

Mapping, imaging e cateteri ibridi

L'uso del catetere "all-in-one" nelle ablazioni di AF ripetute: l'importanza di uno strumento potente

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BACKGROUND & RATIONALE

30–50%

AF recurrence after
first PVI

~20%

Patients undergo
≥2 sessions



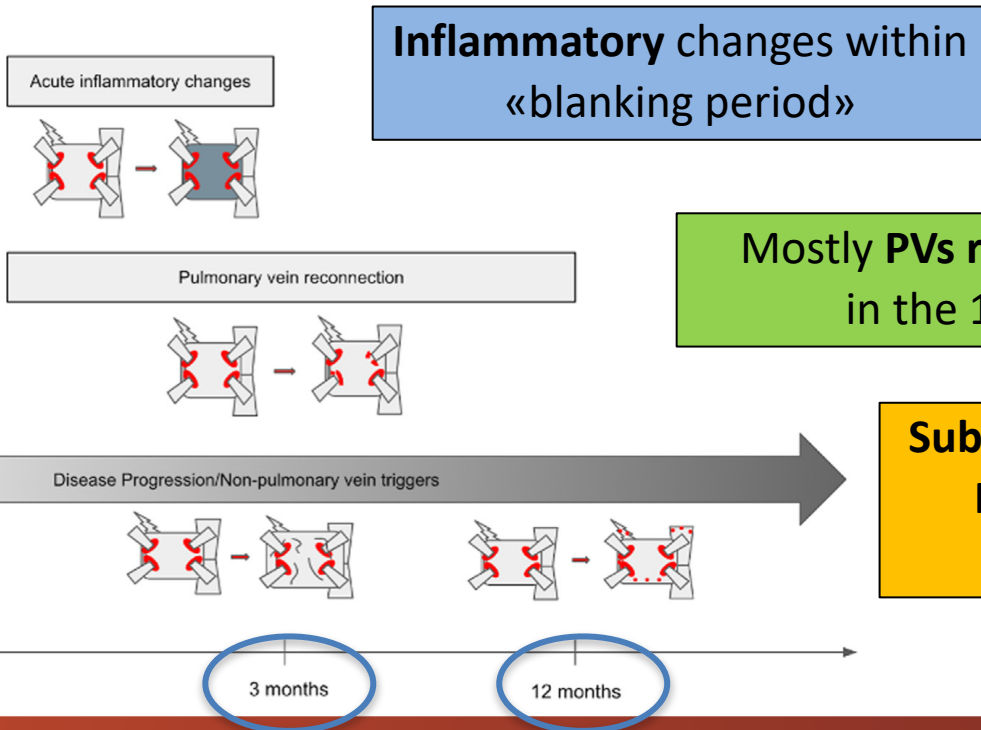
Procedural complexity
in redo

Redo AF ablation is increasingly common in EP practice



Time of AF recurrence matters...

Index Catheter
Ablation for AF



**Mostly PVs reconnection
in the 1st year**

**Substrate disease progression:
PVs, non-PV foci, AT/AFL
>1 year**

Heart Rhythm 2024;21:471–483



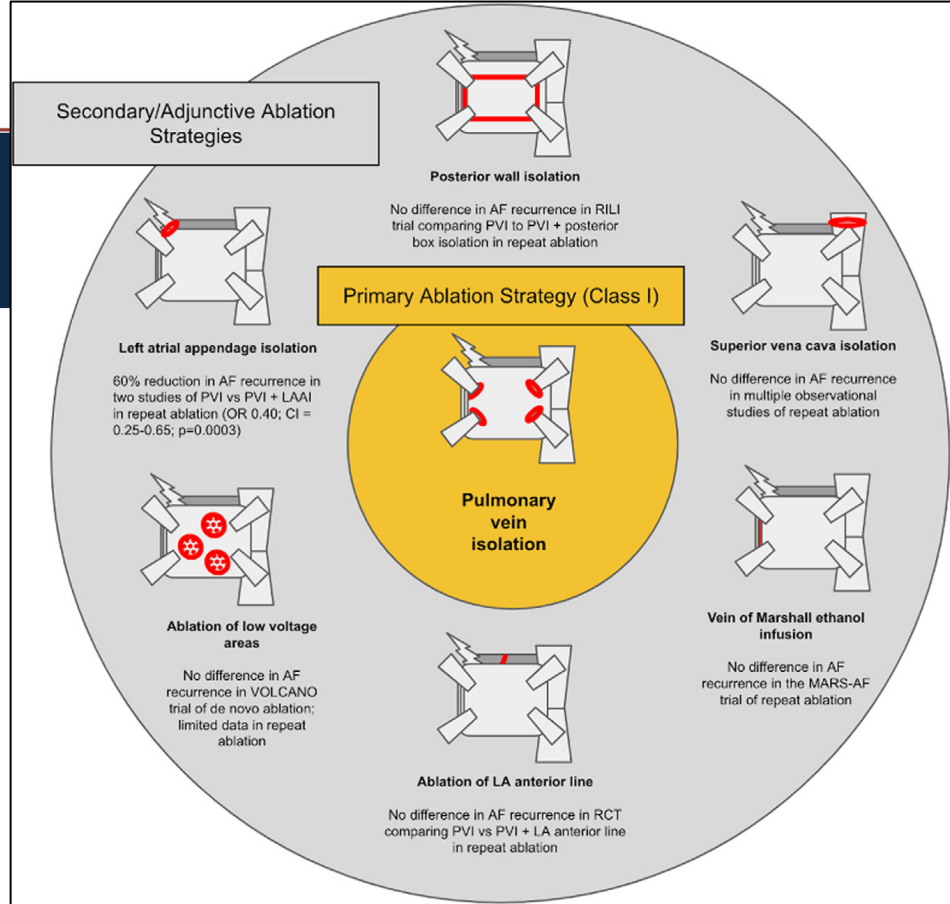
Challenges in Redo AF

Prior lesion sets modify atrial anatomy

- PV reconnection (>80%)
- Non-PV triggers (PW, SVC, Marshall)
- Fibrotic substrate with atrial remodeling
- -> *Atrial tachycardia, atypical flutters*



- Need for **high density mapping**
- HD Map and ablate traditionally requires **multiple catheters**
- **Longer procedure time** → higher X-Ray, thromboembolic risk, operator fatigue



