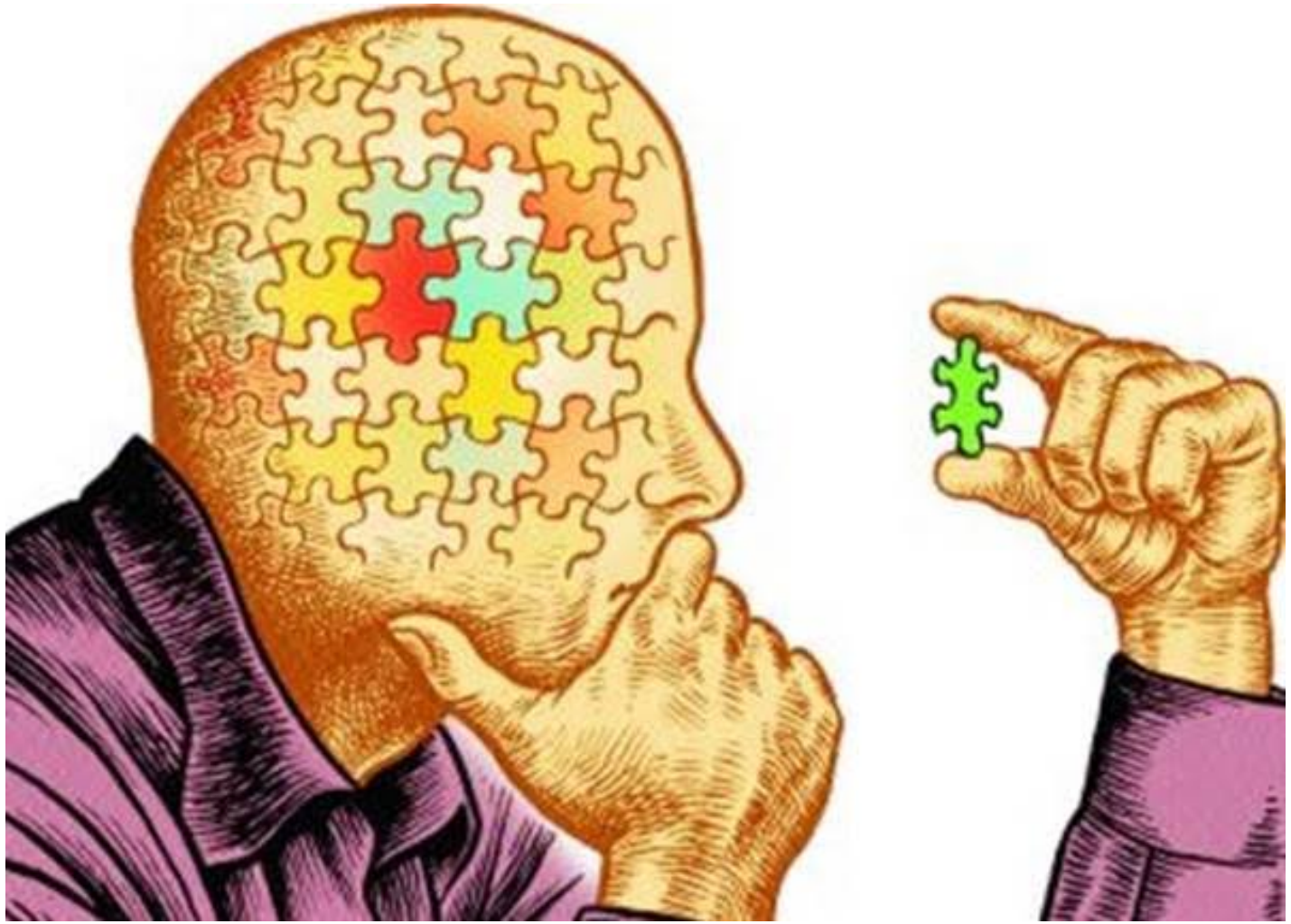
Güncel Bilgiler Işığında Persistan AF Ablasyonu

PVI + ek ablasyon yapılmalıdır

Doç. Dr. Kerem Can Yılmaz

Bursa Özel Aritmi Osmangazi Hastanesi

Aralık 2022, Antalya



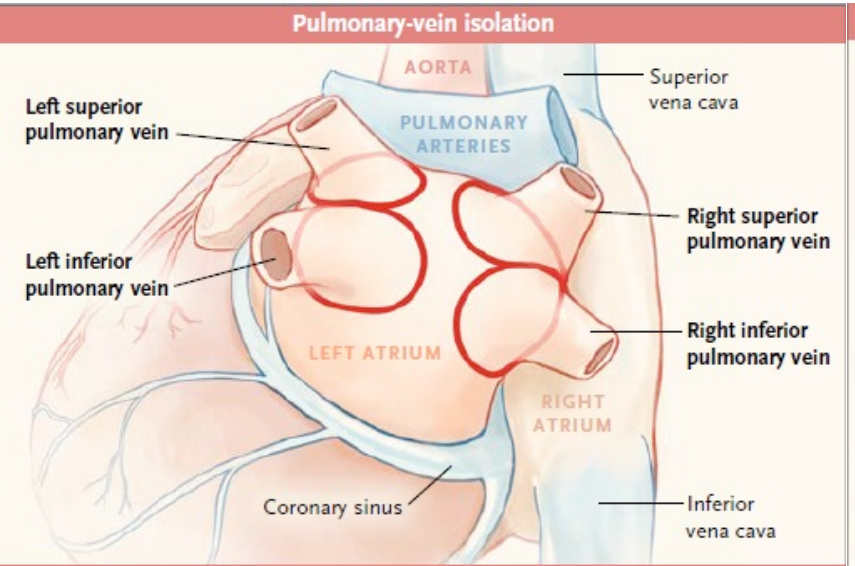
PERSİSTAN AF'DE ATRİYUM ÇOK HASTA, O YÜZDEN YAPABİLDİĞİN KADAR ABLASYON YAPMAN LAZIM!

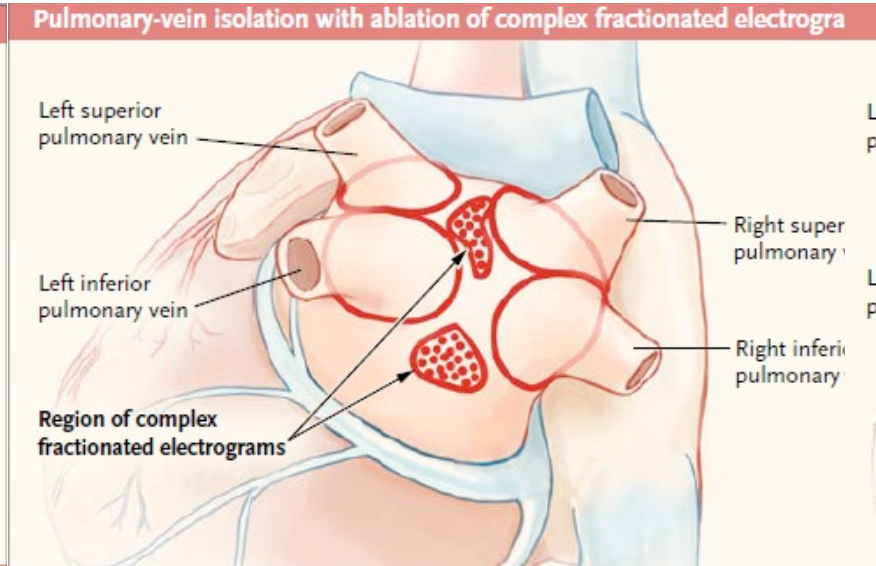
PERSİSTAN AF'DE ATRİYUM ZATEN ÇOK HASTA, NE KADAR ABLASYON YAPARSAN YAP EK KATKISI OLMAZ!

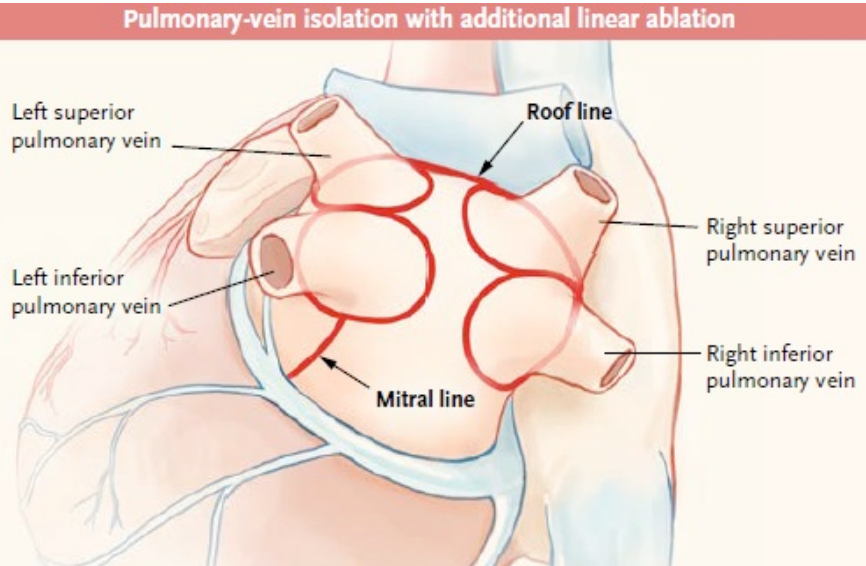
Approaches to Catheter Ablation for Persistent Atrial Fibrillation

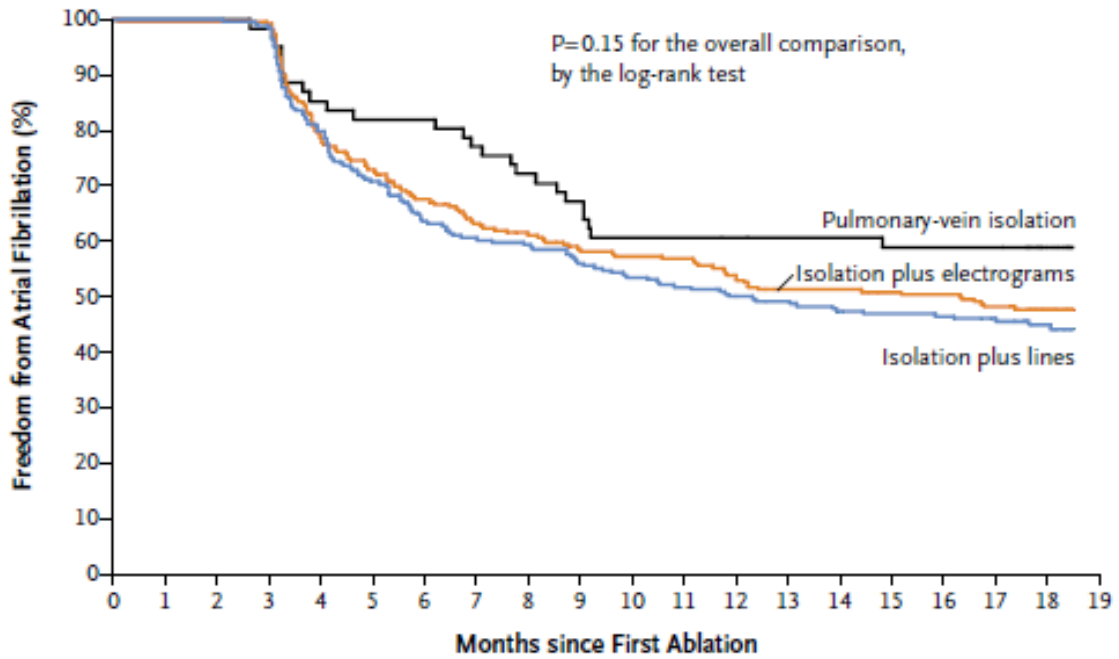
Atul Verma, M.D., Chen-yang Jiang, M.D., Timothy R. Betts, M.D., M.B., Ch.B., Jian Chen, M.D., Isabel Deisenhofer, M.D., Roberto Mantovan, M.D., Ph.D., Laurent Macle, M.D., Carlos A. Morillo, M.D., Wilhelm Haverkamp, M.D., Ph.D., Rukshen Weerasooriya, M.D., Jean-Paul Albenque, M.D., Stefano Nardi, M.D., Endrj Menardi, M.D., Paul Novak, M.D., and Prashanthan Sanders, M.B., B.S., Ph.D., for the STAR AF II Investigators*

N Engl J Med 2015;372:1812-22.
DOI: 10.1056/NEJMoa1408288









No. at Risk

Pulmonary-vein isolation	61	60	50	41	36	23
Isolation plus electrograms	244	242	161	137	124	72
Isolation plus lines	244	240	152	133	115	57

Figure 2. Freedom from Atrial Fibrillation.

