Κατάλυση εμμένουσας κολπικής μαρμαρυγής

Ελάχιστα παρεμβατική (PVI only)

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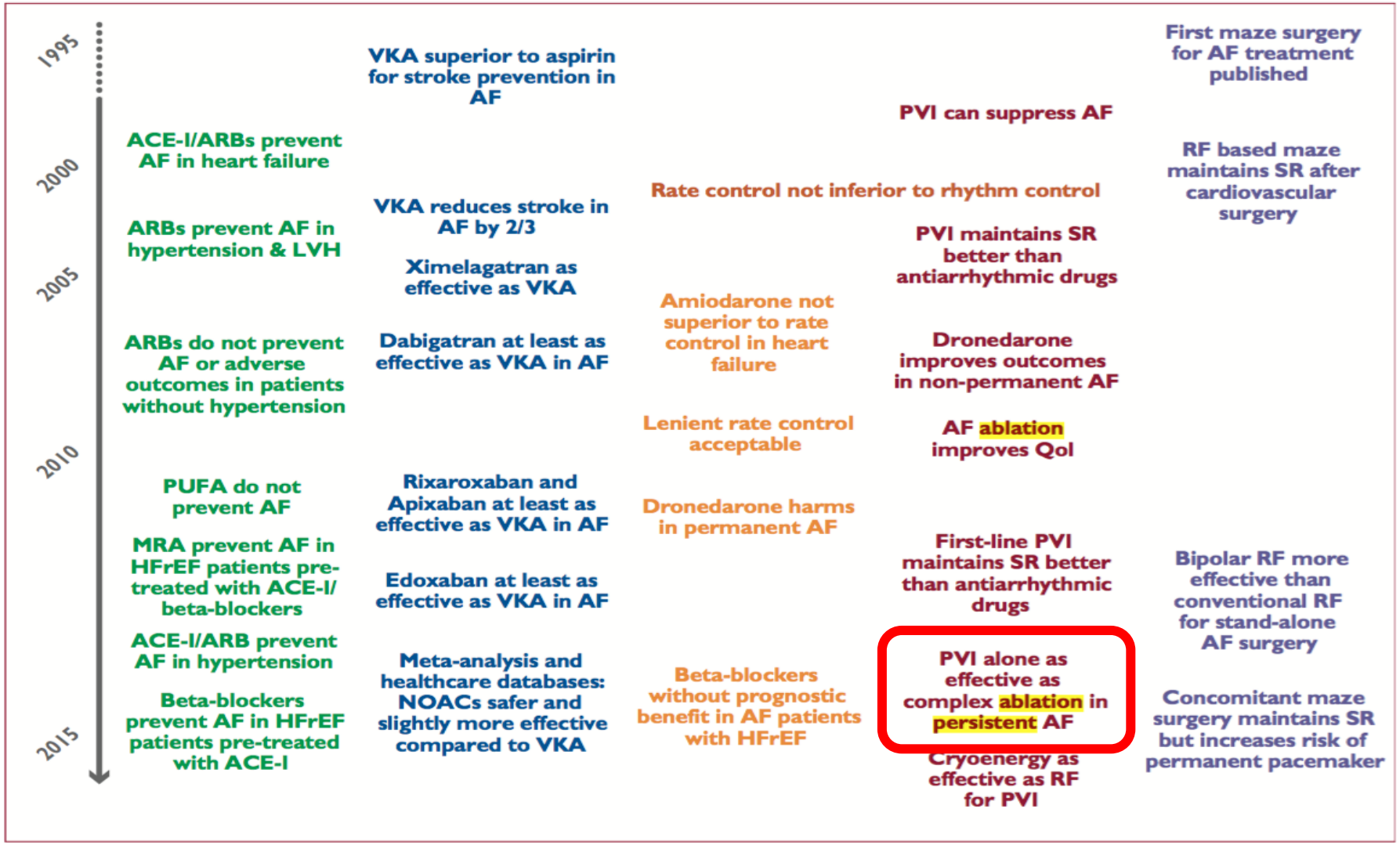
Α Καρδιολογική Κλινική/Ηλεκτροφυσιολογίας Βηματοδότησης
«Ερρίκος Ντυνάν» Hospital Center, Αθήνα

Presenter Disclosure Information

The presenter has received honoraria for participation in lectures and advisory boards from the following pharmaceutical and biotechnology companies:

- *Abbot*
- *AstraZeneca,*
- *Bard,*
- *Bayer Healthcare,*
- *Boehringer Ingelheim,*
- *Boston Scientific,*
- *Bristol-Myers Squibb,*
- *ELPEN,*
- *Galenica,*
- *Lilly,*
- *Medtronic,*
- *Menarini,*
- *MSD,*
- *Pfizer,*
- *Sanofi,*
- *Servier,*
- *Unifarma,*
- *Vianex.*

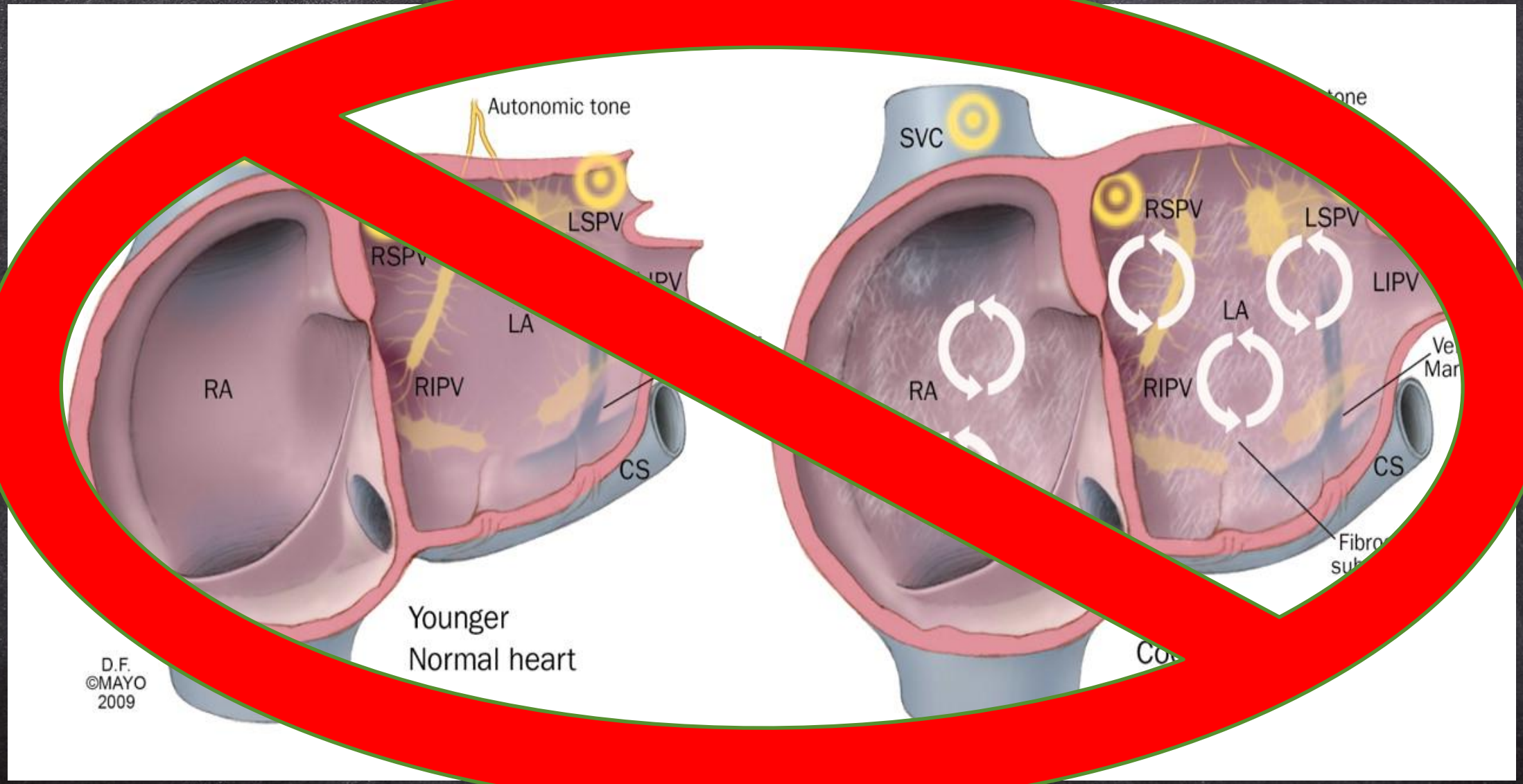
2016 ESC/EACTS Guidelines for the management of atrial fibrillation



ACE-I = angiotensin-converting enzyme inhibitor; AF = atrial fibrillation; ARB = angiotensin receptor blocker; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; LVH = left ventricular hypertrophy; NOAC = non-vitamin K antagonist oral anticoagulant; PUFA = polyunsaturated fatty acid; PVI = pulmonary vein isolation; QoL = quality of life; RF = radiofrequency; SR = sinus rhythm; VKA = vitamin K antagonist.

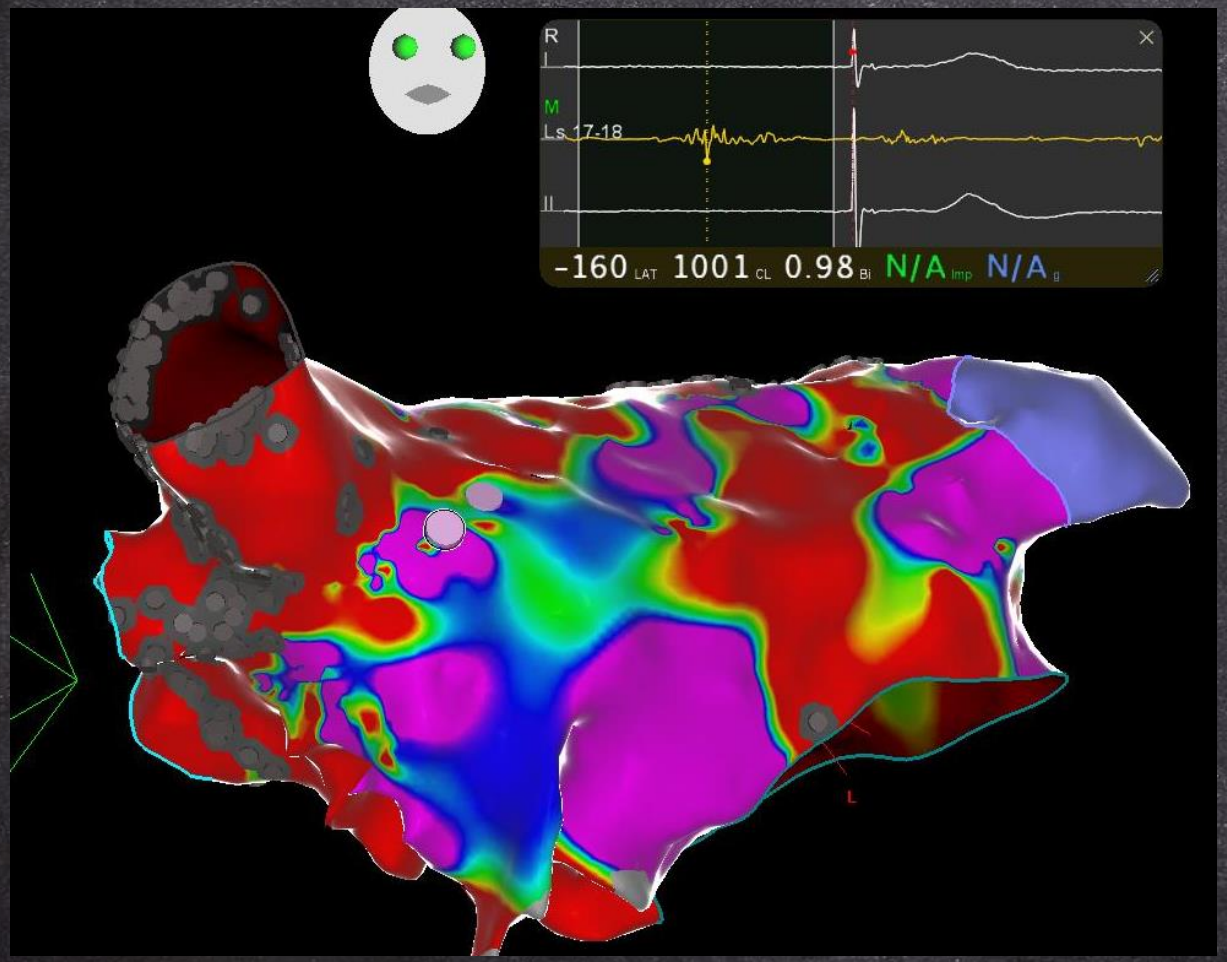
Figure 1 Timeline of findings from landmark trials in atrial fibrillation management, including treatment of concomitant conditions and prevention (green), anticoagulation (blue), rate control therapy (orange), rhythm control therapy (red), and atrial fibrillation surgery (purple).