The 'All-in-One' Catheter Concept

- Single platform for HD mapping and ablation, suitable for different targets
- Real-time electrogram interpretation
- Reduction in catheter exchanges and workflow interruptions



Procedural advantages:

Fast identification of gaps

Immediate Mapping to Ablate

Potential reduction of procedure and X-Ray time



Electrophysiological advantages:

High-density EGM

Improved substrate characterization

Better identification of low-voltage areas



All-in-one Sphere-9™ catheter



One single catheter with **dual-energy** capabilities, **RF** and **PFA**



Safe^{1,2} and effective^{1,2} procedures in less time² using fewer **wide-area focal lesions**^{1,3}



9 **mini electrodes** and central electrode provide HD mapping utilizing high-fidelity, close-unipolar EGMs¹



9 thermocouples provide **real-time tissue temperature** monitoring for safe energy delivery



9 mm conformable lattice tip provides **tissue contact and stability**



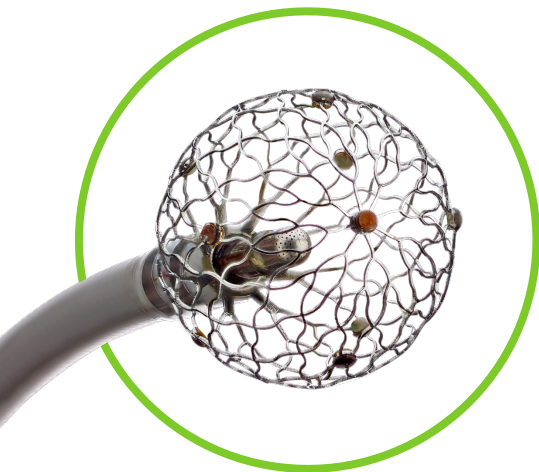
8 Fr, bi-directional catheter with built-in controller for **direct mapping system interaction**

- ¹Anter E, et al. *JACC Clin Electrophysiol.* 2020;6:507-519.
- ²Reddy VY, et al. *Circ Arrhythm Electrophysiol.* 2020;13:e008718.
- ³Barkagan M, et al. *Circ Arrhythm Electrophysiol.* 2019;12:e007090.



All-in-one Sphere-9™ catheter: **wide-area focal ablation**

Create lesions in less time^{1,2} with effective surface area 10x larger than standard irrigated ablation catheters.¹



4 sec

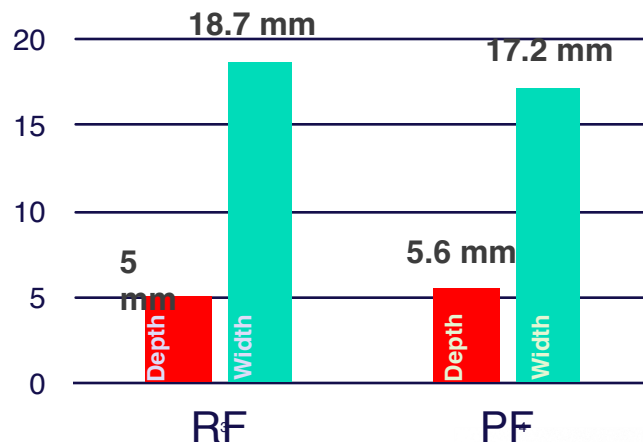
Pulsed field

Unipolar, biphasic waveform to cause cell death by irreversible electroporation

5 sec

Radiofrequency

Temperature-controlled RF delivery



1. Anter E, et al. *JACC Clin Electrophysiol.* 2020;6:507–519.
2. Barkagan M, et al. *Circ Arrhythm Electrophysiol.* 2019;12:e007090.
3. GLP study (S6585). 2023. Medtronic data on file.
4. Yavin HD, et al. *Circ Arrhythm Electrophysiol.* 2021;14:e010375.



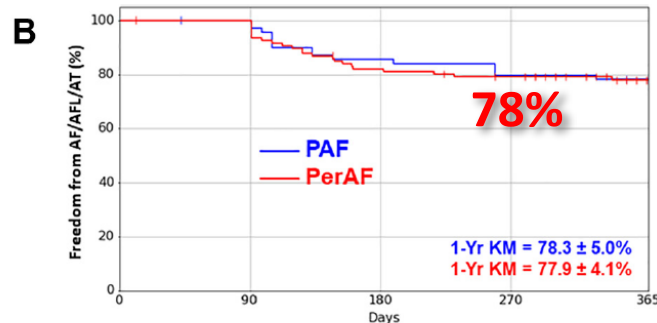
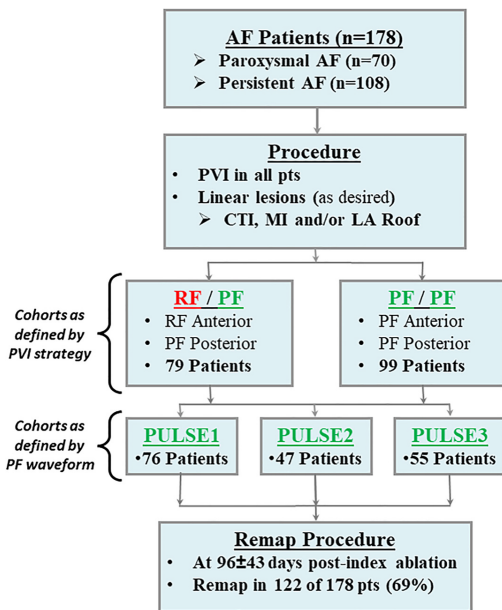
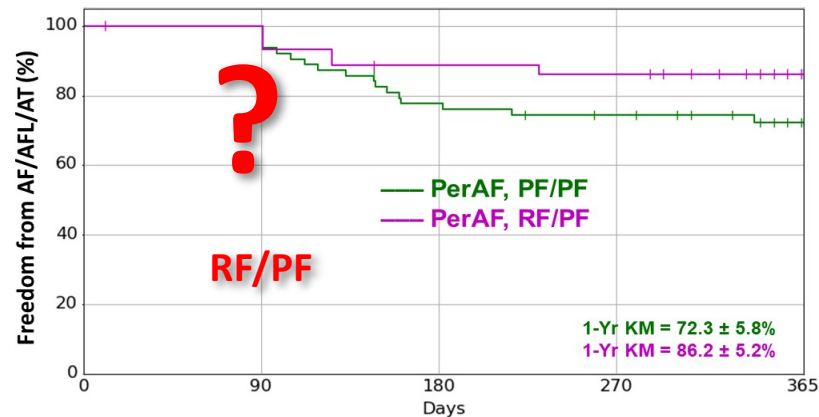
A Focal Ablation Catheter Toggling Between Radiofrequency and Pulsed Field Energy to Treat Atrial Fibrillation