The graph shows Kaplan–Meier estimates of freedom from documented atrial fibrillation more than 30 seconds after a single procedure, with or without the use of antiarrhythmic medications. There were no significant differences between groups (P=0.15). Isolation plus electrograms denotes ablation with pulmonary-vein isolation plus additional ablation of complex fractionated electrograms; isolation plus lines refers to ablation with pulmonary-vein isolation plus additional linear ablation.

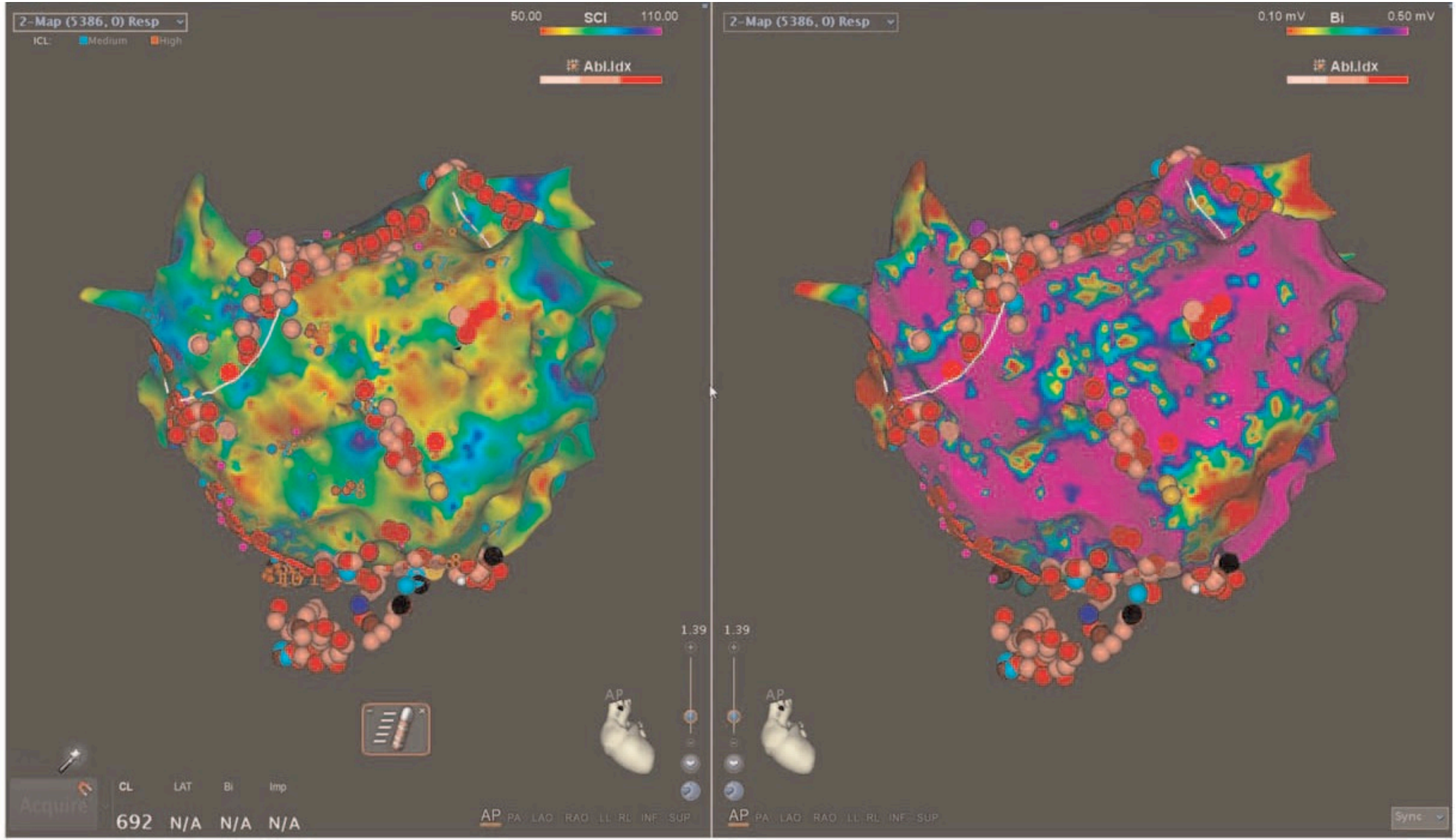
Ablation of persistent atrial fibrillation based on high density voltage mapping and complex fractionated atrial electrograms

A randomized controlled trial

Jongmin Hwang, MD[a], Hyoung-Seob Park, MD[a,*], Seongwook Han, MD[a], Cheol Hyun Lee, MD[a], In-Cheol Kim, MD[a], Yun-Kyeong Cho, MD[a], Hyuck-Jun Yoon, MD[a], Jin wook Chung, MD[a], Hyungseop Kim, MD[a], Chang-Wook Nam, MD[a], Seung-Ho Hur, MD[a], Jin Young Kim, MD[b], Yun Seok Kim, MD[c], Woo Sung Jang, MD[c]

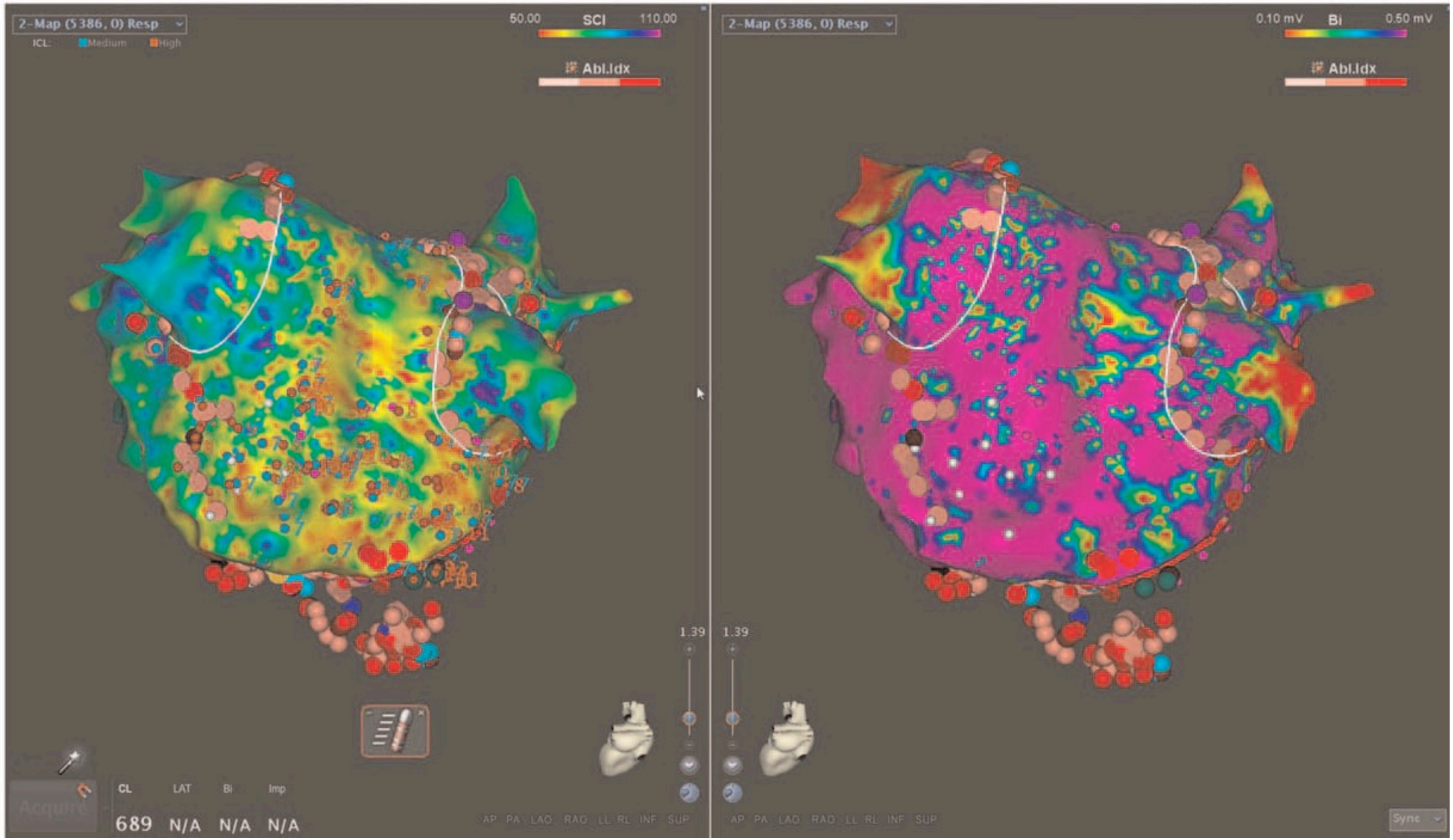
Hwang et al. Medicine (2021) 100:31

- 25 hasta sadece PVI, 25 hasta PVI+KFAE
- Pentaray kateter kullanılarak CARTO 3 CONFIDENSE modülü (Biosense Webster, Inc.,Diamond Bar, CA, USA)



A

Ablasyon sonrası anteroposterior görünüm, CFAE haritası ve Voltaj Haritası, ablasyon noktaları pembe ve kırmızı noktalar



B

Ablasyon sonrası posteroanterior görünüm, CFAE haritası ve Voltaj Haritası

Table 2

Procedural and clinical outcomes.

	Total (n=50)	PVI + CFAE (n=25)	PVI only (n=25)	*P* value
Procedure time (min)	155.3±45.0	190.4±33.9	118.7±17.1	<.001
Fluoroscopy time (min)	17.3±8.5	21.3±7.7	13.3±7.4	<.001
Ablation time (min)	54.5±24.9	70.7±21.4	38.3±16.0	<.001
1-year AF-free, n (%)	32 (64.0)	21 (84.0)	11 (44.0)	.006
1-year AT/AF free, n (%)	25 (50.0)	15 (60.0)	10 (40.0)	.329
Recurrent patients with AT	7 (14.0)	6 (24.0)	1 (4.0)	.044
Redo procedure, n (%)	7 (14.0)	3 (12.0)	4 (16.0)	.687
Patients with sinus rhythm after the initial procedure	25 (50.0)	15 (60.0)	10 (40.0)	.329
Patients with sinus rhythm at 1-year, n (%)	33 (66.0)	19 (76.0)	16 (64.0)	.359

AF = atrial fibrillation, AT = atrial tachycardia, CFAE = complex fractionate atrial electrogram, PVI = pulmonary vein isolation.

n=50

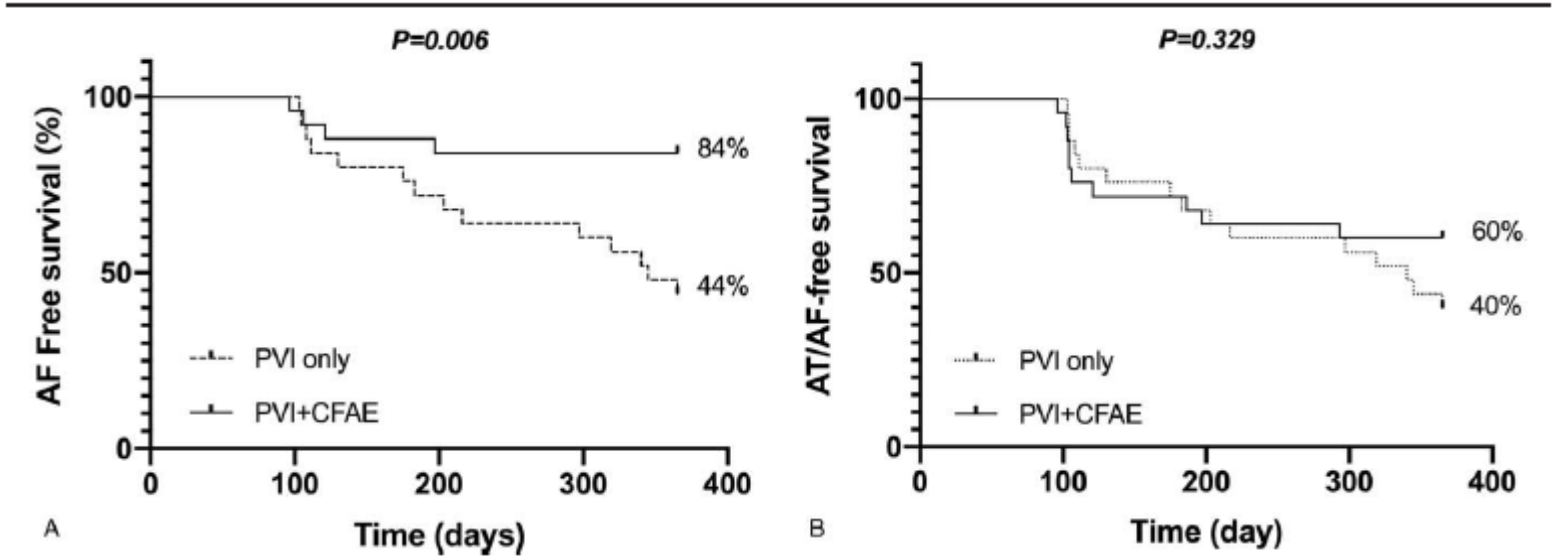


Figure 3. Comparison of the Kaplan–Meier survival curves for the one-year freedom from atrial tachyarrhythmias after ablation between the 2 groups. (A) The pulmonary vein isolation (PVI) + complex fractionated atrial electrogram (CFAE) ablation group had a higher one-year atrial fibrillation free survival than the PVI only group. (B) However, there was no significant difference in the one-year atrial fibrillation / atrial tachycardia free survival between the 2 groups.