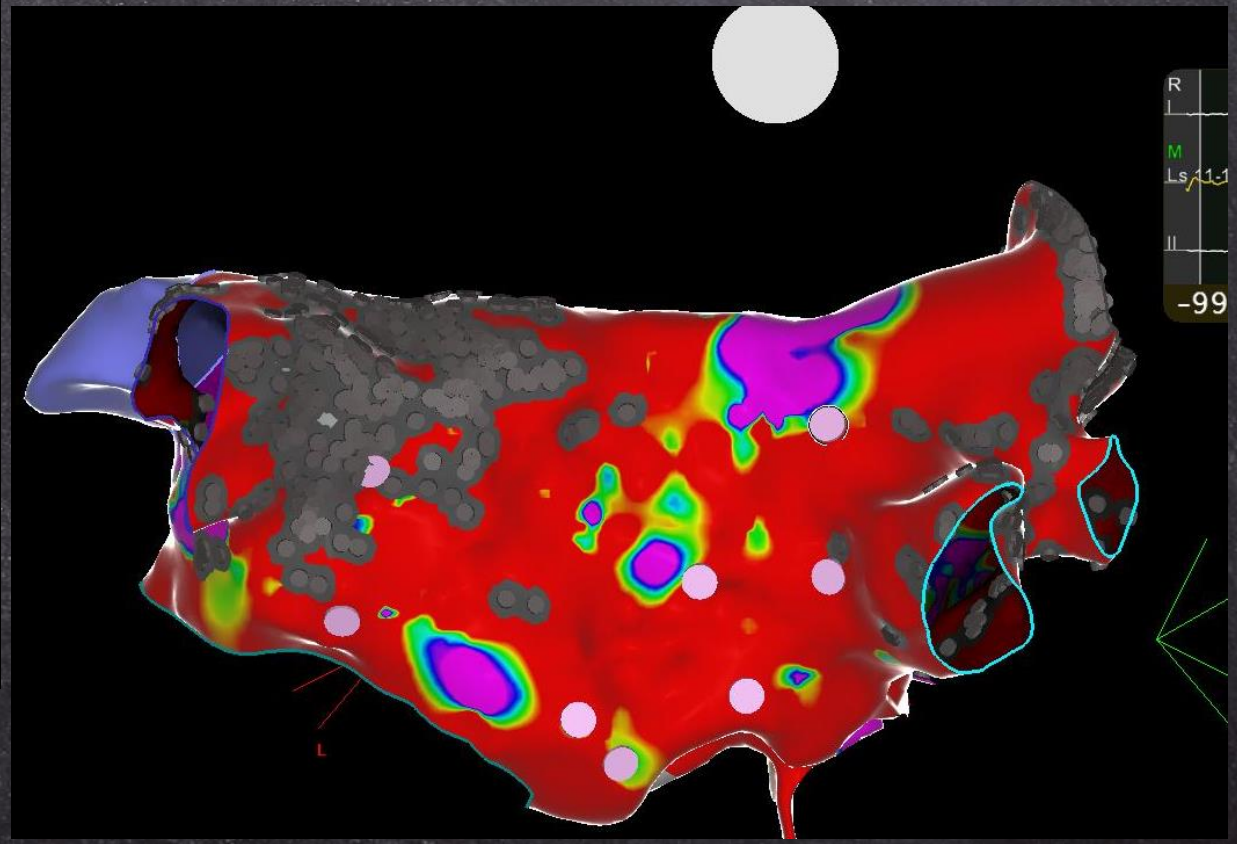
Paroxysmal vs Persistent AF



Crandall M A et al. Mayo Clin Proc. 2009;84:643-662

ΕΜΜΕΝΟΥΣΑ ΚΟΛΠΙΚΗ ΜΑΡΜΑΡΥΓΗ ΣΕ ΑΣΘΕΝΗ ΜΕ ΑΡΡΥΘΜΙΟΓΟΝΟ ΜΥΟΚΑΡΔΙΟΠΑΘΕΙΑ ΠΟΥ ΠΡΟΣΗΛΘΕ ΓΙΑ ΚΑΤΑΛΥΣΗ ΜΕΤΑ ΤΟ 1^{Ο} ΕΠΕΙΣΟΔΙΟ ΕΜΜΕΝΟΥΣΑΣ ΚΟΛΠΙΚΗΣ ΜΑΡΜΑΡΥΓΗΣ





Αρχείο Γ.Ανδρικόπουλου, Οκτώβριος 2019

Atrial Fibrillation Burden Specifically Determines Human Ventricular Cellular Remodeling

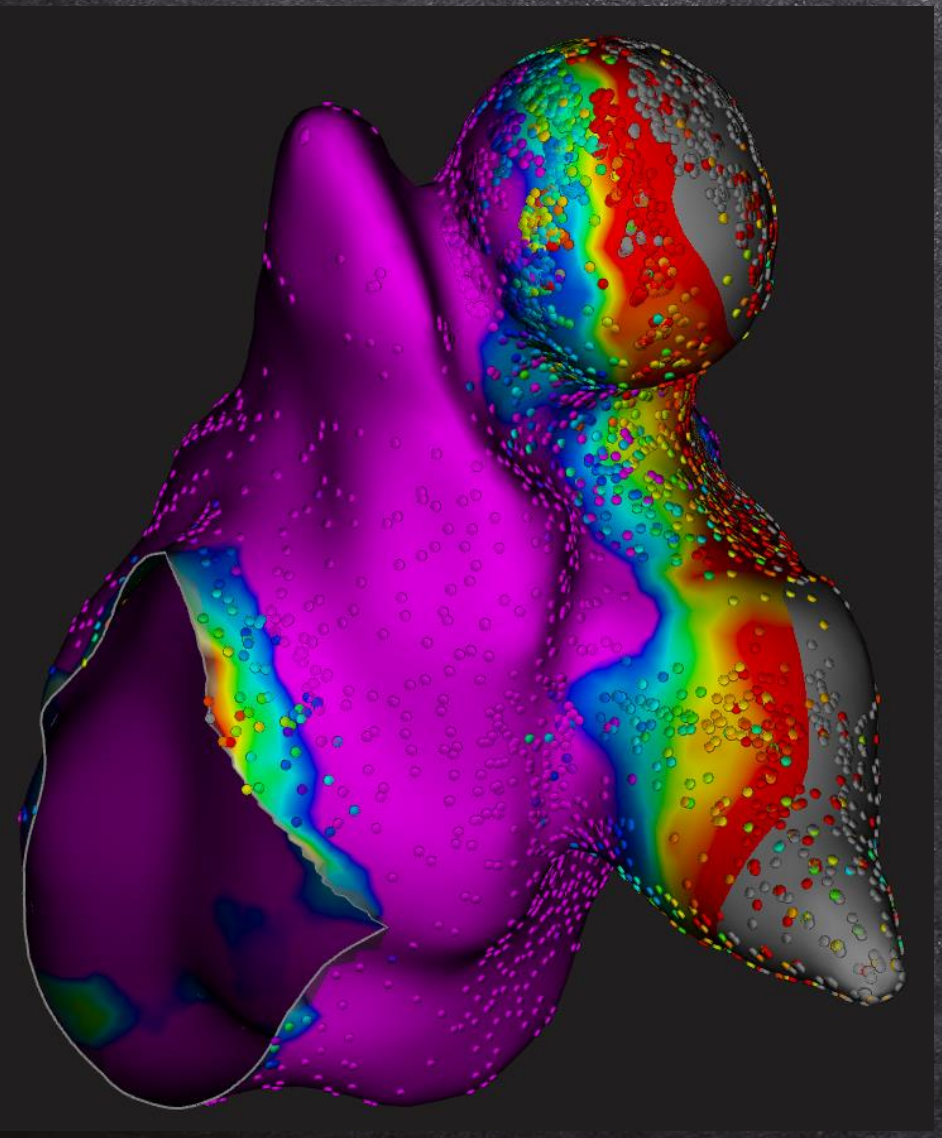
Methods: To study the ventricular effects of different AF burdens, experiments were performed using human ventricular induced pluripotent stem cell-derived cardiomyocytes undergoing in vitro AF simulation. Epifluorescence microscopy, action potential measurements, and measurements of sarcomere regularity were conducted.

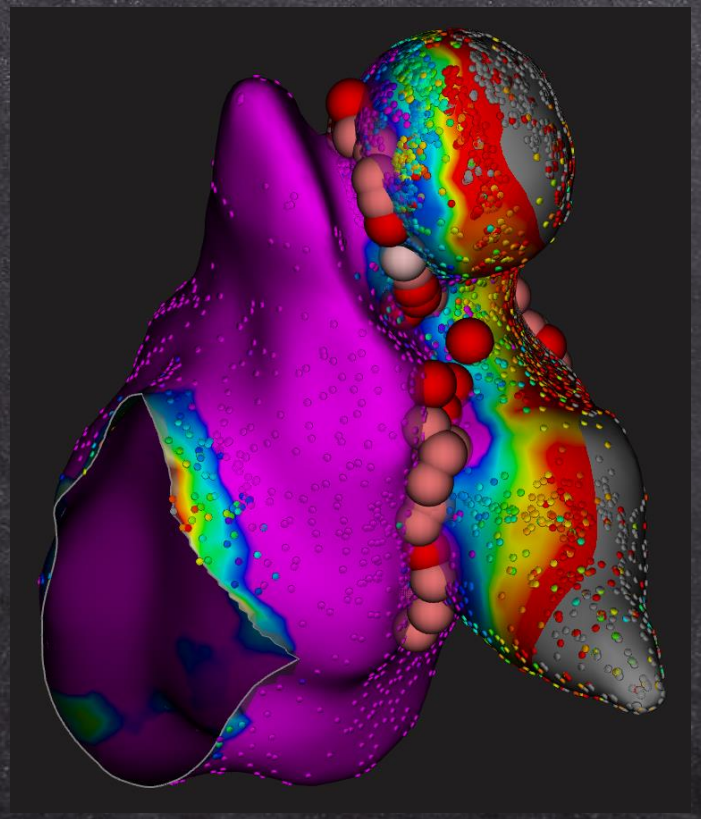
A significant decrease of sarcomere regularity could explain impaired cardiac contractility in patients with high AF burden. These effects were more pronounced after 7 days of AF simulation compared with 48 hours

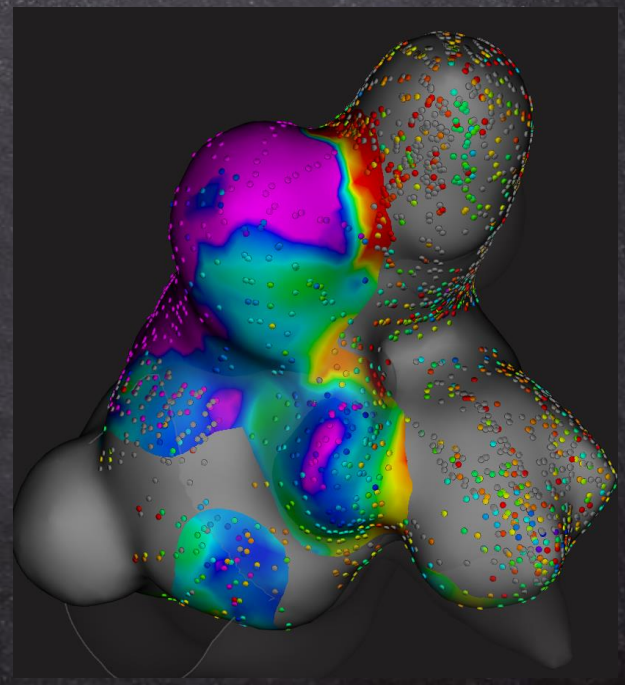
Conclusions: Significant functional and structural alterations occurred at the cellular level **at a threshold of ~50% AF burden** as it was observed to be harmful in the CASTLE-AF trial. Therefore, these translational results may help to understand the findings of the CASTLE-AF trial.

Kort T., et al. JACC Clin Electrophysiol 2022 Nov;8(11):1357-1366.

Ασθενής 38 ετών με εμμένουσα ΚΜ αγνώστου ενάρξεως, διάταση ΑΡ κόλπου και συχνές υποτροπές ΚΜ και ΚΤ μετά το πρώτο ablation (9/2022 - PFA)

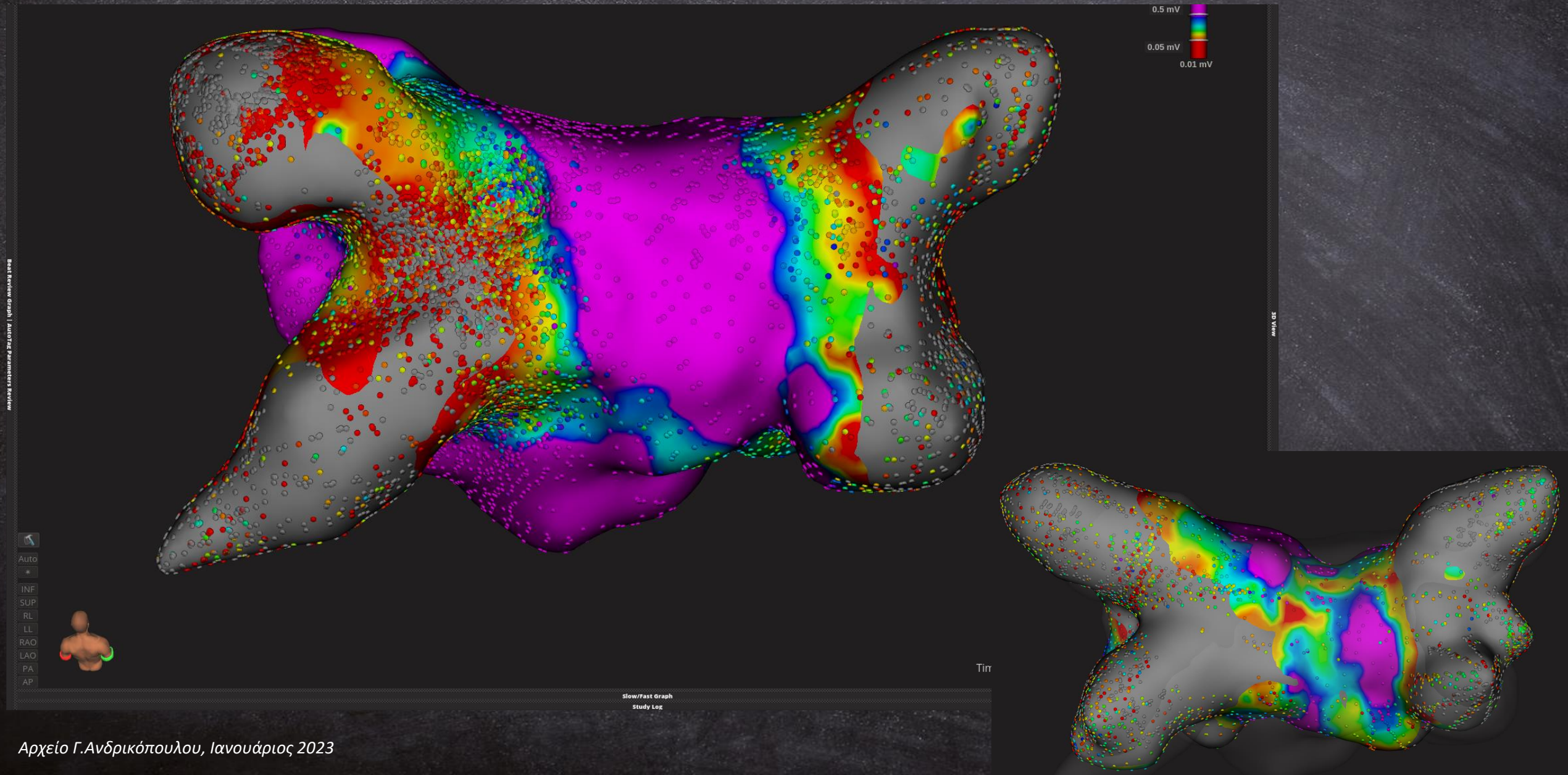






Αρχείο Γ.Ανδρικόπουλου, Ιανουάριος 2023

Ασθενής 38 ετών με εμμένουσα ΚΜ αγνώστου ενάρξεως, διάταση ΑΡ κόλπου και συχνές υποτροπές ΚΜ και ΚΤ μετά το πρώτο ablation (9/2022 - PFA)