Vivek Y. Reddy, MD,^{a,b} Petr Peichl, MD, PhD,^c Elad Anter, MD,^d Gediminas Rackauskas, MD, PhD,^e Jan Petru, MD,^a Moritoshi Funasako, MD,^a Kentaro Minami, MD,^a Jacob S. Koruth, MD,^a Andrea Natale, MD,^f Pierre Jais, MD,^g Germanas Marinakis, MD, PhD,^h Audrius Aidietis, MD, PhD,^g Josef Kautzner, MD, PhD,^c Petr Neuzil, MD, PhD^d

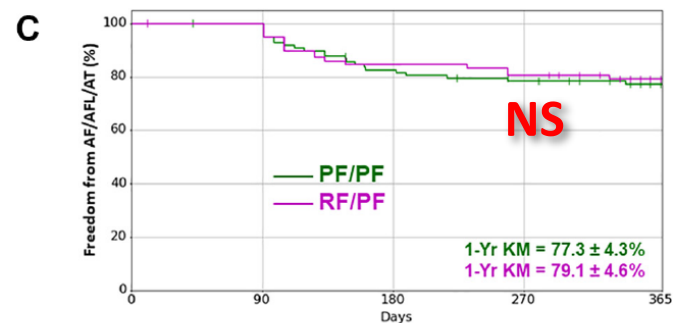
J Am Coll Cardiol EP 2023;9:1786–1801



PVI durability at 3 months: 97%



PAF at risk	70	69	59	55
PerAF at risk	108	107	84	79



PF/PF at risk	99	98	80	74
RF/PF at risk	79	78	63	60

Complications: 1 inflammatory late pericarditis





A novel focal lattice-tip catheter toggling between pulsed field energy and radiofrequency for atrial arrhythmia ablation: Results from a real-world, multicenter registry

Giampaolo Vetta, MD,^{1,4} Domenico G. Della Rocca, MD, PhD,^{1,4} Andrea Sarkozy, MD, PhD,¹ Roberto Menè, MD,² Luigi Pannone, MD,¹ Alexandre Almorad, MD,¹ Antonio Sorgente, MD, PhD,¹ Andres Betancur, MD,² Lorenzo Marcon, MD,¹ Sahar Mouram, MD,¹ Erwin Stroker, MD, PhD,¹ Ioannis Doundoulakis, MD, PhD,¹ Ivan Eltsov, MD,¹ Ourania Kariki, MD,³ Alvise Del Monte, MD,¹ Ingrid Overeinder, MD,¹ Charles Audiat, MD,¹ Kazutaka Nakasone, MD,¹ Vasileios Sousonis, MD,² Wael Zaher, MD,¹ Gezim Bala, MD, PhD,¹ Kostantinos P. Letsas, MD,³ Stephane Combes, MD,² Juan Sieira, MD, PhD,¹ Michael Efremidis, MD,³ Serge Boveda, MD, PhD,² Carlo de Asmundis, MD, PhD, FHRS,^{1,5} Gian-Battista Chierchia, MD, PhD^{1,5}

Real world registry N= 130

mean age, 67 years; 63.8% M

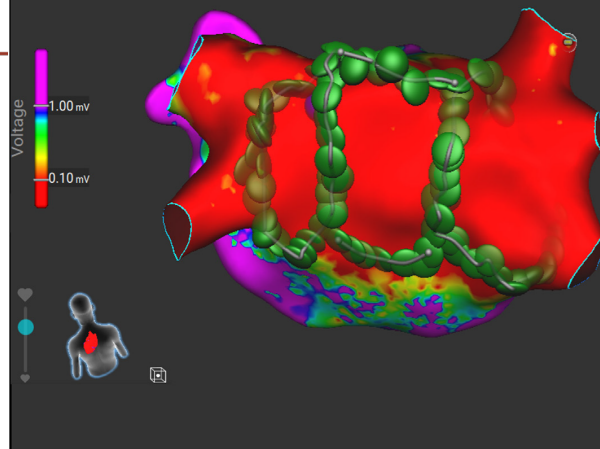
61.5% non-paroxysmal AF;

55.% first-time AF ablation, 45% redo ablation

- **First-pass isolation for pulmonary vein in 100% of cases.**
- **0.3% of acute recovery**

- **2 (1.5%) major complications:**
 - 1 ST-segment elevation inferolateral
 - 1 atrioventricular block

Posterior Wall Isolation



84 patients

	PW
Primary efficacy endpoint	100.0%
First Pass isolation	100.0%
Acute reconnection	0.0%
	PW
First procedure	61.9%
Redo procedure	38.1%

A total of **289** ablation lines were performed



Primary efficacy end point 100%

First-pass isolation 96.2% :

- roof line 100%
- inferior line 100%
- anterior mitral line 96.9%
- posterior mitral line 84.4%
- cavotricuspid isthmus 92.1%



Potential advantages of a combined RF+PF approach

PFA

- Fast and uniform reisolation of wide/multiple gaps
- **Fast linear lesions**
- **Tissue selectivity** and lower risk of
 - ✓ esophageal injury on PW
 - ✓ pulmonary vein stenosis
 - ✓ phrenic nerve damage