5. Conclusion

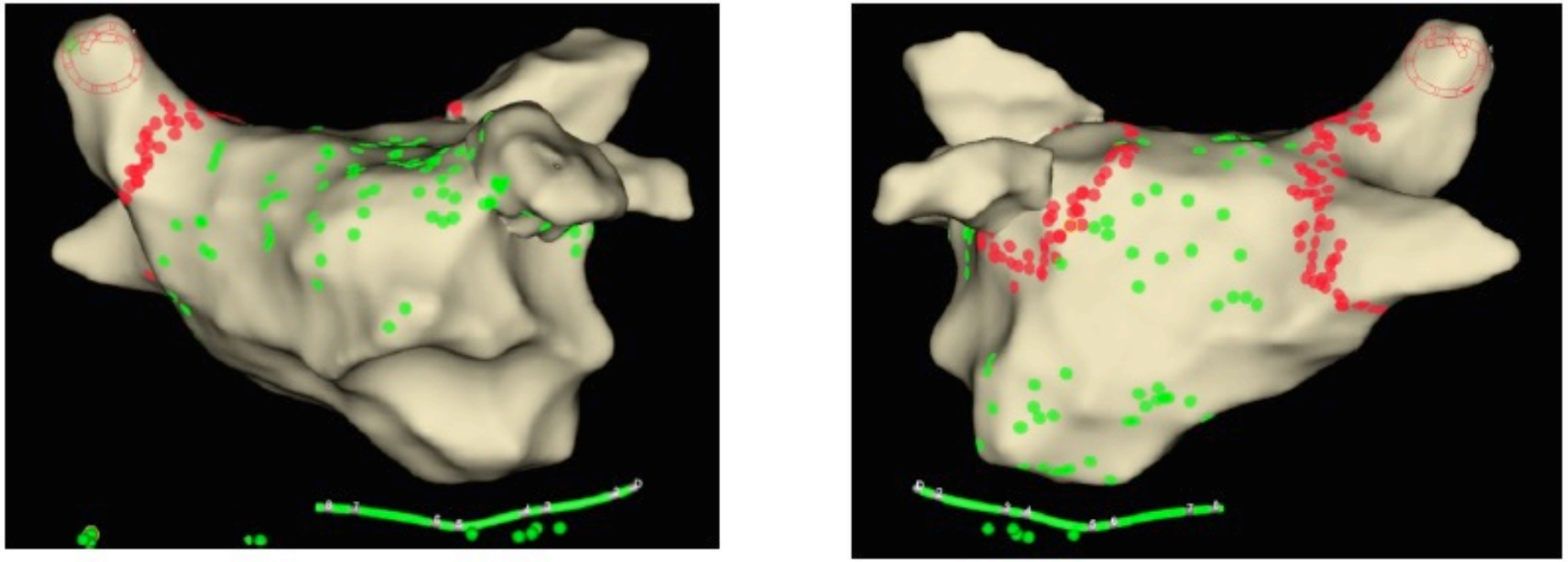
Persistent AF ablation targeting CFAE areas only within the low voltage zones in addition to the PVI using a high-density mapping technology with a multielectrode catheter and the CARTO standardized CFAE mapping system had a higher AF free survival as compared to a PVI only. Although the recurrence of AF or AT did not differ in the PVI+CFAE group, the sinus rhythm maintenance rate after a redo procedure was 76%, which was higher than that in many studies including a similar patient group.

Ablation of Complex Fractionated Electrograms With or Without ADditional LINEar Lesions for Persistent Atrial Fibrillation (The ADLINE trial)

Sonia Ammar-Busch, M.D.[1-2], Felix Bourier, M.D.[2], Tilko Reents, M.D.[2], Verena Semmler M.D.[2], Marta Telishevska M.D.[2], Susanne Kathan[2], Monika Hofmann M.D.[2], Gabriele Hessling M.D.[2], Isabel Deisenhofer M.D.[2].

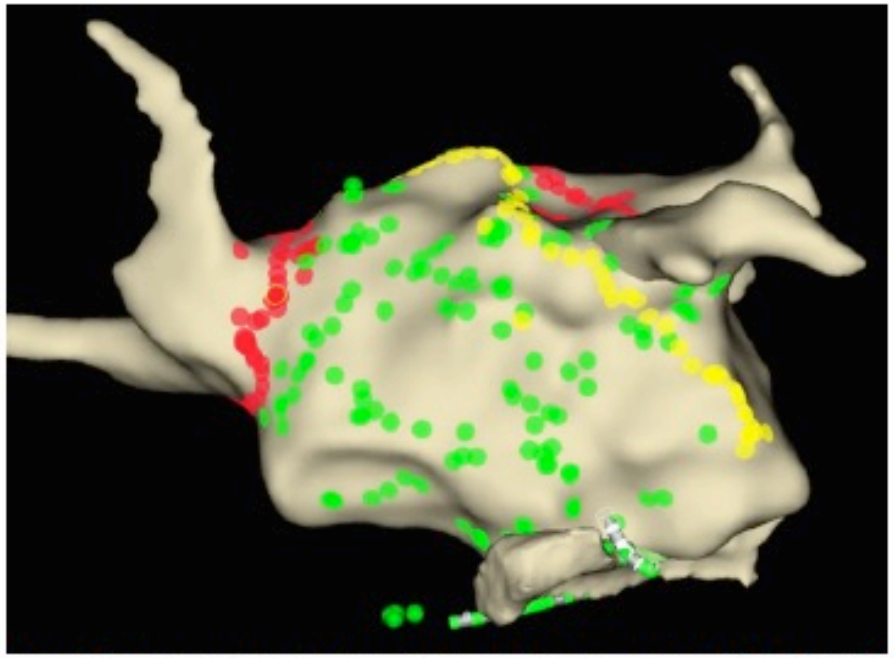
J Cardiovasc Electrophysiol.2017, 28 (6)

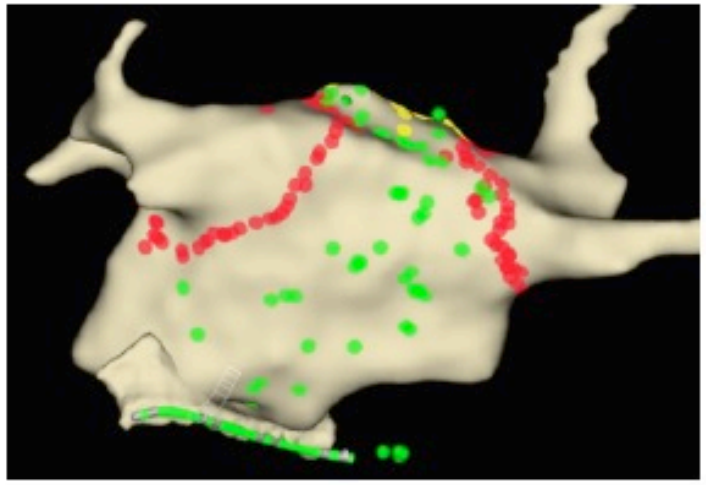
- 90 hasta; 45 hastaya PVI + CFAE, 45 hastaya ek olarak LL
- 12 aylık takipte AT/AF rekürrensi
- NavX Velocity, St.Jude Medical, St. Paul, MN, USA veya Carto, Biosense-Webster, Diamond Bar, CA, USA



PVI+CFAE
n=45

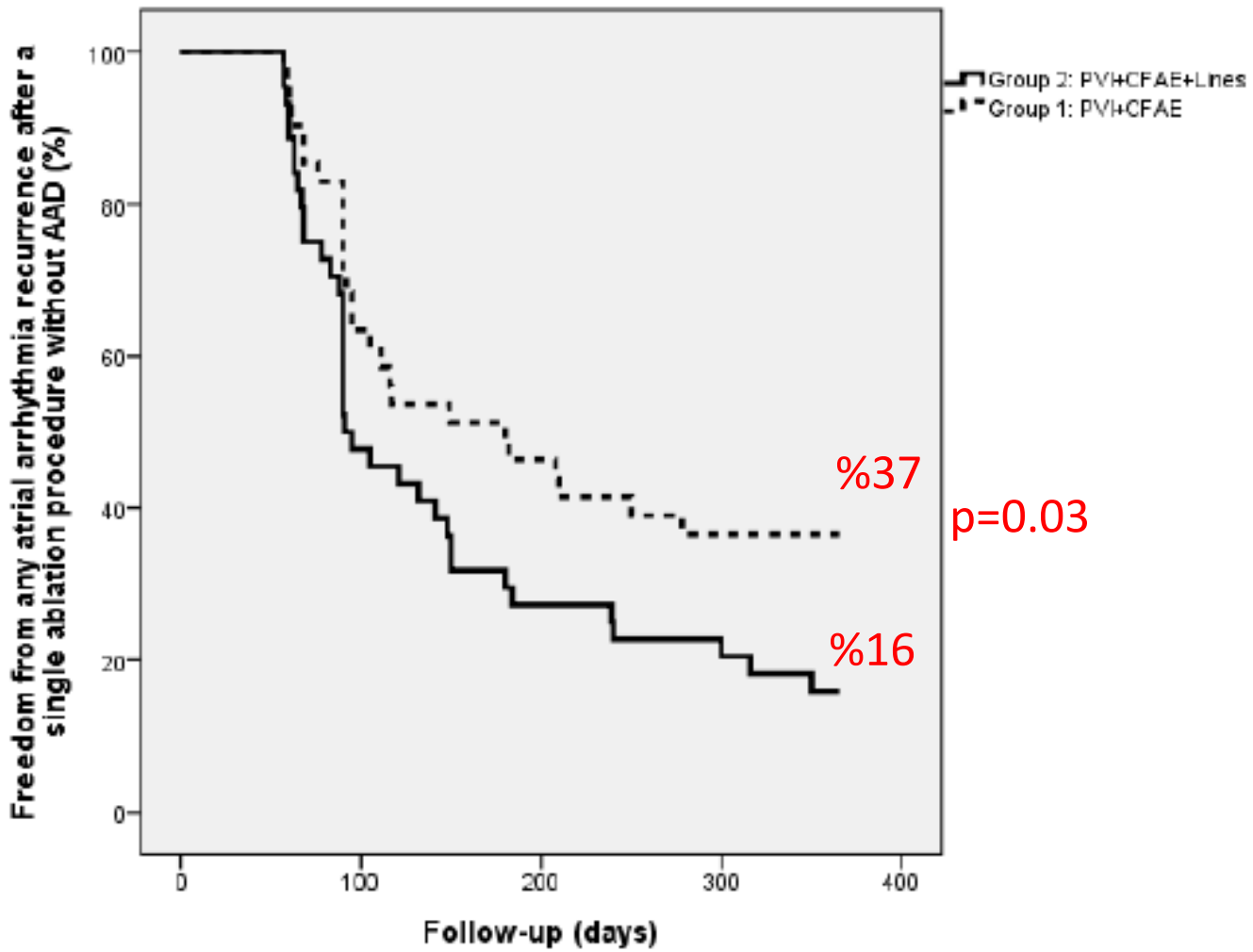
A- 3 D map showing the lesion set in Group 1 (PVI+CFAE): AP and PA view of the left atrium. The red dots show the ablation points for circumferential pulmonary vein isolation. The green dots show the ablation points for CFAE ablation