Αρχείο Γ.Ανδρικόπουλου, Ιανουάριος 2023

Repeat catheter ablation for recurrent atrial fibrillation: Electrophysiologic findings and clinical outcomes

[1]Division of Cardiology, Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

[2]Department of Biostatistics, Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, USA

- 300 patients who underwent their first repeat AF ablations for symptomatic, recurrent AF
- All repeat ablations were performed using RF energy, 78% RF for 1st ablation
- 67% at SR before repeat ablation

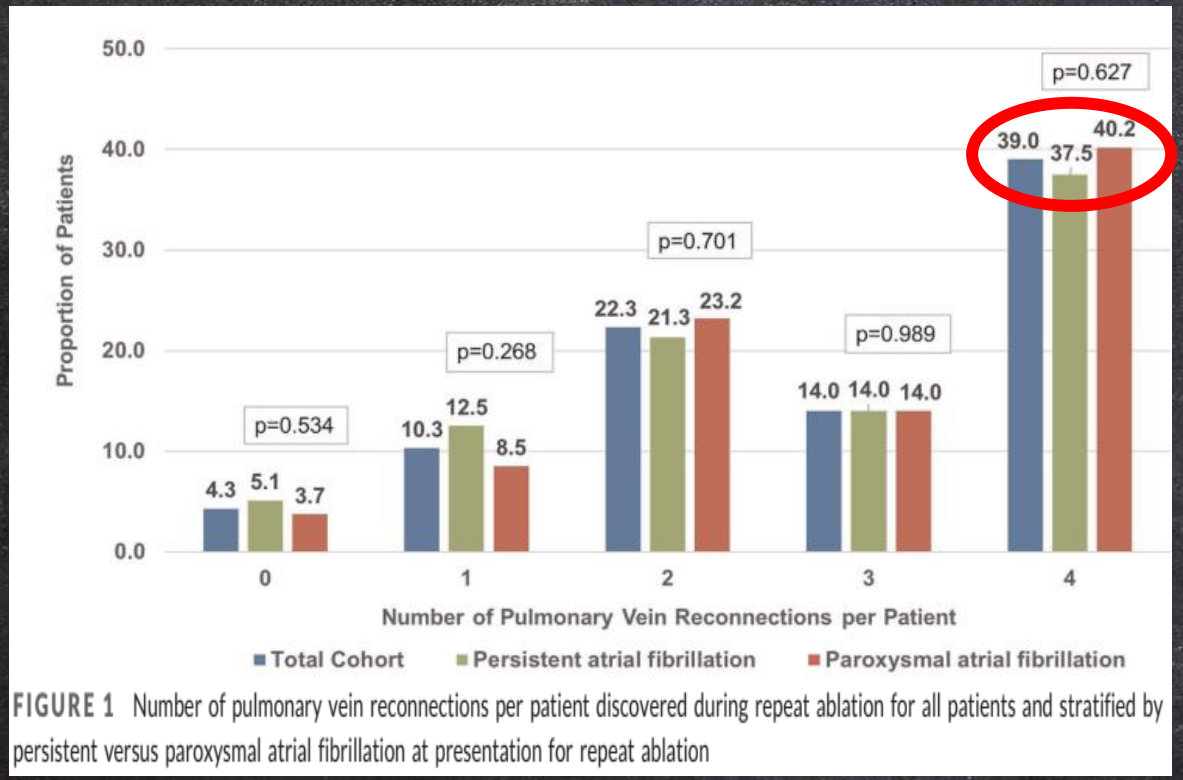


FIGURE 1 Number of pulmonary vein reconnections per patient discovered during repeat ablation for all patients and stratified by persistent versus paroxysmal atrial fibrillation at presentation for repeat ablation

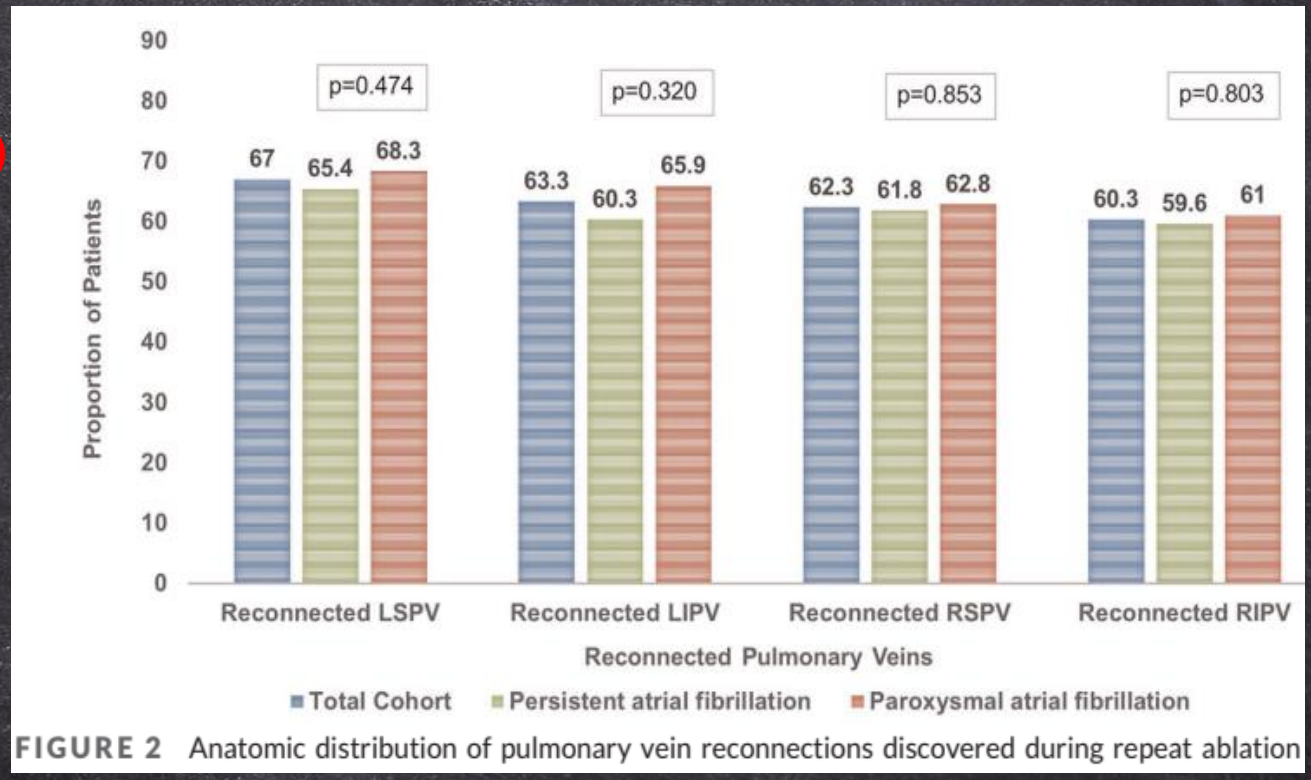


FIGURE 2 Anatomic distribution of pulmonary vein reconnections discovered during repeat ablation

"During repeat ablation, at least one PV reconnection was found in 257 (85.6%) patients, while 159 (53%) had three to four reconnections"

Daimee UA, et al. Akhtar T, Boyle TA, Jager L, Arbab-Zadeh A, Marine JE, Berger RD, Calkins H, Spragg DD. Repeat catheter ablation for recurrent atrial fibrillation: Electrophysiologic findings and clinical outcomes. J Cardiovasc Electrophysiol. 2021 Mar;32(3):628-638.

Repeat catheter ablation for recurrent atrial fibrillation: Electrophysiologic findings and clinical outcomes

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- All repeat ablations were performed using RF energy, 78% RF for 1st ablation
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3.5 | Repeat AF ablation strategies

All repeat ablations were performed using RF energy. Re-isolation of the PVs was performed in all patients, with additional non-PV ablation in 171 (57%) patients. The most common non-PV lesions involved the LA roof ($n = 89$, 29.7%), CTI ($n = 64$, 21.3%), LA posterior wall ($n = 51$, 17%), and the mitral isthmus ($n = 26$, 8.7%).

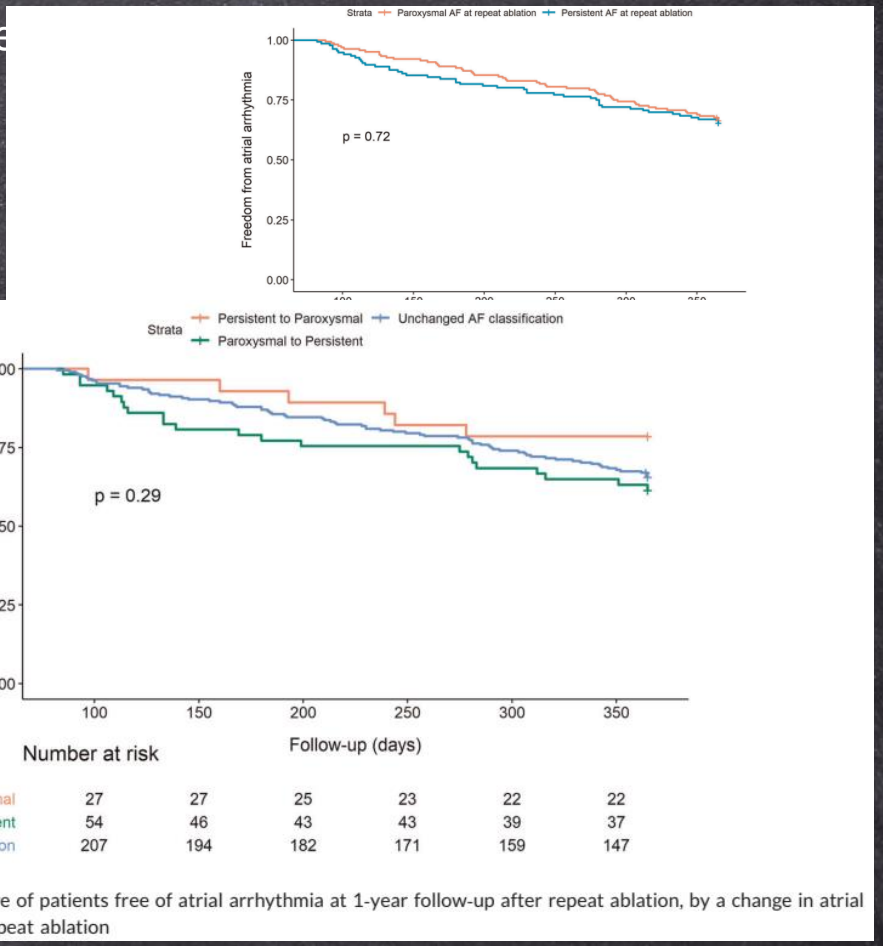
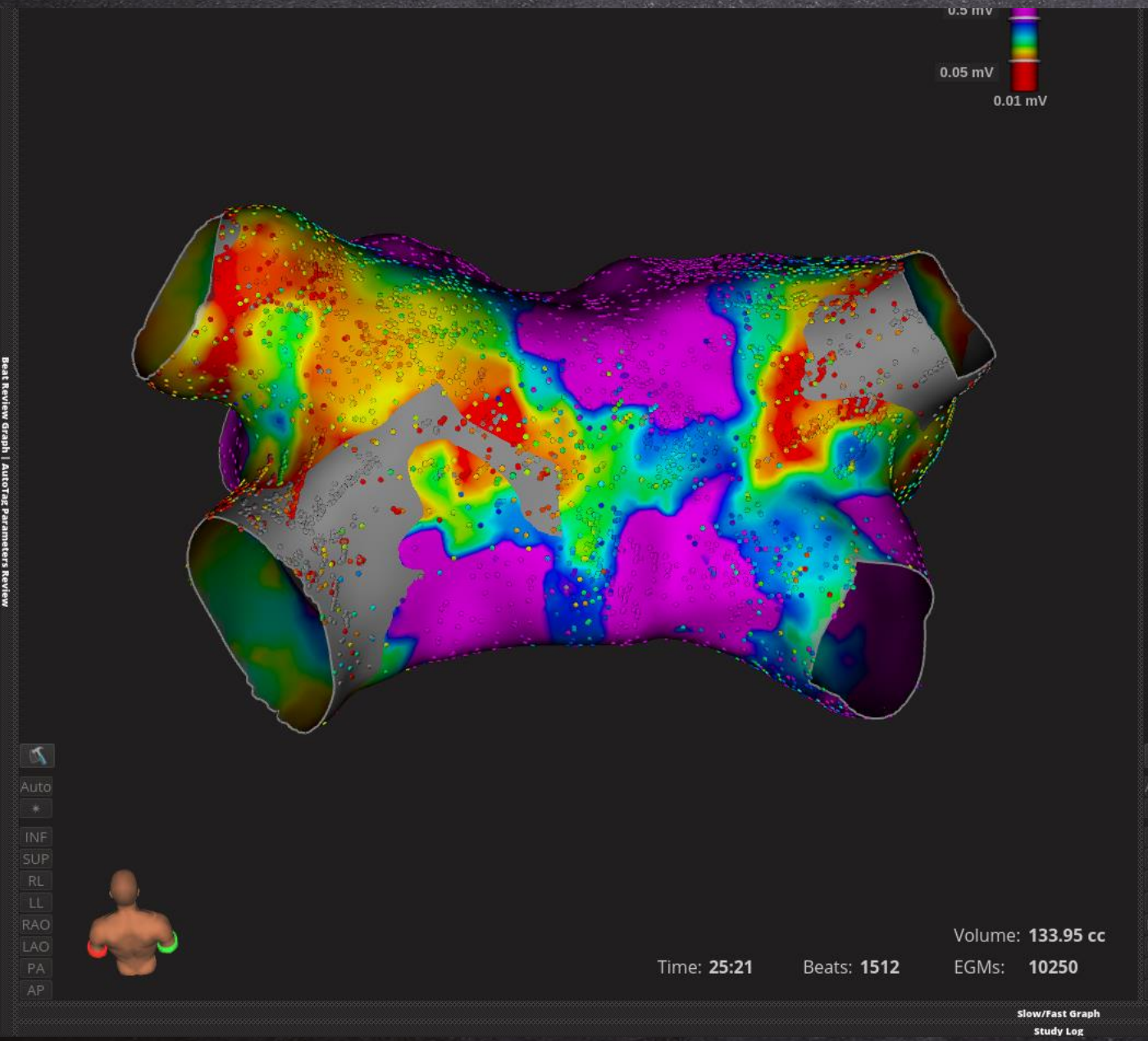