RF

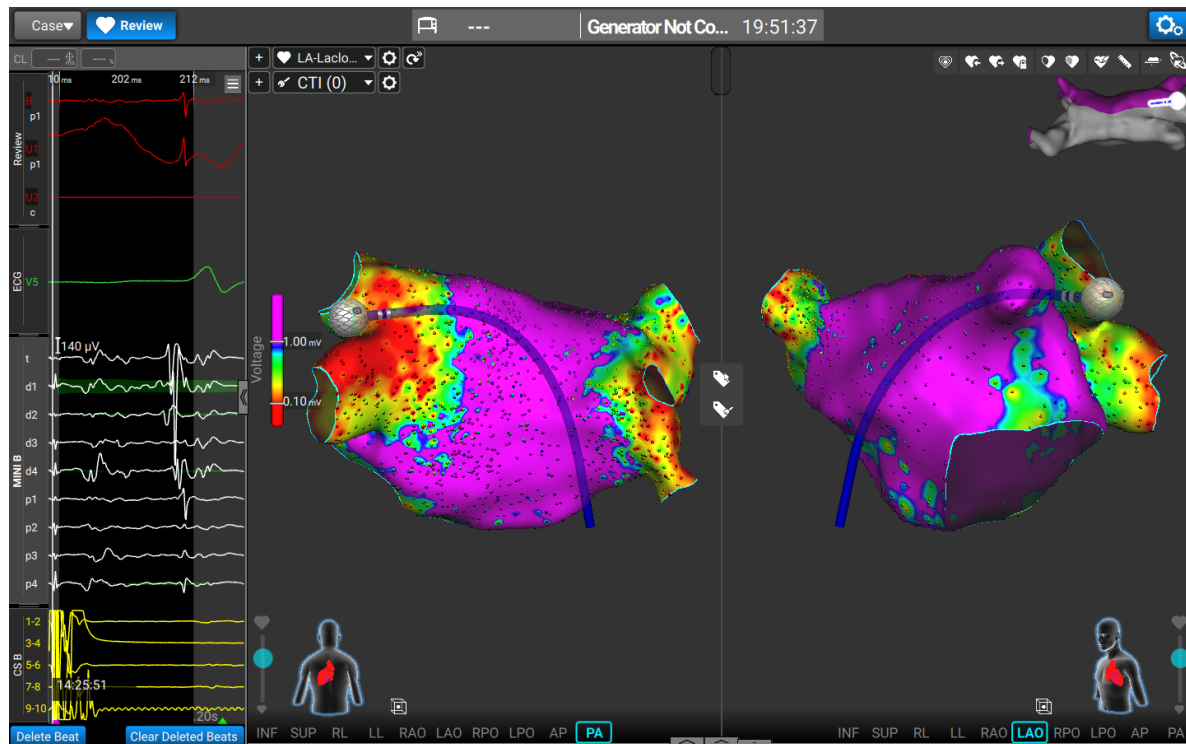
- Fast reisolation of gaps
- **Safer** on mitral and CT isthmuses avoiding coronary vasospasm
- Role in ablation of anterior PV ostia (possible favourable effect by cardiac ganglia plexi modulation???)

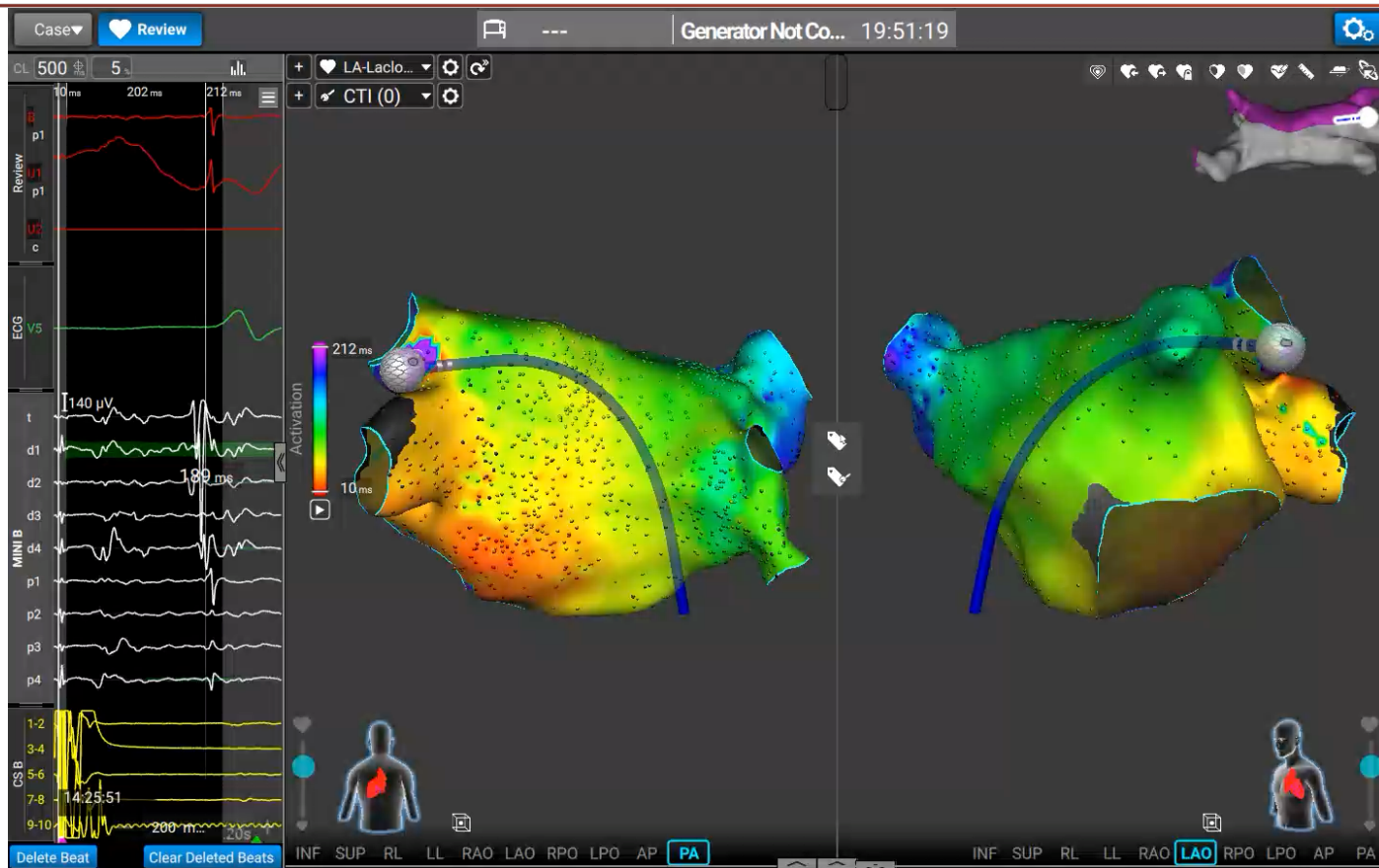
RF + PFA = maximum technical flexibility in redo procedures, allowing energy and strategy to be tailored to recurrence type and patient anatomy.