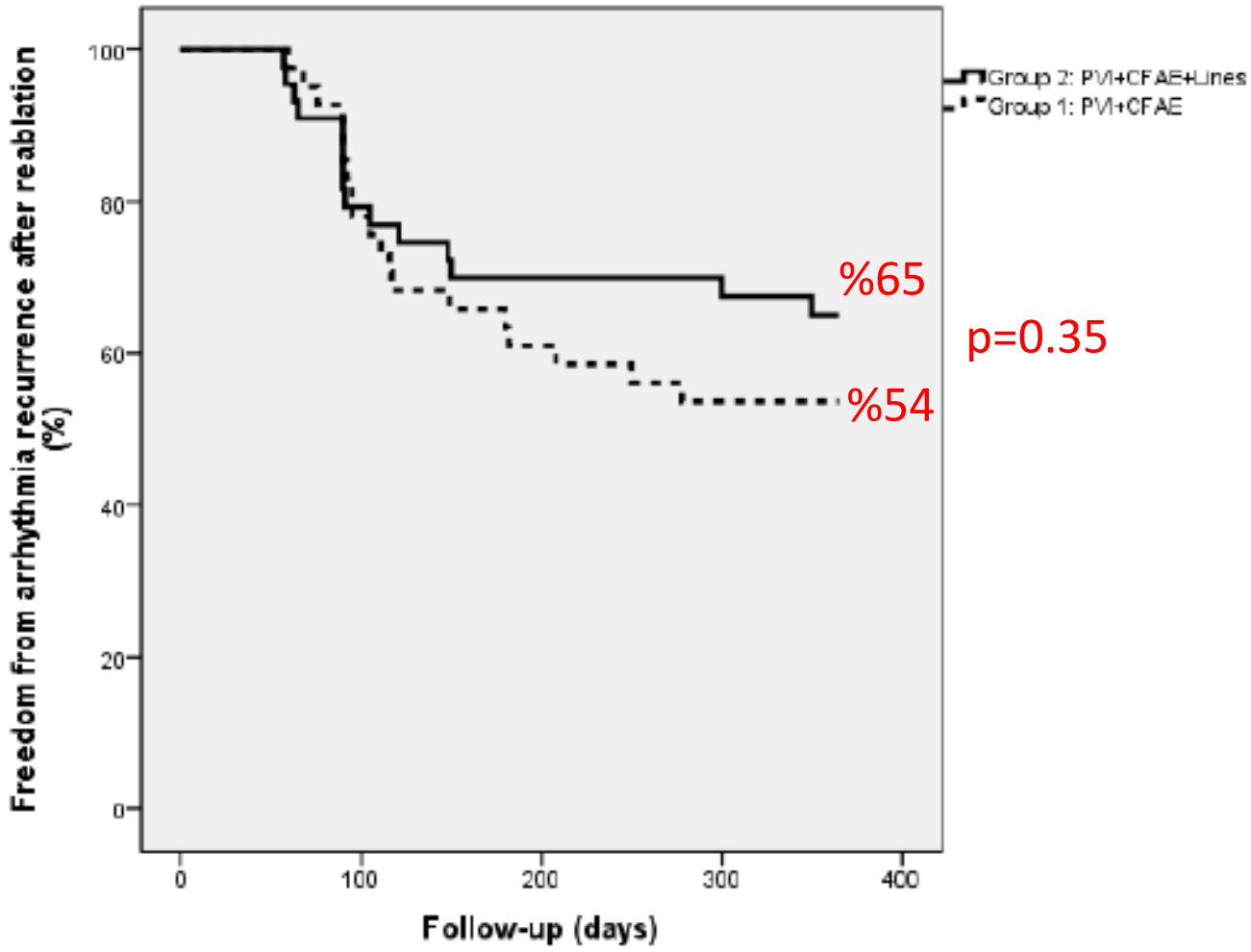


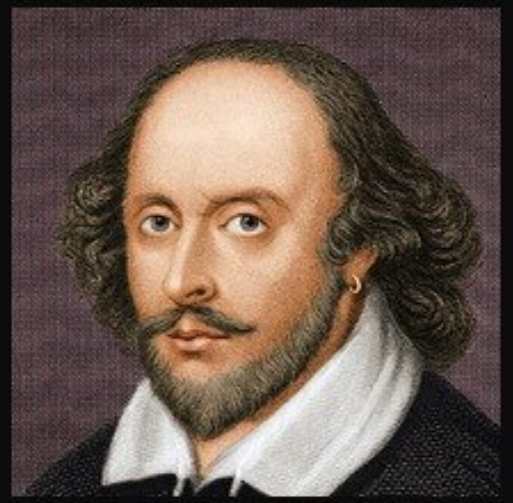


PVI+CFAE
+ LL
n=45

A- 3 D map showing the lesion set in Group 2 (PVI+CFAE+lines): AP and PA view of the left atrium. The red dots show the ablation points for circumferential pulmonary vein isolation. The green dots show the ablation points for CFAE ablation. The yellow dots show the anterior and the roof line.


Freedom from any atrial arrhythmia recurrence after a single ablation procedure without AAD (%)
100
80
60
40
20
0
0
100
200
300
400
Follow-up (days)
Group 2: PVI+CFAE+Lines
Group 1: PVI+CFAE
%37
%16
p=0.03


Freedom from arrhythmia recurrence after reablation (%)
100
80
60
40
20
0
0
100
200
300
400
Follow-up (days)
Group 2: PVI+CFAE+Lines
Group 1: PVI+CFAE
%65
%54
p=0.35



Sometimes, less is more.

~ William Shakespeare

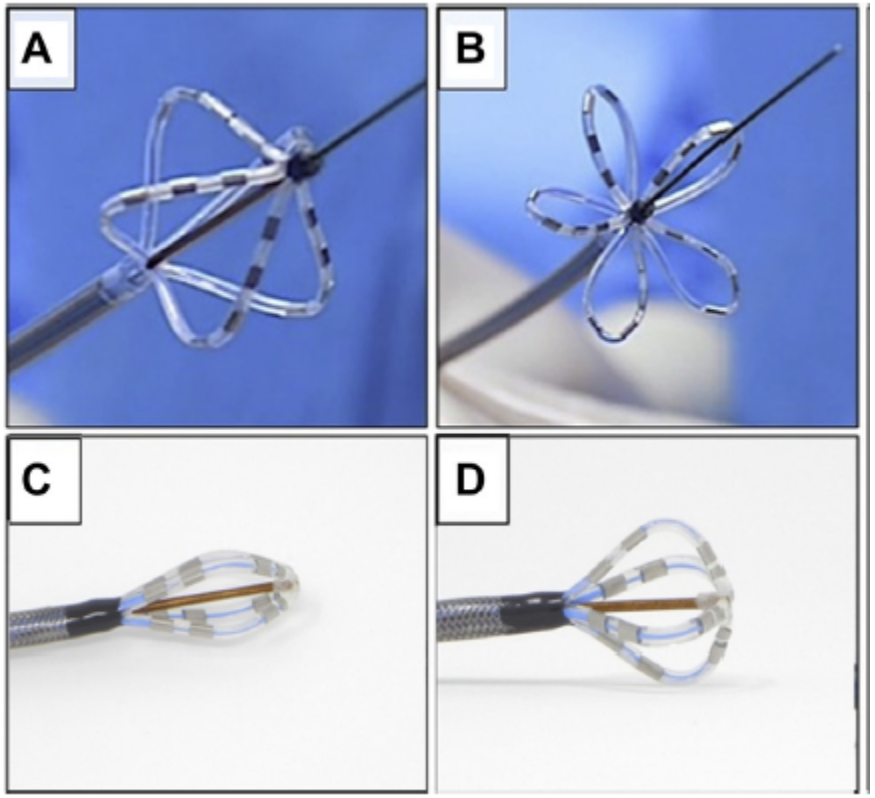
AZ QUOTES

Pulsed Field Ablation in Patients With Persistent Atrial Fibrillation (PersAFOne)

Vivek Y. Reddy, MD,[a,b] Ante Anic, MD,[c] Jacob Koruth, MD,[b] Jan Petru, MD,[a] Moritoshi Funasako, MD,[a] Kentaro Minami, MD,[a] Toni Breskovic, MD, PhD,[c] Ivan Sikiric, MD,[c] Srinivas R. Dukkipati, MD,[b] Iwanari Kawamura, MD,[b] Petr Neuzil, MD, PhD[a]

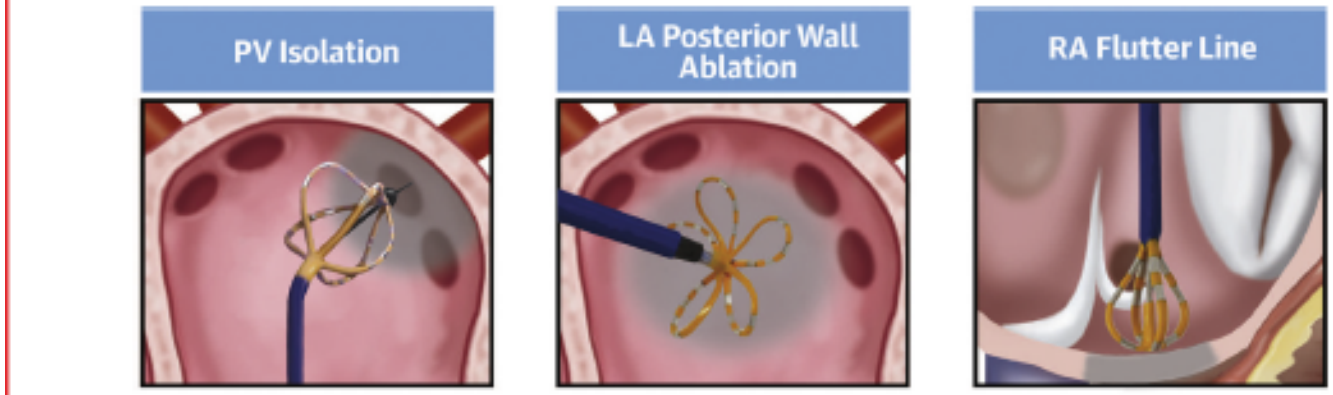
(J Am Coll Cardiol 2020;76:1068-80)

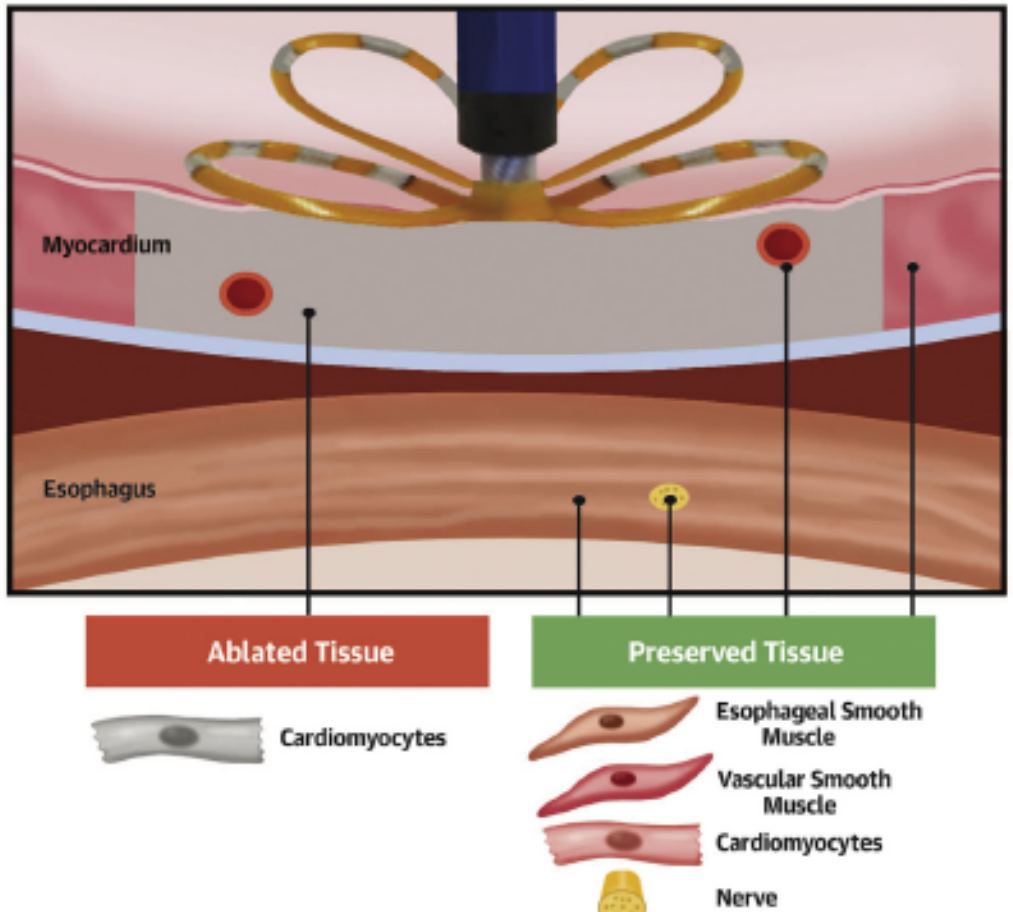
FIGURE 1 PFA Catheters



- Akut ve güvenilir PVI lezyonu +
- Sol atriyal posterior duvar izolasyonu +
- KTİ ablasyonu

