



11. Atriyal Fibrilasyon Zirvesi 2022
9 - 10 Aralık 2022 • Spice Kongre Merkezi, Antalya

**Güncel Bilgiler Işığında Persistan AF
Ablasyonu**
Yalnızca PV izolasyonu yeterlidir

Dr. Muhammet DURAL

Atrial fibrilasyon progresyonu ve erken ritm kontrolü

Atrial yüksek hız epizotları Paroksizmal **Persistan** Uzun süreli persistan Permenant

Artmış yeniden şekillenme, Artmış komorbiditeler, Artmış tromboembolik risk

Erken ritim kontrolü?

EAST-AFNET 4 Randomize Kontrollü Çalışma

Primer sonlanım: kardiyovasküler ölüm, stroke, kalp yetmezliği veya akut koroner sendrom nedeniyle yatış

Erken ritim kontrolü
(daha çok medikal tedavi)

'Lenient' yaklaşım
(daha çok medikal tedavi)

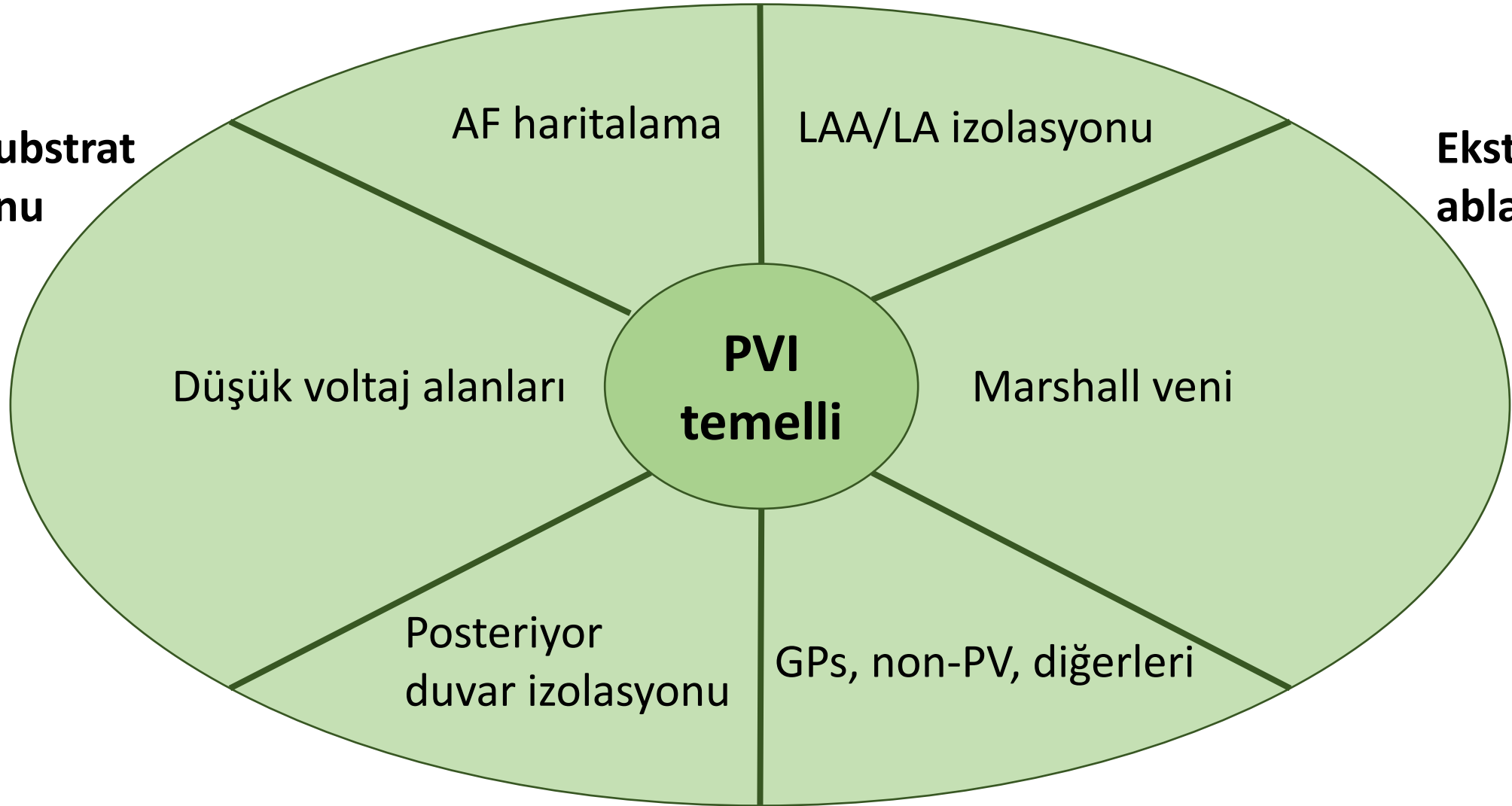
- Persistan AF;
 - Yapısal
 - Elektriksel
 - Otonomik remodeling
- AF; *AF'yi tetikler*

Persistan AF'de kateter ablasyonu

(Kime, ne zaman, nereyi, nasıl, lezyon kalitesi, güvenlik)

