

Percutaneous Transvenous Atrial Fibrillation Ablation and Stroke

Vivek Y. Reddy, MD
Helmsley Trust Professor of Medicine
Director, Cardiac Arrhythmia Service
The Mount Sinai Hospital



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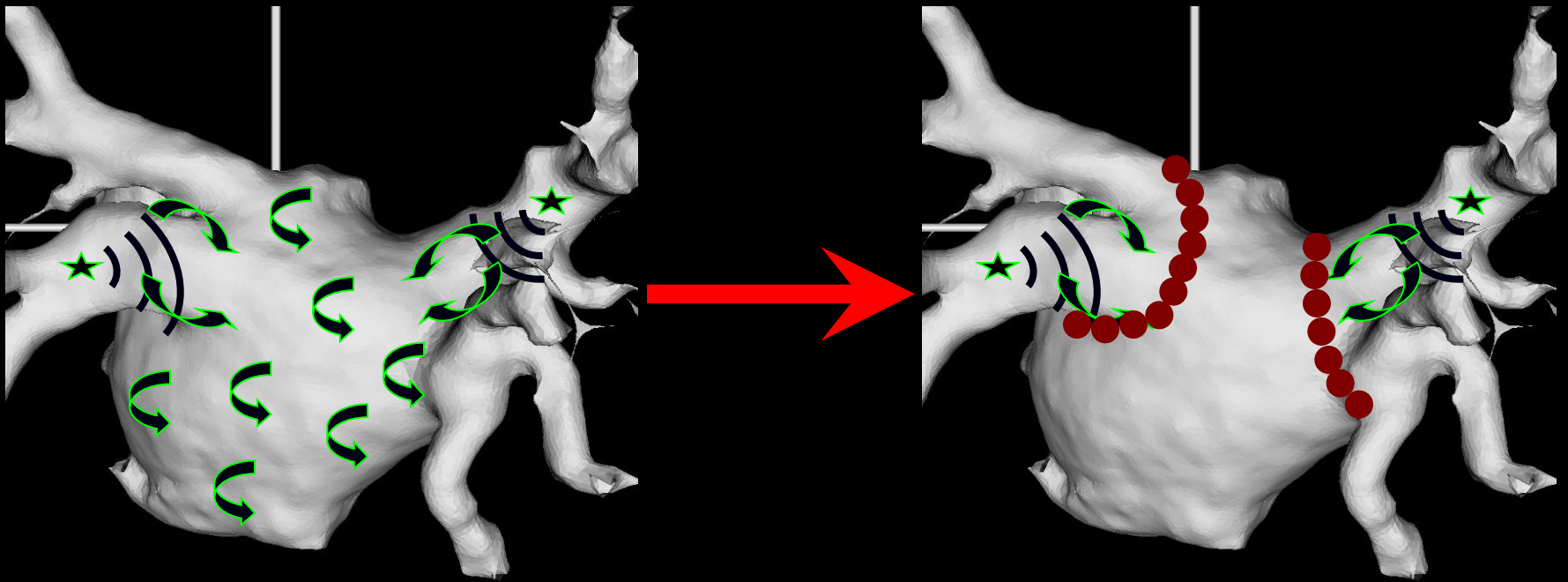


Disclosures

- Grant support and/or Consultant:
 - ACT, Acutus Medical, Apama Medical, Biosense-Webster, Boston Scientific, Cardiofocus, Coherex, Endosense, Magnetecs, Medtronic, Philips, St Jude Medical, VytronUS
- I will be discussing off-label use of catheter ablation devices.