CENTRAL ILLUSTRATION Pulsed Field Ablation for Persistent Atrial Fibrillation





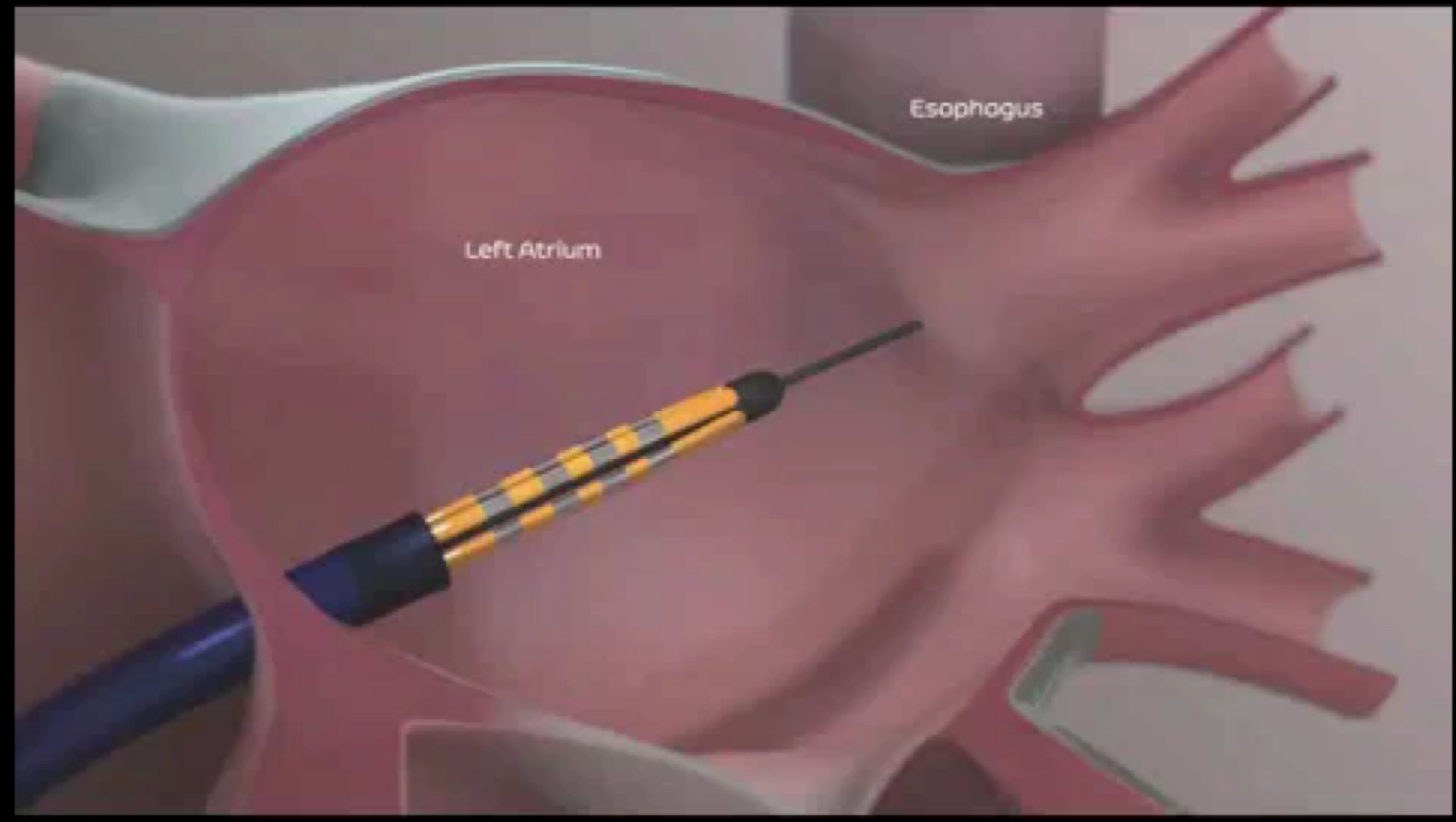
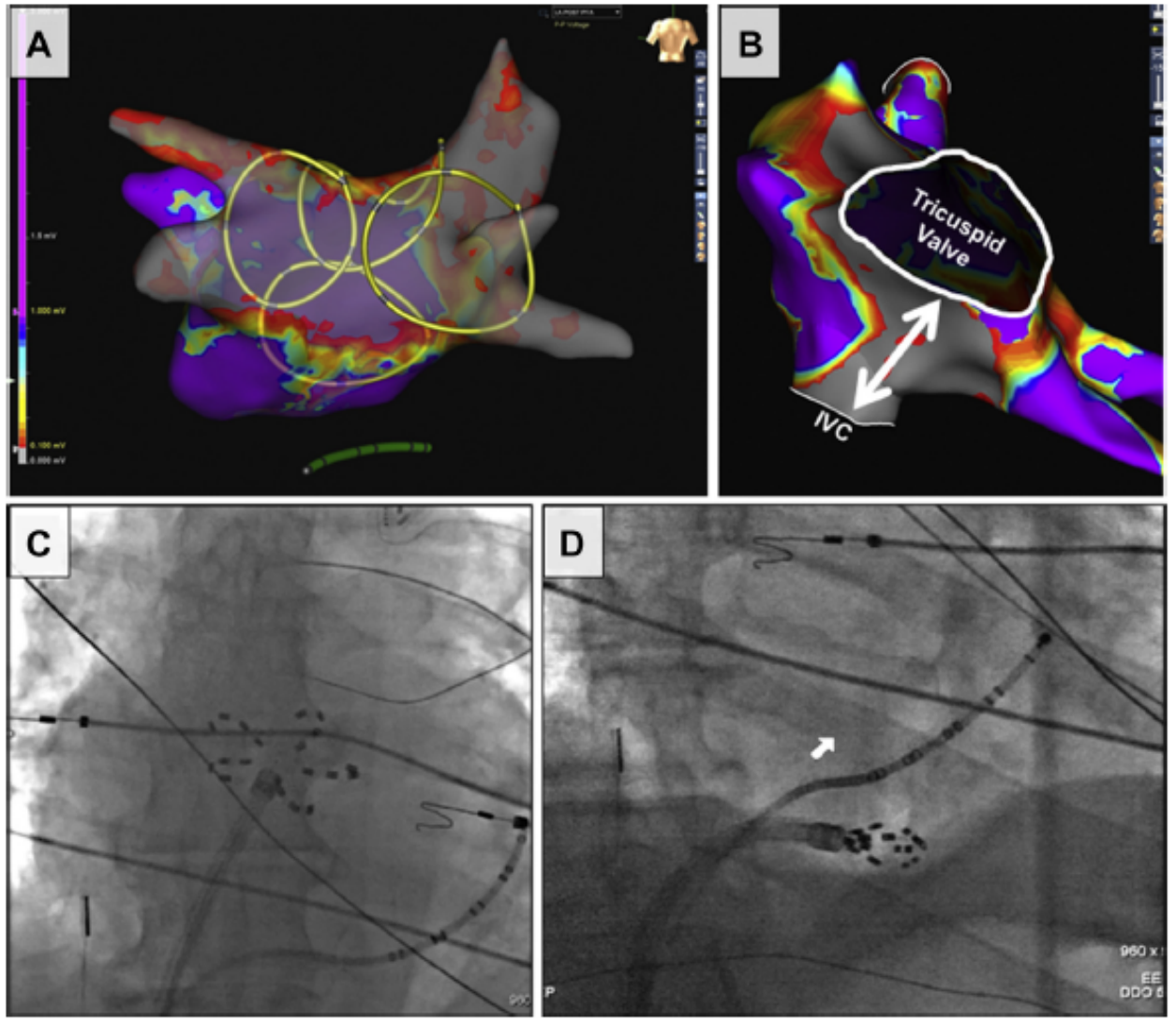

Esophogus
Left Atrium

FIGURE 2 Posterior Wall and Cavotricuspid Isthmus Ablation



(A) Electroanatomic mapping demonstrates the 4 PVs and the left atrial posterior wall (LAPW) after pulsed field ablation (PFA) (**gray** indicates low voltage, <0.1 mV; **purple** indicates preserved voltage, >0.5 mV). Four circular renditions of the catheter catalog 4 discrete, overlapping positions of the pentaspline catheter in the flower pose during LAPW isolation. **(B)** Right atrial mapping (inferior view) demonstrates a linear zone of low voltage at the cavotricuspid isthmus **(white arrow)** after focal PFA. **(C)** On anteroposterior fluoroscopy, the pentaspline catheter is positioned at the LAPW. **(D)** The right anterior oblique fluoroscopic view shows the focal PFA catheter at the cavotricuspid isthmus.
IVC = inferior vena cava; PV = pulmonary vein.

TABLE 2 Index Procedure Characteristics (N = 25)

Procedure time, min	125 (108-166)
Anesthesia method	
General	5 (20)
Conscious sedation	20 (80)
Pentaspline PFA catheter	
Time for PV isolation, min (n = 25)	22 (15-29)
Time for LAPW ablation, min (n = 24)	10 (6-13)
Focal PFA catheter	
Time for CTI ablation, min (n = 13)	9 (6-12)
Fluoroscopy time, min	16 (12-23)
Mapping time, min	28 (25-33)
Total number of PV lesions per patient*	
Left superior PV	8 (8-8)
Left inferior PV	8 (8-8)
Right superior PV	8 (8-8)
Right inferior PV	8 (8-8)
Left common PV ostium (n = 4)	16 (16-17)
Total number of LAPW lesions per patient*	
Full cohort (n = 24)	7 (5-8)
PWA-1 cohort (n = 14)	6 (6-8)
PWA-2 cohort (n = 10)	8 (5-8)
Total number of CTI ablation lesions†	
Full cohort (n = 13)	6 (5-7)
Focal-1 cohort (n = 4)	6 (5-7)
Focal-2 cohort (n = 9)	6 (5-7)

Values are median (interquartile range) or n (%). *Using the pentaspline PFA catheter. †Using the focal PFA catheter.

CTI = cavotricuspid isthmus; LAPW = left atrial posterior wall; PFA = pulsed field ablation; PV = pulmonary vein; PWA = posterior wall ablation.

TABLE 3 Primary and Secondary Endpoints (N = 25)

Primary feasibility endpoint (n = 25)	
Acute PV isolation	96/96 (100)
Secondary feasibility endpoints (n = 25)	
Chronic PV isolation (n = 22)	82/85 (96)
Chronic LAPW isolation (n = 22)	
Full cohort (n = 22)	21/22 (95)*
Treated using pentaspline catheter only (n = 21)	21/21 (100)*
Acute CTI block (n = 13)	13/13 (100)
Chronic CTI block (n = 12)	9/12 (75)
Primary safety endpoints	
Early onset (within 30 days of index procedure)	
Death	0/25 (0)
Myocardial infarction	0/25 (0)
Diaphragmatic paralysis	0/25 (0)
Stroke or TIA	0/25 (0)
Peripheral or organ thromboembolism	0/25 (0)
Cardiac tamponade/perforation	1/25 (4)†
Vascular access complications	0/25 (0)
Hospitalization (initial or prolonged)	0/25 (0)
Heart block	0/25 (0)
Pericarditis	0/25 (0)
Late onset (any time during follow-up)	
PV stenosis (>70% from baseline)	0/25 (0)
Atrioesophageal fistula	0/25 (0)

Values are n/N (%). *The lone reconnected LAPW was in the first patient receiving linear PFA using the initial Focal-1 dose. In patients undergoing posterior wall ablation with the pentaspline PFA catheter, all LAPWs remained durably ablated. †Pericardial effusion without tamponade occurred during remapping using radiofrequency only; clinical events committee adjudication pending.

Abbreviations as in Tables 1 and 2.

