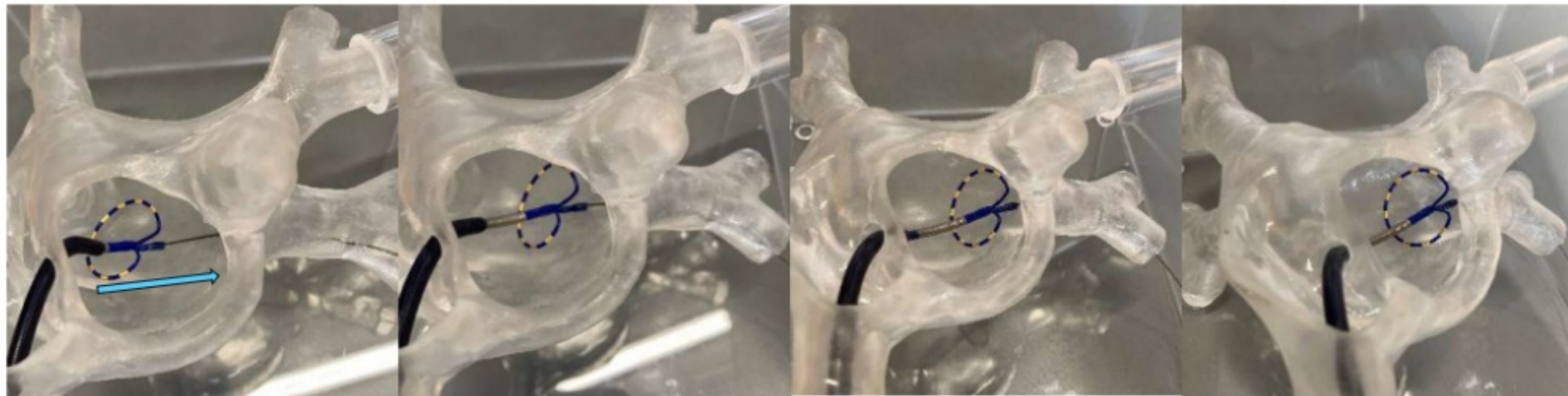
Efficiency and Procedural Speed:

The authors describe **posterior wall ablation** with this system as a rapid and **effective workflow**, enabling efficient lesion delivery and streamlined posterior wall isolation.

Esophageal Safety:

Owing to the catheter's atraumatic design and the tissue-selective mechanism of pulsed field ablation (PFA), which does not rely on significant thermal energy generation, the authors report that **routine esophageal temperature monitoring is not required during the procedure**. The risk of esophageal injury—given its close anatomical proximity to the posterior left atrial wall—is considered substantially reduced compared with conventional thermal ablation technologies.

- Wire the LSPV deeply, retract the sheath and catheter
- Orient the sheath towards the RPVs
- Orient the array towards the posterior wall
- Slide the catheter over the wire while keeping the sheath still, pointing towards the RPVs





Superior Posterior Wall Coverage

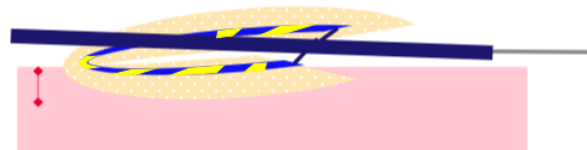
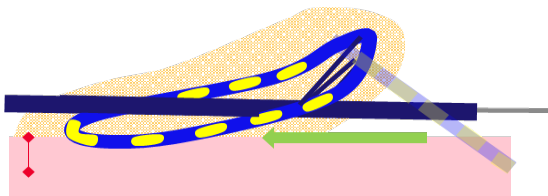
The guidewire is anchored in the LSPV. The dragging maneuver is then performed across the roof region, typically requiring 4–5 PFA applications to achieve complete lesion coverage.

Inferior Posterior Wall Coverage

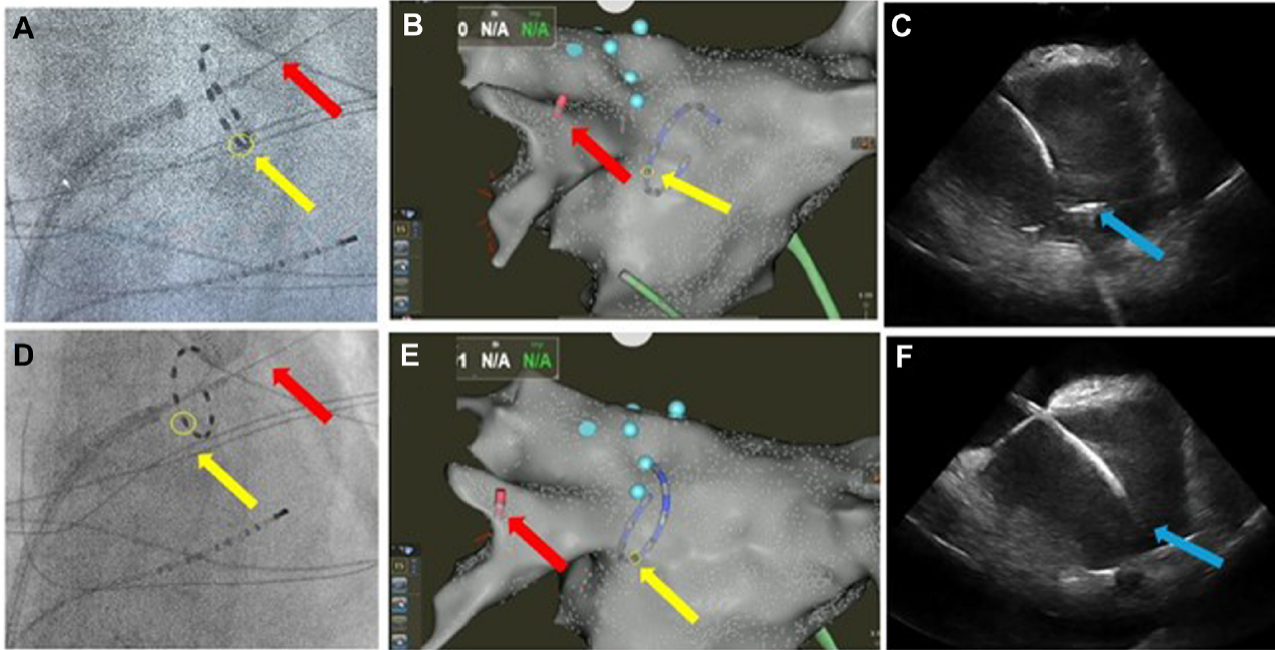
The guidewire is anchored in the LIPV. The technique is repeated in mirror-image fashion to complete inferior posterior wall coverage.

Mountantonakis, S., Beccarino, N., Abrams, M., Sharma, N., Skipitaris, N., Bernstein, N., Jia, K., Bhasin, K., Kanda, T., Kordalis, A., Tsiachris, D., & Coleman, K. (2025). *Methods and techniques to optimize energy delivery using the circular array pulsed field ablation catheter*. *Heart Rhythm*, 22(7), e74–e84. <https://doi.org/10.1016/j.hrthm.2024.10.045>

Taking advantage of its atraumatic design, the catheter can follow and adhere to the posterior wall, facilitating rapid wall isolation.