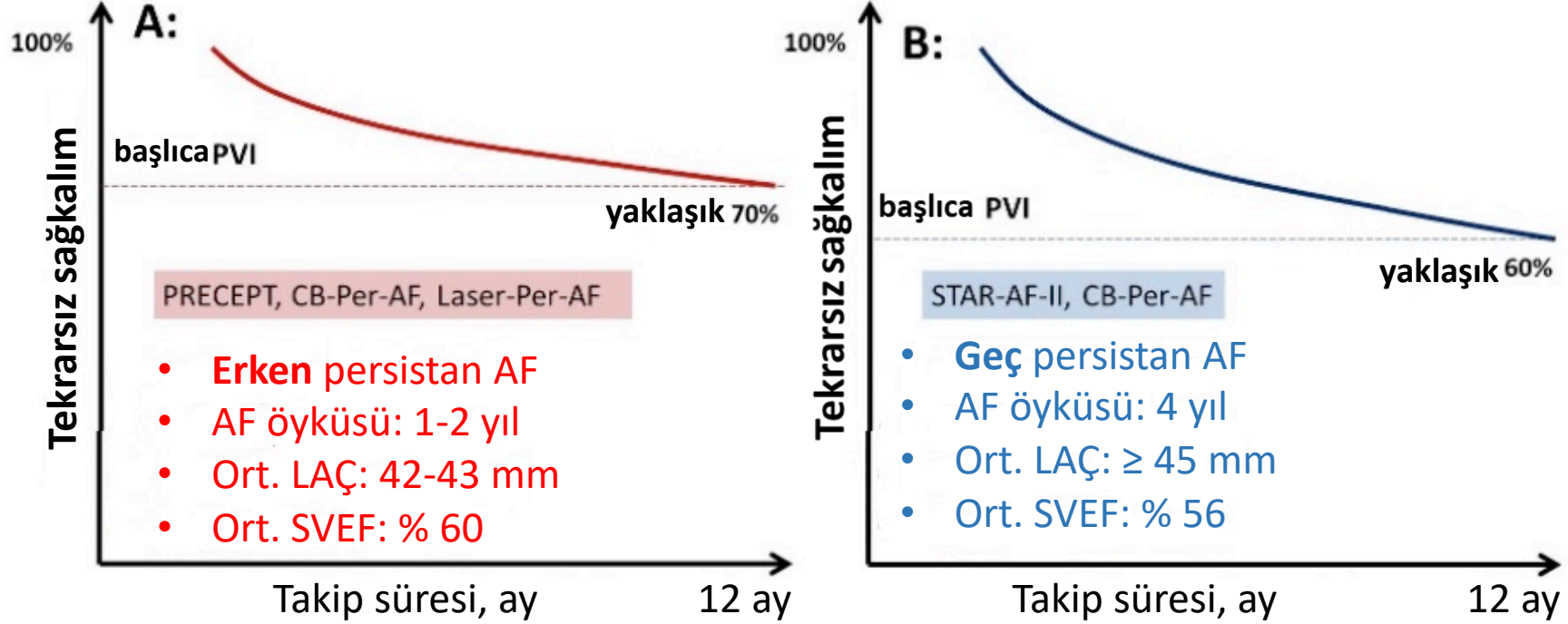
**Ekstra substrat
ablasyonu**

**Ekstra trigger
ablasyonu**

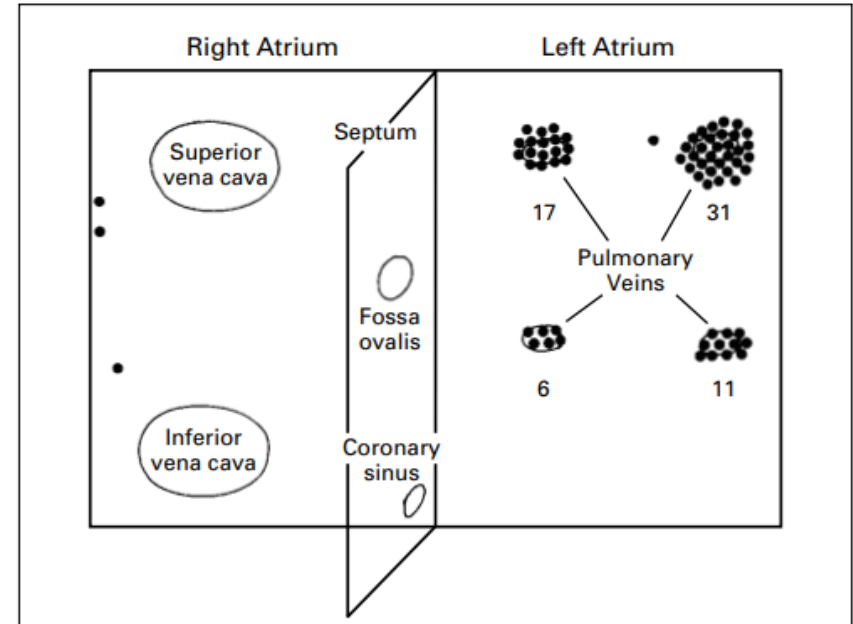
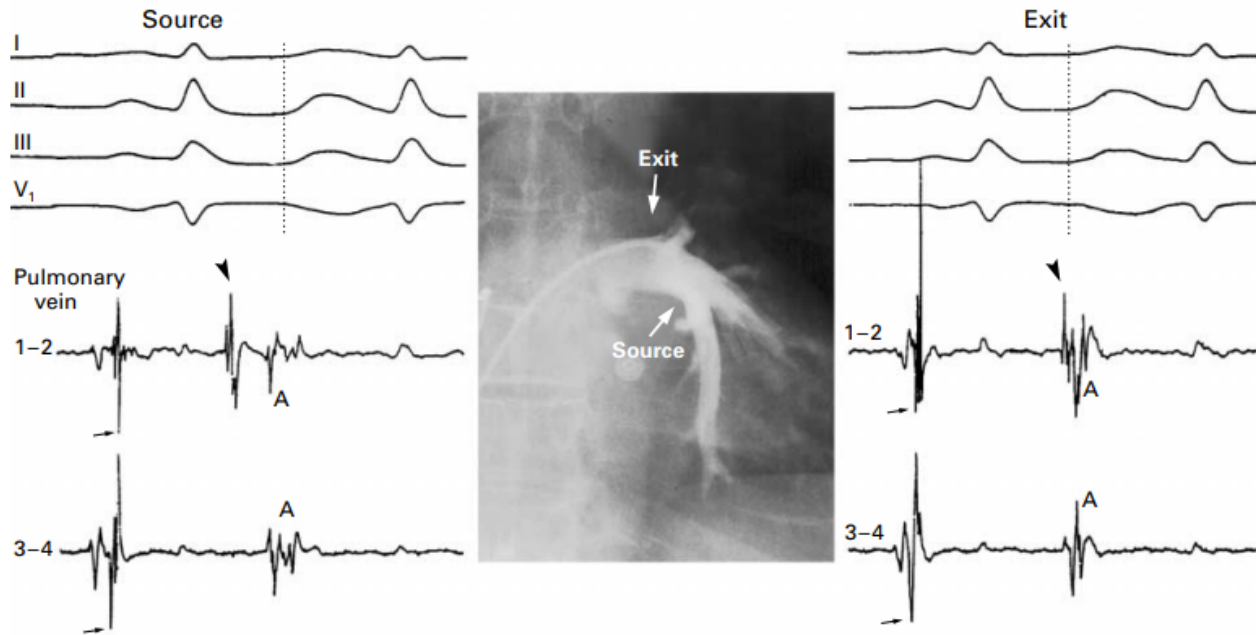


DECAAF II, POBI-AF, CB PWI, VENUS, BELIEF, CB-LAAI

Persistan AF'de kateter ablasyonu



Pulmoner ven izolasyonu



SPONTANEOUS INITIATION OF ATRIAL FIBRILLATION BY ECTOPIC BEATS ORIGINATING IN THE PULMONARY VEINS

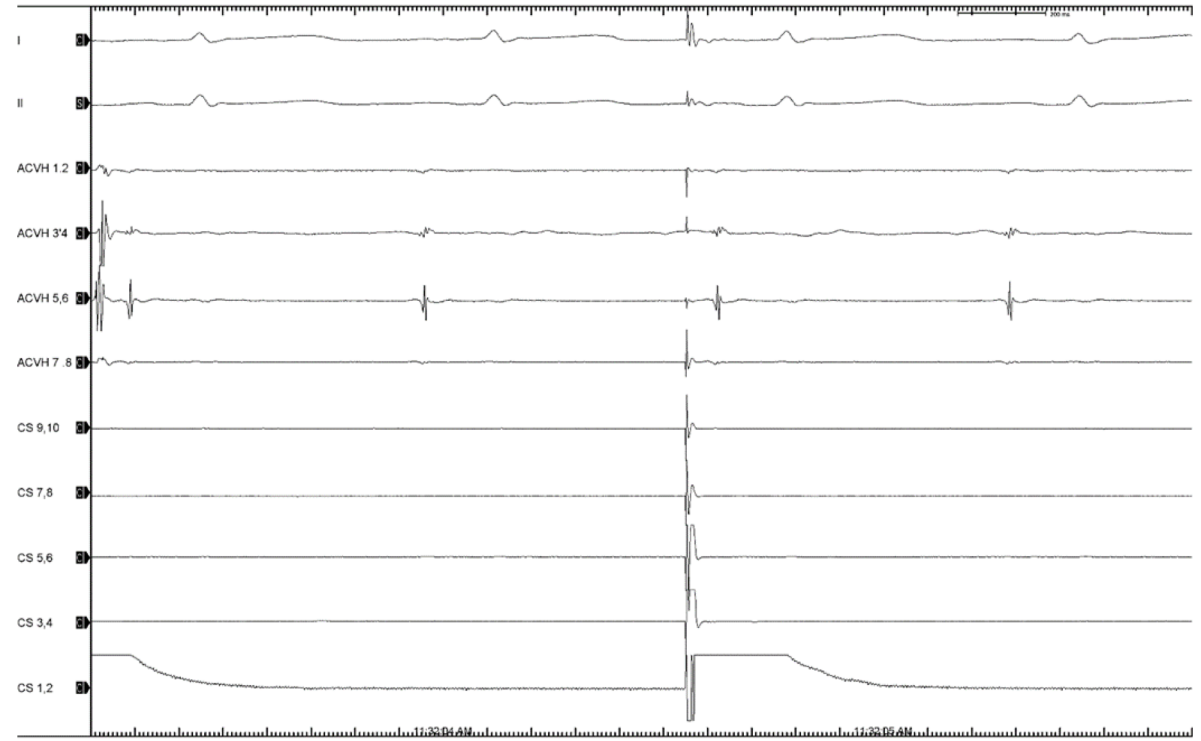
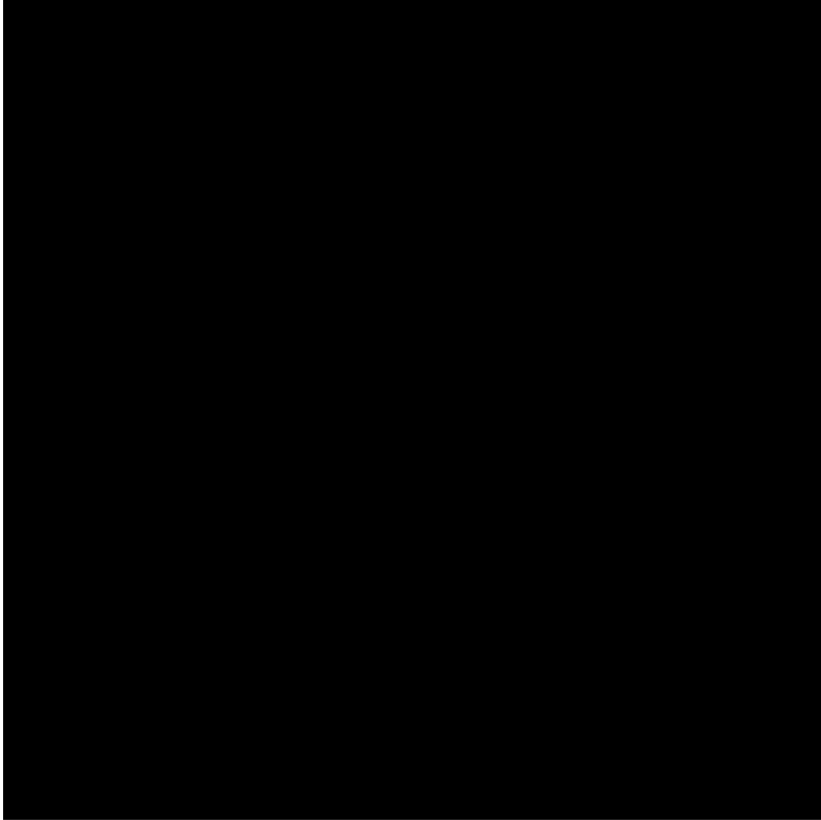
MICHEL HAÏSSAGUERRE, M.D., PIERRE JAÏS, M.D., DIPEN C. SHAH, M.D., ATSUSHI TAKAHASHI, M.D., MÉLÈZE HOCINI, M.D.,
GILLES QUINIOU, M.D., STÉPHANE GARRIGUE, M.D., ALAIN LE MOUROUX, M.D., PHILIPPE LE MÉTAYER, M.D.,
AND JACQUES CLÉMENTY, M.D.