TABLE 5 Dimensional Analysis of the PV Diameters

	n	Pre-RFA, mm	Post-RFA, mm	Change of PV Dimension, %	p Value*
LSPV					
Long axis	12	23.5 (21.6 to 25.3)	23.5 (20.7 to 26.2)	-1.7 (-6.6 to 3.0)	0.308
Short axis		16.2 (13.0 to 20.2)	15.2 (12.0 to 19.7)	-6.2 (-11.6 to 4.1)	0.158
LIPV					
Long axis	12	18.5 (16.7 to 20.7)	17.5 (14.5 to 19.4)	-5.6 (-11.6 to 2.9)	0.071
Short axis		12.9 (10.9 to 17.4)	12.5 (9.6 to 17.7)	0.6 (-5.2 to 6.8)	1.000
LCPV					
Long axis	2	32.2 (31.9 to n/a)	31.7 (30.4 to n/a)	-1.8 (-5.2 to n/a)	0.655
Short axis		19.8 (17.2 to n/a)	19.9 (18.1 to n/a)	1.1 (-2.8 to n/a)	0.655
RSPV					
Long axis	14	22.4 (19.0 to 24.0)	21.9 (18.1 to 23.9)	-1.6 (-8.4 to 2.6)	0.363
Short axis		20.7 (16.8 to 21.9)	19.0 (16.7 to 21.9)	-1.9 (-11.3 to 3.1)	0.198
RIPV					
Long axis	14	18.7 (16.8 to 22.9)	19.5 (15.5 to 20.9)	-5.2 (-11.4 to 2.3)	0.140
Short axis		16.6 (11.1 to 17.9)	16.3 (13.0 to 18.7)	2.2 (-2.5 to 9.8)	0.233

Values are median (interquartile range). *Data analyzed with the Wilcoxon signed rank test.

LCPV = left common pulmonary vein; LIPV = left inferior pulmonary vein; LSPV = left superior pulmonary vein; n/a = not applicable; PV = pulmonary vein; RFA = radiofrequency ablation; RIPV = right inferior pulmonary vein; RSPV = right superior pulmonary vein.

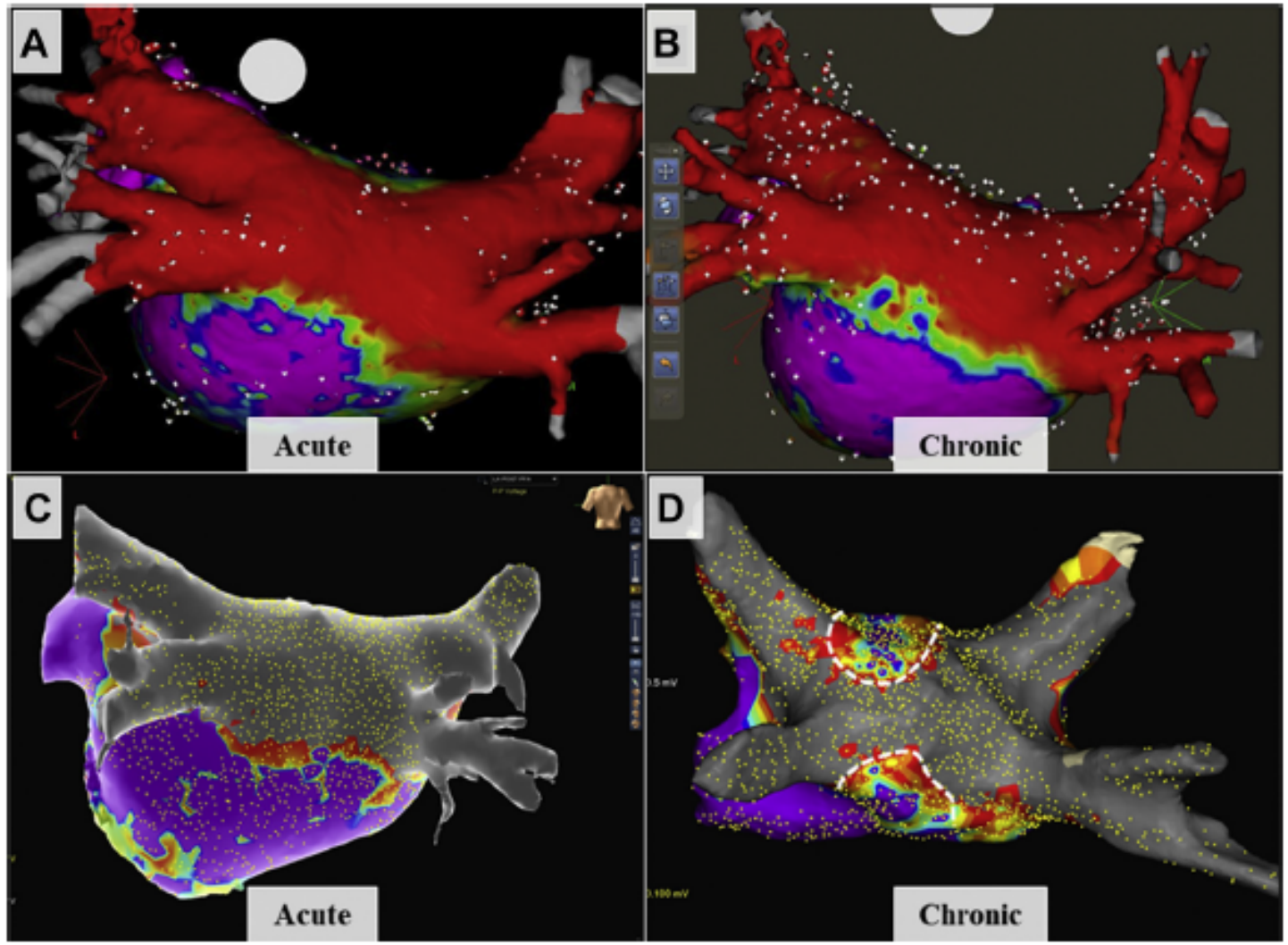
TABLE 4 Additional Safety Assessments

	Number of Patients With Assessment	Findings
Esophagogastroduodenoscopy	21	No esophageal lesions
Phrenic nerve		
Phrenic nerve assessment*	25	No paresis/palsy
Chest x-ray film at 3 months	16	No paresis/palsy
Pulmonary vein stenosis		
CT scanning at 3 months	14	No PV stenosis/narrowing

*By either observation of diaphragmatic motion with patient inspiration or by diaphragmatic capture with phrenic nerve pacing from within the superior vena cava.

CT = computed tomography.

FIGURE 4 Durability of Posterior Wall PFA



(A, C) Electroanatomic mapping immediately post-ablation demonstrates ablation of all PVs and the LAPW (**A,** indicates low voltage, <0.1 mV; **purple** indicates preserved voltage, >0.5 mV; **C, gray** indicates low voltage, <0.1 mV; **purple** indicates preserved voltage, >0.5 mV). **(B, D)** Remapping of these patients during follow-up demonstrates durable isolation. The low-voltage area during remapping is nearly identical to baseline in the first patient (**A** vs. **B**), whereas there was partial ingress of voltage recovery in the second patient (**dotted white line**; **C** vs. **D**). Abbreviations as in Figures 2 and 3.

Contact force catheter ablation for the treatment of persistent atrial fibrillation: Results from the PERSIST-END study

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J Cardiovasc Electrophysiol. 2022;1–12.

- PERSIST-END çok merkezli, prospektif, non randomize
- TactiCath™Ablation Catheter, Sensor Enabled™(SE) (TactiCath SE)

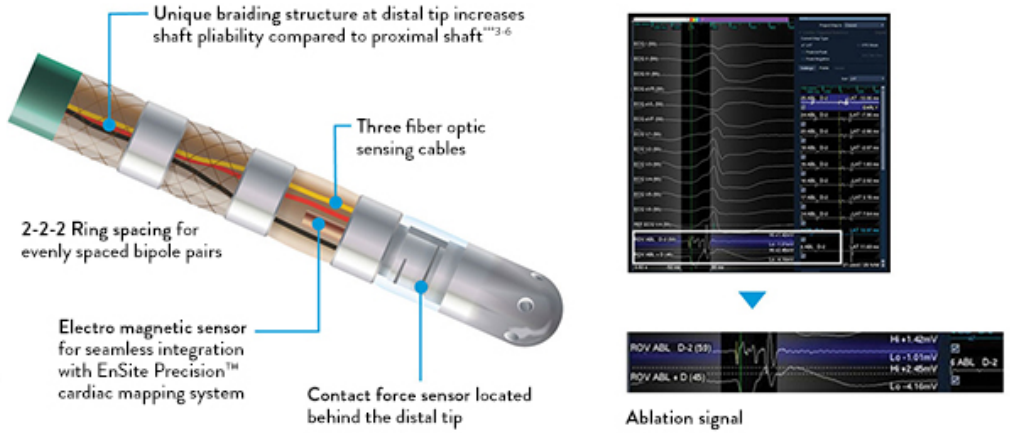


TABLE 2 Procedure and lesion characteristics

Description	Index procedure (*N* = 223) Mean ± SD (*n*), Median (Q1, Q3)
Procedure characteristics	
Total procedure time (min)	164.6 ± 77.9 (223)
	143.0 (64, 521)
Ablation time (min)	93.8 ± 63.9 (222)
	76.0 (20, 382)
Total RF time (min)	38.4 ± 25.8 (223)
	30.0 (2, 129)
PV ablation time (min)	76.8 ± 55.7 (222)
	61.0 (14, 382)
Non-PV ablation time (min)	40.0 ± 47.2 (152)
	23.0 (1, 307)
Total fluoroscopy time (min)	10.10 ± 10.84 (223)
	8.80 (0.0, 91.0)

TABLE 3 Ablation strategy details

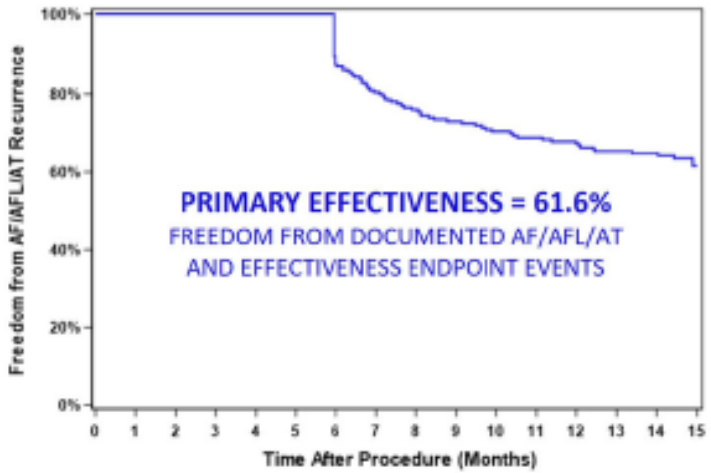
Description	Index procedure (*N* = 223)% (*n*/*N*)
Pulmonary vein isolation	100% (223/223)
Wide area circumferential ablation	70.0% (156/223)
Wide area circumferential ablation with lines	28.3% (63/223)
Individual pulmonary vein isolation	1.8% (4/223)
Non-PV ablations	68.2% (152/223)
Typical atrial flutter	60.5% (92/152)
Linear lesion	52.6% (80/152)
Roof line	90.0% (72/80)
Mitral isthmus	15.0% (12/80)
Posterior line	65.0% (52/80)
Ablations on the posterior wall	11.8% (18/152)
CFAE sites	9.2% (14/152)
Atypical atrial flutter	5.9% (9/152)
Superior vena cava	5.3% (8/152)
Atrial tachycardia	3.3% (5/152)
Coronary sinus	3.3% (5/152)
Scar ablation identified by voltage mapping or MRI	2.0% (3/152)
Left atrial appendage isolation	1.3% (2/152)
Left atrial appendage focal ablation	1.3% (2/152)
Rotational activity	1.3% (2/152)
Ligament of Marshall	0.7% (1/152)

Abbreviation: CFAE, complex fractionated atrial electrogram.