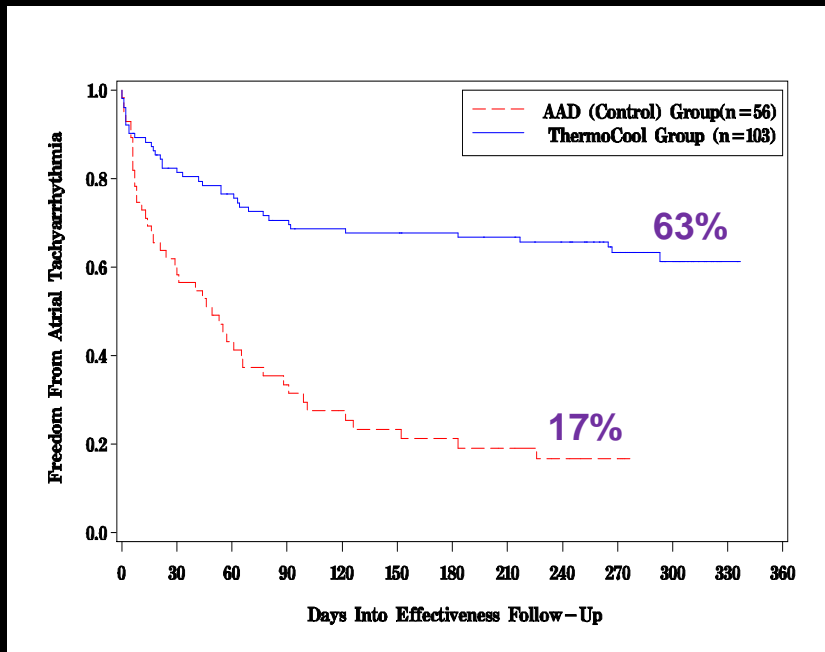


Paroxysmal AF: Catheter Ablation



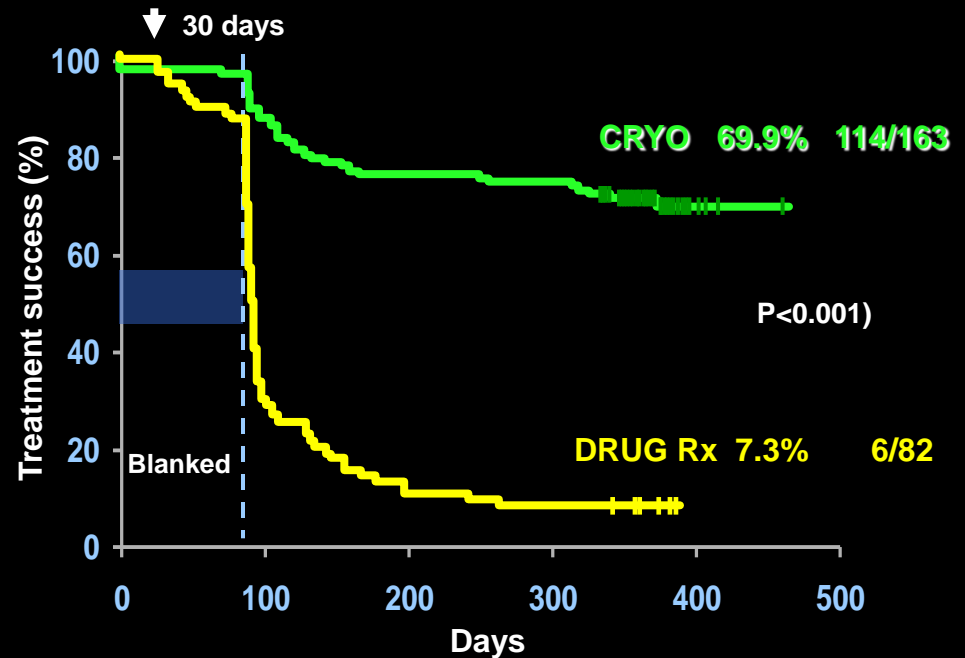
Success of Catheter Ablation: Comparison to Medications