Methods and techniques to optimize energy delivery using the circular array pulsed field ablation catheter





Article

Initial Real-World Experiences of Pulmonary Vein Isolation and Ablation of Non-Pulmonary Vein Sites Using a Novel Circular Array Pulsed Field Ablation Catheter

Joerg Yogarajah ^{1,*} , Julie Hutter ¹, Patrick Kahle ¹, Philipp Beaujean ¹, Marko Tomic ¹, Andreas Hain ¹, Samuel Sossalla ^{1,2}, Malte Kuniss ¹ and Thomas Neumann ¹

100 AF patients were included (29% female, 50% persistent AF).

33 patients (33%) underwent adjunctive LARA,

1 patient (1%) received posterior wall isolation,

6 patients (6%) required additional CTI ablation.

The skin-to-skin procedural time averaged 66.3 ± 13.8 min, while the fluoroscopy time and dose area product were 13.7 ± 4.7 min and 6.8 ± 4.9 Gycm², respectively.

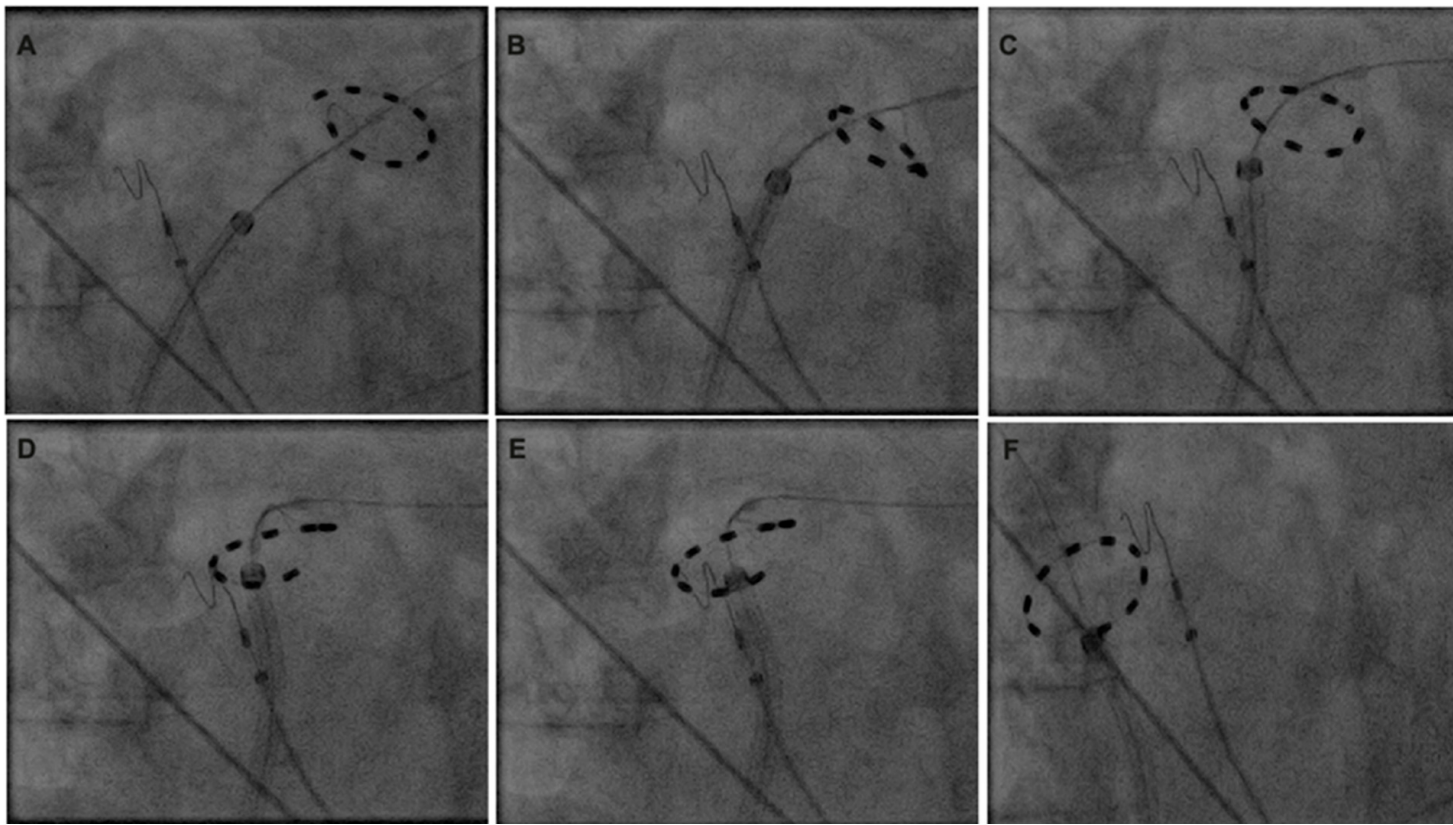
Acute PVI was achieved in 100% of pulmonary veins.

A bidirectional conduction block of the LARA and CTI lines was confirmed in all patients, and no major adverse events were reported.

Conclusions: These real-world data demonstrate the feasibility, safety, and acute efficacy of PVI and ablation beyond PVI using a novel circular array PFA catheter in patients with atrial fibrillation and flutter. The system can easily be integrated with standard PVI workflows.

Article

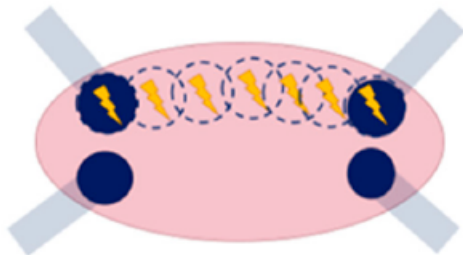
Initial Real-World Experiences of Pulmonary Vein Isolation and Ablation of Non-Pulmonary Vein Sites Using a Novel Circular Array Pulsed Field Ablation Catheter



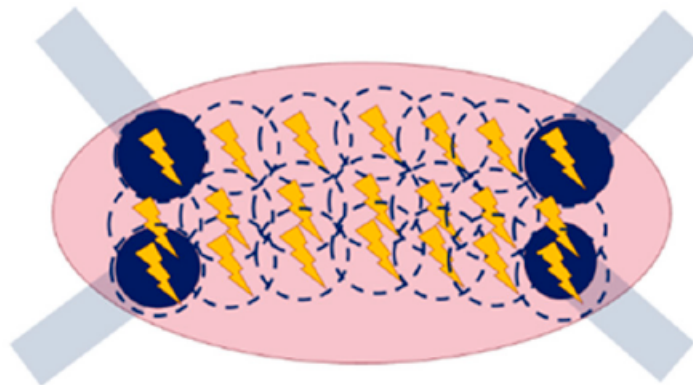
Article

Initial Real-World Experiences of Pulmonary Vein Isolation and Ablation of Non-Pulmonary Vein Sites Using a Novel Circular Array Pulsed Field Ablation Catheter

Ablation beyond PVI



LARA: 8 ± 4



PWI: 12

Acute and Long-Term Outcomes from Pulsed field Ablation for PVI using the Circular Multielectrode Catheter (PulseSelect) with Adjunct posterior wall isolation.