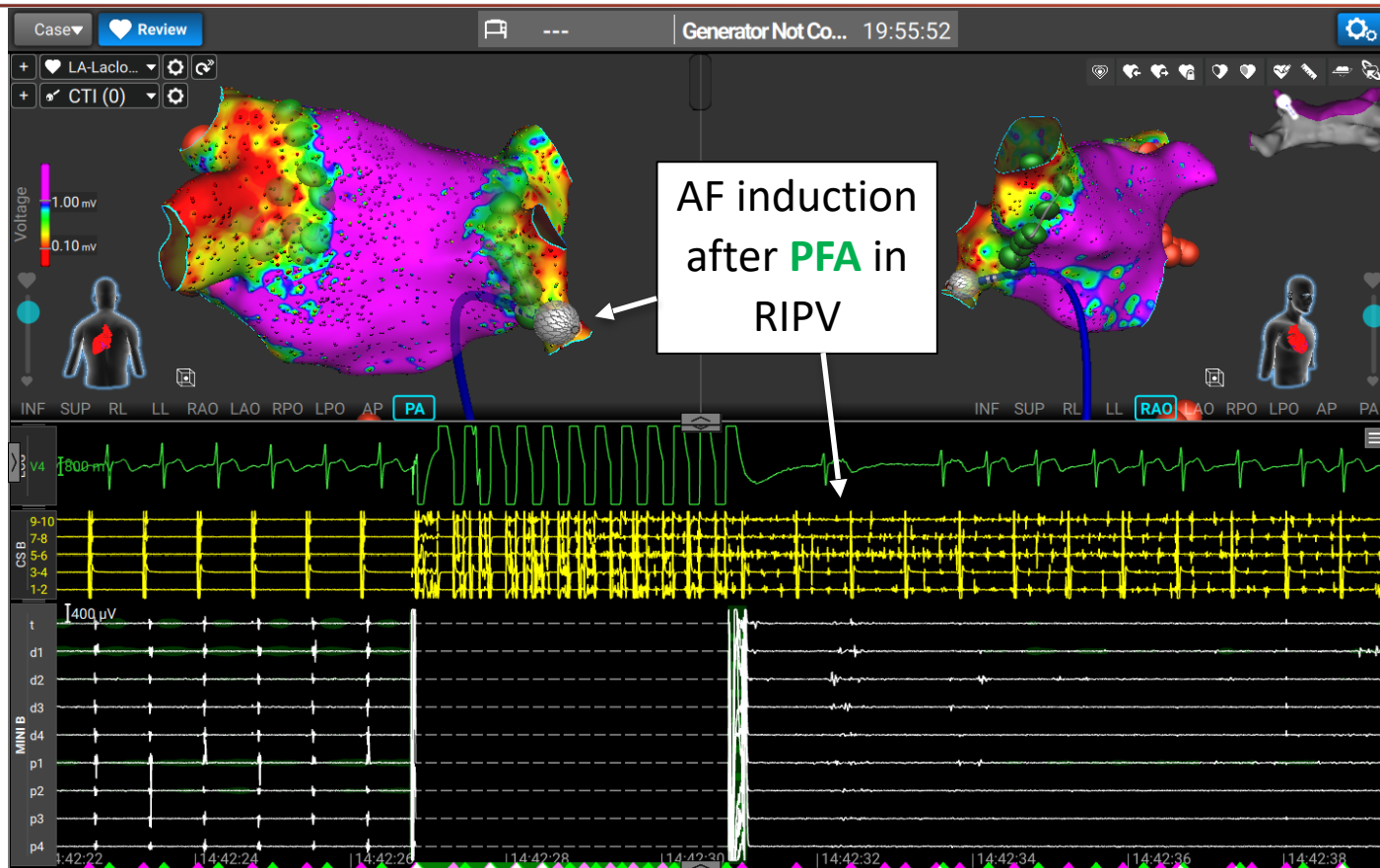


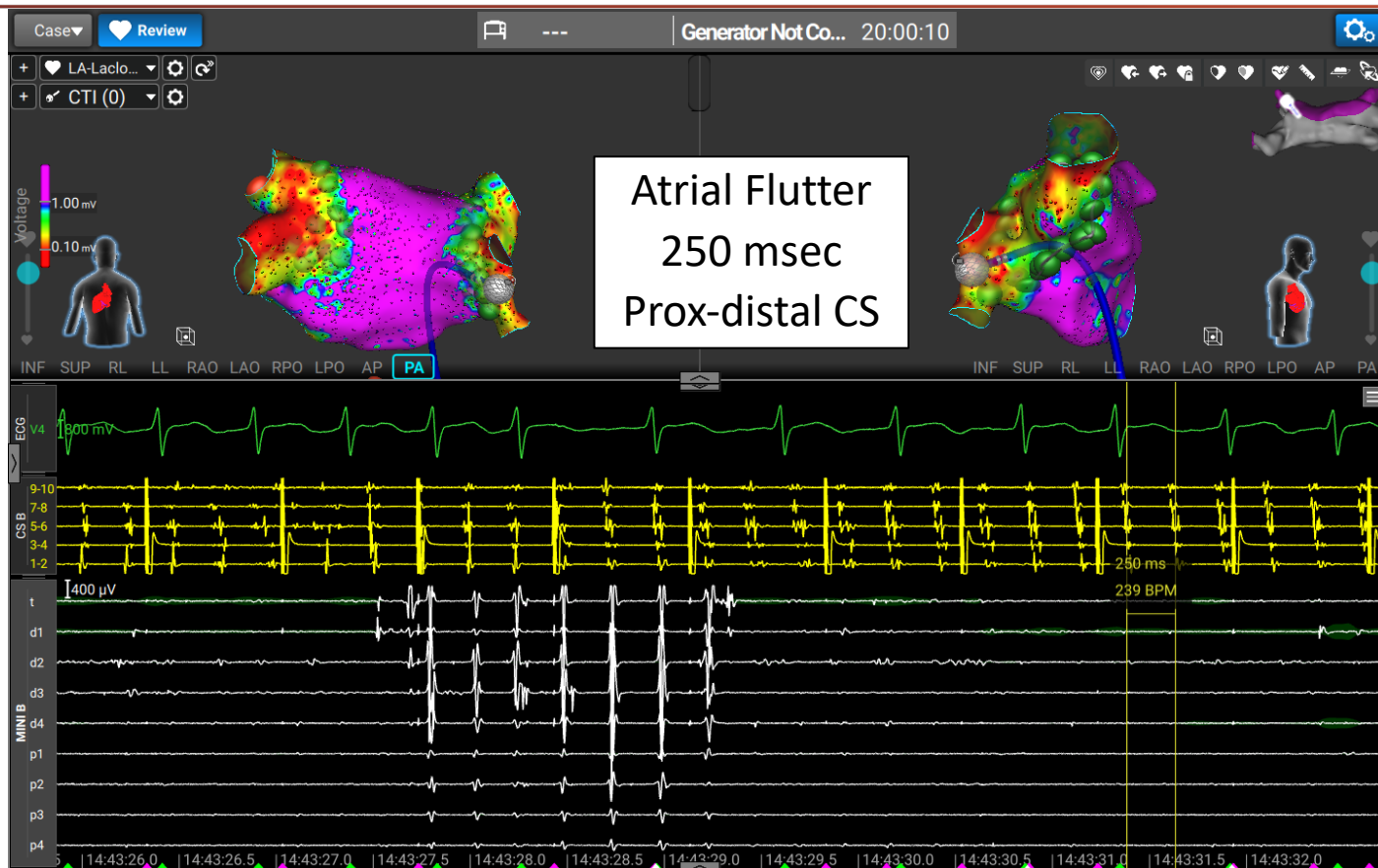
BC, male, 49 y

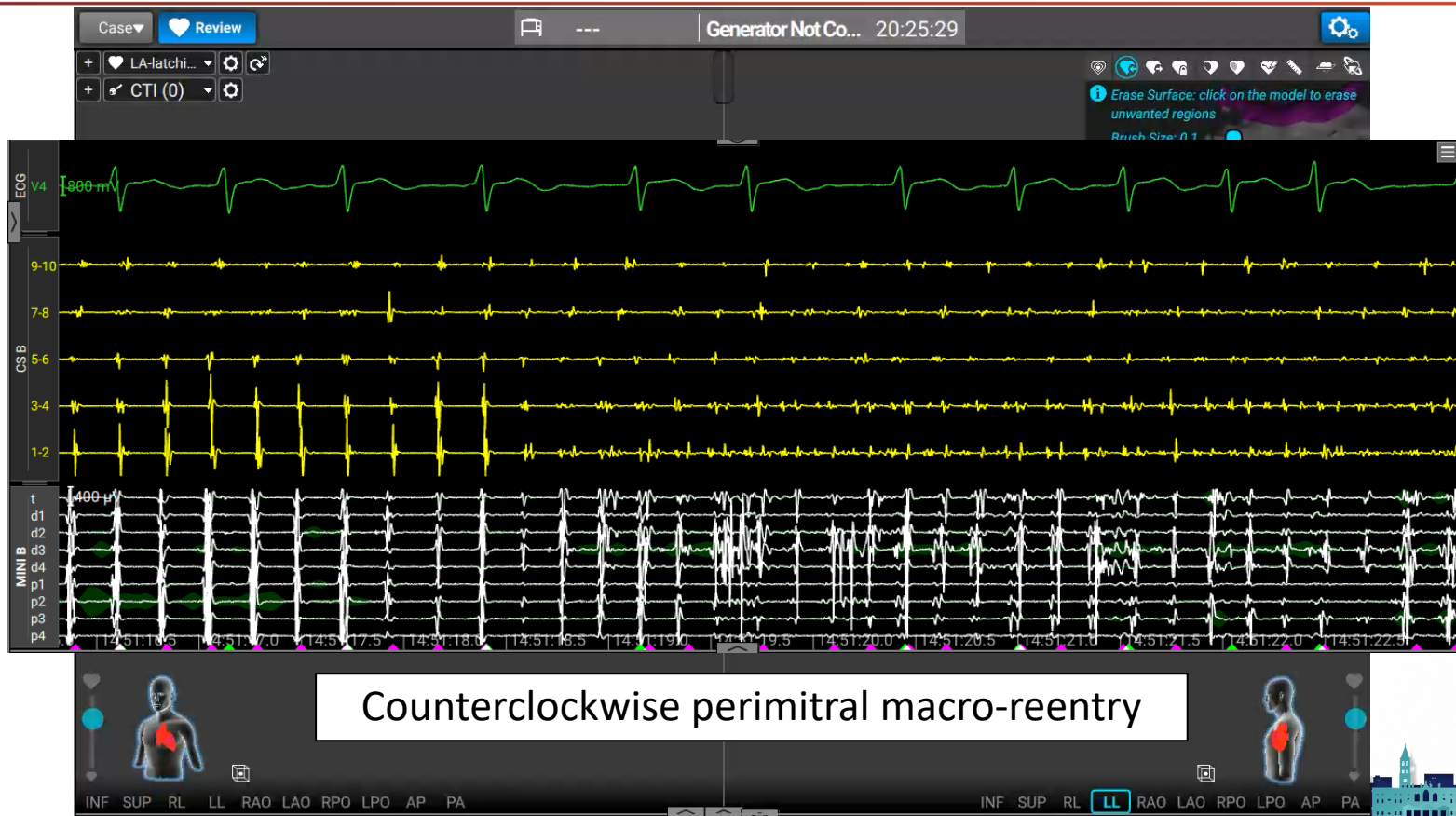
- Normal EF%, LAVi 40 ml/m²
- 2011: Atrial flutter → **CTI line RF**
- 2017: AFib → **PVI cryoballoon**
- ILR (initially few recurrences)
- Worsening of AFIB since 2023
- Redo procedure scheduled with AFFERA/Sphere9