Thermocool IDE Study



Wilber et al, *JAMA*, 2010

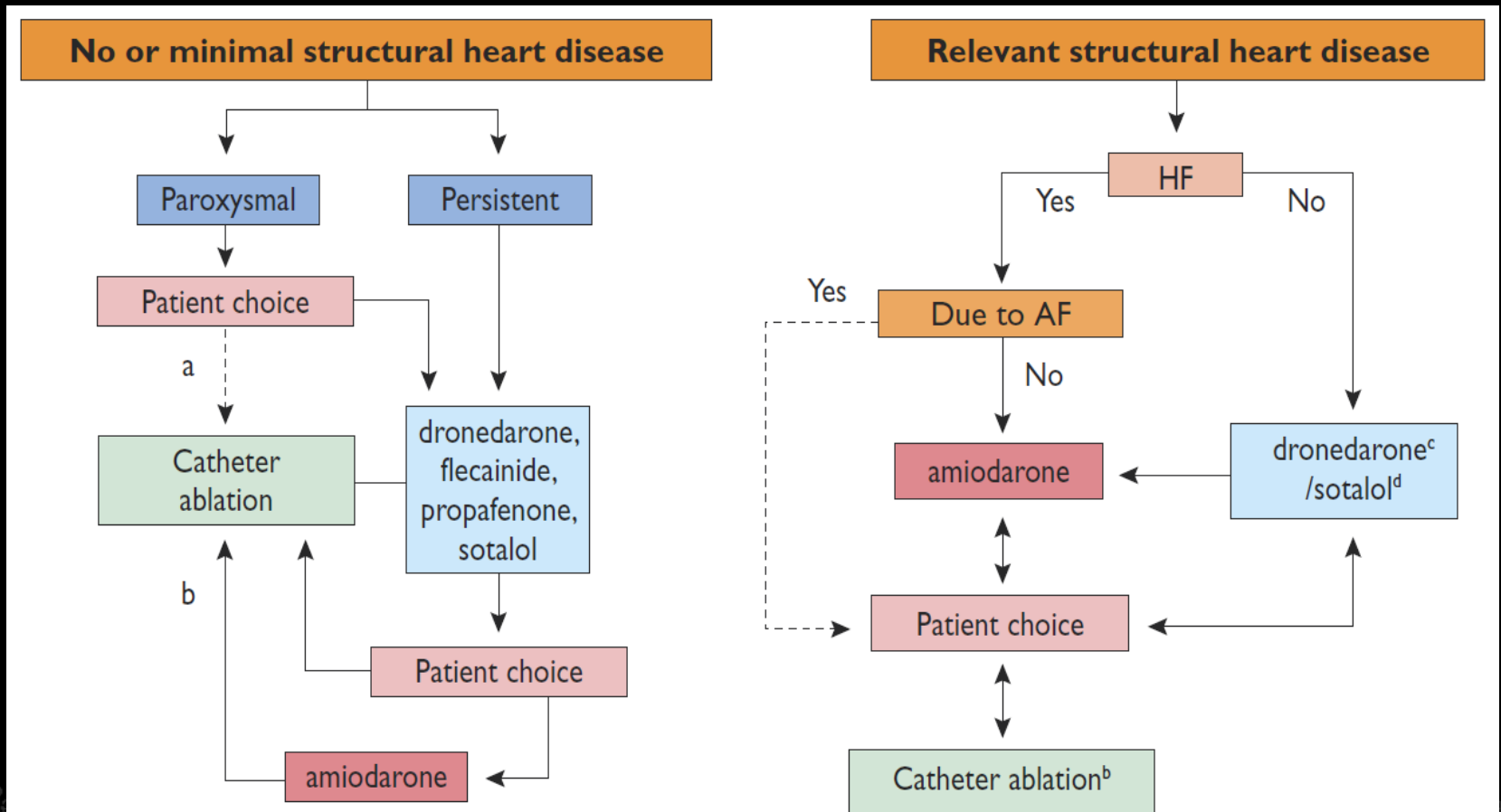
STOP-AF Study



Packer et al, *JACC*, 2013

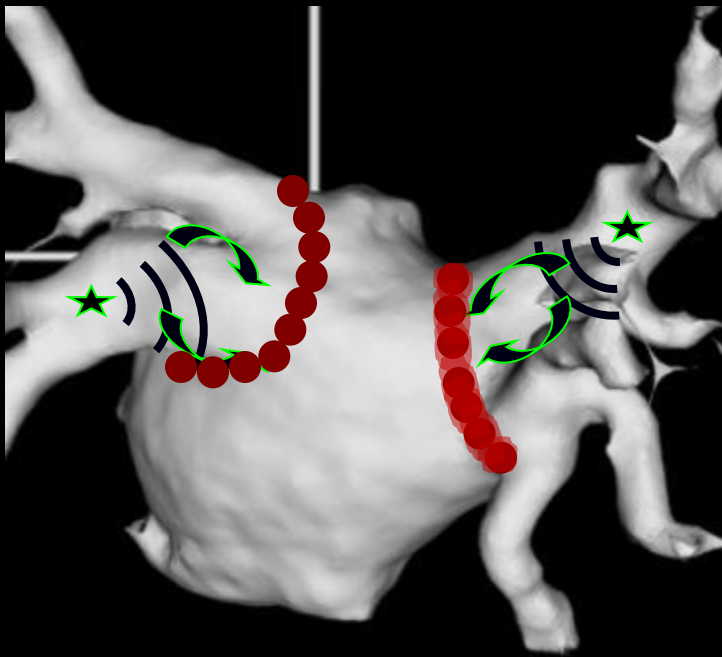


Role of Catheter Ablation: 2012 ESC/EHRA Guideline Update



AF = atrial fibrillation; HF = heart failure. ^aUsually pulmonary vein isolation is appropriate. ^bMore extensive left atrial ablation may be needed. ^cCaution with coronary heart disease. ^dNot recommended with left ventricular hypertrophy. Heart failure due to AF = tachycardiomyopathy.

Paroxysmal AF: Why does ablation fail?

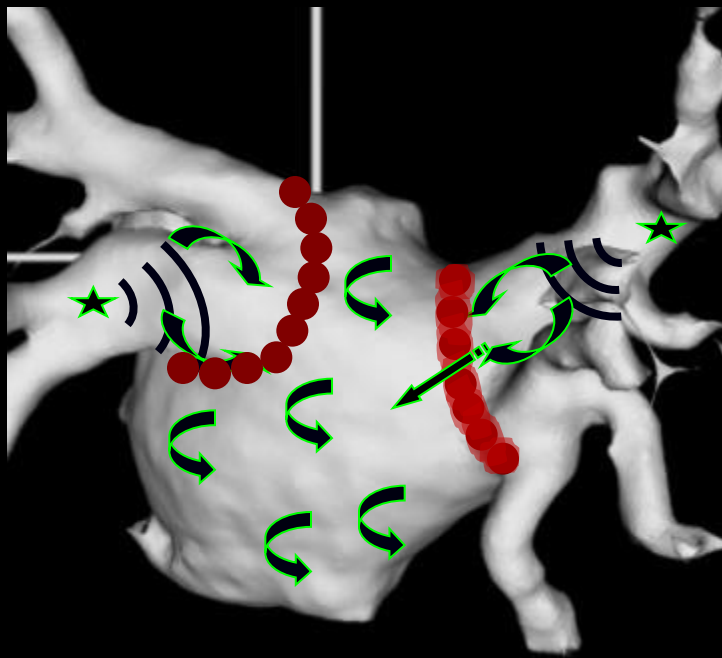


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Paroxysmal AF: Why does ablation fail?



Baseline

24 hrs

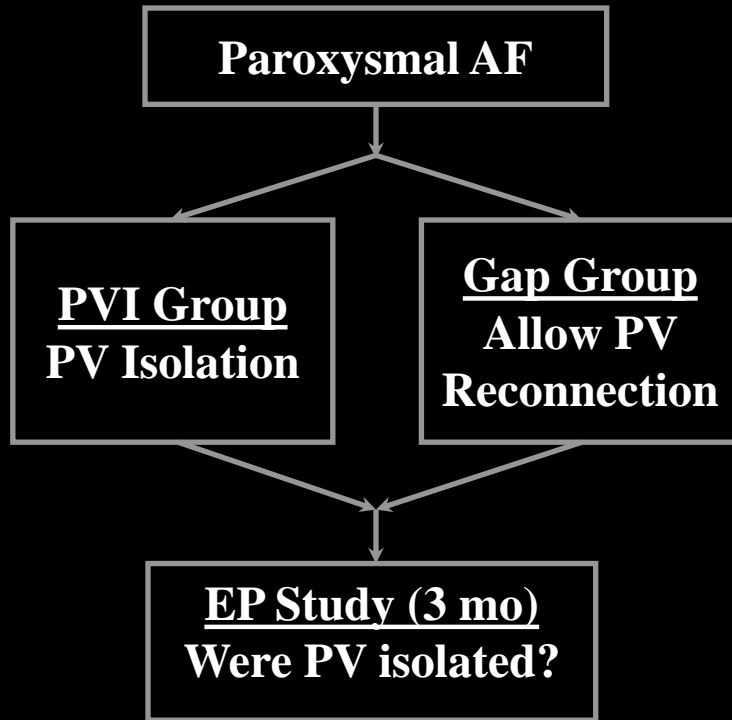
3 mos



Red = DE-T1/scar
Blue = T2/edema

How often does PV reconnection occur?

The GAP-AF Trial



Outcome

- AF Recurrence at 90 days:
 - PVI Group: 61.2%, $p < 0.001$
 - Gap Group: 79.2%
- Patients with any PV reconnections at 3 months
 - Gap Group: 89%
 - PVI Group: **70%**



Rate of Durable PVI in the “Modern” Era

Methodological Changes we Instituted

- Catheter Stability:
 - GA / JET Ventilation (*Natale, Schwartzman, Marchlinski*)
 - Deflectable sheath to maximize tissue contact (*Hindricks*)

- “Good Lesions”:

ICE Imaging of tissue contact (*Marchlinski, Natale, Mounsey*)

How do these changes affect the durability of PVI?:

➤ Examined our rate of PV reconnection in patients undergoing redo procedures after a “first-ever” ablation procedure

➤ Outcome:

➤ 93% of PV pairs remain isolated

➤ 86% of patients had all PVs isolated

Miller MA, Dukkipati S, Koruth J, d’Avila A, Reddy VY – AHA 2011

- Minimize chance of dormant conduction.