Manshadi, R. K., Manshadi, K. K., Sandhu, U. G., O'Neill, P. G., LaRue, M., Kaplon, R., Kueffer, F. J., Aryana, A., et al. (2026). *Pulmonary Vein and Posterior Wall Isolation Using the Circular Multielectrode Catheter for Treatment of Atrial Fibrillation: Acute and Long-Term Outcomes from Pulsed Field Ablation for PVI Using PulseSelect with Adjunct Posterior Wall Isolation (PERSEPOLIS) Trial*. *Heart Rhythm*. Advance online publication. <https://doi.org/10.1016/j.hrthm.2026.06.002>

Results

178 patients (age: 69 ± 11 years; 62% male; 61% paroxysmal AF) underwent AF ablation using the circular multielectrode PFA catheter between 2/2024 and 8/2024 using 62 ± 17 PFA application (procedure time: 66 ± 11 min, fluoroscopy time: 14 ± 5 min). Acute PVI was achieved in 100% ($n=178$), and 96.6% of patients ($n=172$) received PVI+PWI. Four (2.2%) adverse events (2 minor) were encountered. Analysis of biomarkers demonstrated an increase in serum total bilirubin (1.01 mg/dL ; 95% CI: 0.84, 1.17, $P < 0.001$) 2 h post-ablation and stage 1 acute kidney injury in one patient with a history of chronic kidney disease. All changes in biomarkers resolved spontaneously within 48-72h without clinical sequelae. **Freedom from recurrent atrial arrhythmia was 81.6% in paroxysmal and 66.6% in persistent AF patients at 1 year.**

Conclusion

These real-world results demonstrate that PVI with/without PWI using the circular multielectrode array PFA catheter is safe, feasible, and effective in patients with symptomatic paroxysmal and persistent AF with a low risk of complications, including hemolysis.

Real-World Analysis of 178 Consecutive Patients Undergoing AF Ablation with the Circular Multielectrode PFA Catheter

• PVI + PWI Completed in 172/178 Patients •



Procedural Characteristics

Number of Applications



62±17

Total Procedure Time



66±11 min

Total Fluoroscopy Time



14±5 min

Acute Efficacy: PVI



100%

Acute Efficacy: PWI



100%

Adjunctive RFA in 11/172

Overall Safety

Major Adverse Events

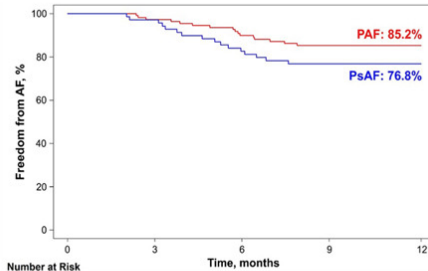
1.1%



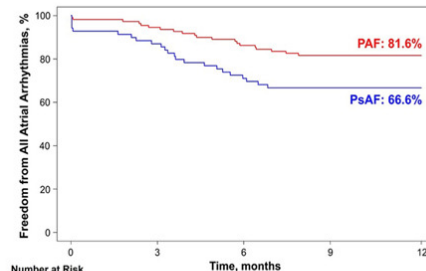
- Catheter entanglement causing vascular bleeding (n=1)
- Coronary artery spasm (n=1)
- No clinically-significant hemolysis or renal dysfunction

1-Year Efficacy

Freedom from Atrial Fibrillation



Freedom from All Atrial Arrhythmias



PVI with/without PWI using the circular multielectrode array PFA catheter is safe, feasible, and effective in patients with symptomatic paroxysmal and persistent AF

Peak frequency–guided tissue proximity assessment during posterior wall isolation using the fixed-loop pulsed field ablation catheter

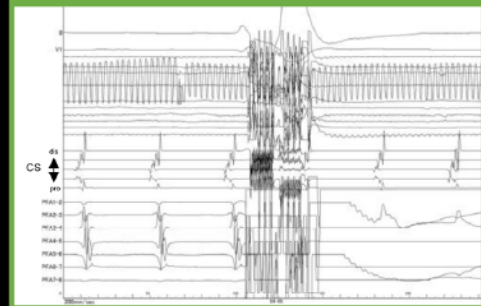
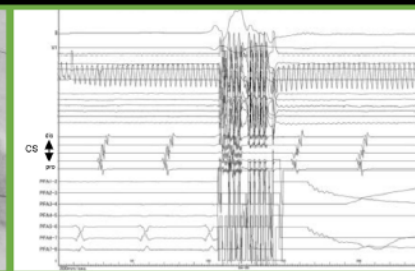
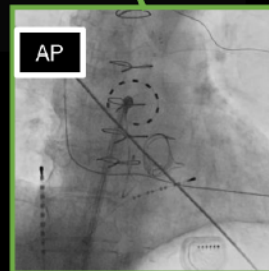
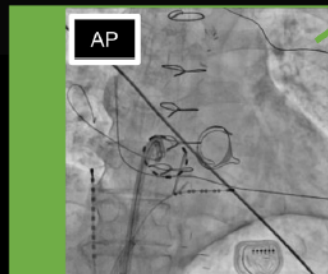
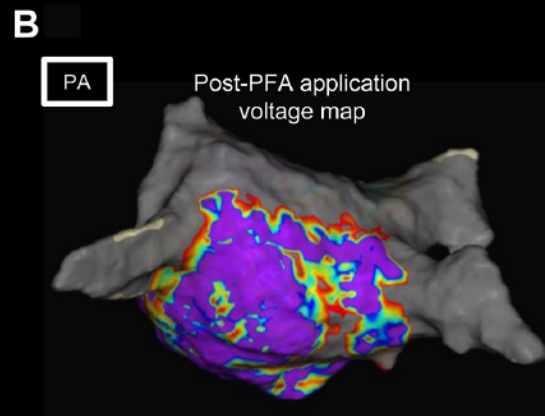
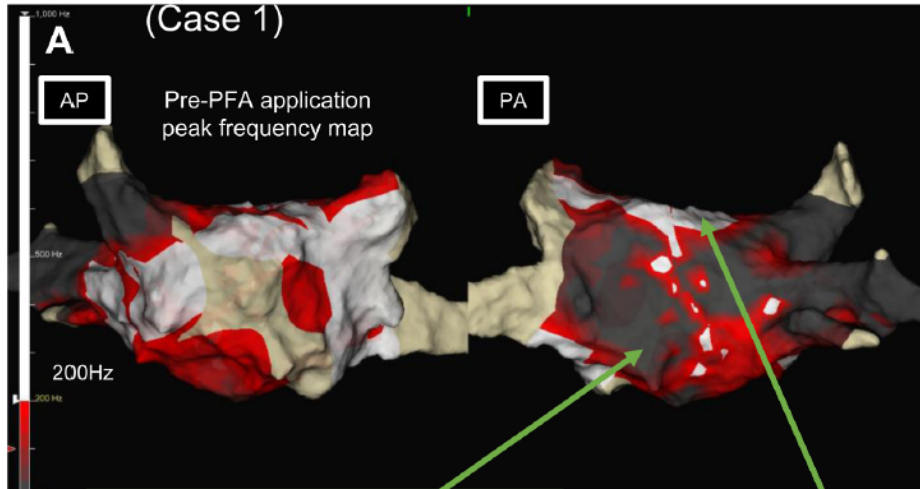
Tetsuma Kawaji, MD, PhD, FJCC,^{1,2} Suguru Nishiuchi, MD, PhD,³ Saki Yamano, CE,¹
Misaki Naka, MD¹

A case series demonstrating the utility of evaluating preapplication peak frequencies also for posterior wall isolation (PWI).