The New England Journal of Medicine; September 3, 1998

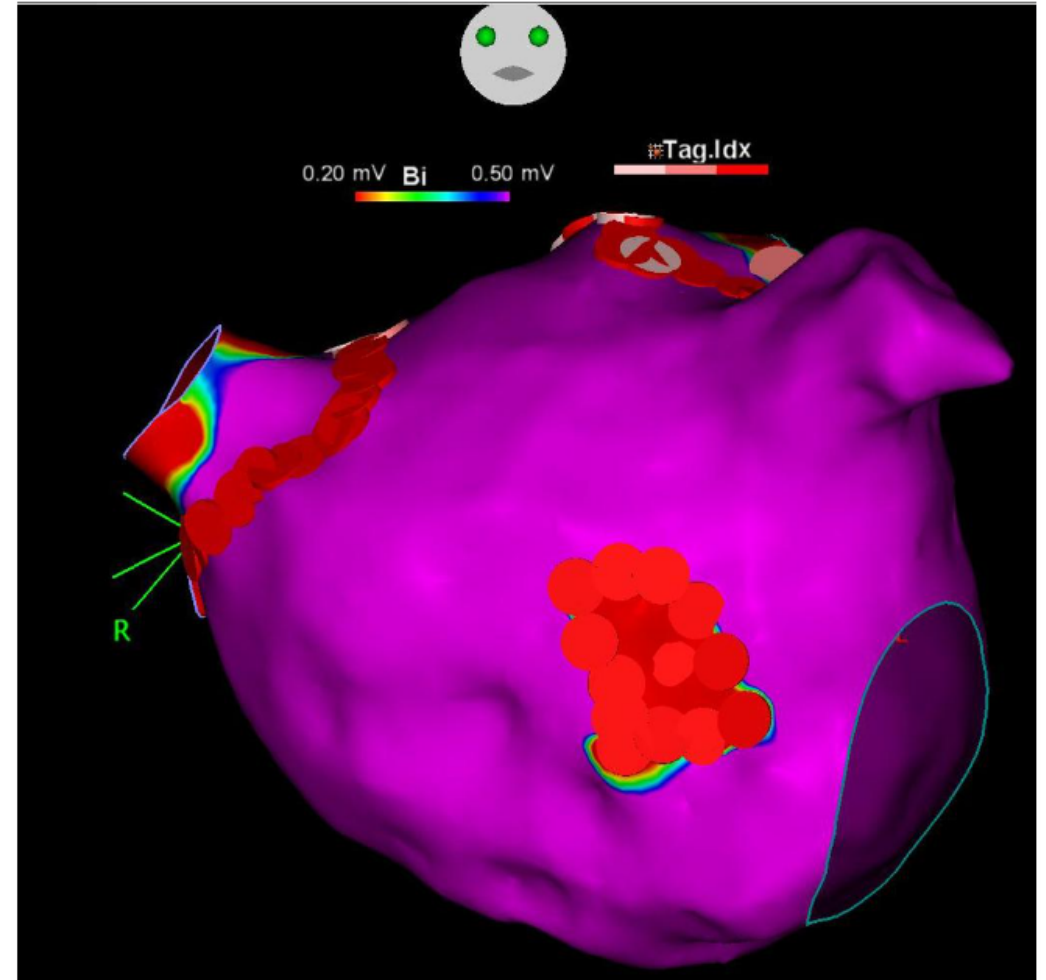
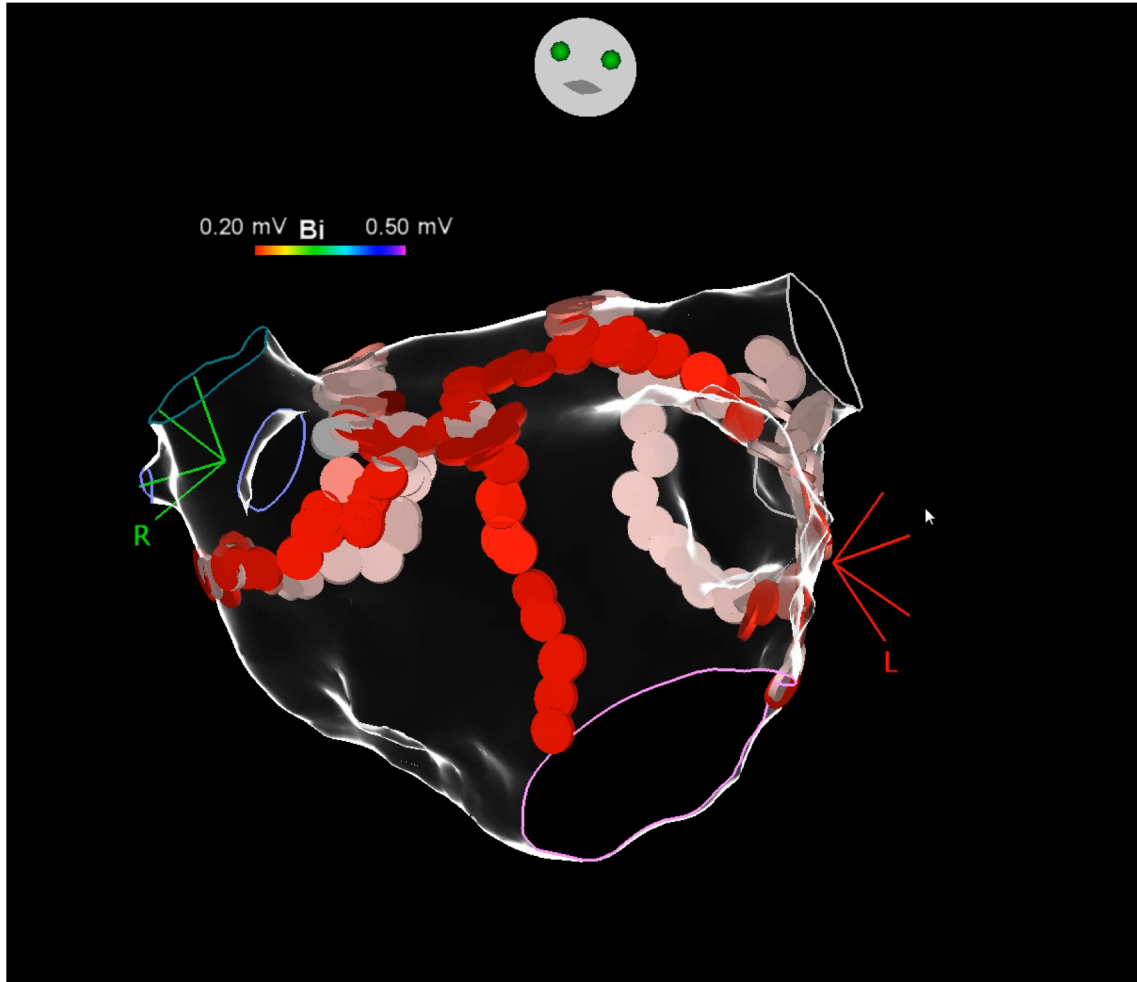
Pulmoner ven izolasyonu

- PV'lerdeki tetikleyiciler AF başlangıcı için dominant mekanizma
- PV içinden fokal ablasyon → PV ostiumunda segmental ablasyon → sadece aritmojenik PV'lerin izolasyonu → tüm PV'lerin ampirik izolasyonu → geniş PV antrum çevresel ablasyonu (WACA)
- Rekürrensin en önemli nedeni PV rekonneksiyonu

Pulmoner ven izolasyonu



PVi+Ek ablasyon



PVI ↔ PVI + ek ablasyon

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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 372;19 NEJM.ORG MAY 7, 2015