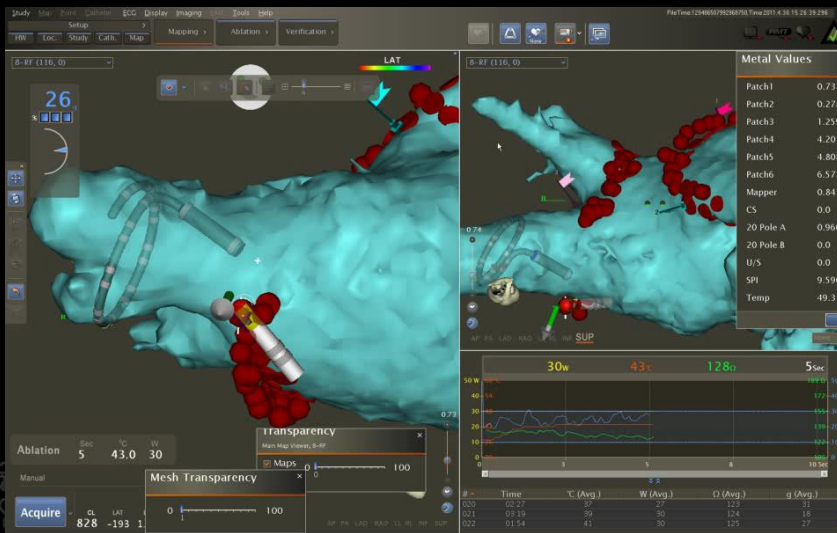
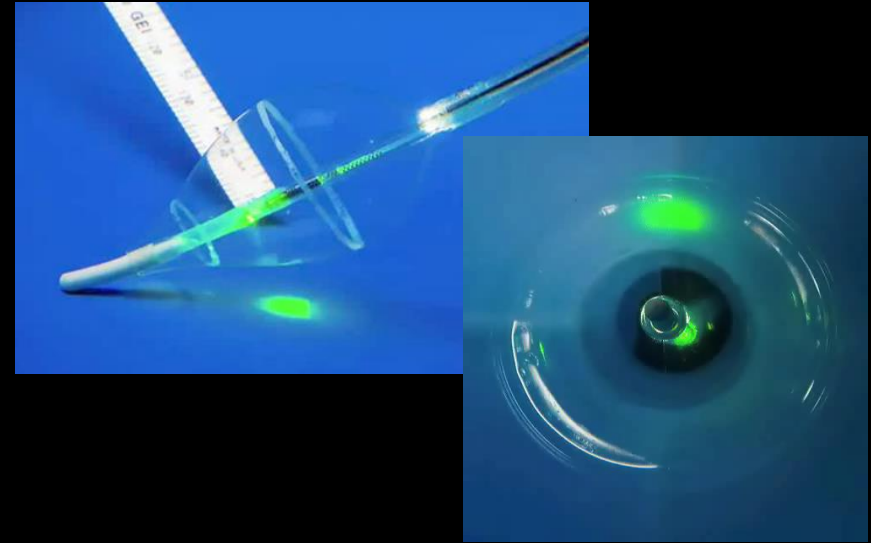
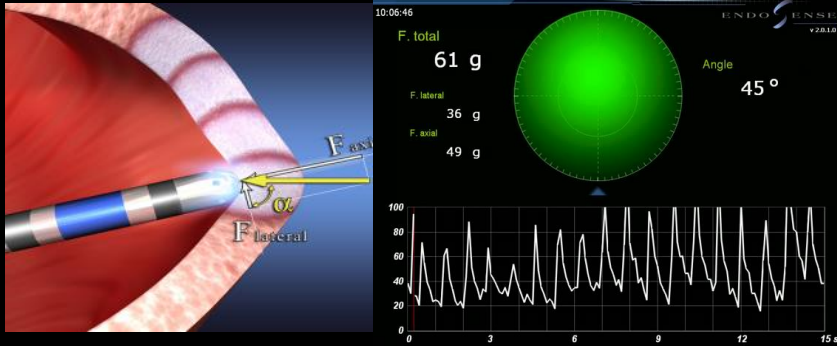
- Longitudinal redundancy of the lesion set
- After PVI, additional ablation at sites of pace-capture (*Michaud, Hindricks*)
- Use Adenosine to identify dormant conduction (*Arentz, Nattel*)

- Use Isuprel to identify non-PV Triggers (*Marchlinski, Natale*)

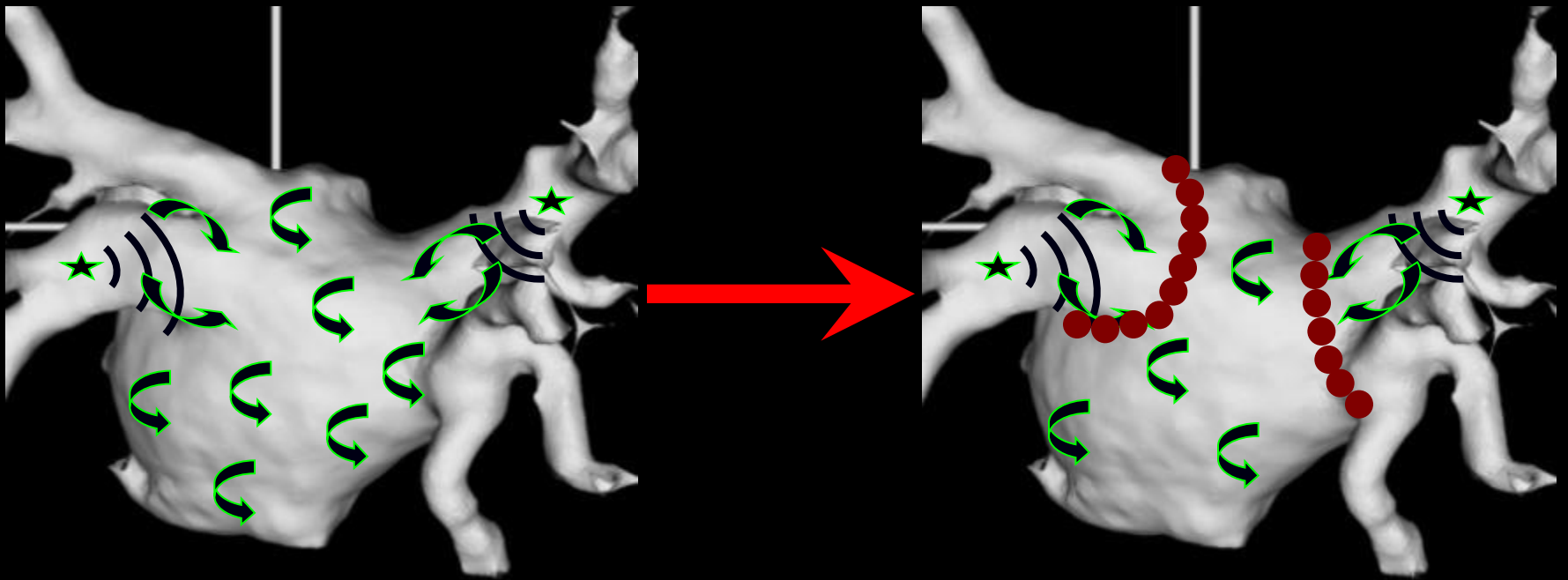


How to improve AF ablation outcome?