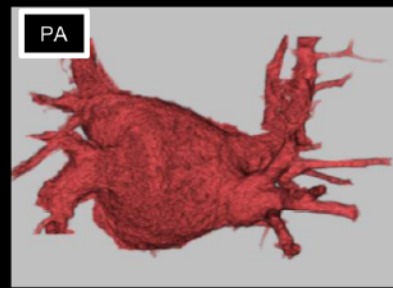
PFA at sites with high preapplication peak frequencies seems to make particular sense for PWI.

Although the definitive threshold of the peak frequency for the tissue proximity remains to be established, our analysis of these 3 cases indicates that **200 Hz** may serve as a robust cutoff value.

Although the PFA offers a safety ablation method for both PVI and PWI with minimal risk to surrounding extracardiac tissue, we propose peak frequency–guided tissue proximity assessment to ensure the lesion formation and enhance procedural efficacy.



C



**Target 1: Left Atrial
Posterior Wall (LAPWI)**

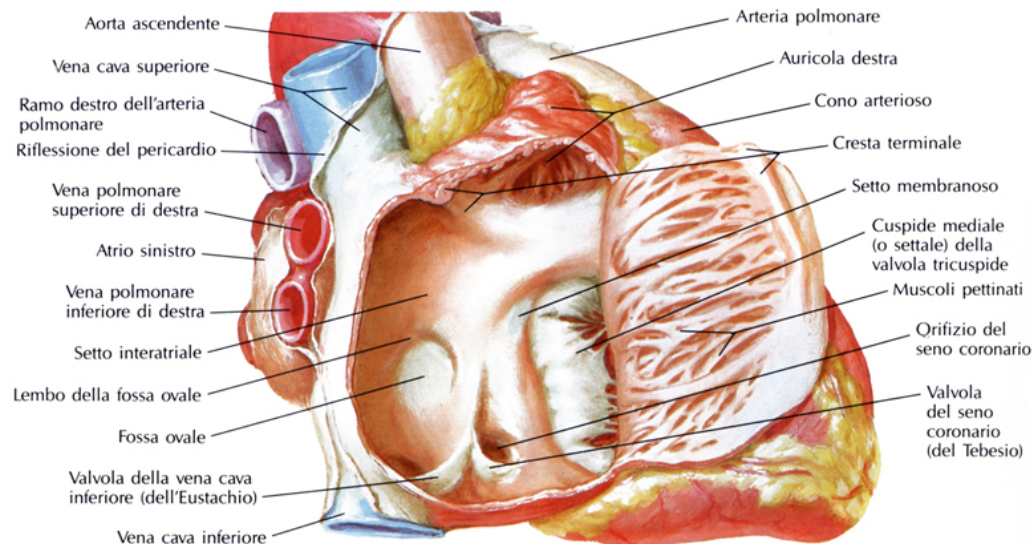
**Target 4: Mitral
Isthmus (MI)**



**Target 3: Superior
Vena Cava (SVC)**

**Target 2: Cavotricuspid
Isthmus (CTI)**





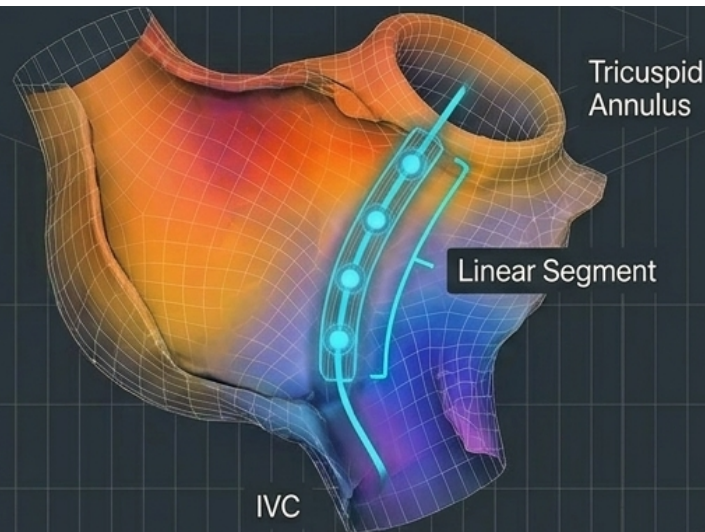
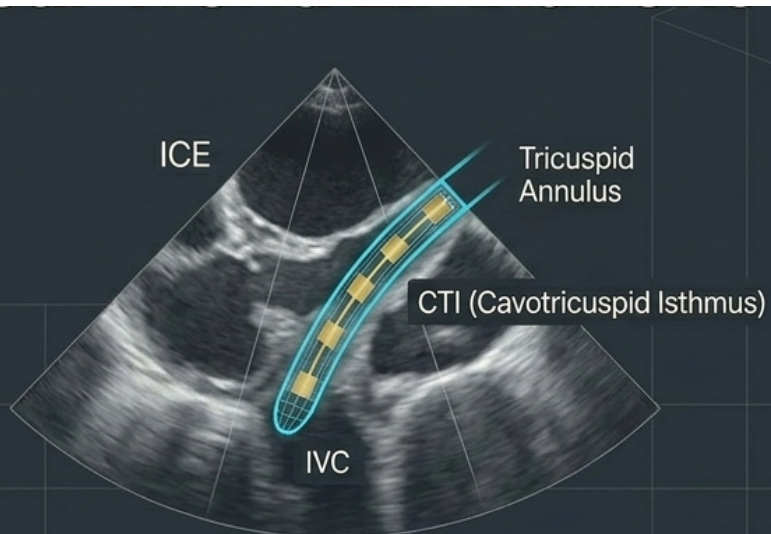
The hidden risk:

Geometry challenge of circular arrays on linear anatomy

Proximity to the RCA

Proximity to HIS.