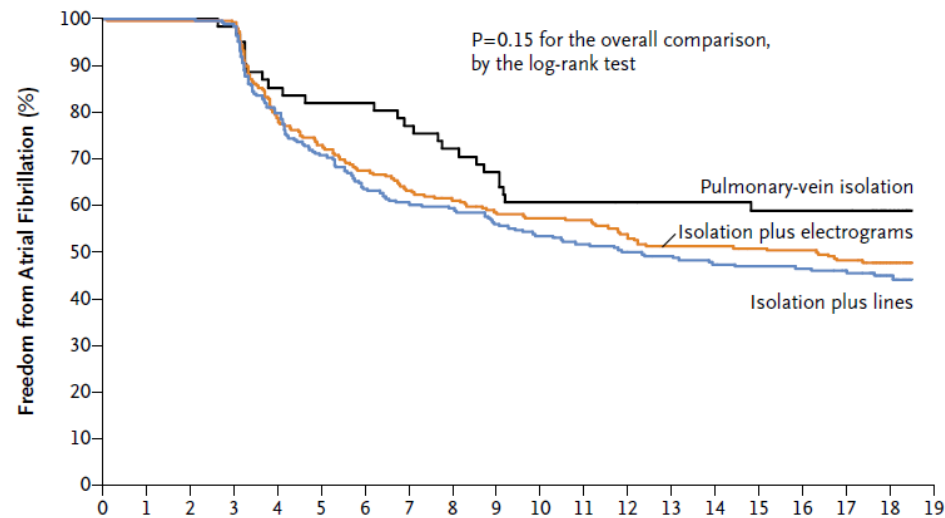
PVI ↔ PVI + ek ablasyon

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Isolation Alone (N=67)	Isolation plus Electrograms (N=263)	Isolation plus Lines (N=259)
Age — yr	58±10	60±9	61±9
Male sex — no. (%)	52 (78)	213 (81)	196 (76)
Ejection fraction — %	55±11	57±10	57±10
Left atrial diameter — mm	44±6	44±6	46±6
Time from first diagnosis of atrial fibrillation — yr	4.3±6.3	4.2±5.0	3.6±4.2
Burden of atrial fibrillation at baseline — hr/mo†	83±36	85±33	80±37
Constant atrial fibrillation for >6 mo — no. (%)	52 (78)	207 (79)	186 (72)
Medical history — no. (%)			
Hypertension	32 (48)	143 (54)	158 (61)
Diabetes	6 (9)	31 (12)	26 (10)
Coronary disease	2 (3)	21 (8)	29 (11)
Stroke or transient ischemic attack	6 (9)	14 (5)	19 (7)
Heart failure	3 (4)	10 (4)	15 (6)
CHADS ₂ score — no. (%)			
0	31 (46)	93 (35)	81 (31)
1	25 (37)	126 (48)	127 (49)
2	6 (9)	31 (12)	29 (11)
>2	5 (7)	10 (4)	19 (7)
Baseline CCS SAF score — no./total no. (%)			
0	2/63 (3)	12/248 (5)	14/243 (6)
1	14/63 (22)	55/248 (22)	53/243 (22)
2	19/63 (30)	79/248 (32)	70/243 (29)
3	24/63 (38)	86/248 (35)	89/243 (37)
4	4/63 (6)	16/248 (6)	17/243 (7)
Baseline medications — no. (%)			
Beta-blocker	43 (64)	148 (56)	160 (62)
Calcium-channel blocker	9 (13)	42 (16)	46 (18)
Cardiac glycoside	8 (12)	39 (15)	39 (15)
Propafenone	2 (3)	2 (1)	7 (3)
Flecainide	8 (12)	32 (12)	28 (11)
Sotalol	3 (4)	13 (5)	15 (6)
Amiodarone	16 (24)	50 (19)	62 (24)
Dronedarone	3 (4)	19 (7)	15 (6)
Dofetilide	0	3 (1)	1 (<1)
Vitamin K antagonist	55 (82)	189 (72)	190 (73)
Oral direct thrombin inhibitor	5 (7)	27 (10)	23 (9)
Acetylsalicylic acid	5 (7)	29 (11)	29 (11)

Table 2. Major Efficacy Outcomes.

Variable	Isolation Alone (N=61)	Isolation plus Electrograms (N=244)	Isolation plus Lines (N=244)	P Value
	<i>number (percent)</i>			
Freedom from documented atrial fibrillation after one procedure, with or without antiarrhythmic drugs	36 (59)	119 (49)	112 (46)	0.15
Freedom from documented atrial fibrillation after one procedure, without antiarrhythmic drugs*	29 (48)	90 (37)	81 (33)	0.11
Freedom from documented atrial arrhythmia after one procedure, with or without antiarrhythmic drugs	30 (49)	100 (41)	90 (37)	0.15
Freedom from documented atrial arrhythmia after one procedure, without antiarrhythmic drugs*	25 (41)	81 (33)	71 (29)	0.08
Freedom from documented atrial fibrillation after two procedures, with or without antiarrhythmic drugs	44 (72)	146 (60)	142 (58)	0.18
Freedom from documented atrial arrhythmia after two procedures, with or without antiarrhythmic drugs	37 (61)	122 (50)	117 (48)	0.24
Documented atrial flutter or tachycardia after one procedure, with or without antiarrhythmic drugs	7 (11)	27 (11)	34 (14)	0.57
Documented atrial flutter or tachycardia after two procedures, with or without antiarrhythmic drugs	7 (11)	32 (13)	29 (12)	0.98
Patients undergoing a second ablation procedure	13 (21)	63 (26)	81 (33)	0.10



PVI ↔ PVI+Substrat modifikasyonu

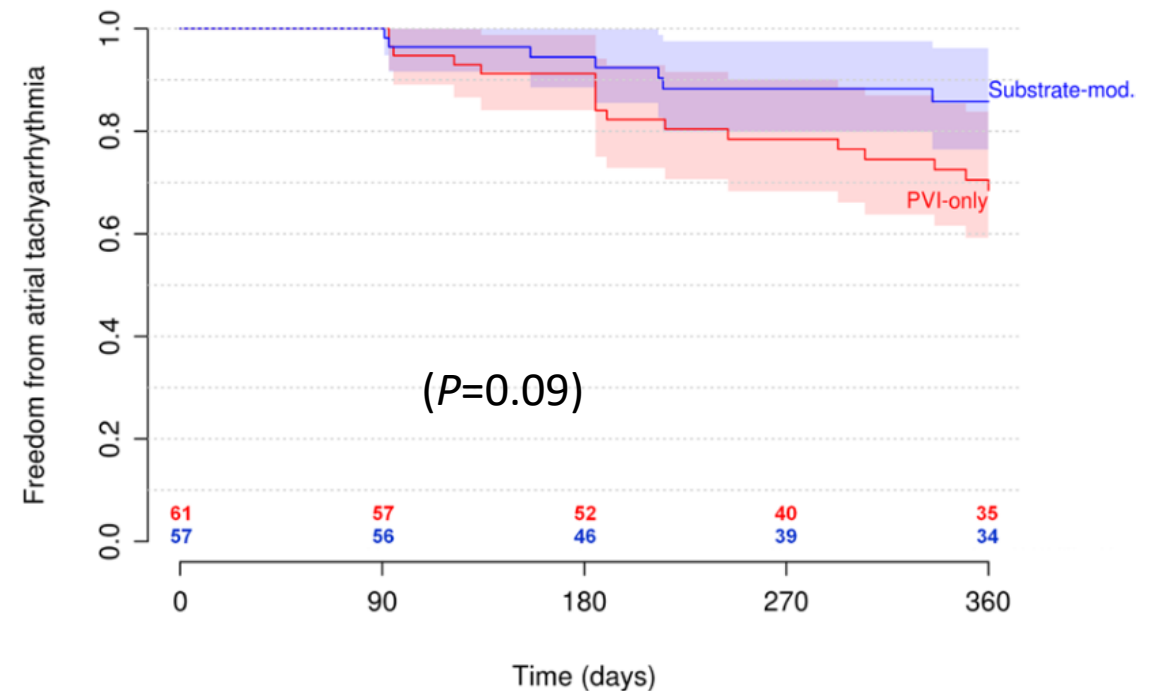
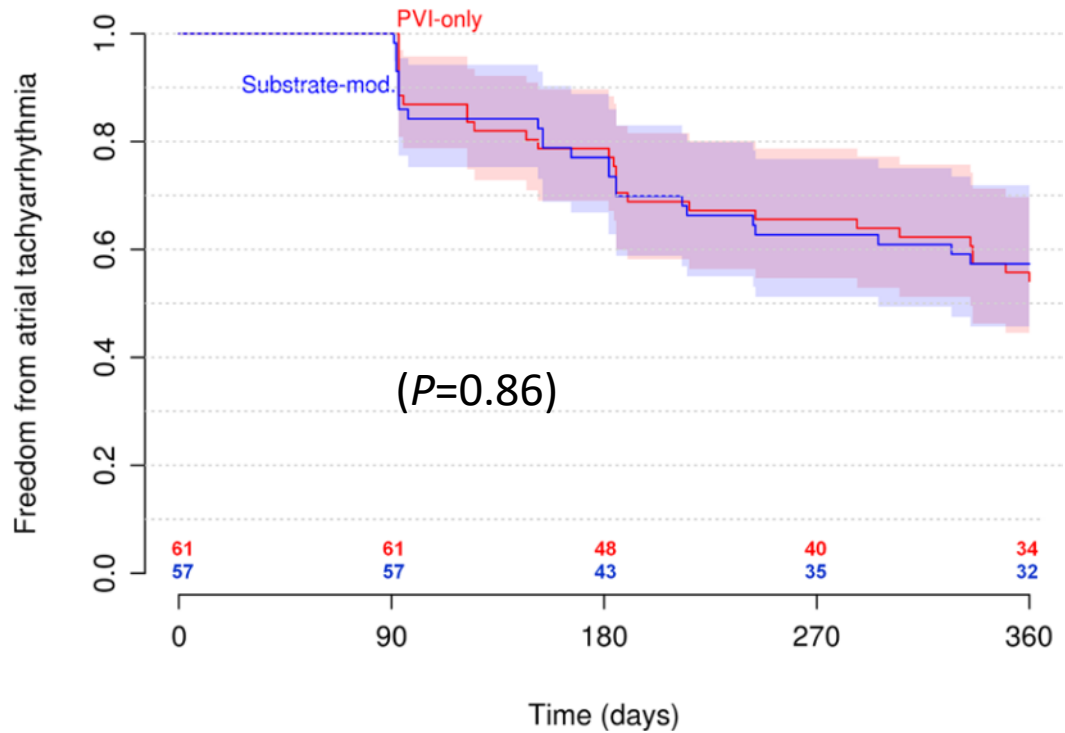
Original Article