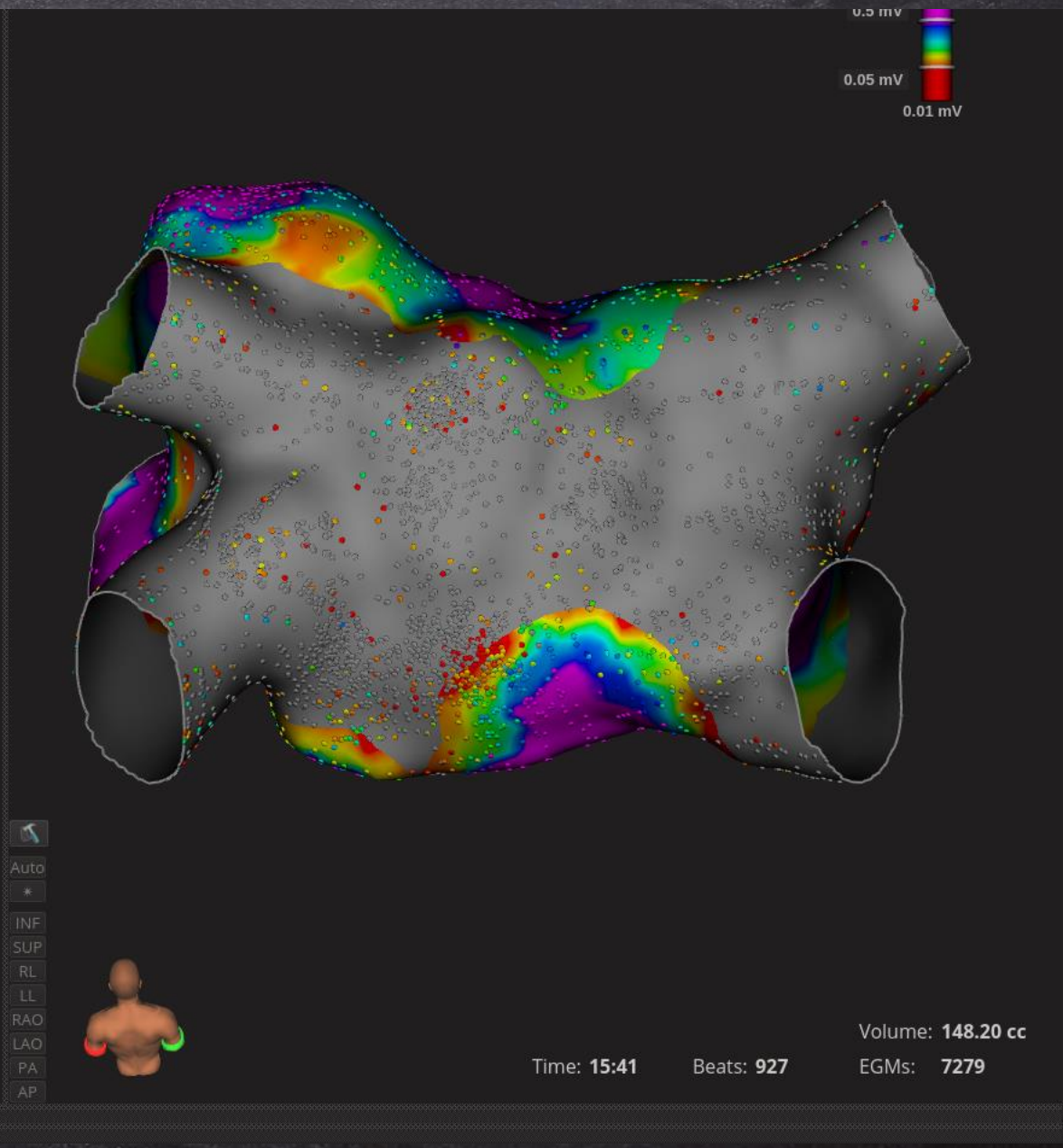
FIGURE 5 Kaplan–Meier survival curve of patients free of atrial arrhythmia at 1-year follow-up after repeat ablation, by a change in atrial fibrillation classification from index to repeat ablation

During repeat ablation, at least one PV reconnection was found in 257 (85.6%) patients, while 159 (53%) had three to four reconnections

Daimee UA, et al. Akhtar T, Boyle TA, Jager L, Arbab-Zadeh A, Marine JE, Berger RD, Calkins H, Spragg DD. Repeat catheter ablation for recurrent atrial fibrillation: Electrophysiologic findings and clinical outcomes. J Cardiovasc Electrophysiol. 2021 Mar;32(3):628-638.

Posterior Wall Isolation?

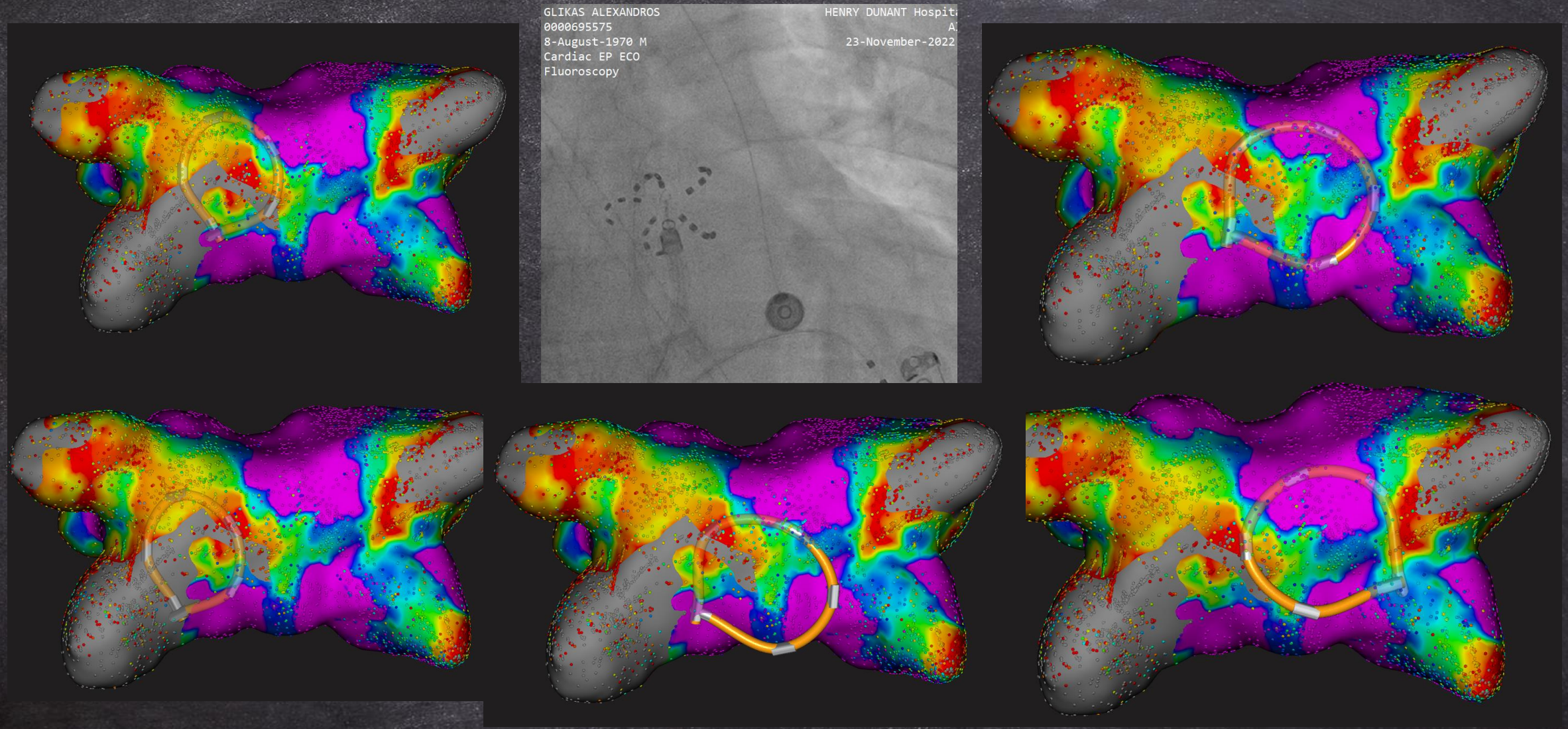




Ερρίκος Ντυνάν Hospital Center, Νοέμβριος 2022

Ασθενής 52 ετών, απουσία οργανικής καρδιοπάθειας, συχνά επεισόδια ρυθμικής ταχυκαρδίας τελευταίο 6μηνο

AF ablation 2016 (cryo – άλλο κέντρο) - AF ablation 2019 (RF Rhythmia – Ερρίκος Ντυνάν)



Posterior Wall Isolation?

Ερρίκος Ντυνάν Hospital Center, Νοέμβριος 2022

This Issue | Views 10,620 | Citations 0 | Altmetric 125

Original Investigation

January 10, 2023

Effect of Catheter Ablation Using Pulmonary Vein Isolation With vs Without Posterior Left Atrial Wall Isolation on Atrial Arrhythmia Recurrence in Patients With Persistent Atrial Fibrillation

The CAPLA Randomized Clinical Trial

Question Does adding posterior wall isolation (PWI) to pulmonary vein isolation (PVI) improve success in patients with persistent atrial fibrillation (AF) undergoing first-time catheter ablation?

Findings In this randomized clinical trial that included 338 patients with persistent AF, there was no significant difference in 12-month freedom from recurrent atrial arrhythmia after a single procedure and without antiarrhythmic medication among those with PVI and PWI compared with PVI alone (52.4% vs 53.6%, respectively; hazard ratio, 0.99).

Meaning Among patients with persistent AF undergoing first-time catheter ablation, the addition of PWI to PVI did not improve freedom from atrial arrhythmias compared with PVI alone.

Results Among 338 patients randomized (median age, 65.6 [IQR, 13.1] years; 76.9% men), 330 (97.6%) completed the study. After 12 months, 89 patients (52.4%) assigned to PVI with PWI were free from recurrent atrial arrhythmia without antiarrhythmic medication after a single procedure, compared with 90 (53.6%) assigned to PVI alone (between-group difference, -1.2%; hazard ratio [HR], 0.99 [95% CI, 0.73-1.36]; *P* = .98). Of the secondary end points, 9 showed no significant difference, including freedom

Mean procedural times (142 [SD, 69] vs 121 [SD, 57] minutes, P < .001) and ablation times (34 [SD, 21] vs 28 [SD, 12] minutes, P < .001) were significantly shorter for PVI alone. There were 6 complications for PVI with PWI and 4 for PVI alone

CAPLA reminds *all* clinicians that before accepting new approaches, especially more aggressive ones, testing in adequately powered, well-conducted randomized trials ought to be required. This trial strengthens my belief that the greatest advance in all of medicine has been the discovery of the randomized trial.