Article

Initial Real-World Experiences of Pulmonary Vein Isolation and Ablation of Non-Pulmonary Vein Sites Using a Novel Circular Array Pulsed Field Ablation Catheter

Joerg Yogarajah ^{1,*} , Julie Hutter ¹, Patrick Kahle ¹, Philipp Beaujean ¹, Marko Tomic ¹, Andreas Hain ¹, Samuel Sossalla ^{1,2}, Malte Kuniss ¹ and Thomas Neumann ¹

100 AF patients were included (29% female, 50% persistent AF).

33 patients (33%) underwent adjunctive LARA,

1 patient (1%) received posterior wall isolation,

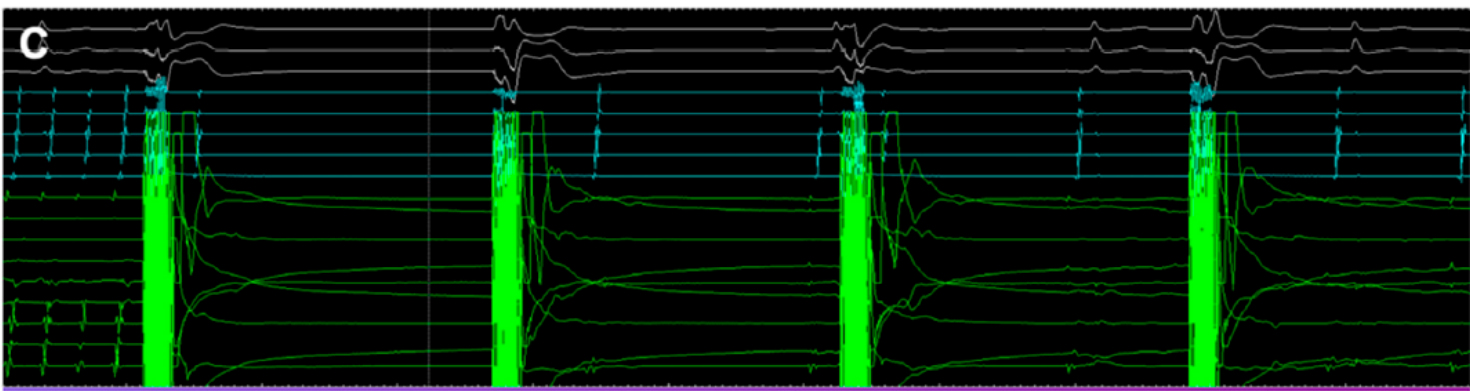
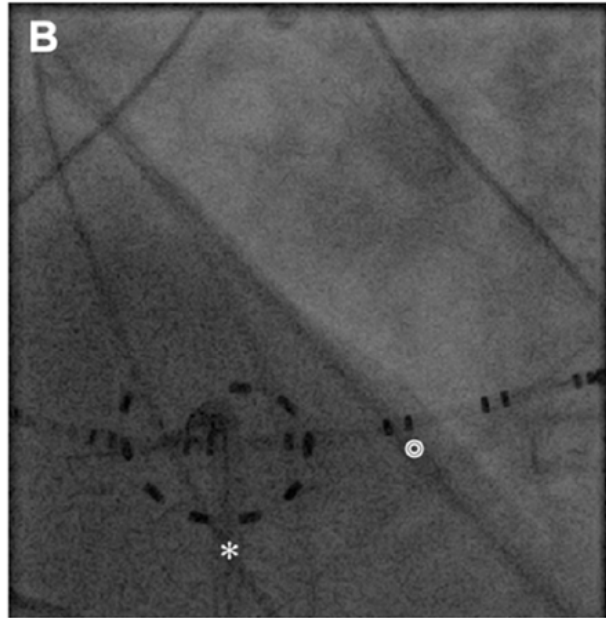
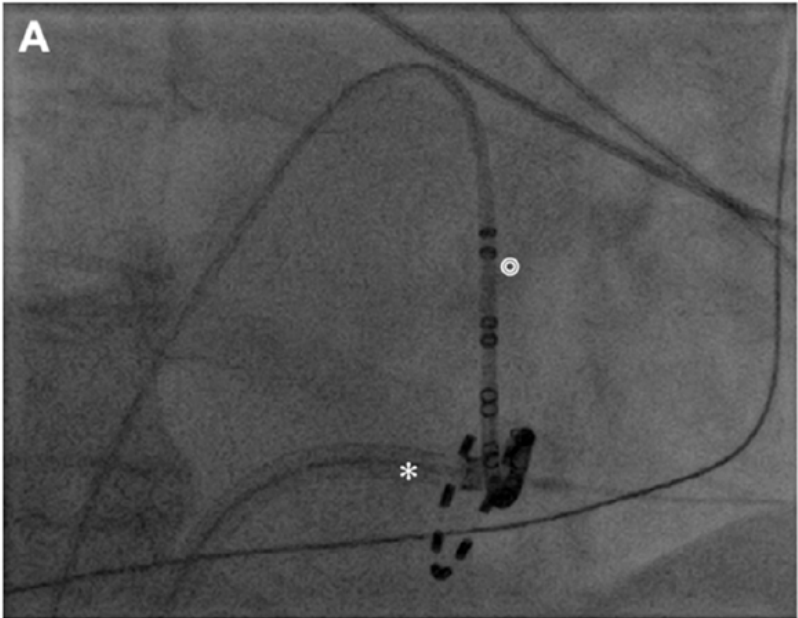
6 patients (6%) required additional CTI ablation.

The skin-to-skin procedural time averaged 66.3 ± 13.8 min, while the fluoroscopy time and dose area product were 13.7 ± 4.7 min and 6.8 ± 4.9 Gycm², respectively.

Acute PVI was achieved in 100% of pulmonary veins.

A bidirectional conduction block of the LARA and CTI lines was confirmed in all patients, and no major adverse events were reported.

Conclusions: These real-world data demonstrate the feasibility, safety, and acute efficacy of PVI and ablation beyond PVI using a novel circular array PFA catheter in patients with atrial fibrillation and flutter. The system can easily be integrated with standard PVI workflows.