Stand-Alone Pulmonary Vein Isolation Versus Pulmonary Vein Isolation With Additional Substrate Modification as Index Ablation Procedures in Patients With Persistent and Long-Standing Persistent Atrial Fibrillation

The Randomized Alster-Lost-AF Trial (Ablation at St. Georg Hospital for Long-Standing Persistent Atrial Fibrillation)

***Circ Arrhythm Electrophysiol.* 2017;10:e005114**

PVI ↔ Substrat modifikasyonu



Sadece PVI (61 hasta), PVI + substrat modifikasyonu (CFAE±linear ablasyon) (57 hasta)

PVI ↔ Substrat modifikasyonu



ESC


European Society
of Cardiology

Europace (2021) **23**, 565–574
doi:10.1093/europace/eaab293

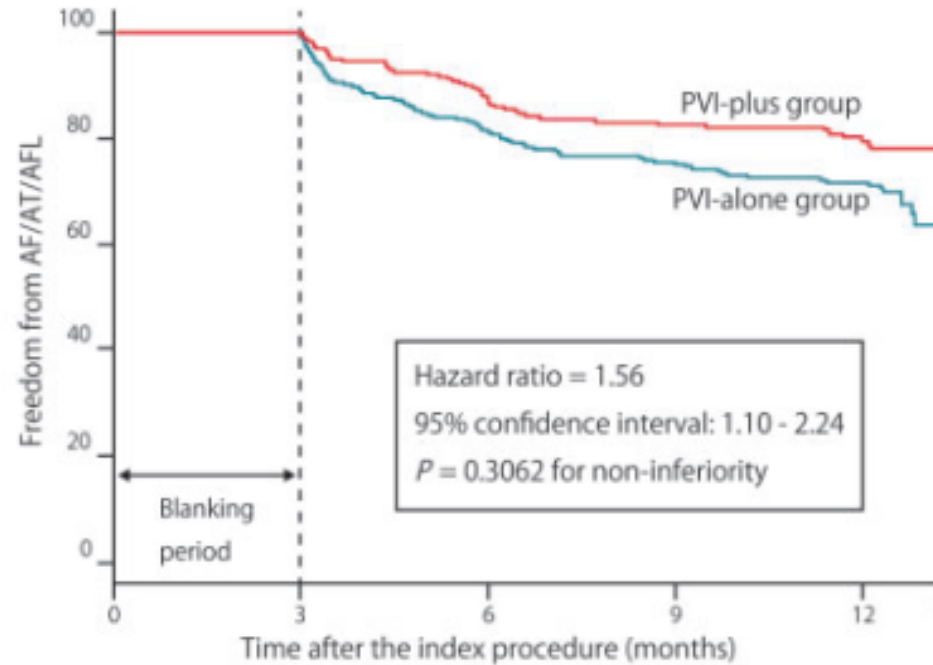
CLINICAL RESEARCH

Ablation for atrial fibrillation

Pulmonary vein isolation alone vs. more extensive ablation with defragmentation and linear ablation of persistent atrial fibrillation: the EARNEST-PVI trial

Koichi Inoue  ^{1*}, **Shungo Hikoso**¹, **Masaharu Masuda**², **Yoshio Furukawa**³, **Akio Hirata**⁴, **Yasuyuki Egami**⁵, **Tetsuya Watanabe**⁶, **Hitoshi Minamiguchi**¹, **Miwa Miyoshi**⁷, **Nobuaki Tanaka**¹, **Takafumi Oka**¹, **Masato Okada**¹, **Takashi Kanda**², **Yasuhiro Matsuda**², **Masato Kawasaki**³, **Kenichi Hayashi**⁸, **Tetsuhisa Kitamura**¹⁰, **Tomoharu Dohi**¹, **Akihiro Sunaga**¹, **Hiroya Mizuno**¹, **Daisaku Nakatani**¹, and **Yasushi Sakata**¹; on behalf of the **OCVC Arrhythmia Investigators**

PVI ↔ Substrat modifikasyonu



No. at risk					
PVI-alone group	249	247	201	183	138
PVI-plus group	248	245	214	197	154

Sadece PVI (249 hasta), PVI + substrat modifikasyonu (CFAE±linear ablasyon) (248 hasta)

PVI ↔ Substrat modifikasyonu

JACC Journals › JACC: Clinical EP › Archives › Vol. 8 No. 7

Circumferential Pulmonary Vein Isolation Plus Low-Voltage Area Modification in Persistent Atrial Fibrillation: The STABLE-SR-II Trial

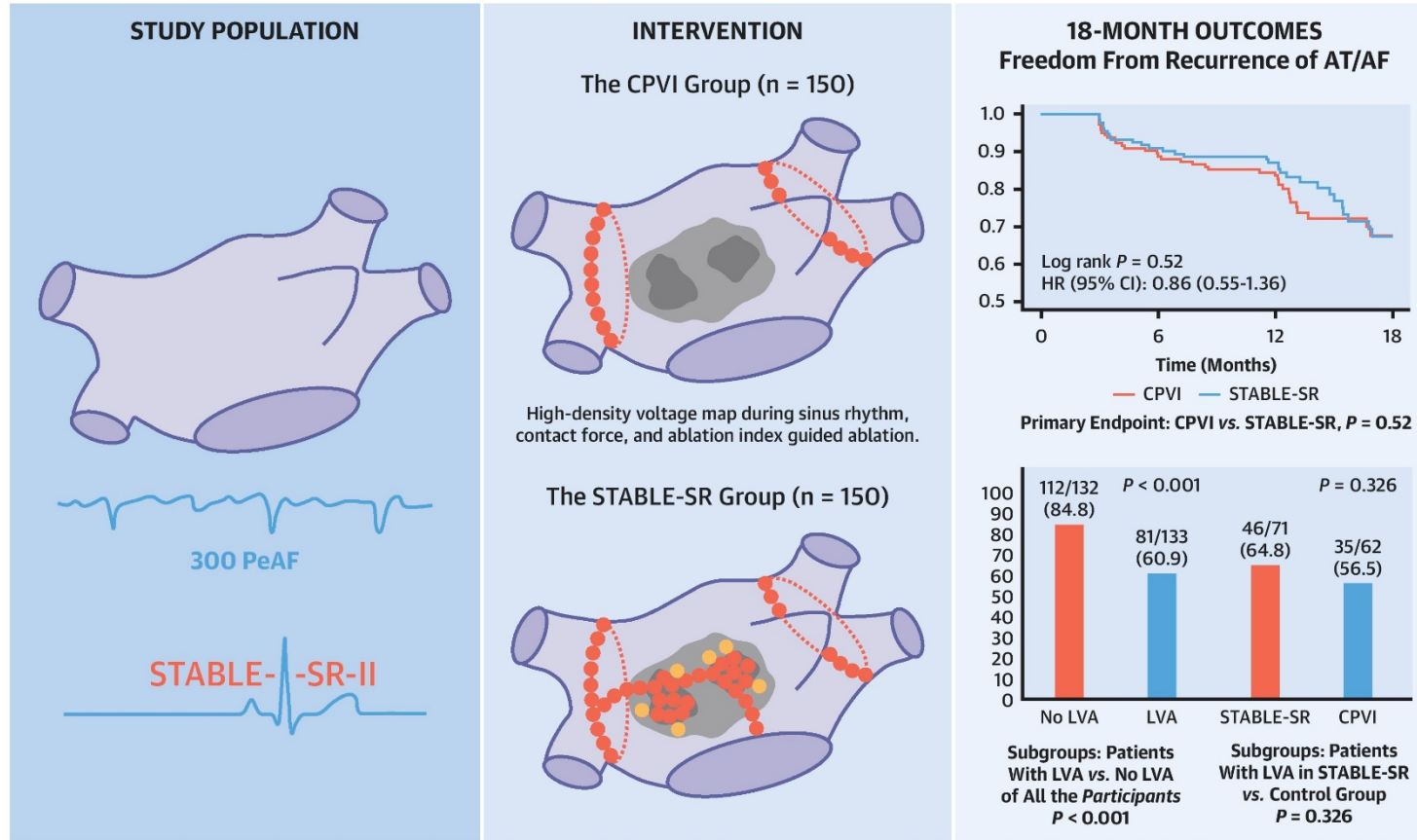
Atrial Fibrillation - Catheter Ablation

Gang Yang, Liangrong Zheng, Chenyang Jiang, Jie Fan, Xingpeng Liu, Xianzhang Zhan, Jianping Li, Lichun Wang, Hao Yang, Wenqing Zhu, Hong Du, Genshan Ma, Wei Ma, Pipin Kojodjojo, Minglong Chen, and on behalf of the STABLE-SR-II Investigators

J Am Coll Cardiol EP. 2022 Jul, 8 (7) 882–891

PVI ↔ Substrat modifikasyonu

CENTRAL ILLUSTRATION: CPVI+LVA Ablation vs CPVI Alone for PeAF (STABLE-SR-II Trial)



Yang G, et al. J Am Coll Cardiol EP. 2022;8(7):882-891.