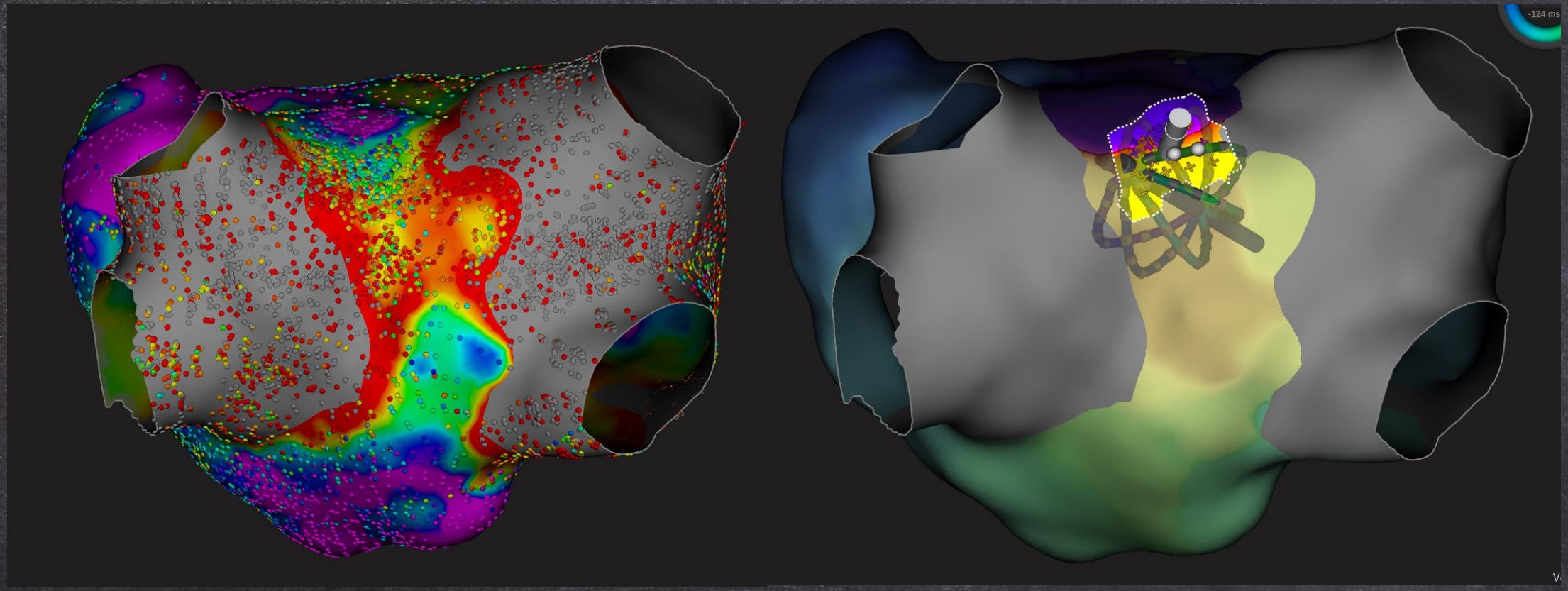
(comments by John Mandrola, Louisville, Kentucky)

Kistler PM, et al. JAMA 2023 Jan 10;329(2):127-135

LA Roof “Line” with PFA

Αρχείο Γ.Ανδρικόπουλου, Νοέμβριος 2022

Roof-depended flutter 7 χρόνια μετά από επέμβαση κρυοκατάλυσης εμμένουσας κολπικής μαρμαρυγής

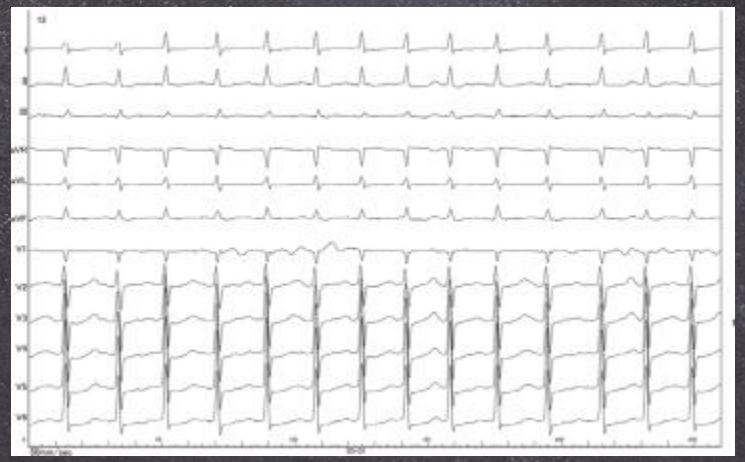


Αρχείο Γ.Ανδρικόπουλου, 2021

Roof-dependent atrial flutter with epicardial conduction pathway masked by left atrium posterior wall debulking ablation

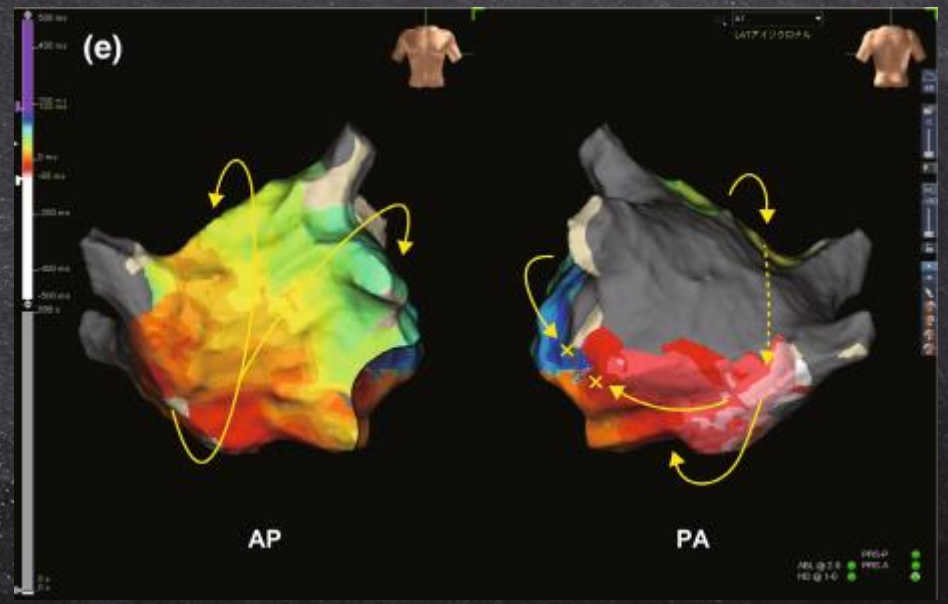
Abstract

Roof-dependent atrial flutter (AFL) is a major tachyarrhythmia rotating in the left atrium (LA). Here, we describe a case of roof-dependent AFL during atrial fibrillation ablation. LA posterior wall (LAPW) debulking ablation was performed before the induction. Atrial tachycardia (AT) was induced by burst pacing, and the 3D mappings showed a focal pattern from the LA inferior area. The post-pacing interval from the roof and bottom line corresponded to the AT cycle length. The LAPW debulking ablation masked roof-dependent AFL due to the lack of endocardium potentials in the LAPW. We report that roof-dependent AFL connected by epicardium fibers.



4 | CONCLUSIONS

Left atrium posterior wall debulking ablation masked roof-dependent AFL because of the lack of endocardium potentials. Ethanol infusion into the VOM is possible to effectively ablate epicardium fibers.



Ishimura M., et al. Ann Noninvasive Electrocardiol. 2023;28:e1299

J Interv Card Electrophysiol. 2022 Oct 1. doi: 10.1007/s10840-022-01378-8. Online ahead of print.

The Maine vein of Marshall ethanol experience: learning curve and safety

Methods: One hundred twenty nine atrial ablation cases wherein VOM ethanol infusion was attempted were identified from the time of the program's inception in 2019 at Maine Medical Center (Portland, ME). Our technical approach, procedural success, and complications were adjudicated from the medical record.

Results: The overall VOM ethanol infusion success was 90%. Infusion success rates improved and fluoroscopy utilization decreased with experience. Arrhythmia recurrence was 14% after a mean follow-up of 9.5 months. Complications occurred in 5.4% of patients, including a **3.1% risk of delayed tamponade**.

Conclusion: In our single center experience, VOM ethanol infusion was feasible with a high technical success rate. These positive results are balanced against a concerning rate of delayed tamponade.

Effect of Catheter Ablation With Vein of Marshall Ethanol Infusion vs Catheter Ablation Alone on Persistent Atrial Fibrillation

The VENUS Randomized Clinical Trial

IMPORTANCE Catheter ablation of persistent atrial fibrillation (AF) has limited success. Procedural strategies beyond pulmonary vein isolation have failed to consistently improve results. The vein of Marshall contains innervation and AF triggers that can be ablated by retrograde ethanol infusion.

OBJECTIVE To determine whether vein of Marshall ethanol infusion could improve ablation results in persistent AF when added to catheter ablation.

DESIGN, SETTING, AND PARTICIPANTS The Vein of Marshall Ethanol for Untreated Persistent AF (VENUS) trial was an investigator-initiated, National Institutes of Health–funded, randomized, single-blinded trial conducted in 12 centers in the United States. Patients (N = 350) with persistent AF referred for first ablation were enrolled from October 2013 through June 2018. Follow-up concluded in June 2019.

INTERVENTIONS Patients were randomly assigned to catheter ablation alone (n = 158) or catheter ablation combined with vein of Marshall ethanol infusion (n = 185) in a 1:1.15 ratio to accommodate for 15% technical vein of Marshall ethanol infusion failures.

MAIN OUTCOMES AND MEASURES The primary outcome was freedom from AF or atrial tachycardia for longer than 30 seconds after a single procedure, without antiarrhythmic drugs, at both 6 and 12 months. Outcome assessment was blinded to randomization treatment. There were 12 secondary outcomes, including AF burden, freedom from AF after multiple procedures, perimitral block, and others.

RESULTS Of the 343 randomized patients (mean [SD] age, 66.5 [9.7] years; 261 men), 316 (92.1%) completed the trial. Vein of Marshall ethanol was successfully delivered in 155 of 185 patients. At 6 and 12 months, the proportion of patients with freedom from AF/atrial tachycardia after a single procedure was 49.2% (91/185) in the catheter ablation combined with vein of Marshall ethanol infusion group compared with 38% (60/158) in the catheter ablation alone group (difference, 11.2% [95% CI, 0.8%-21.7%]; $P = .04$). Of the 12 secondary outcomes, 9 were not significantly different, but AF burden (zero burden in 78.3% vs 67.9%; difference, 10.4% [95% CI, 2.9%-17.9%]; $P = .01$), freedom from AF after multiple procedures (65.2% vs 53.8%; difference, 11.4% [95% CI, 0.6%-22.2%]; $P = .04$), and success achieving perimitral block (80.6% vs 51.3%; difference, 29.3% [95% CI, 19.3%-39.3%]; $P < .001$) were significantly improved in vein of Marshall–treated patients. Adverse events were similar between groups.

CONCLUSIONS AND RELEVANCE Among patients with persistent AF, addition of vein of Marshall ethanol infusion to catheter ablation, compared with catheter ablation alone, increased the likelihood of remaining free of AF or atrial tachycardia at 6 and 12 months. Further research is needed to assess longer-term efficacy.

A Atrial fibrillation or tachycardia occurrence after single procedure in as-randomized analysis

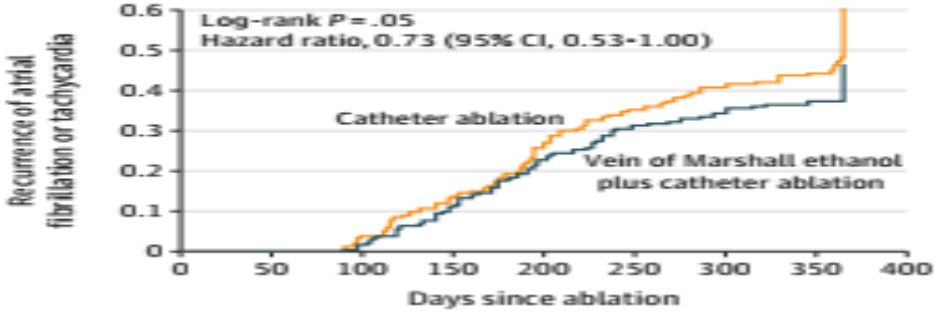
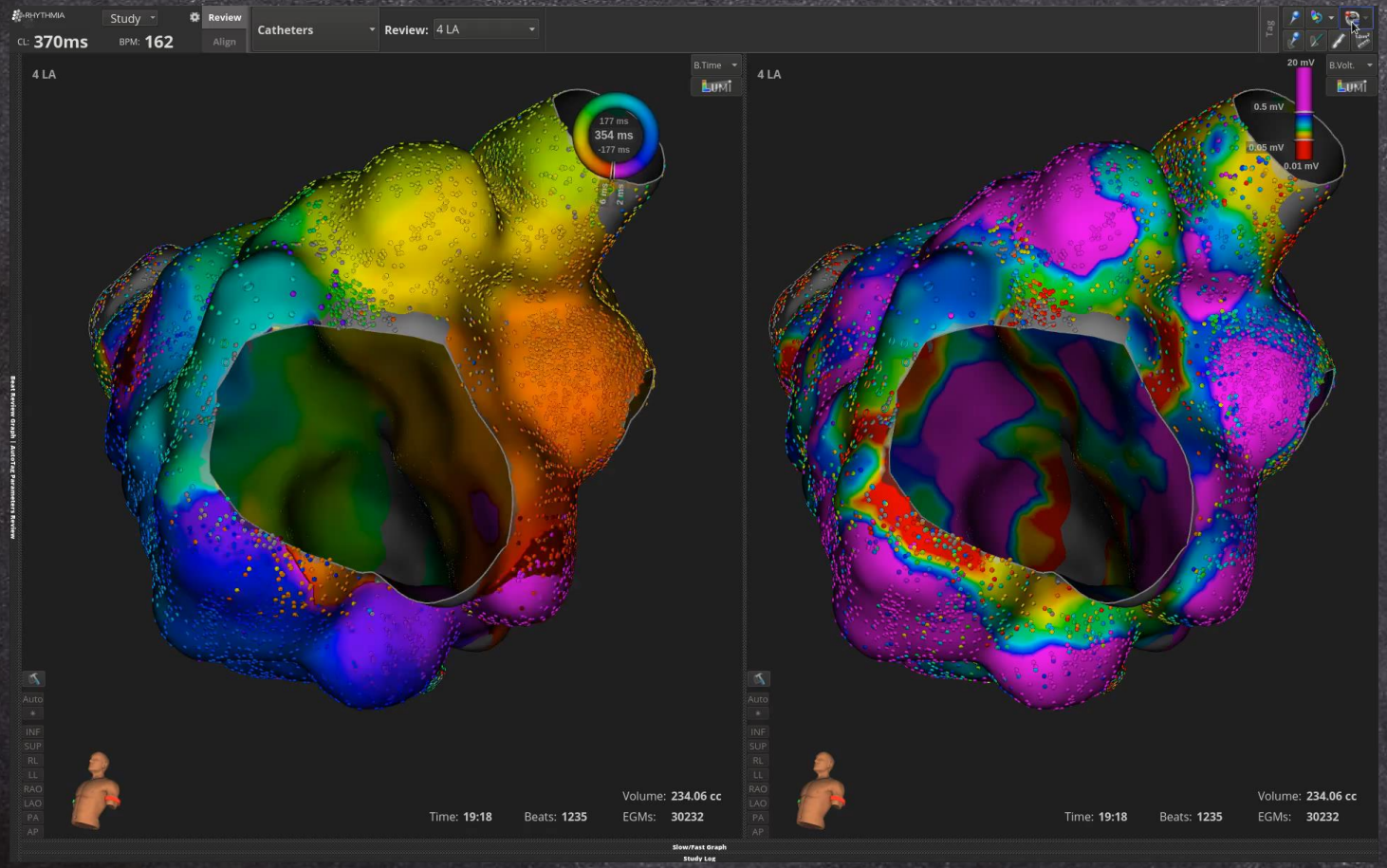