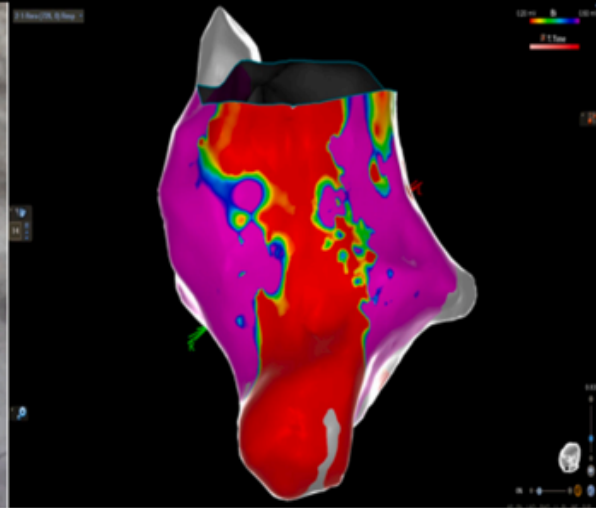
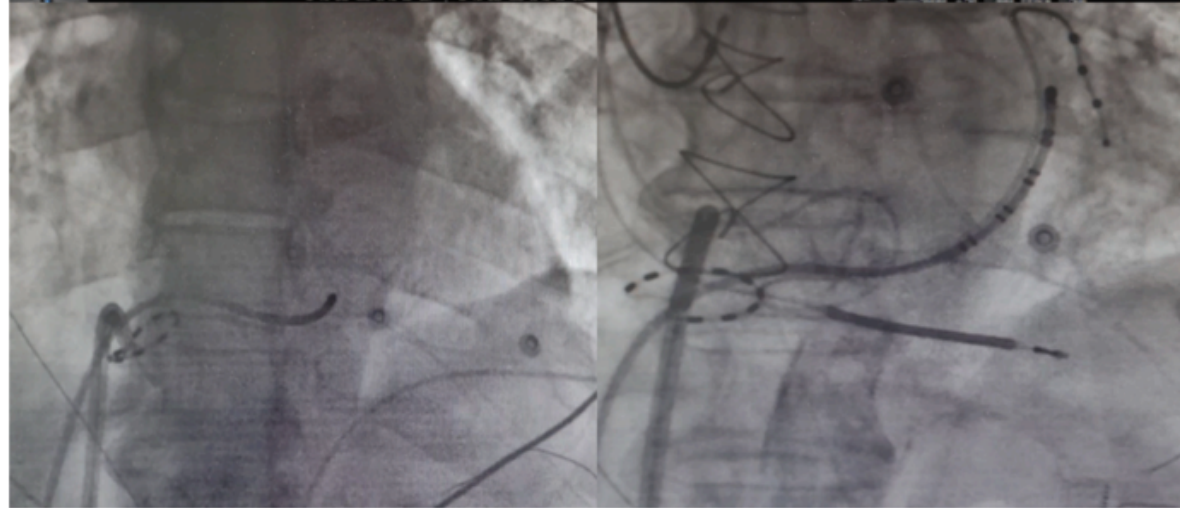
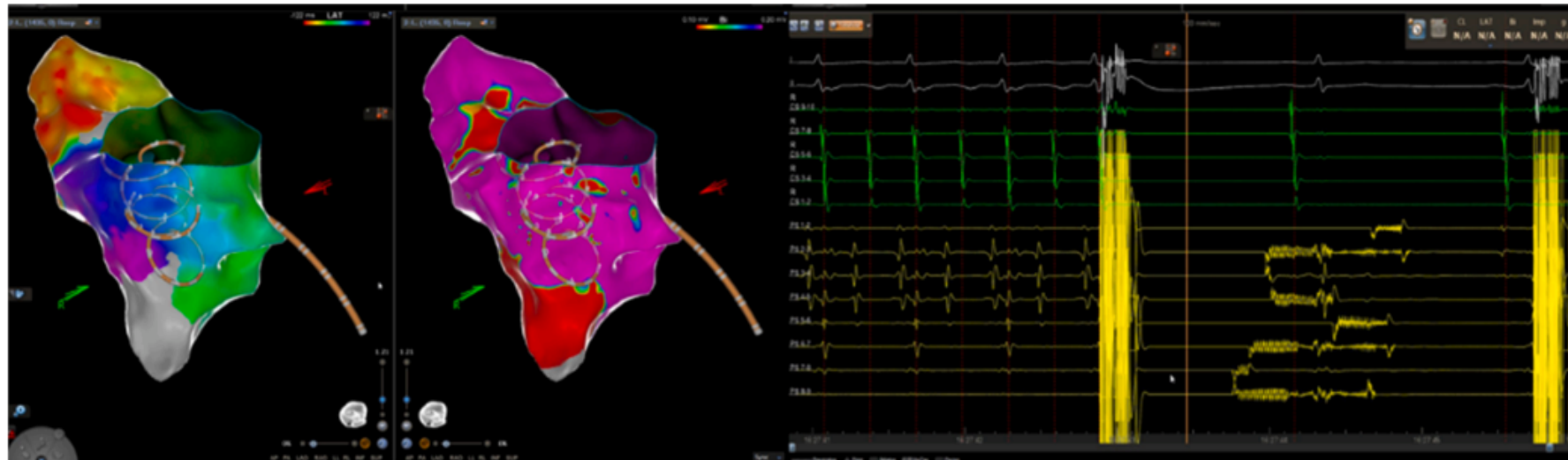
CTI: 7 ± 4



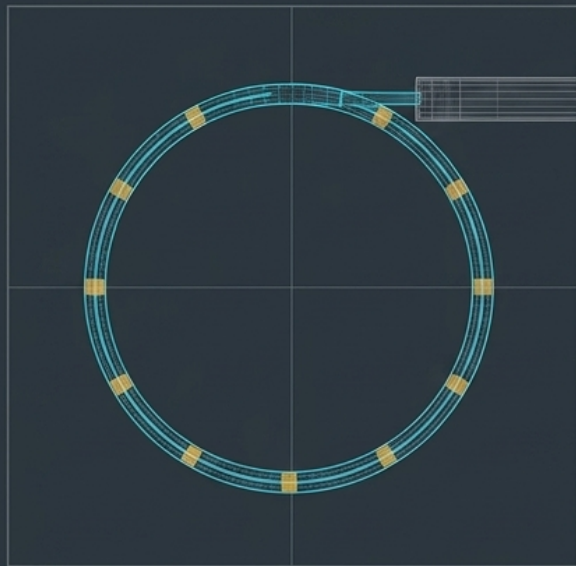
Feasibility and safety of cavotricuspid isthmus ablation using a circular array pulse field ablation catheter: A single-center experience

Athanasios Kordalis, MD, PhD,¹ Dimitrios Tsiachris, MD, PhD,¹
Christos-Konstantinos Antoniou, MD, PhD,¹ Aggeliki Laina, MD,¹
Panagiotis Xydis, MD,¹ Aikaterini-Eleftheria Karanikola, MD,¹
Panagiotis Tsioufis, MD,¹ Ioannis Doundoulakis, MD, PhD,¹
Stavros Mountantonakis, MD, PhD, FHRS,^{2,3} Konstantinos Tsioufis, MD, PhD¹

- Cavotricuspid isthmus ablation using a circular pulsed field ablation (PFA) catheter was feasible and achieved bidirectional block in all **18 patients**, with conversion to sinus rhythm during ablation in the 13 cases performed under flutter.
- The procedure was efficient, requiring a median of **10 PFA applications** and 17 minutes of right atrium dwelling time.
- No adverse events, such as conduction disturbances, QRS widening, or coronary spasm, were observed, despite reducing prophylactic nitrate doses over the study.
- Durable short-term outcomes: over a median follow-up of 7.7 months, no atrial flutter recurrences were reported or detected in any patient despite limited rhythm monitoring.

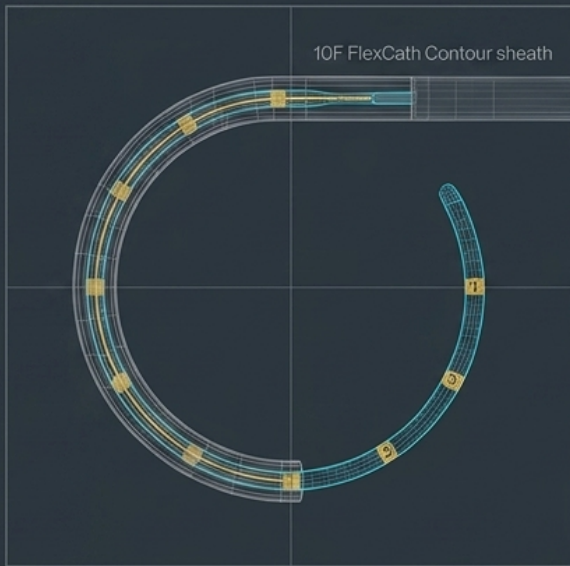


Procedural Adaptation: The Linearization Maneuver



1. Standard Configuration

Full 25mm loop deployed outside the sheath.