PVI ↔ Ek 'linear' ablasyon

Original Article

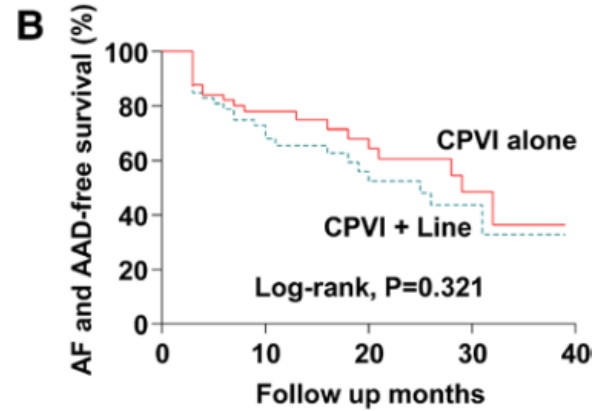
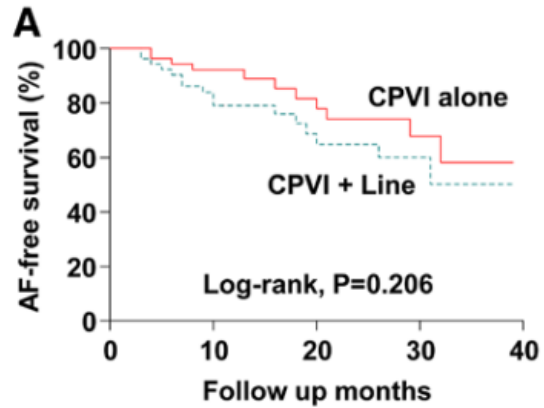
Pulmonary Vein Isolation Alone Versus Additional Linear Ablation in Patients With Persistent Atrial Fibrillation Converted to Paroxysmal Type With Antiarrhythmic Drug Therapy

A Multicenter, Prospective, Randomized Study

Hee Tae Yu, MD, PhD; Jaemin Shim, MD, PhD; Junbeom Park, MD, PhD; In-Soo Kim, MD; Tae-Hoon Kim, MD; Jae-Sun Uhm, MD, PhD; Boyoung Joung, MD, PhD; Moon-Hyoung Lee, MD, PhD; Young-Hoon Kim, MD, PhD; Hui-Nam Pak, MD, PhD

Circ Arrhythm Electrophysiol. 2017;10:e004915

PVI ↔ Ek 'linear' ablasyon



CPVI vs CPVI + line
arasında AF
rekürrensinde fark yok

PVi ↔ Atriyal düşük voltaj alan ablasyonu

Original Investigation

June 21, 2022

Effect of MRI-Guided Fibrosis Ablation vs Conventional Catheter Ablation on Atrial Arrhythmia Recurrence in Patients With Persistent Atrial Fibrillation

The DECAAF II Randomized Clinical Trial

Nassir F. Marrouche, MD¹; Oussama Wazni, MD²; Christopher McGann, MD³; [et al](#)

JAMA. 2022;327(23):2296-2305. doi:10.1001/jama.2022.8831

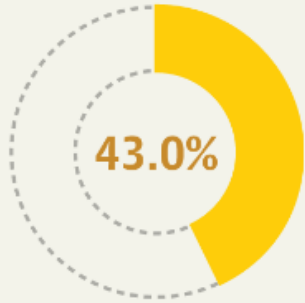
PVI ↔ Atriyal düşük voltaj alan ablasyonu

FINDINGS

Patients with atrial arrhythmia recurrence

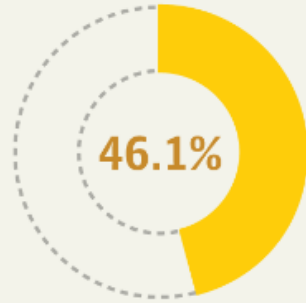
**PVI plus MRI-guided
atrial fibrosis ablation**

175 of 407 patients



PVI alone

188 of 408 patients



There was no significant difference:

Hazard ratio, **0.95**

(95% CI, 0.77 to 1.17); $P = .63$

© AMA

- Subgrup analizde evre 1-2 fibrozis olanlarda fibrozis ablasyonu faydalı ($p < 0.05$)

PVI ↔ Posterior duvar izolasyonu

- Embriyolojik olarak PV'lerin devamı
- Septal ve lateral PV'lerle bağlantılı
- AF başlangıcında ve devamında etkili
- PVI'a ek olarak posterior 'box' izolasyonu ek fayda sağladığına dair veriler mevcut.

Circulation 2003;107:733–9

Circulation 2006;113:626–33

J Cardiovasc Electrophysiol 2007;18:1047–52

J Am Heart Assoc 2016;5:e003885

PVI ↔ Posterior duvar izolasyonu

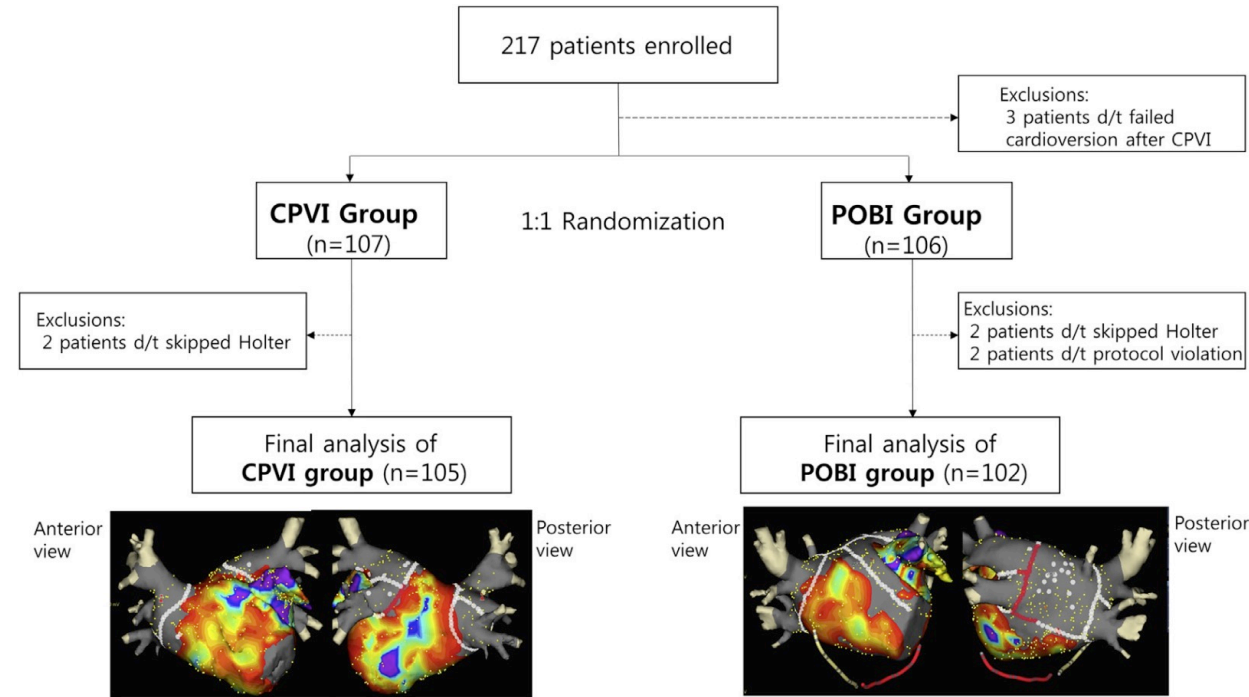
JACC: CLINICAL ELECTROPHYSIOLOGY
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VOL. 5, NO. 11, 2019