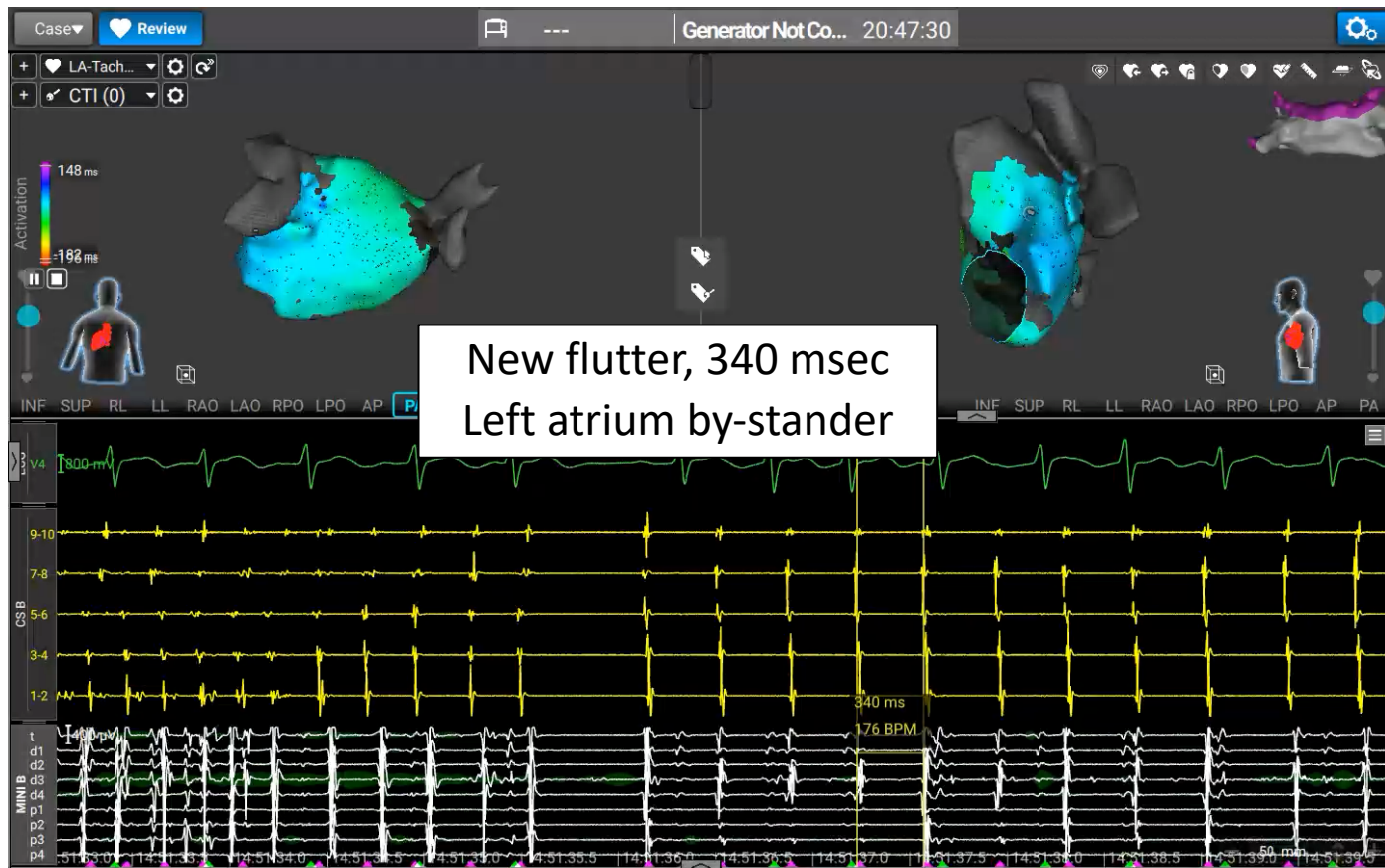


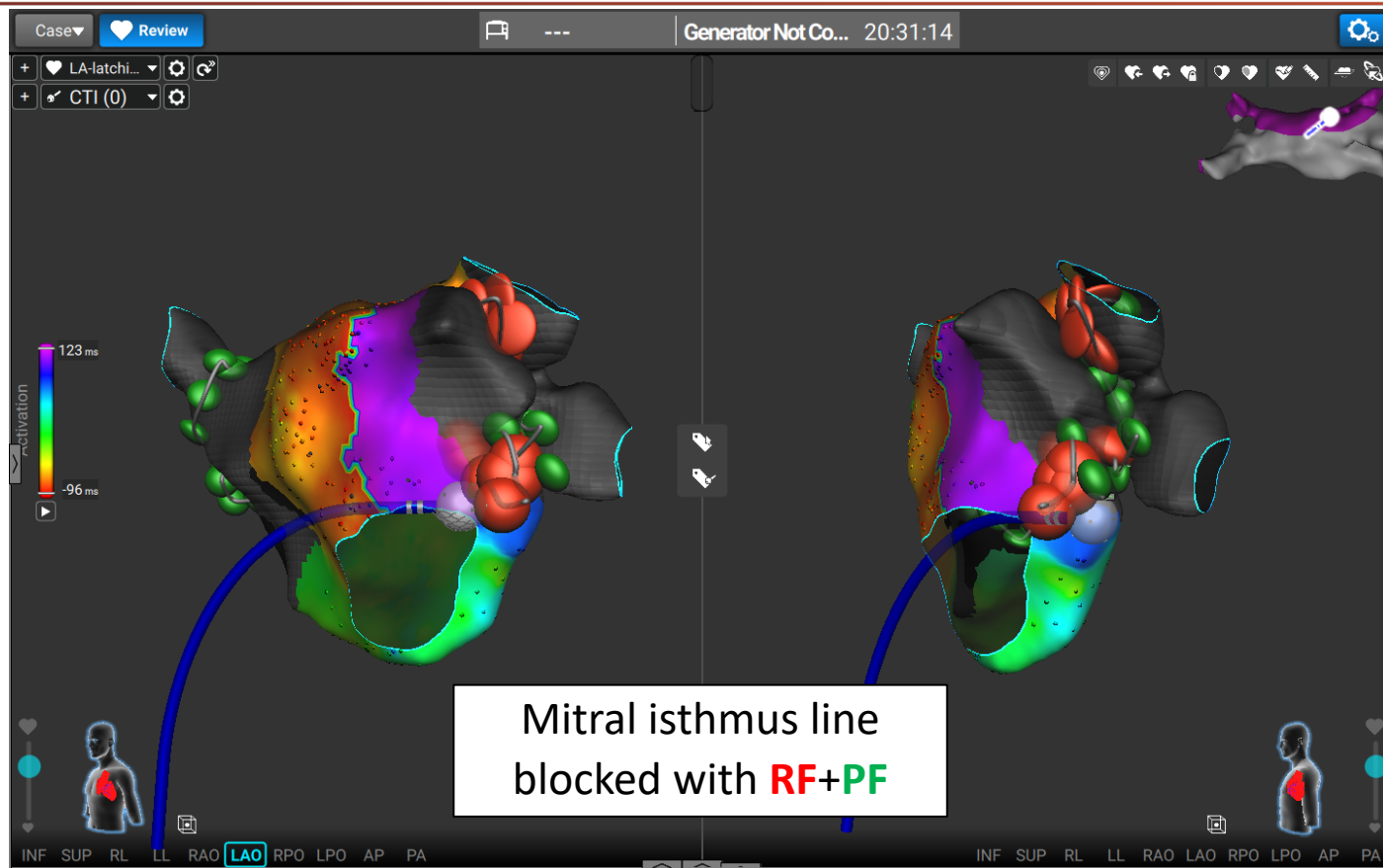


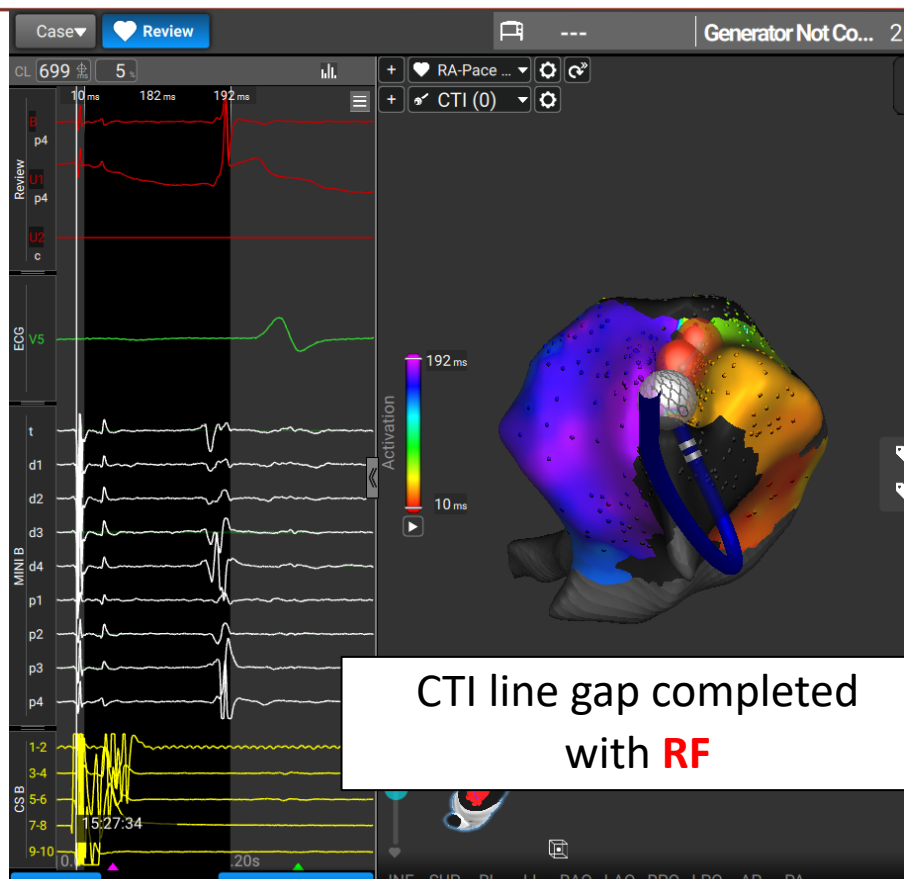












- ✓ Basal voltage/activation map
- ✓ Complete 4 PV reisoletion **PFA**
- ✓ Mapping of 2 AFL
- ✓ Mitral isthmus line **RF** + **PFA**
- ✓ CTI line gap **RF**

- Skin to skin time 90 min
- LA dwelling time 55 min
- RX time 4.6 min

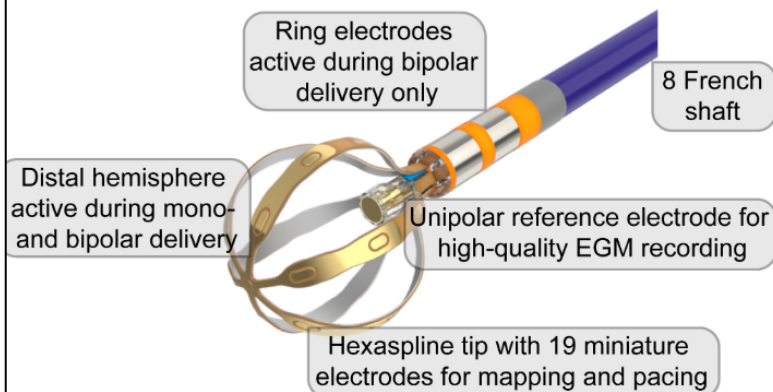
ILR: 0% AF burden at 6-m



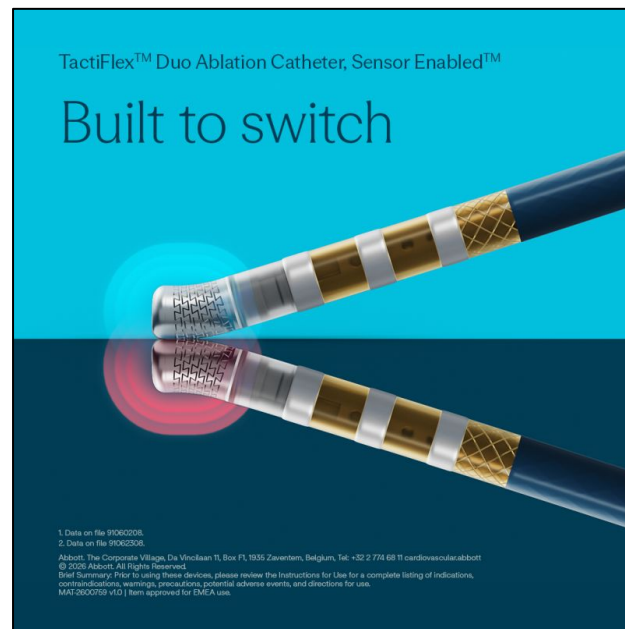
OTHER CHOICES?

Faraflex

A novel 3D enabled large-area focal PFA catheter



Tactiflex DUO



Take-Home Messages

- ✓ **Redo AF ablation** is increasingly common and technically demanding, so a powerful, **versatile tool is essential**.
- ✓ **The all-in-one catheter simplifies** complex workflows with rapid HD mapping, pacing and ablation
- ✓ **A powerful tool**, with both RF and PF, **may improve outcomes** in Atrial fibrillation redo and challenging cases.