2. Sheath Retraction

Proximal electrodes (5-9) drawn into the 10F FlexCath Contour sheath.



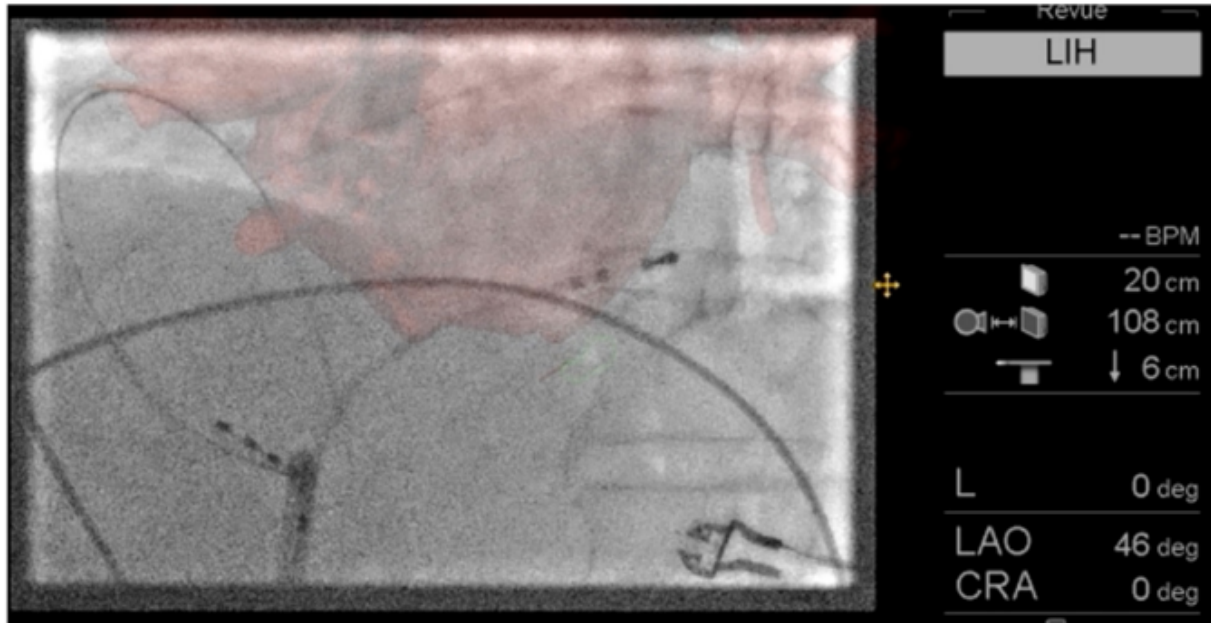
3. Targeted Exposure

Distal electrodes (1-4) mechanically straightened for targeted, contiguous bipolar ablation.

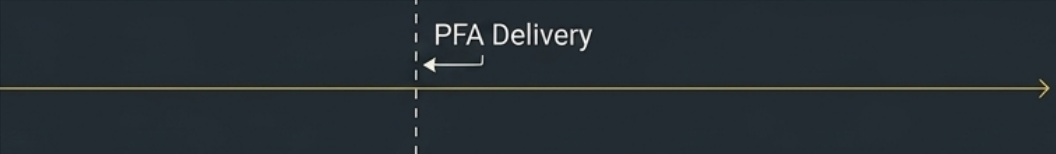
Linear cavotricuspid isthmus ablation with a circular pulsed-field catheter

Jonathan Bialobroda, MD, Jérôme Lacotte, MD

- Extending only the 4 distal electrodes of the circular PFA catheter from the sheath ensures a straight trajectory of the ablation catheter and enables a linear ablation of the cavotricuspid isthmus.
- No severe ECG change, such as ST-segment elevation suggesting coronary spasm or atrioventricular block, was observed.



Pharmacological Mitigation Protocols for Coronary Spasm

Protocol 1: Control (No Prophylaxis)		Result: 80-100% severe spasm. High risk of ischemia.
Protocol 2: Bolus + Infusion		Result: 40% spasm incidence. Suboptimal protection.
Protocol 3: Repeated Bolus (JACC EP)		Result: 0% severe spasm, 20% mild/moderate.
Protocol 4: Athens Protocol		Result: 0% clinical spasm. Excellent hemodynamic tolerance.

**Target 1: Left Atrial
Posterior Wall (LAPWI)**

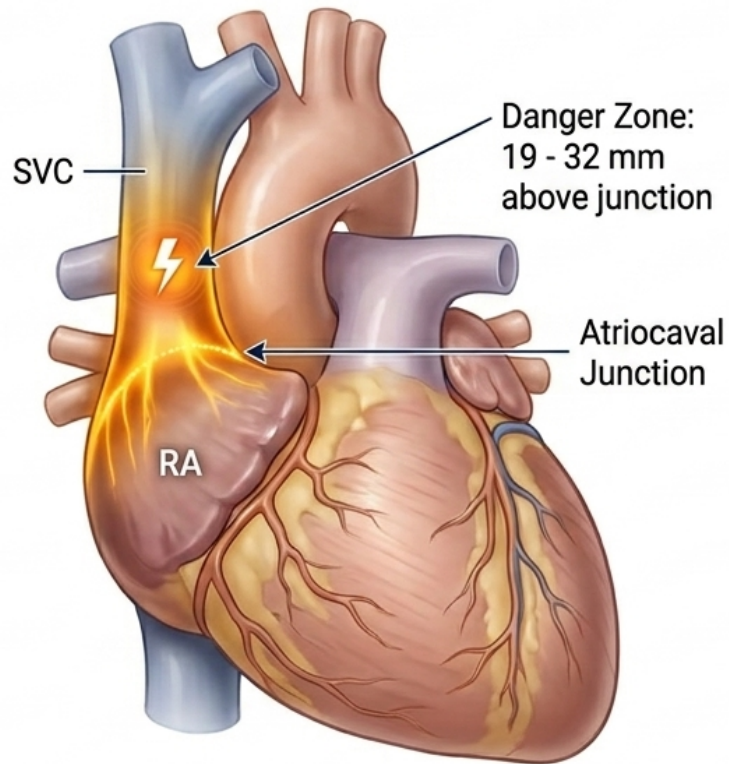
**Target 4: Mitral
Isthmus (MI)**



**Target 3: Superior
Vena Cava (SVC)**

**Target 2: Cavotricuspid
Isthmus (CTI)**





Successful Pulsed-field Ablation of Superior Vena Cava Fibrillation Using a Circular Multielectrode Array Catheter

Masatsugu Nozoe¹, Hiroshi Mannouji¹, Ryo Miyake¹, Akihito Ishikita¹, Nobuhiro Suematsu¹, and Toru Kubota¹

The efficacy and safety of SVCI using PFA have been recently proven in an animal model, but evidence in humans is limited. In this small case series, SVCI using a circular multielectrode array PFA catheter was feasible, and acute isolation was achieved in all patients. Pre- and post-mapping revealed controlled lesion formation by the circular multielectrode array PFA catheter, with the fifth electrode facing downward. We set the target of application 2 cm above the sinus node to avoid sinus node dysfunction. Based on our case series, this strategy is feasible and safe. Importantly, no cases of persistent phrenic nerve palsy were observed in this study.