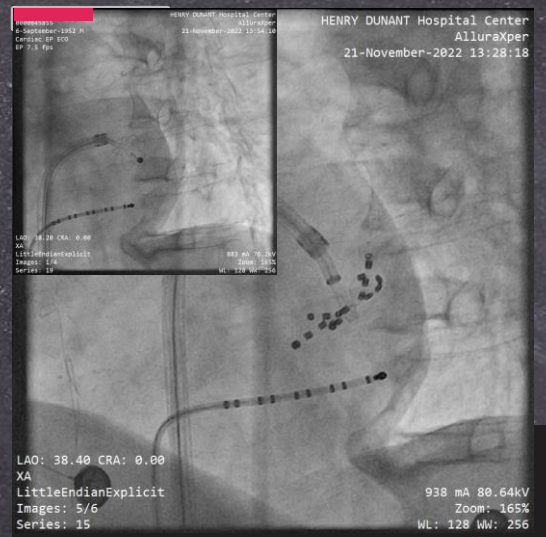
Table 3. Adverse Events

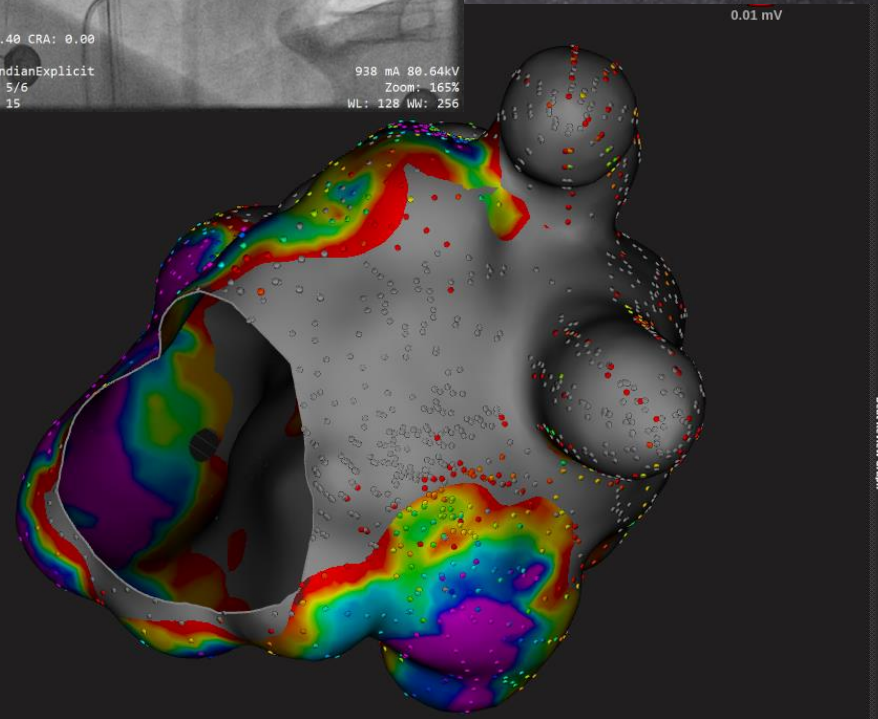
	Vein of Marshall-catheter ablation as randomized (n = 185)	Catheter ablation (n = 158)	Vein of Marshall-catheter ablation as treated (n = 155)
Intraprocedural pericardial effusion	2	1	1
Subacute pericardial effusion requiring drainage	2	2	2
Subacute pericardial effusion/pericarditis not requiring drainage	11	6	10
Vascular access complications			
Hematoma	3	6	3
Pseudoaneurysm	0	2	0
Stroke	1	2	1
Transient ischemic attack	2	2	1
Fluid overload	10	2	7
Pneumonia	3	4	2
Atrioesophageal fistula	0	0	0
Death	4[a]	2[b]	3[c]

Valderrábano M, et al. JAMA. 2020:27;324(16):1620-1628

Fluoroscopy guided “modified anterior line” with PFA (Is it another way to treat perimitral tachycardias?)



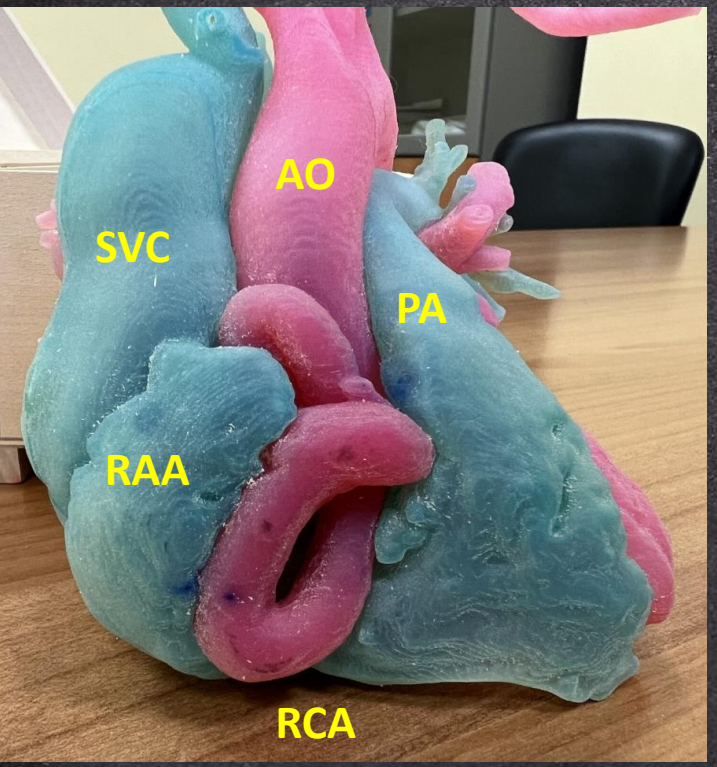


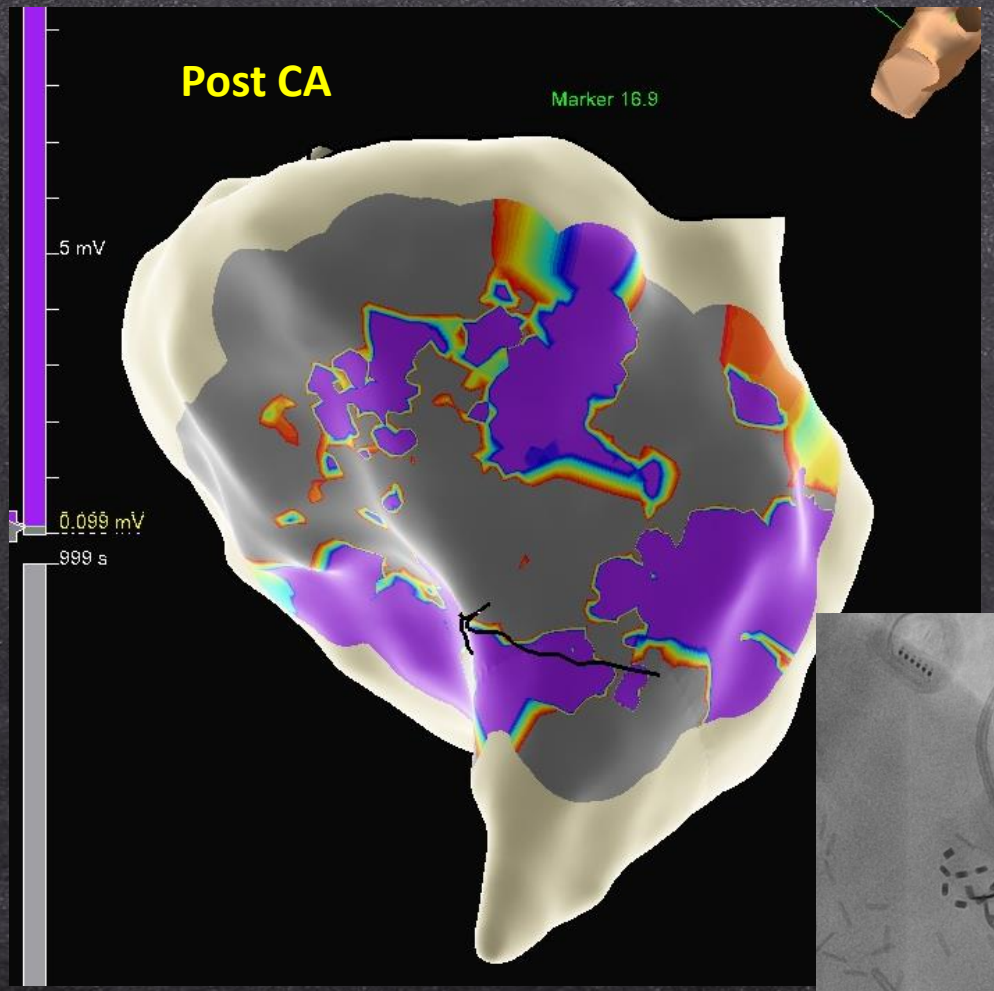


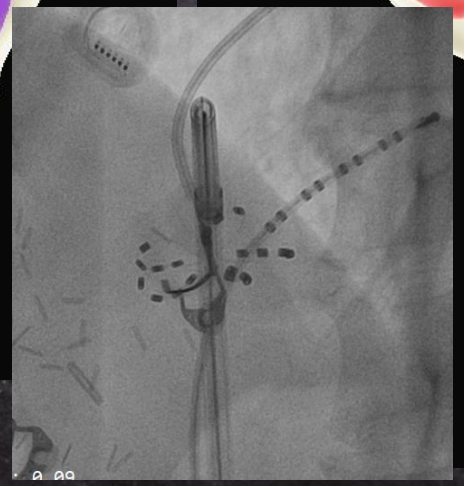
Ερρίκος Ντυνάν Hospital Center, Νοέμβριος 2022

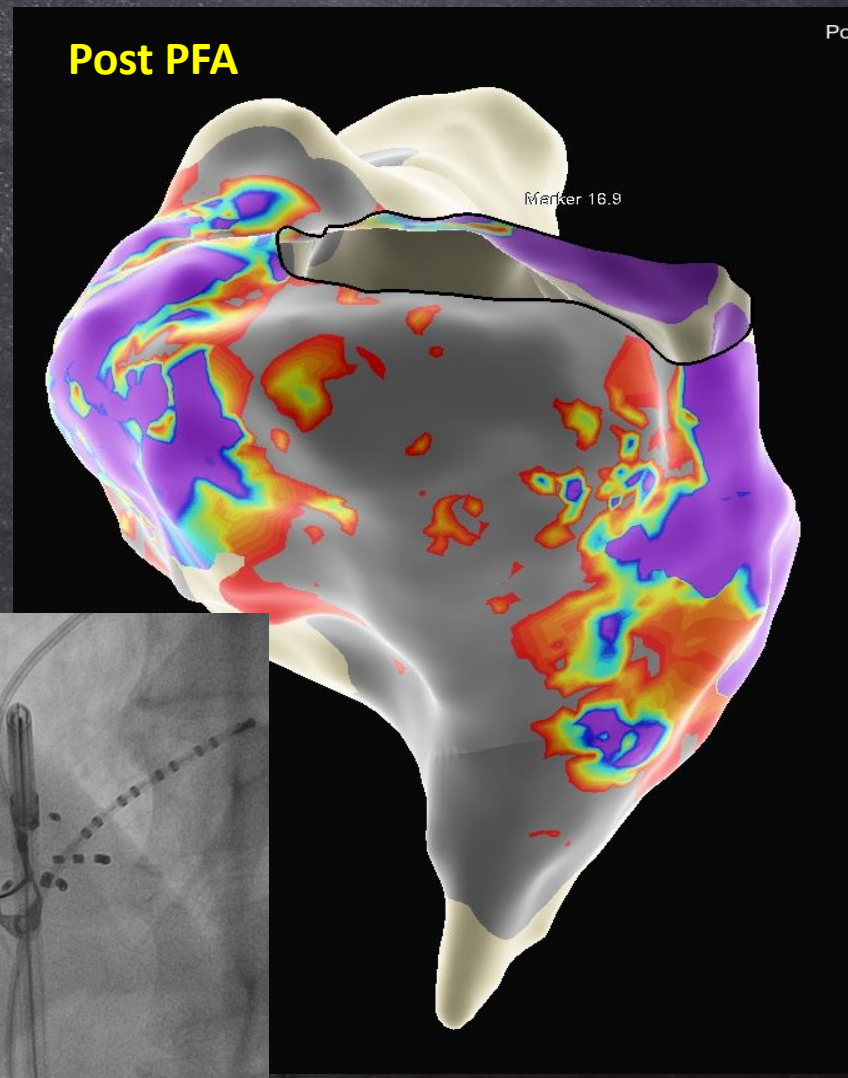
Fluoroscopy guided PF CTI ablation in a patient with peculiar anatomy