TABLE 4 Primary safety endpoint events

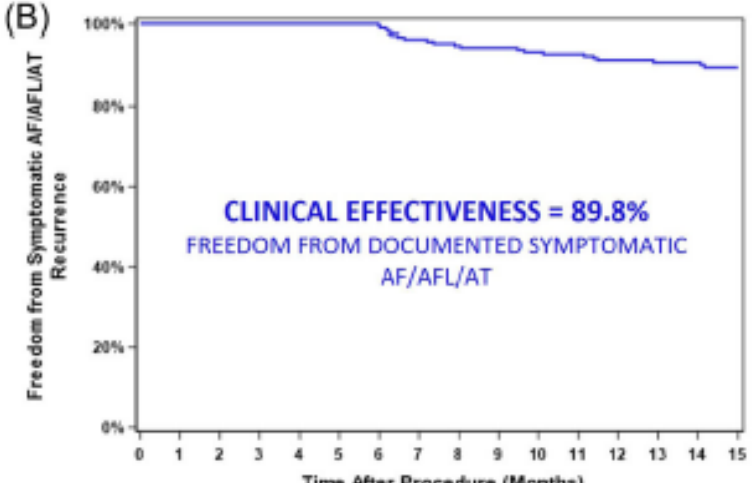
Primary safety endpoint event	Events	Subjects *n* (%)
Atrioesophageal fistula	0	0 (0.0%)
Bleeding	1	1 (0.4%)
Cardiac tamponade/perforation	2	2 (0.9%)
Death	0	0 (0.0%)
Heart block	0	0 (0.0%)
Myocardial infarction (MI)	0	0 (0.0%)
Pericarditis	1	1 (0.4%)
Phrenic nerve injury resulting in diaphragmatic paralysis	0	0 (0.0%)
Pneumothorax	0	0 (0.0%)
Pulmonary edema (respiratory insufficiency)	2	2 (0.9%)
Pulmonary vein stenosis	0	0 (0.0%)
Stroke/cerebrovascular accident (CVA)	1	1 (0.4%)
Thromboembolism	0	0 (0.0%)
Transient ischemic attack	0	0 (0.0%)
Total	7	7 (3.1%)

(A)



	0	3	6	9	12	15
# Subjects at Risk	223	219	181	143	132	58
# Cumulative Events	0	0	25	55	66	75
% Survived	100.0%	100.0%	87.9%	73.0%	67.4%	61.6%
[95% CI]	[100.0%, 100.0%]	[100.0%, 100.0%]	[82.6%, 91.6%]	[66.4%, 78.6%]	[60.5%, 73.4%]	[54.1%, 68.2%]

(B)

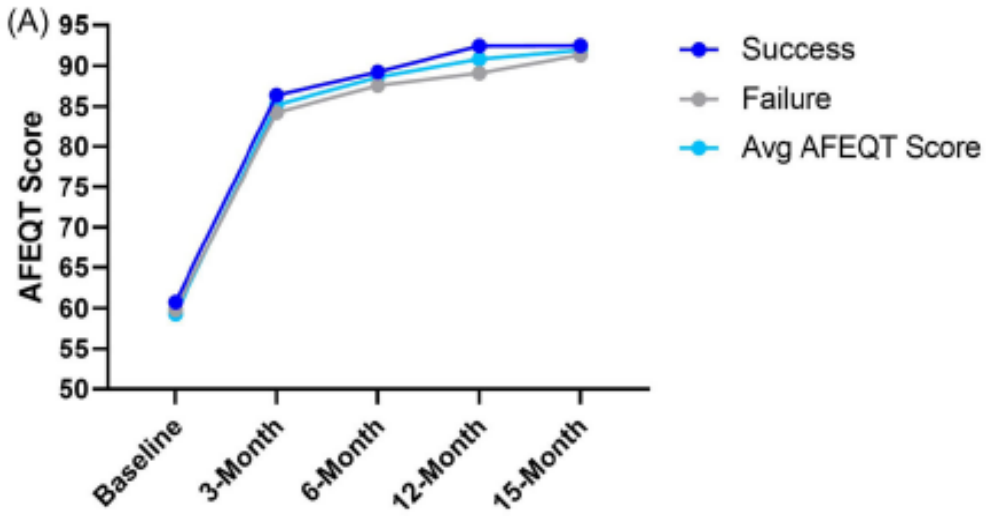


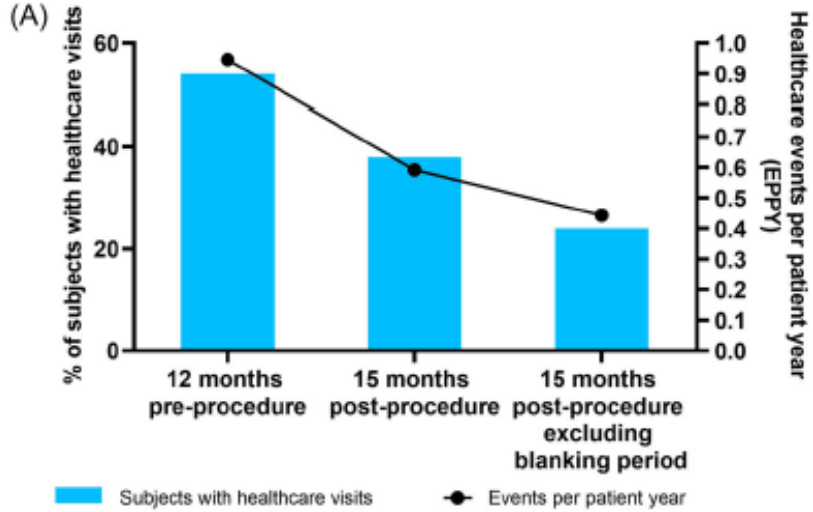
	0	3	6	9	12	15
# Subjects at Risk	223	219	205	187	180	175
# Cumulative Events	0	0	1	11	17	20
% Survived	100.0%	100.0%	99.5%	94.6%	91.6%	90.0%
[95% CI]	[100.0%, 100.0%]	[100.0%, 100.0%]	[96.6%, 99.9%]	[90.5%, 97.0%]	[86.8%, 94.7%]	[85.0%, 93.5%]

(C)

Primary Effectiveness Endpoint Failure Events
AF/AFL/AT recurrence (>30 sec) after therapy consolidation period
Repeat procedure for AF after the therapy consolidation period
Two repeat procedures at any time after index procedure
New Class I/III AAD or a previously failed Class I/III AAD at greater dose after therapy consolidation period
Cardioversion for the treatment of AF after therapy consolidation
Continuous AF on ECG only (thought to be >30 sec) after therapy consolidation period

- 223 hastanın 27’sinde (%12.1) tekrarlayan işlem, 15’inde AF
- Blanking period dışında % 7.2 tekrarlayan işlem





Marshall bundle elimination, Pulmonary vein isolation, and Line completion for ANatomical ablation of persistent atrial fibrillation (Marshall-PLAN): Prospective, single-center study

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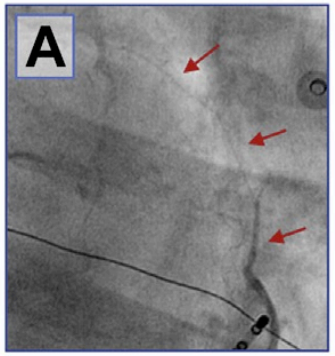
F. Daniel Ramirez, MD,*† Saagar Mahida, MD,§ Clémentine André, MD,*†
Philipp Krisai, MD,*† Yosuke Nakatani, MD,*† Takeshi Kitamura, MD,*†
Masateru Takigawa, MD,*† Remi Chauvel, MD,*† Romain Tixier, MD,*†
Xavier Pillois, PhD,*†‡ Frédéric Sacher, MD, PhD,*†‡ Mélèze Hocini, MD,*†‡
Michel Haïssaguerre, MD,*†‡ Pierre Jaïs, MD, PhD,*†‡ Thomas Pambrun, MD*†

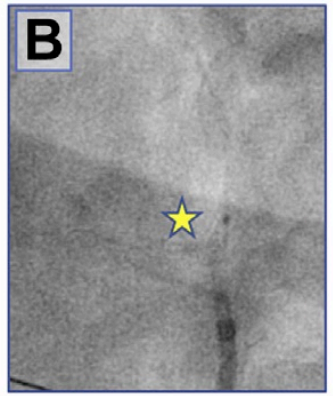
https://doi.org/10.1016/j.hrthm.2020.12.023

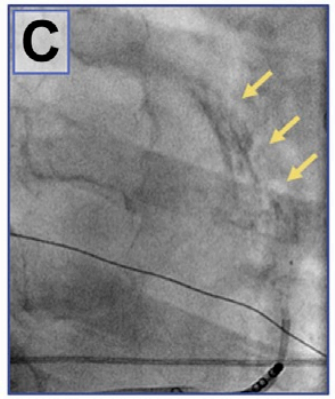
(Heart Rhythm 2021;18:529–537)

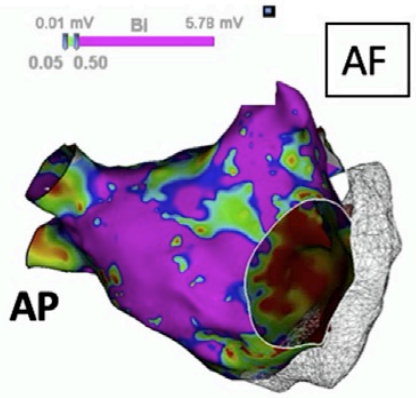
- 75 hasta
- Marshall ven eliminasyonu (etanol uygulaması), PVI, Mitral, roof ve KTI ablasyonu
- MVE – 69 hastada
- Tüm ablasyon setleri 68 hastada (% 91)
- 12.ayda 54 hastada tek işlem sonrası AT/AF izlenmemiş
- Ablasyon seti tamamlanan hastalarda başarı oranı % 79, tekrarlayan işlem sonrası başarı % 89