Clinical Protocol & Recommendations

Step 1: 3D EAM Mapping

Map the right atrium in sinus rhythm; explicitly mark the sinus node boundary.

Step 2: CT Screening

Review pre-op CT for RSPV-SVC distance. Flag if < 7.15 mm or crescent-shaped.

Step 3: Establish Margin

Target the ablation line strictly > 2.0 cm above the marked sinus node.

Step 4: Venography Validation

Perform AP/LAO venography to ensure perfect coaxial alignment of the 25 mm array.

Step 5: Utilize Test Pulse

Always fire the Phrenic Test Pulse prior to the 1500V therapeutic discharge.

Step 6: ATP Challenge

Administer 10mg ATP post-ablation to verify durable block and rule out dormant conduction.



**Target 1: Left Atrial
Posterior Wall (LAPWI)**

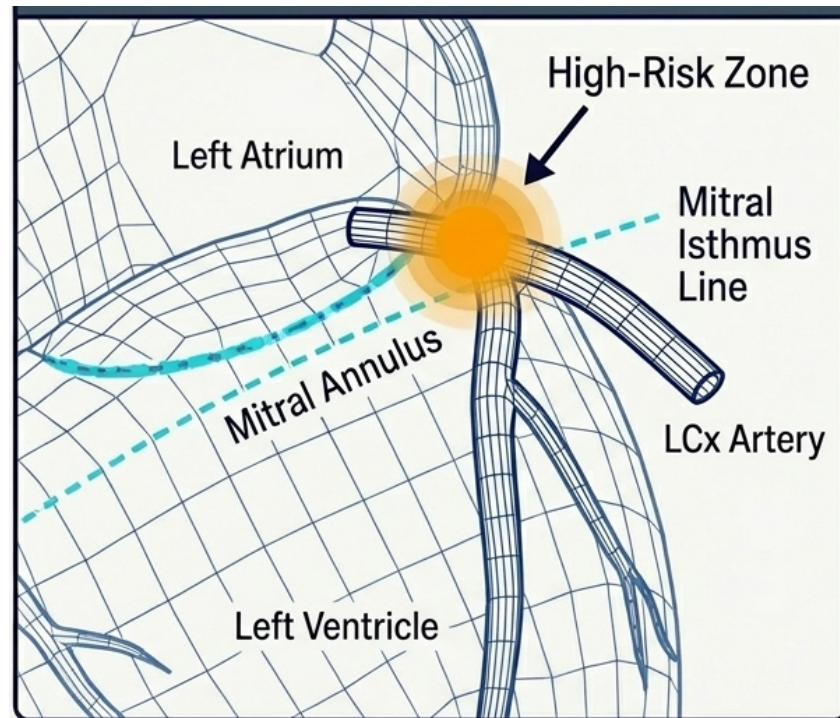
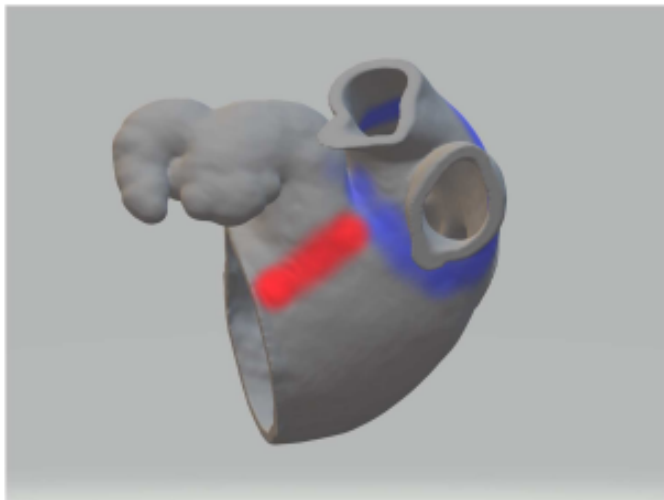
**Target 4: Mitral
Isthmus (MI)**



**Target 3: Superior
Vena Cava (SVC)**

**Target 2: Cavotricuspid
Isthmus (CTI)**





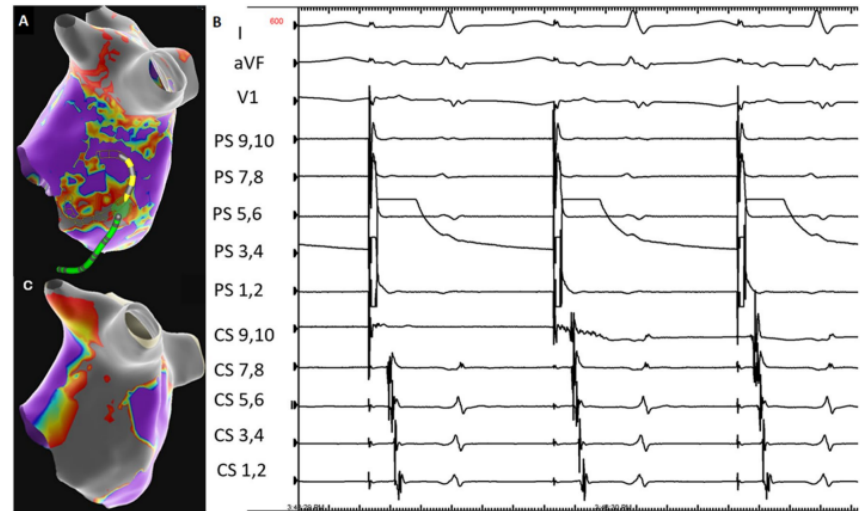
Achieving a steady pulse with pulse field ablation

Rachel M. Kaplan¹  · Matthew Long¹ · Sergio L. Pinski¹

Received: 13 June 2024 / Accepted: 9 August 2024 / Published online: 17 August 2024

© The Author(s) 2024

This is the first reported case of using the circular array PFA catheter for mitral isthmus ablation after failed endocardial radiofrequency ablation. PFA may represent an efficient option for achieving mitral isthmus block using exclusively endocardial ablation.



La tecnologia PFA è in rapida evoluzione e sta cambiando le modalità di ablazione e le abitudini degli operatori.

Il catetere circolare over-the-wire a diametro fisso permette di estendere in sicurezza e semplicità l'ablazione oltre l'isolamento delle vene polmonari.

A tale scopo è necessario:

- Stretta pianificazione del lavoro prima della procedura
- Rispettare i protocolli già validati
- Valutare l'eventuale utilizzo di un mappaggio elettroanatomico al fine di migliorare la precisione nelle erogazioni.