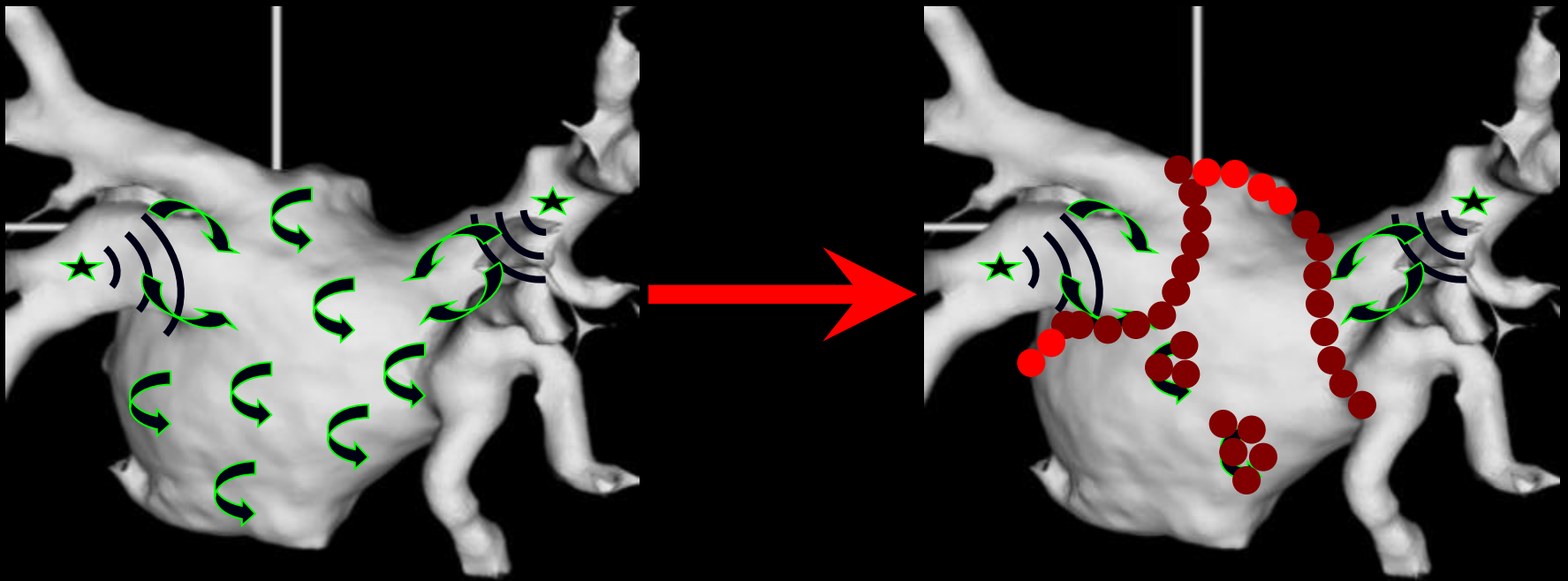
New Technology



Persistent AF: Catheter Ablation



Persistent AF: Catheter Ablation



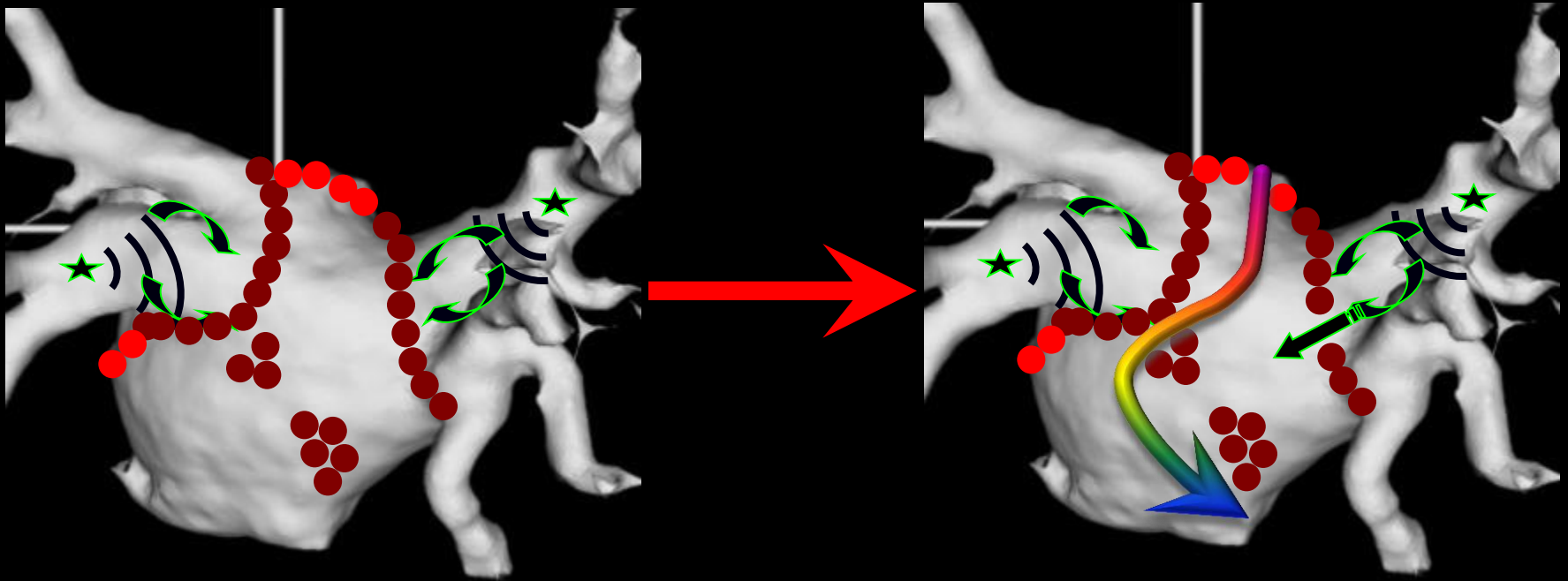
“Normal”
AF EGM:



CFAE:



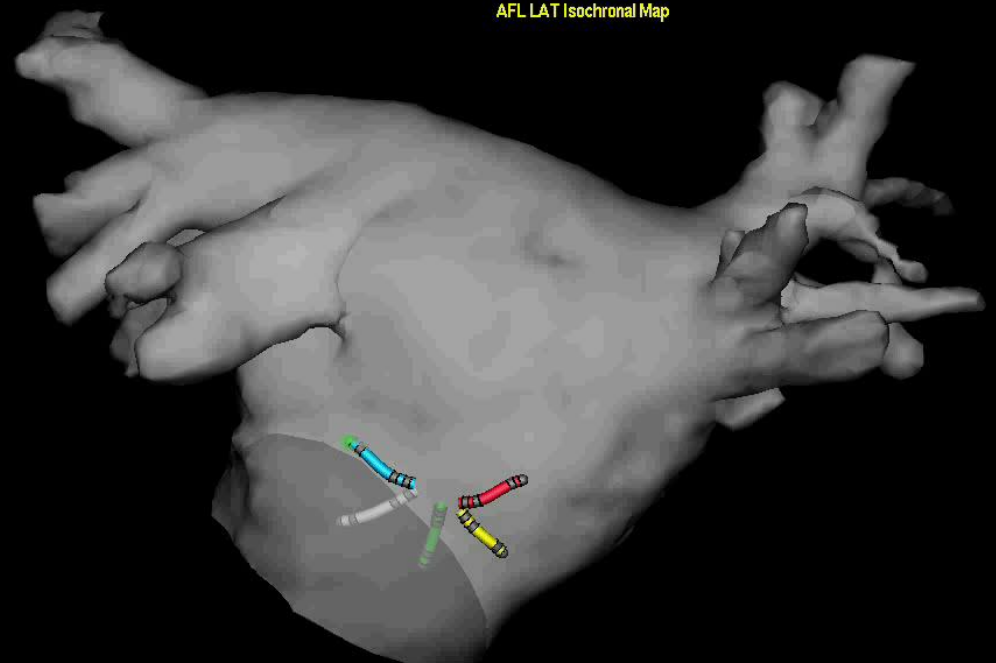
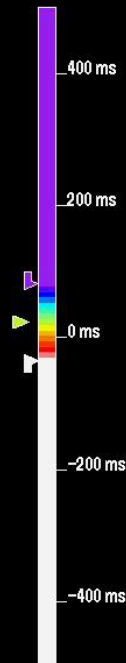
Persistent AF: Why does ablation fail?



Atypical Flutter: Multielectrode Mapping



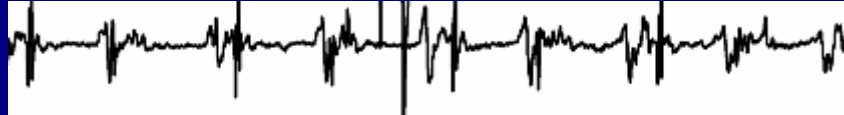
AFL LAT Isochronal Map



Ablation in Persistent AF: What is the future?

Old Approach: CFAE Ablation

“Normal”
AF EGM:

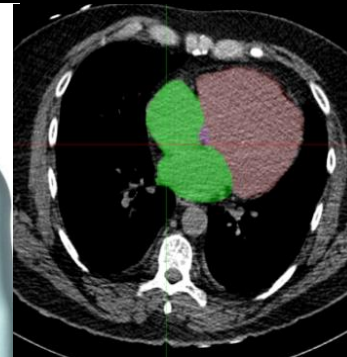
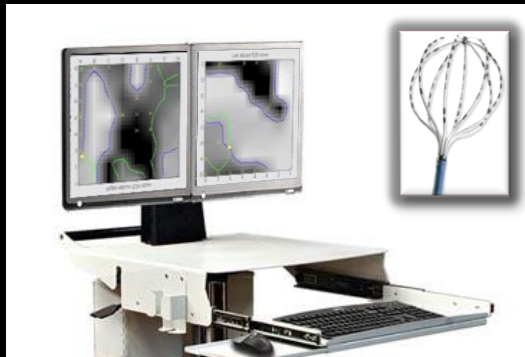


CFAE:



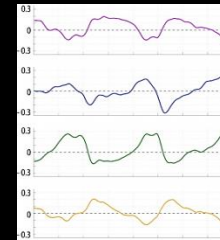
“New” Approach: Identifying AF Rotors/Sources

1. FIRM: Focal Impulse and Rotor Modulation
2. “Panoramic” Body Surface Mapping

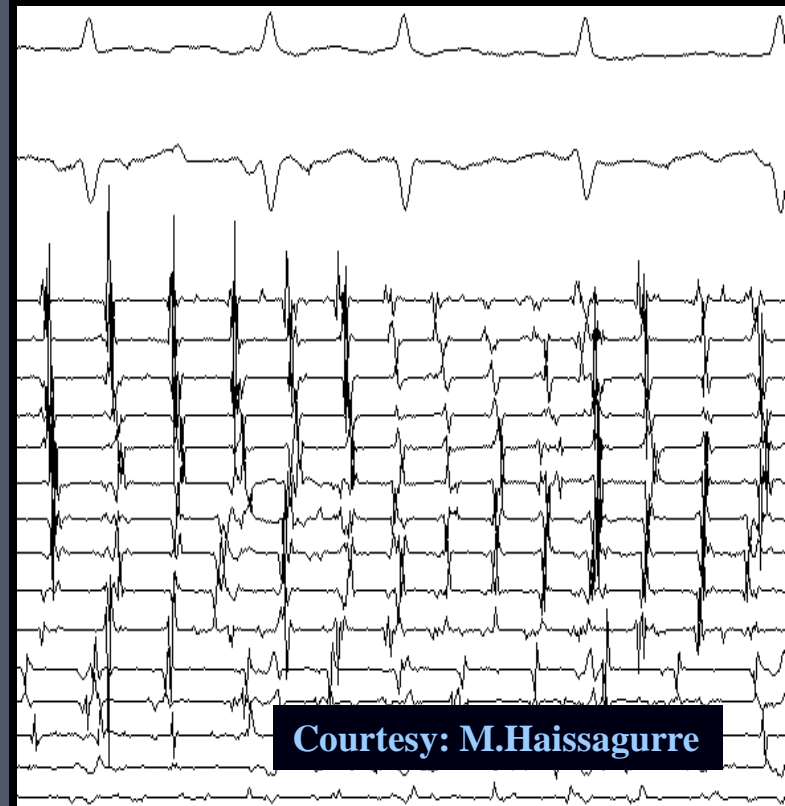


Case Example:

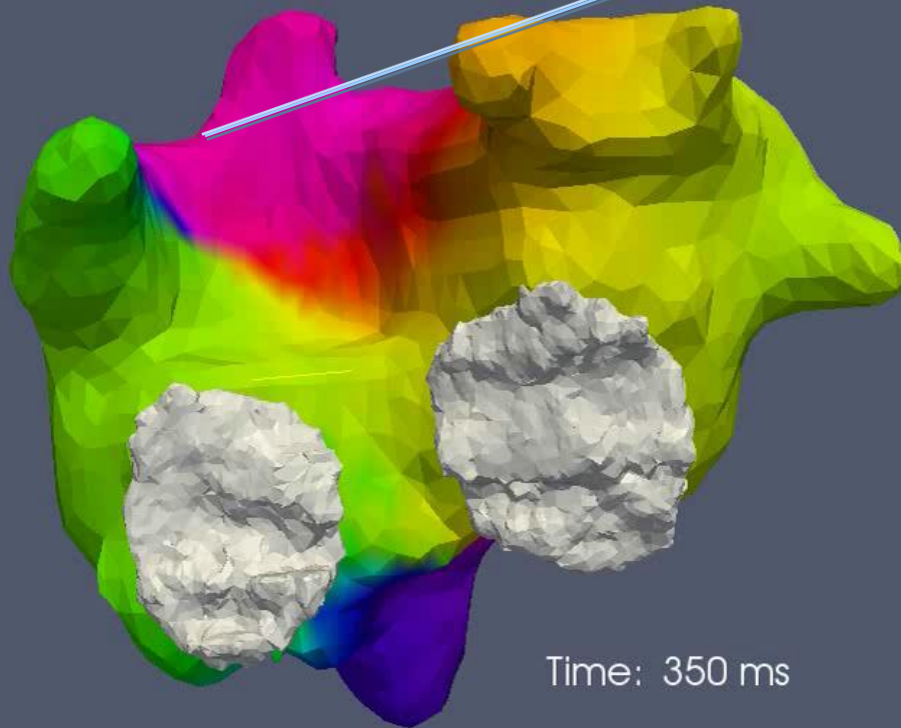
54y Pers AF despite prior extensive LA ablation



RAA



Courtesy: M.Haissagurre



Time: 350 ms

So Ablation improves symptoms.

Does ablation decrease stroke risk?