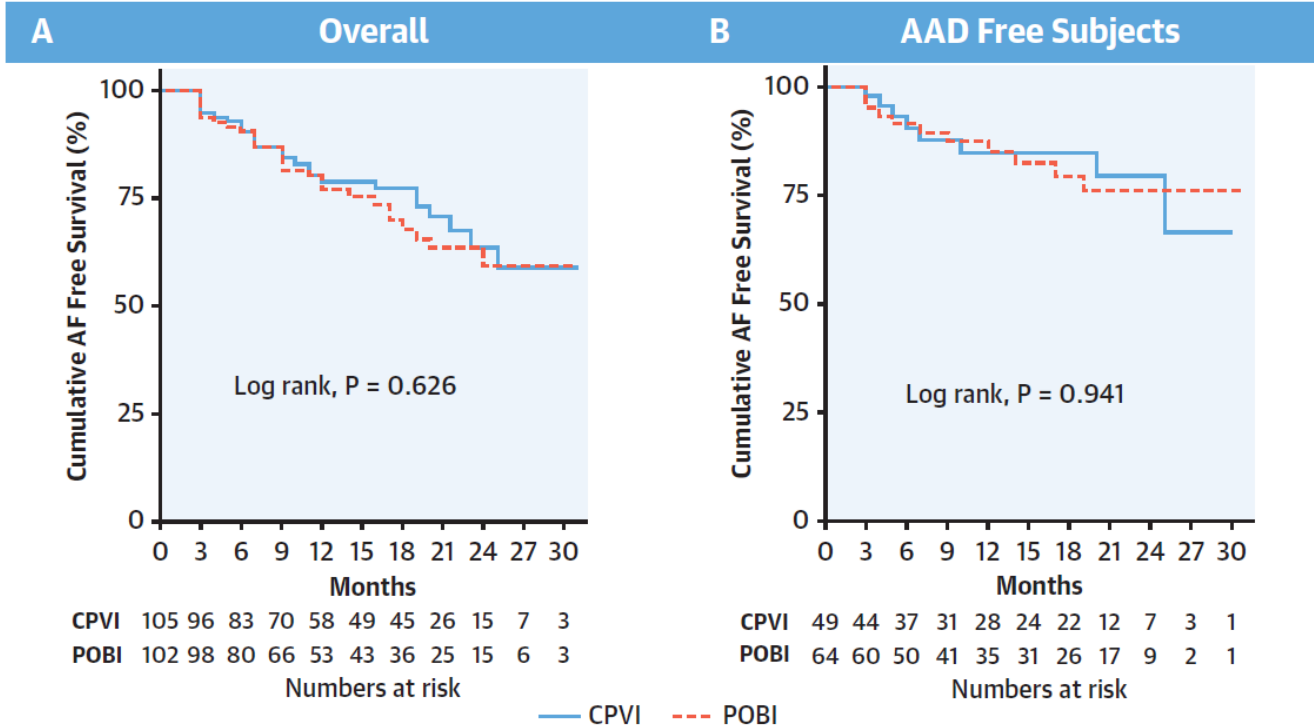
NEW INSIGHTS IN AF ABLATION

The Electrical Isolation of the Left Atrial Posterior Wall in Catheter Ablation of Persistent Atrial Fibrillation

Jung Myung Lee, MD, PhD,^a Jaemin Shim, MD, PhD,^b Junbeom Park, MD, PhD,^c Hee Tae Yu, MD, PhD,^d
Tae-Hoon Kim, MD,^d Jin-Kyu Park, MD, PhD,^e Jae-Sun Uhm, MD, PhD,^d Jin-Bae Kim, MD, PhD,^a
Boyoung Joung, MD, PhD,^d Moon-Hyoung Lee, MD, PhD,^d Young-Hoon Kim, MD, PhD,^b Hui-Nam Pak, MD, PhD,^d
for the POBI-AF Investigators



PVI ↔ Posterior duvar izolasyonu



Persistan AF'li hastalarda ampirik posterior duvar izolasyonu ek fayda sağlamıyor.

PVI ↔ Posterior duvar izolasyonu

JACC: CLINICAL ELECTROPHYSIOLOGY
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VOL. 7, NO. 2, 2021

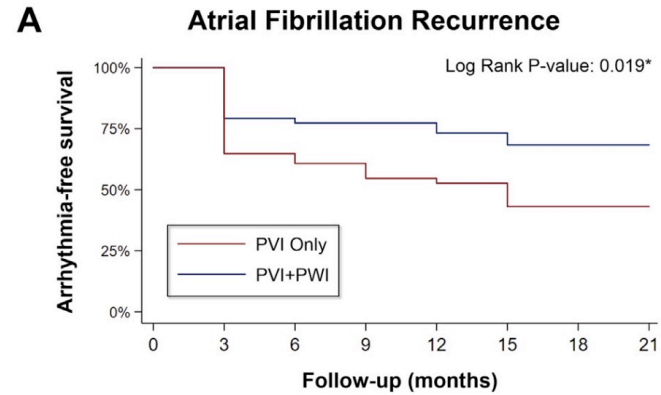
CATHETER ABLATION: ATRIAL FIBRILLATION

Concomitant Pulmonary Vein and Posterior Wall Isolation Using Cryoballoon With Adjunct Radiofrequency in Persistent Atrial Fibrillation

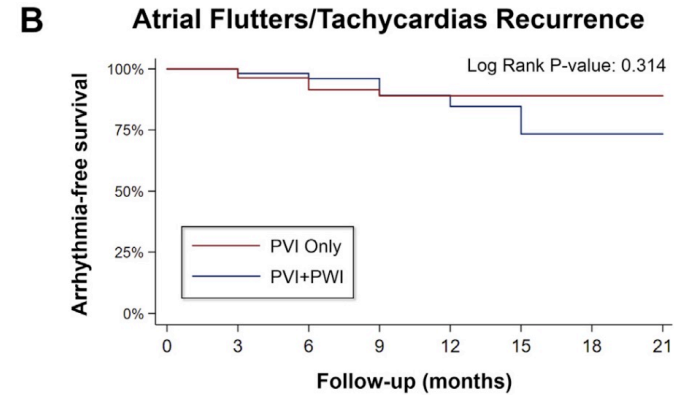


Arash Aryana, MD, PhD,^a Shelley L. Allen, BSN, CCRC, RN,^a Deep K. Pujara, MBBS, MPH,^b Mark R. Bowers, MS, MD,^a
Padraig Gearoid O'Neill, MD,^a Yasuteru Yamauchi, MD,^c Takatoshi Shigeta, MD,^c Eleanor C. Vierra, RN, ACNP,^a
Kaoru Okishige, MD, PhD,^c Andrea Natale, MD^d