(CTI bidirectional block NOT feasible with irrigated catheter and elect6roanatomic mapping)





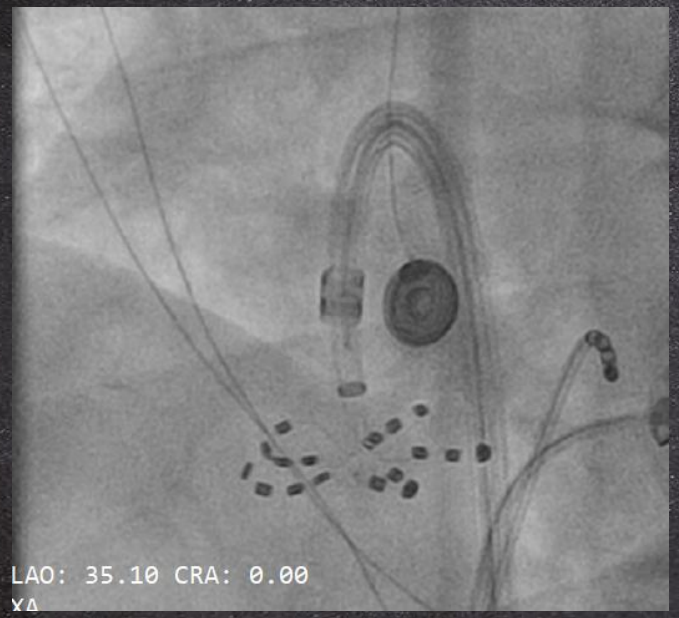


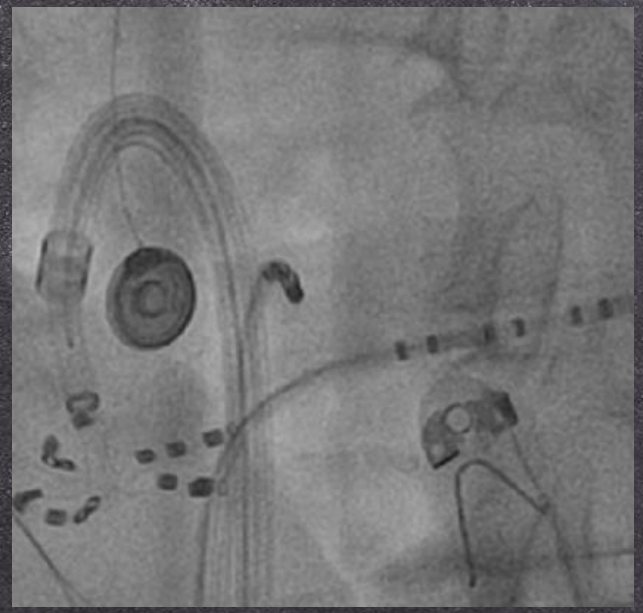


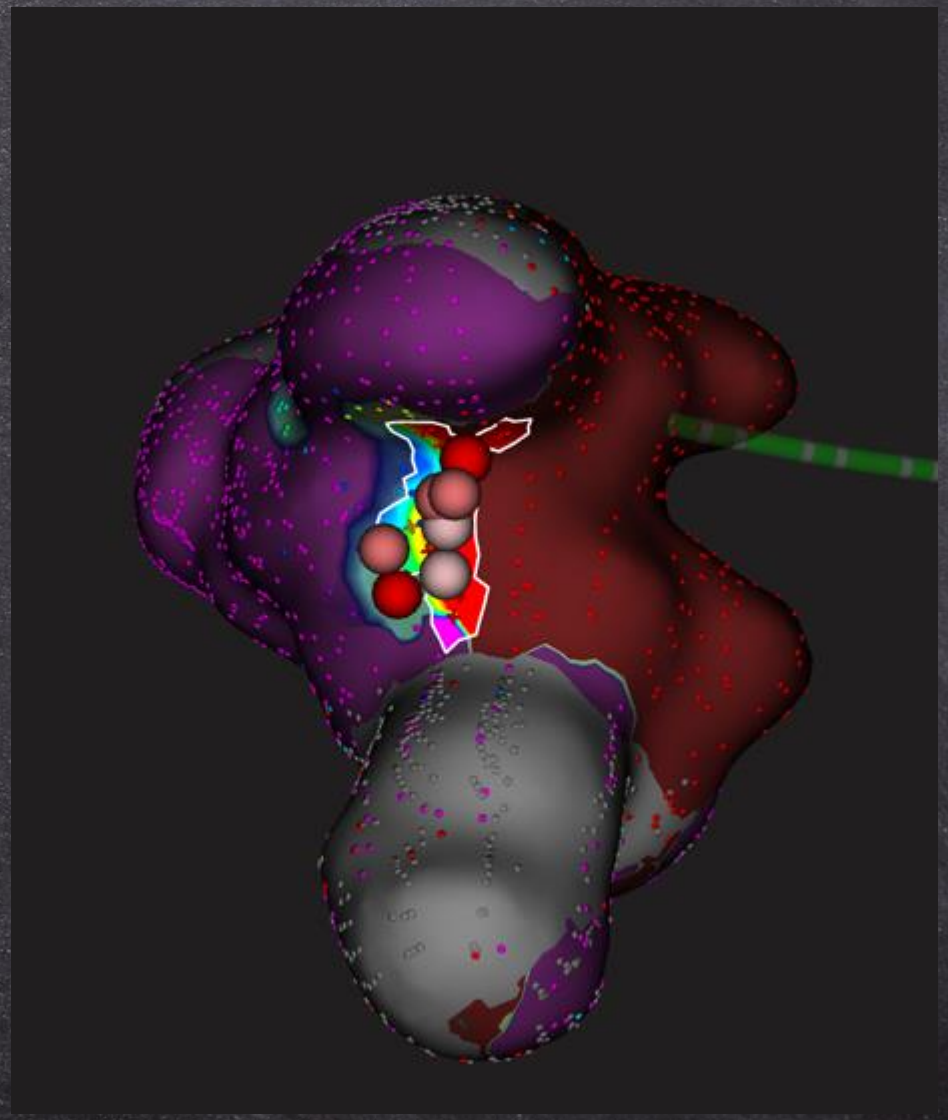
Ερρίκος Ντυνάν Hospital Center, Ιανουάριος 2023

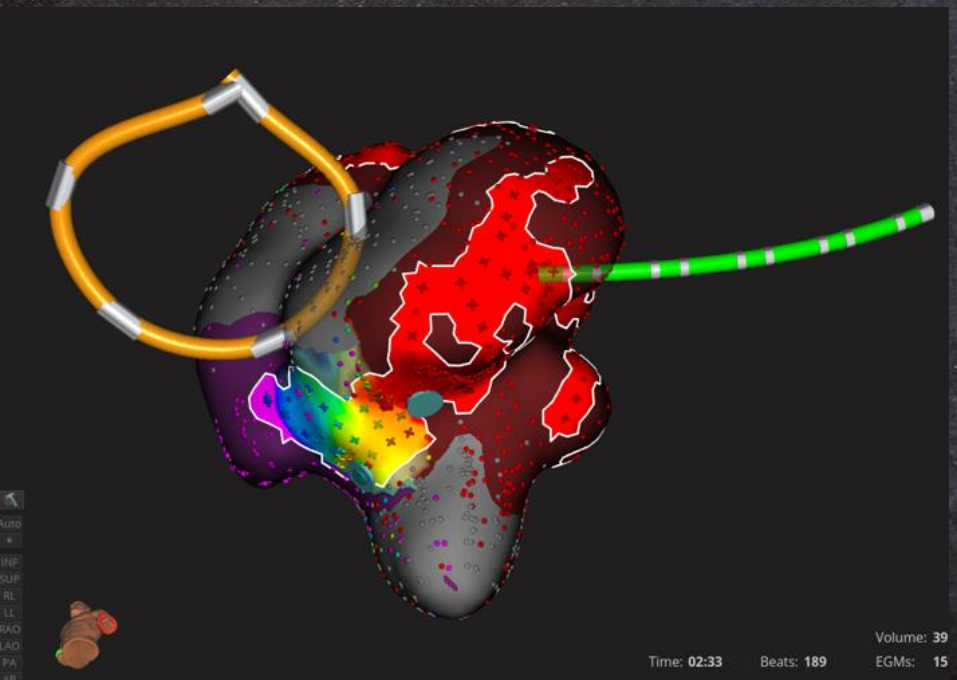
Ασθενής 52 ετών, απουσία οργανικής καρδιοπάθειας, συχνά επεισόδια ρυθμικής ταχυκαρδίας τελευταίο 6μηνο

AF ablation 2016 (cryo – άλλο κέντρο) - AF ablation 2019 (RF Rhythmia – Ερρίκος Ντυνάν)









PFA is NOT Always the solution for everything

Ερρίκος Ντυνάν Hospital Center, Τετάρτη 23 Νοεμβρίου 2022

Hybrid Ablation Versus Repeated Catheter Ablation in Persistent Atrial Fibrillation: A Randomized Controlled Trial

Methods: Forty-one ablation-naive patients with (long-standing)-persAF were randomized to HA (n = 19) or CA (n = 22) and received pulmonary vein isolation, posterior left atrial wall isolation and, if needed, a cavotricuspid isthmus ablation. The primary efficacy endpoint was freedom from any atrial tachyarrhythmia >5 minutes off antiarrhythmic drugs after 12 months. The primary and secondary safety endpoints included major and minor complications and the total number of serious adverse events.

Results: After 12 months, the freedom of atrial tachyarrhythmias off antiarrhythmic drugs was higher in the HA group compared with the CA group (89% vs 41%, P = 0.002). There was 1 pericarditis requiring pericardiocentesis and 1 femoral arteriovenous-fistula in the HA group. In the CA arm, 1 bleeding from the femoral artery occurred. There were no deaths, strokes, need for pacemaker implantation, or conversions to sternotomy, and the number of (serious) adverse events was comparable between groups **(21% vs 14%, P = 0.685).**

Conclusions: Hybrid AF ablation is an efficacious and safe procedure and results in better outcomes than catheter ablation for the treatment of patients with persistent AF. (Hybrid Versus Catheter Ablation in Persistent AF [HARTCAP-AF]; NCT02441738).

JACC Clin Electrophysiol 2023 Jan 10;S2405-500X(22)01143-4. doi: 10.1016/j.jacep.2022.12.011. Online ahead of print.

Hybrid AF Convergent Procedure Vs Endocardial Catheter Ablation Alone for the Treatment of Drug Refractory Persistent and Longstanding Persistent AF (CONVERGE Trial)

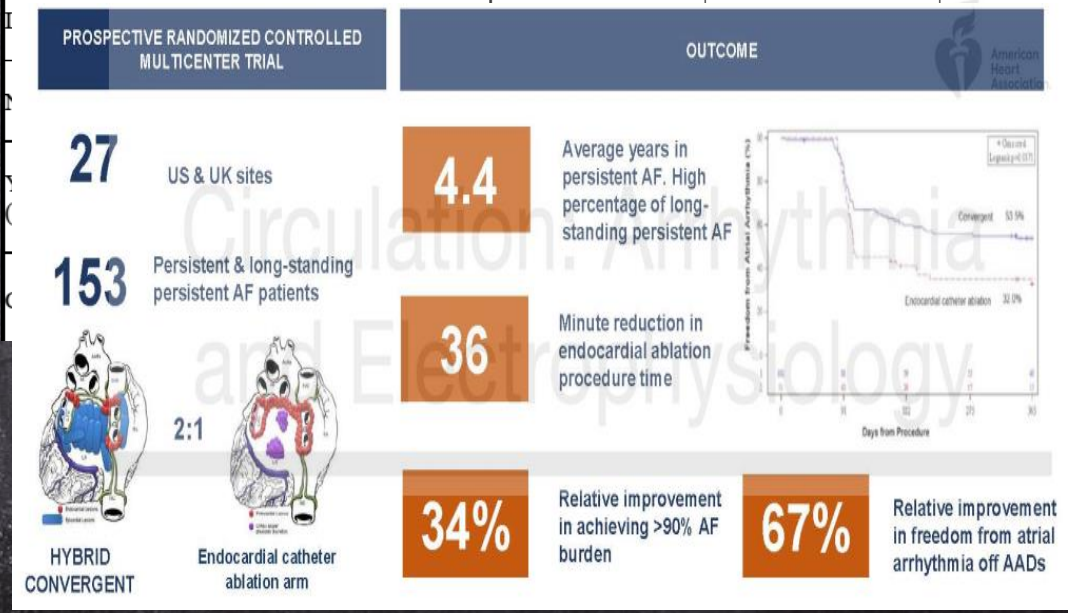
Table 4: Freedom from atrial arrhythmia (AF/AFL/AT) from 3-months through 12-months stratified by AAD usage