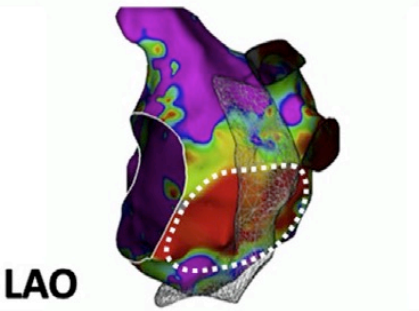
VOM ethanol

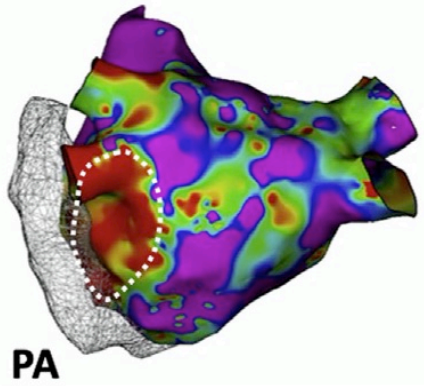






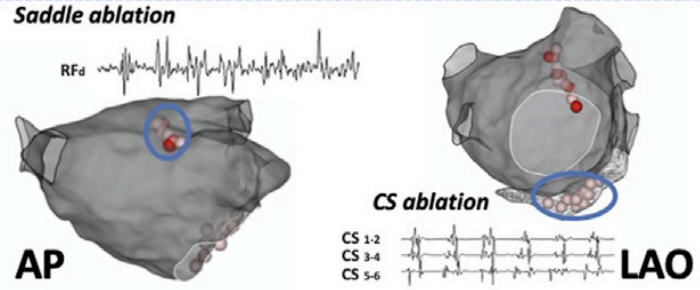




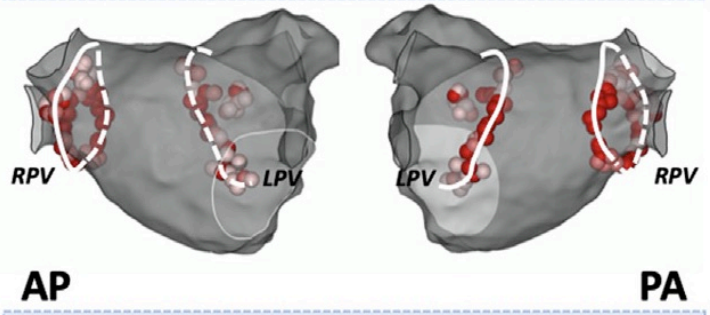


Ablation

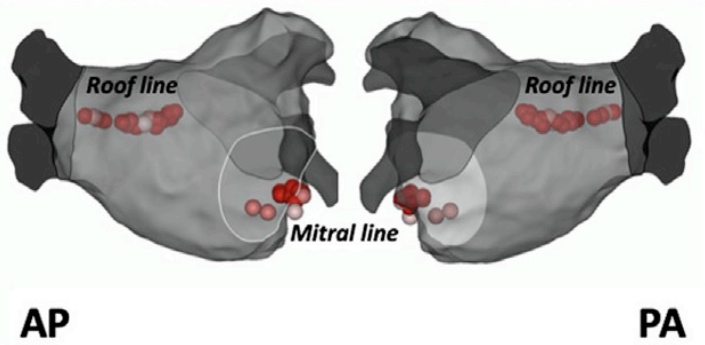
Step 1: Saddle + CS



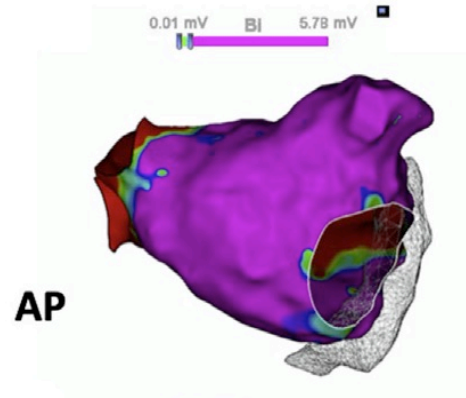
Step 2: PV Isolation

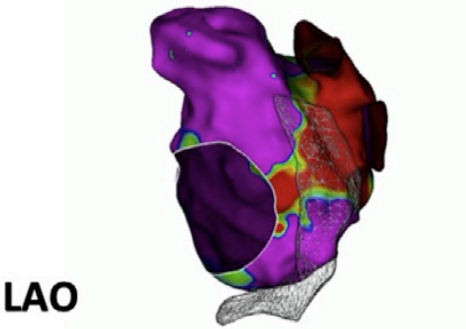


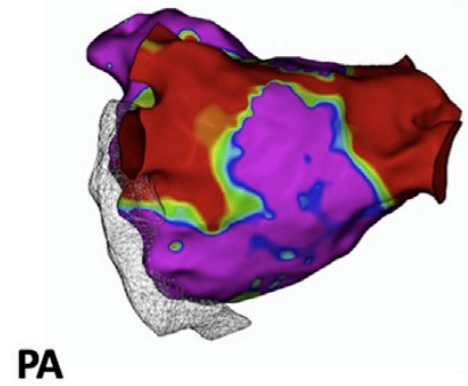
Step 3: Lines



Final Voltage







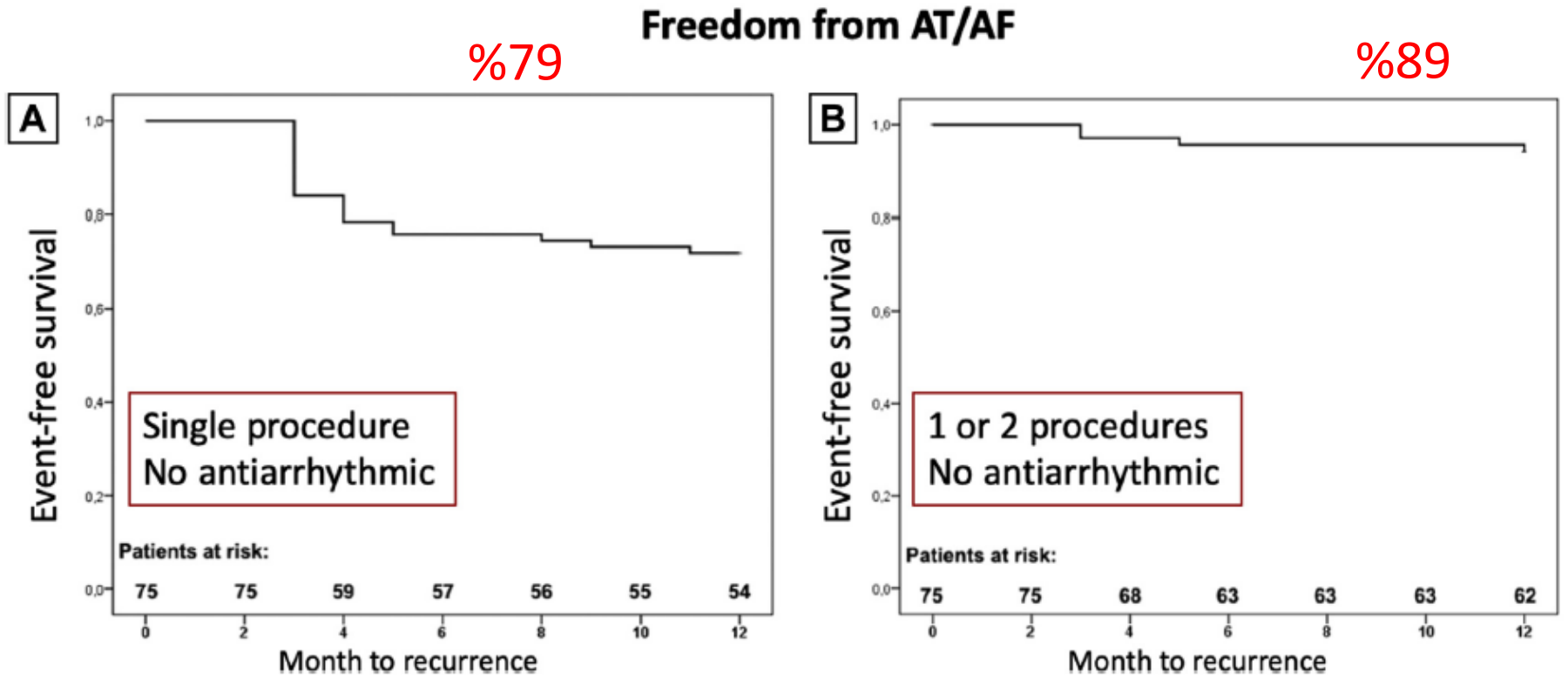


Figure 4 Freedom from atrial fibrillation (AF)/atrial tachycardia (AT). Kaplan-Meier event-free survival curves after a single ablation procedure, without antiarrhythmic drugs (**A**), and after 1 or 2 procedures, without antiarrhythmic drugs (**B**).

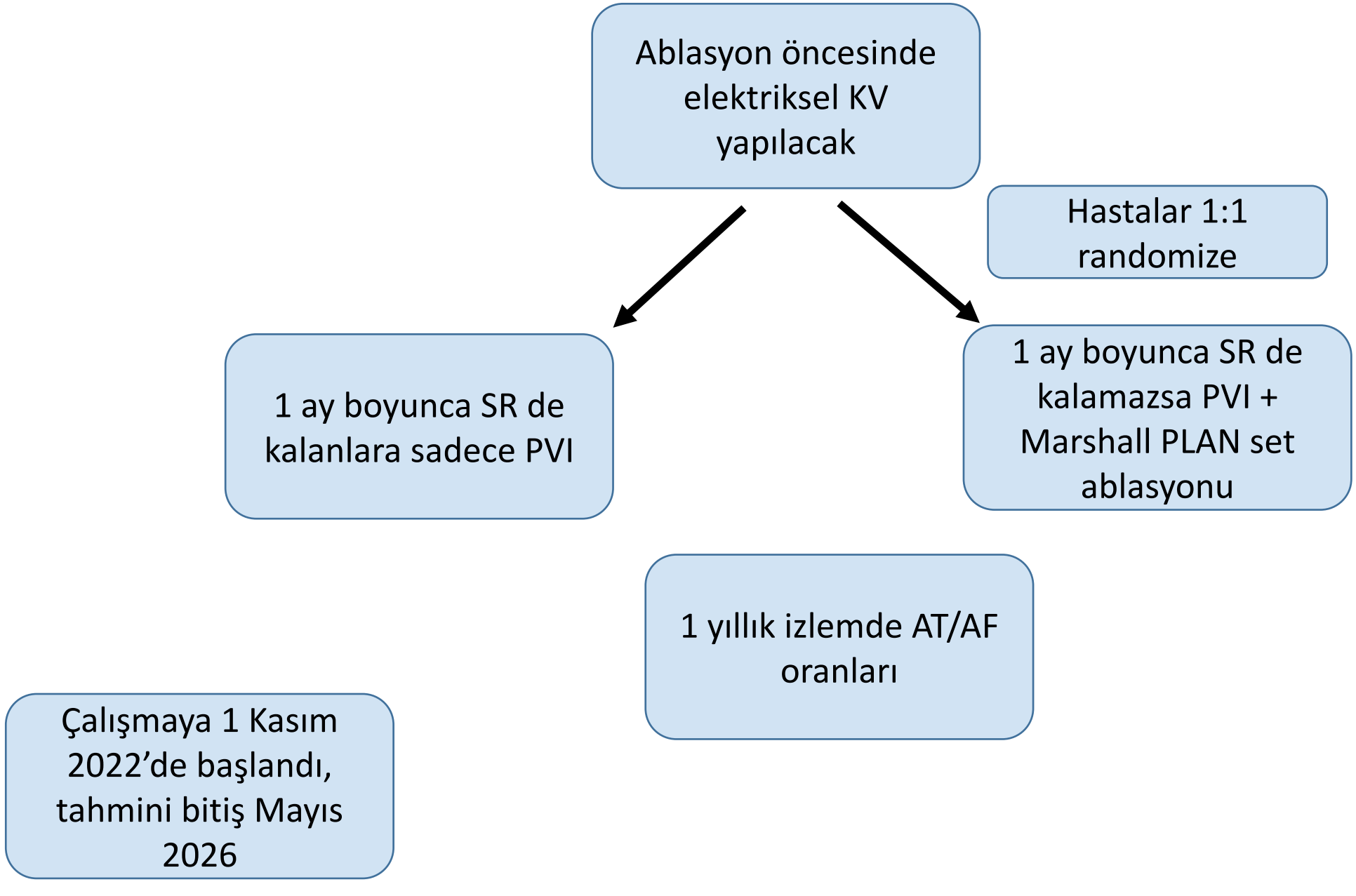
	Post ablation		3 months		P Vs post ablation		12 months		P Vs post ablation	
	A wave	EF	A wave	EF	A wave	EF	A wave	EF	A wave	EF
SR at start (n=29)	53	56%	55	58%	0,18	0,19	58	59%	0,03	0,35
AF at start (n=25)	44	54%	53	57%	0,16	0,35	59	59%	0,02	0,09
All (n=54)	49	57%	53	58%	0,02	0,41	58	60%	0,01	0,02

J Cardiovasc Electrophysiol. 2022 Nov 26. doi: 10.1111/jce.15761. Online ahead of print.

Pulmonary vein isolation Alone or in Combination wIth substrate modulation aFter electrIcal Cardioversion failure in patients with persistent atrial fibrillation: The PACIFIC trial: Study design

Agustín Alfonso Bortone [1], Eloi Marijon [2], Luca Rosario Limite [1], Philippe Lagrange [3], François Brigadeau [4], Raphaël Martins [5], Cyril Durand [6], Jean-Paul Albenque [7]

- Fransa’da yer alan 7 merkez


Ablasyon öncesinde elektriksel KV yapılacak
Hastalar 1:1 randomize
1 ay boyunca SR de kalanlara sadece PVI
1 ay boyunca SR de kalamazsa PVI + Marshall PLAN set ablasyonu
1 yıllık izlemde AT/AF oranları
Çalışmaya 1 Kasım 2022’de başlandı, tahmini bitiş Mayıs 2026

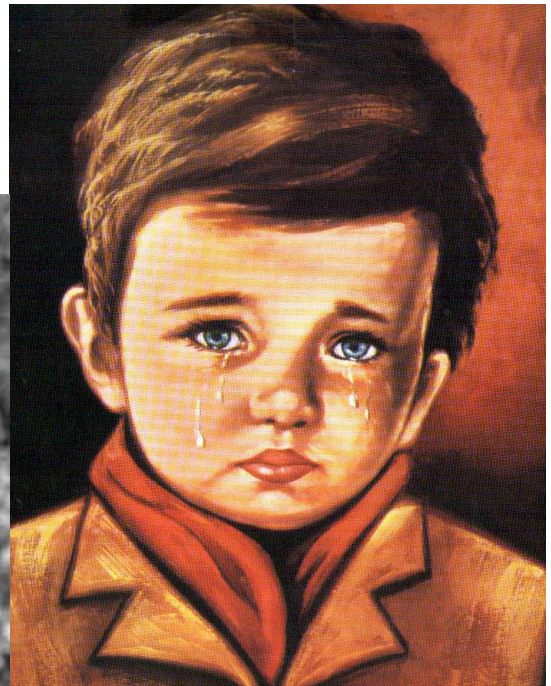
Tartışmanın sonuna gelirken..

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)

ESC European Society of Cardiology
European Heart Journal (2020) **42**, 373–498
doi:10.1093/eurheartj/ehaa612

Techniques and technologies		
Complete electrical isolation of the pulmonary veins is recommended during all AF catheter-ablation procedures.[235–237,239,606,608–610,613,614,678,679,681,683,684,686,713,731,759,780]	I	A
If patient has history of CTI-dependent AFL or if typical AFL is induced at the time of AF ablation, delivery of a CTI lesion may be considered.[731–733,819–821]	IIb	B
Use of additional ablation lesions beyond PVI (low voltage areas, lines, fragmented activity, ectopic foci, rotors, and others) may be considered but is not well established.[677,680,709,711–730]	IIb	B

Bruno Amadio 1911-1981



Belki de ileride..

Non-PVI Bağımlı Persistan AF

- AF süresi uzunsa
- Sol atriyum ileri d
- Skar dokusu ya
- Yapısal ve elekt
- ..

Non-PVI Bağımlı Persistan AF hastalarına **ek ablasyon yapılabilir..**

SABRINIZ İÇİN TEŞEKKÜRLER