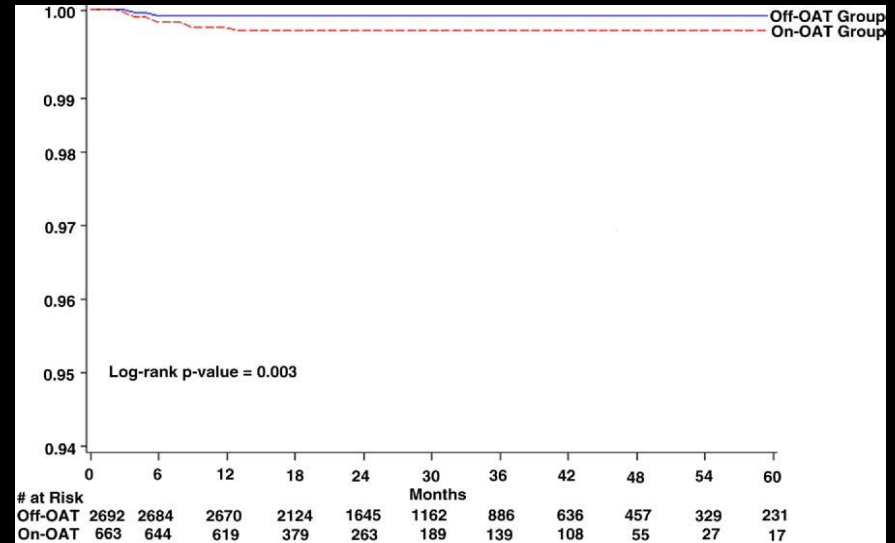
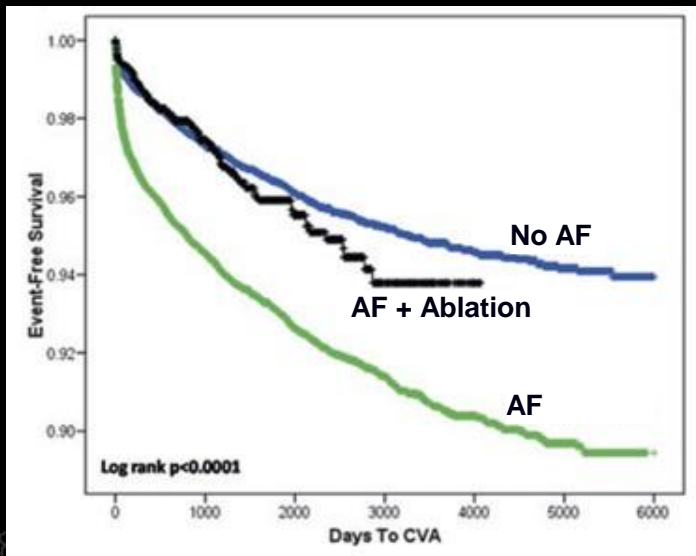
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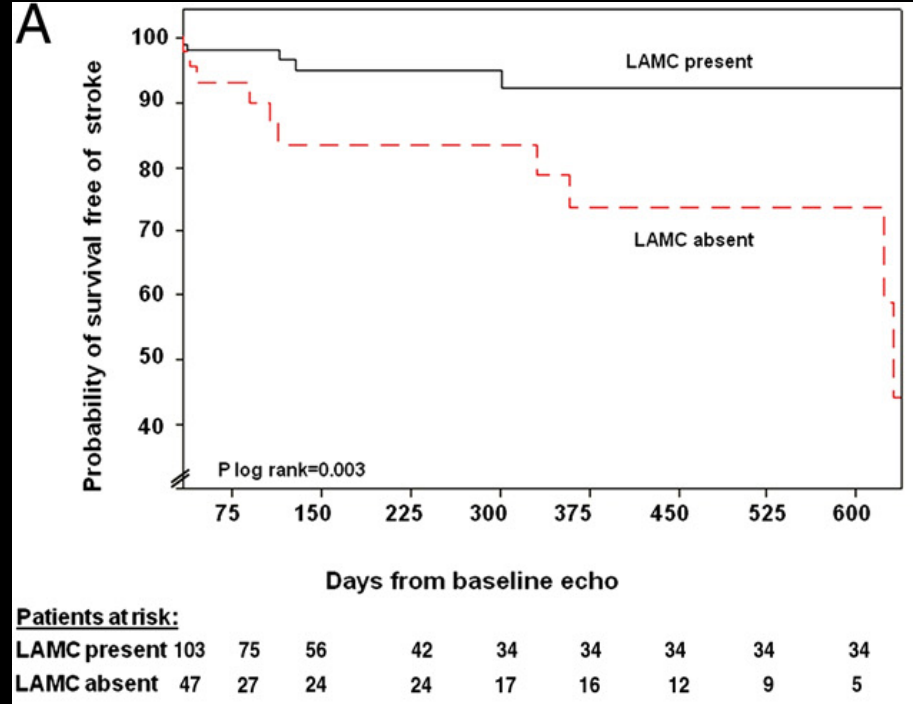
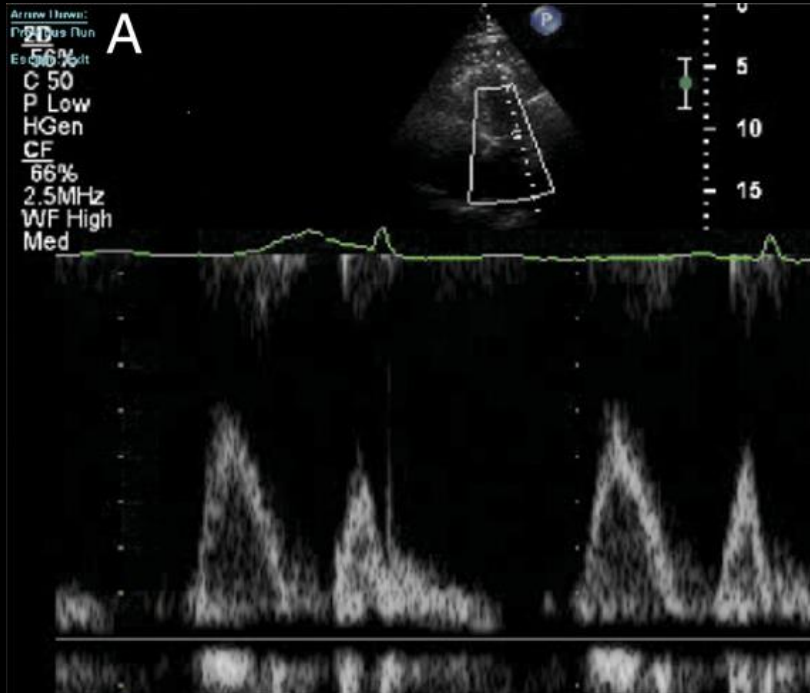
Stroke Risk After Catheter Ablation?

- 4,212 consecutive AF ablation pts
- 16,848 age/gender matched pts w/ AF
- 16,848 age/gender matched pts w/o AF



	CHADS ₂ = 0		CHADS ₂ = 1		CHADS ₂ ≥ 2	
	Off-OAT	On-OAT	Off-OAT	On-OAT	Off-OAT	On-OAT
Patients, n	1,622	155	723	261	347	247
TE, n (%)	1 (0.06)	0	1 (0.14)	1 (0.38)	0	2 (0.81)
Major hemorrhage, n (%)	0	1 (0.64)	1 (0.14)	2 (0.8)	0	10 (4)

Stroke Incidence After MAZE



Catheter Ablation as Stroke Prophylaxis? Guidelines

2006 ACC/AHA/ACC Guidelines

1. Warfarin is recommended for all patients for at least 2 months after an AF ablation procedure.
2. Decisions regarding the use of Warfarin more than 2 months after ablation should be based on the patient's risk factors for stroke and not on the presence or type of AF.
3. Discontinuation of Warfarin therapy post-ablation is generally not recommended in patients who have a CHADS₂ score ≥ 2 .

2010/2012 ESC/EHRA Guidelines

Recommendations	Class ^a	Level ^b	Ref. ^c
Continuation of OAC therapy post-ablation is recommended in patients with 1 'major' ('definitive') or ≥ 2 'clinically relevant non-major' risk factors (i.e. CHA ₂ DS ₂ -VASc score ≥ 2).	Ia	B	136

2012 HRS/EHRA/ECAS Consensus Statement

Post Ablation

- Systemic anticoagulation with warfarin or a direct thrombin or Factor Xa inhibitor is recommended for at least two months following an AF ablation procedure.
- Decisions regarding the continuation of systemic anticoagulation agents more than two months following ablation should be based on the patient's risk factors for stroke and not on the presence or type of AF.
- Discontinuation of systemic anticoagulation therapy post ablation is not recommended in patients who are at high risk of stroke as estimated by currently recommended schemes (CHADS₂ or CHA₂DS₂VASc)^{e3}.



Final Thoughts: Catheter Ablation

- Catheter Ablation of Paroxysmal AF
 - Goal is permanent PV Isolation
- Catheter Ablation of Persistent AF
 - Ideally, ablate while still paroxysmal
 - Good outcome – but with multiple procedures
- Catheter ablation of AF may be sufficient for stroke prevention in lower risk patients
- Long-term freedom from recurrent AF is not low enough in high-risk patients
- Need prospective randomized data!!!





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