Parameter	Hybrid Convergent ablation arm	Endocardial catheter ablation arm	Absolute Difference (Risk Ratio)	p-value
Absent Class I/III AADs, % (n)*	53.5% (53/99)	32.0% (16/50)	21.5% (RR = 1.67)	**0.0128**
Absent Class I/III AADs or Absent new or increased dosage of previously failed AADs, % (n)†	67.7% (67/99)	50.0% (25/50)	17.7% (RR = 1.35)	**0.0360**
With or without AADs, % (n)	76.8% (76/99)	60.0% (30/50)	16.8% (RR = 1.28)	**0.0329**

Primary Safety Events

There were no cardiac perforations, AEFs or deaths. A total of 2.9% (3/102) subjects reported MAE within 7 days post-procedure; one stroke, one excessive bleeding and one excessive bleeding with late pericardial effusion. After day 7 and through 30 days, an additional five (5/102; 4.9%) subjects reported MAEs; three pericardial effusions, one phrenic nerve injury, and one transient ischemic attack. These pre-specified MAEs were not reported in the catheter ablation arm (0% vs 7.8%, Fisher's exact p-value = 0.0525)

Characteristic	Hybrid Convergent Procedure (N = 102)	Endocardial Catheter Ablation (N = 51)	P-value
Age (Mean ± SD)	63.7 ± 9.6	65.1 ± 6.7	NS
Male, n (%)	80 (78%)	27 (53%)	0.0016*
BMI (kg/m2) (Mean ± SD)	32.9 ± 5.9	35.1 ± 7.1	NS
Left atrial diameter (Mean ± SD)	4.4 ± 0.6	4.3 ± 0.6	NS



De Lurgio DB., et al. Circ Arrhythm Electrophysiol. 2020;13:e009288

Building a Standard of Care: Insight From an Experienced Operator

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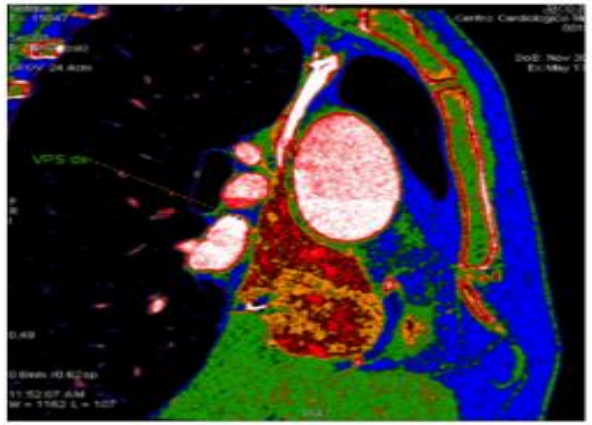
Dept of Biochemical, Surgical and Dental Sciences
University of Milan, Italy and Texas Cardiac Arrhythmia Institute, Austin, TX, US
Honorary Visiting Professor Vrije Univesriteit Brussels (VUB)

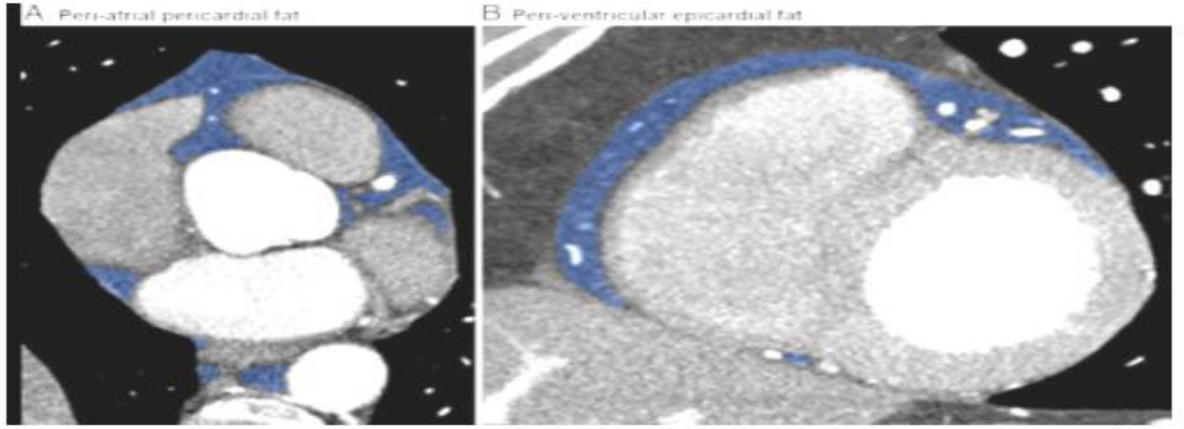
Future Research

Epicardial Fat

- The thickness of epicardial fat can help to identify patients who were <u>at risk of recurrences.</u>
- In the literature cut-off: 5-6 mm for transmural lesion.
- If the left atrium is >55 mm, the fat is also intraparietal, so that even transcatheter ablation fails.

- Our series of radiofrequency supplies (3 Bp– 3 Mp– 2 Bp – 2 Mp– 1 Bp – 1 Mp) <u>is not effective in patients with 7mm of epicardial fat measured at the CT at a later time</u>.

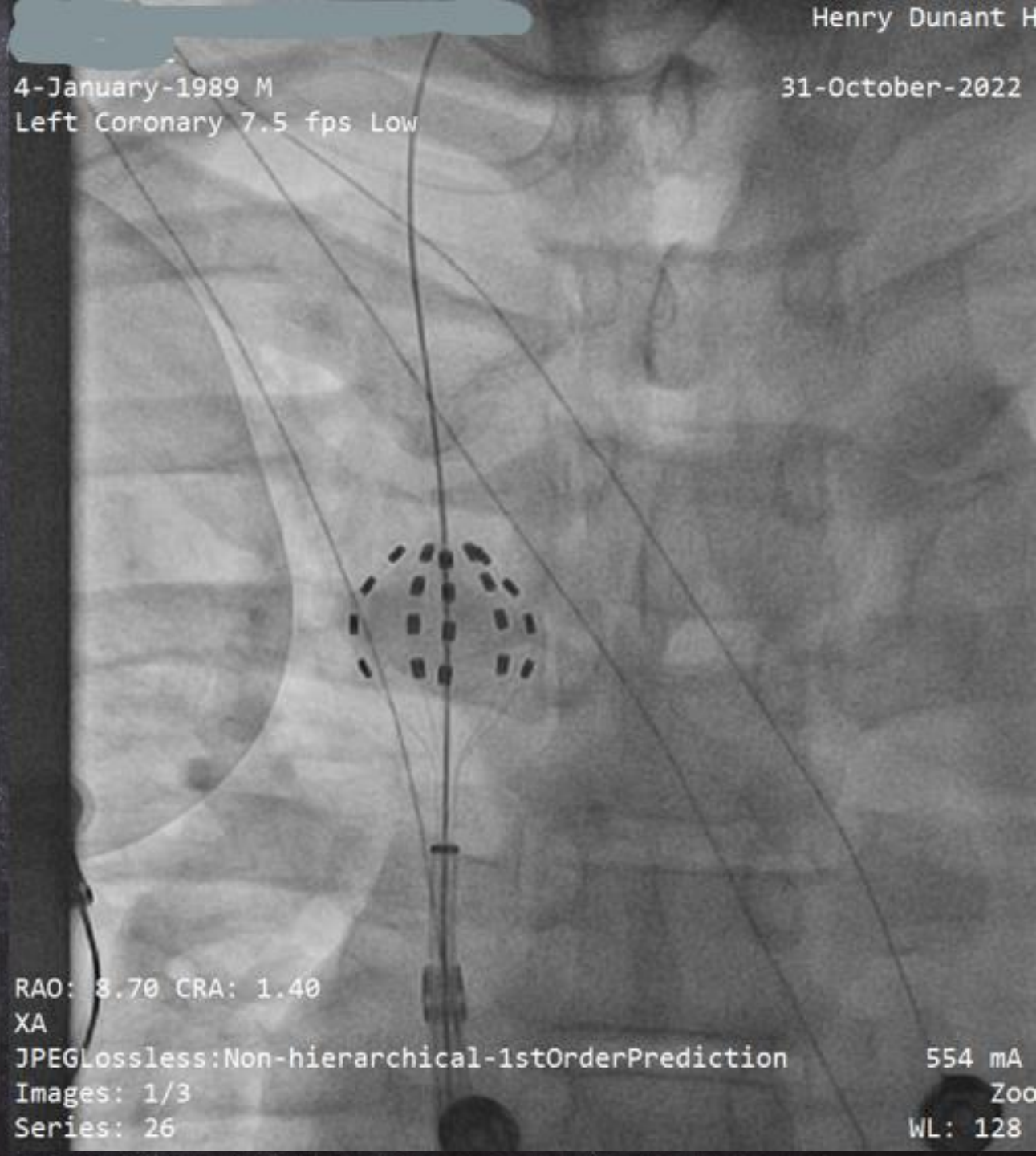




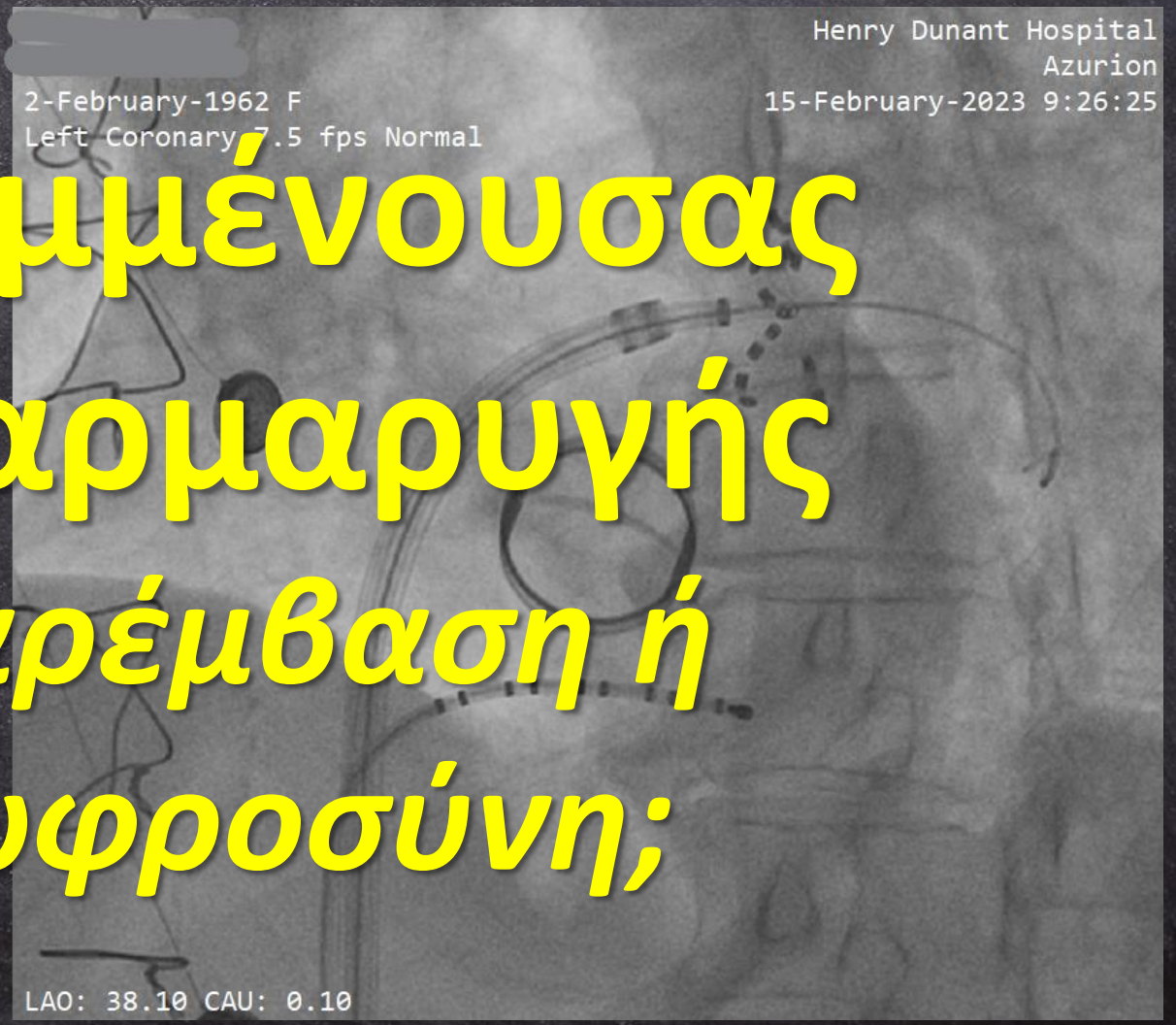
Monzino Cardiac Center

radcliffe medical education

CTI PFA ablation



Ασθενής 61 ετών, με προσθετική μιτροειδούς, με ΑΚ=52 mm και ΚΕΑΚ υποφυσιολογικό με μεγάλη μείωσή του κατά τις περιόδους με εμμένουσα ΚΜ



Κατάλυση εμμένουσας κολπικής μαρμαρυγής

Ελάχιστη παρέμβαση ή Μέγιστη Σωφροσύνη;

Ερρίκος Ντυνάν Hospital Center, Τετάρτη 15 Φεβρουαρίου 2023

Ο Thomas Henry Huxley ήταν Άγγλος βιολόγος που υπερασπίστηκε τη θεωρία της εξέλιξης του Charles Darwin.

The deepest sin against the human mind is to believe things without evidence.

Thomas H. Huxley

(1825 - 1895)