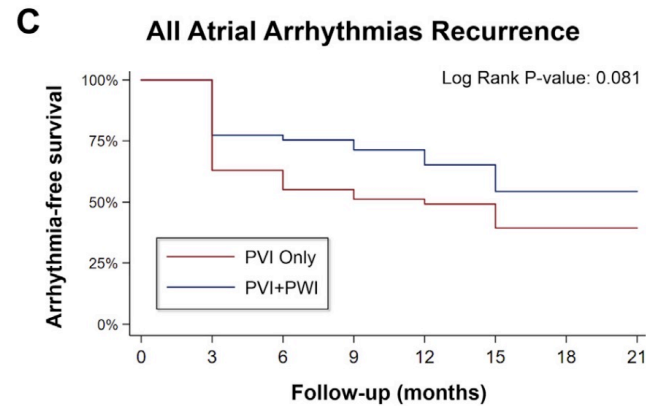
PVI ↔ Posterior duvar izolasyonu



PVI+PWI	53	53	41	38	38	15	8	7
PVI Only	54	54	32	30	27	11	4	2

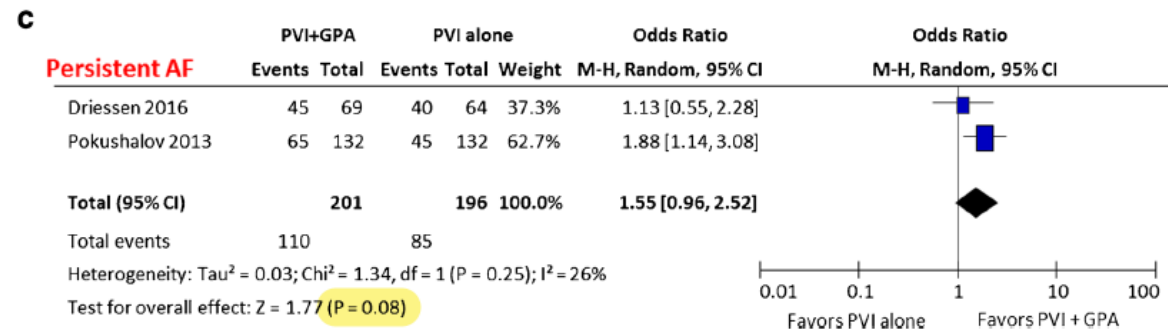
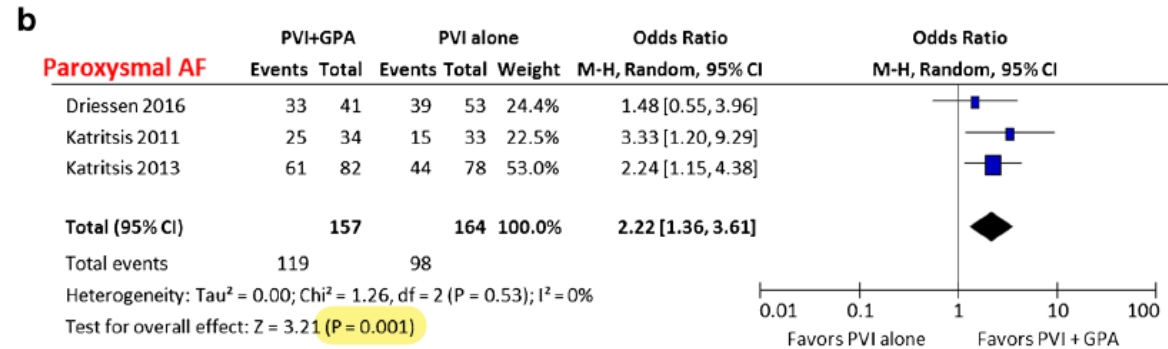
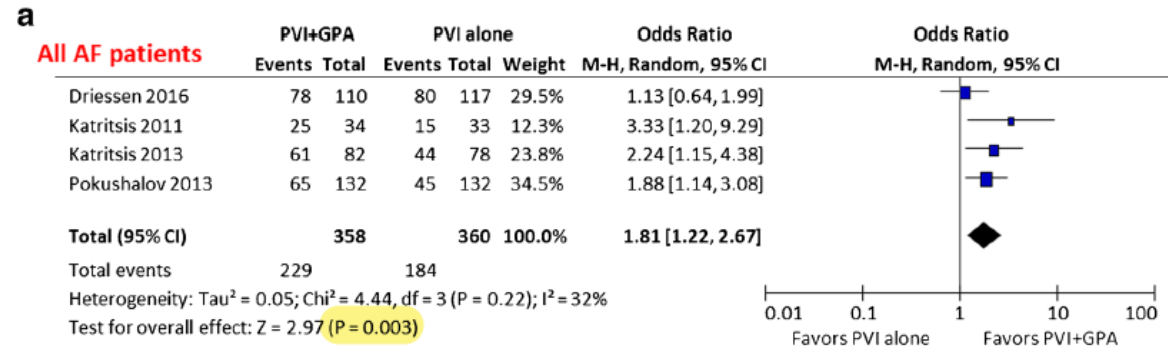


PVI+PWI	53	53	48	42	39	15	6	4
PVI Only	54	54	40	37	36	20	8	5



PVI+PWI	53	53	40	37	35	12	5	4
PVI Only	54	54	32	28	26	10	3	1

PVI ↔ Gangliyon pleksus ablasyonu



Efficacy of ganglionated plexi ablation in addition to pulmonary vein isolation for paroxysmal versus persistent atrial fibrillation: a meta-analysis of randomized controlled clinical trials

Polydoros N. Kampaktis^{1,2} · Evangelos K. Oikonomou^{2,3} · Daniel Y. Choi¹ · Jim W. Cheung¹

Diğer ek lezyonlar

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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ISSN 0735-1097/\$16.00
<http://dx.doi.org/10.1016/j.jacc.2016.07.770>

JAMA | Original Investigation

Effect of Catheter Ablation With Vein of Marshall Ethanol Infusion vs Catheter Ablation Alone on Persistent Atrial Fibrillation The VENUS Randomized Clinical Trial



Miguel Valderrábano, MD; Leif E. Peterson, PhD; Vijay Swarup, MD; Paul A. Schurmann, MD; Akash Makkar, MD; Rahul N. Doshi, MD; David DeLurgio, MD; Charles A. Athill, MD; Kenneth A. Ellenbogen, MD; Andrea Natale, MD; Jayanthi Koneru, MD; Amish S. Dave, MD, PhD; Irakli Giorgberidze, MD; Hamid Afshar, MD; Michelle L. Guthrie, RN; Raquel Bunge, RN; Carlos A. Morillo, MD; Neal S. Kleiman, MD

ORIGINAL INVESTIGATIONS

Left Atrial Appendage Isolation in Patients With Longstanding Persistent AF Undergoing Catheter Ablation BELIEF Trial

Luigi Di Biase, MD, PhD,^{a,b,c,d} J. David Burkhardt, MD,^a Prasant Mohanty, MBBS, MPH,^a Sanghamitra Mohanty, MD,^a Javier E. Sanchez, MD,^a Chintan Trivedi, MD, MPH,^a Mahmut Güneş, MD,^a Yalçın Gökdoğan, MD,^a Carola Gianni, MD,^a Rodney P. Horton, MD,^a Sakis Themistoclakis, MD,^a G. Joseph Gallinghouse, MD,^a Shane Bailey, MD,^a Jason D. Zagrodzky, MD,^a Richard H. Hongo, MD,^a Salwa Beheiry, RN,^a Pasquale Santangeli, MD,^{a,d} Michela Casella, MD,^a Antonio Dello Russo, MD,^a Amin Al-Ahmad, MD,^a Patrick Hranitzky, MD,^a Dhanunjaya Lakkireddy, MD,^b Claudio Tondo, MD,^a Andrea Natale, MD^{a,c,d,e,f,g,h}



LSPAF'lilerde, ampirik LAA izolasyonu atriyal aritmi rekürrensini azaltıyor



PersAF'lilerde Marshal ven etanol infüzyonu eklenmesi AF veya AT riskini azaltıyor

JOURNAL ARTICLE

Long-term outcomes of left atrial appendage isolation using cryoballoon in persistent atrial fibrillation

Hikmet Yorgun ✉, Yusuf Ziya Şener, Nikita Tanese, Ahmet Keresteci, Burak Sezenöz, Cem Çötel, Ahmet Hakan Ateş, Serge Boveda, Kudret Aytemir

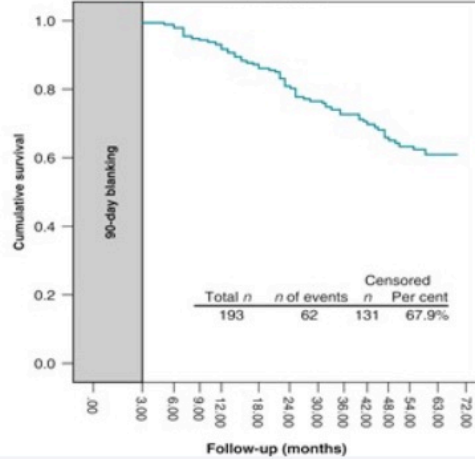
EP Europace, euac167, <https://doi.org/10.1093/europace/euac167>

Published: 27 September 2022

LAAi + PV isolation



AT free survival



Devam eden çalışmalar

- **CAPLA** çalışması

- PerAF'lilerde PVI vs. PVI+PWI
- ESC 2022'de → ek olarak PWI yapmak sonuçlarını değiştiriyor

- **SUPPRESS-AF** çalışması

- PVI vs. PVI+Sol atriyal düşük voltaj alan ablasyonu
- Mart 2023'te bitmesi bekleniyor.

- **PIVOTAL** çalışması

- CB PVI vs. CB PVI+PWI
- Aralık 2023'te bitmesi bekleniyor

Rekürrens nedenleri

- PV rekonneksiyonu
 - En sık mekanizma
 - Reablayonda ilk hedef
 - 'contact-force' kateter ve AI kullanımı riski azaltıyor
- Non-PV tetikleyicileri
 - Teknik olarak zor
 - Yüksek doz isoproterenol, multiple DCCV
 - Culprit tetikleyici?
 - Ampirik ablasyon etkisi kanıtlanmadı
- 'Gap-related' taşikardi
 - İndeks prosedürde linear ablasyon
 - İleti gap'lerinin oluşumu → AT/Afl
 - Non-PV bölgelerinde kalıcı blok oluşturmanın zorlukları

Circ Arrhythm Electrophysiol. 2018;11:e006576
Europace. 2015;17:1229-1235
Pacing Clin Electrophysiol. 2022;45:1216–1224.

Rekürrens nedenleri

- Yaş
- Ek kardiyovasküler risk faktörleri
- Fibrotikatriyal kardiyomiyopati
- Epikardiyal yolaklar veatriyal fibrozis
- Non-transmural lezyonlar → perimitral anüler Afl

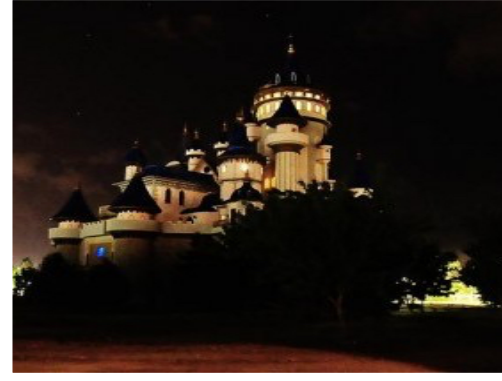
J Cardiovasc Electrophysiol. 2006;17:231-235

*Circ Res.*2017;120:1501-1517

Eur Heart J. 2013;34:2731-2738

Sonuç

- Ek lezyon için yeterli kanıt yok
- ***PVI yeterli***
- Ek lezyon → yeni substrat oluşumu
- Non-transmural lezyonlar – dinamik aritmojenik substratlar
- Yeni teknikler – operatör tecrübesi
- Hasta temelli yaklaşım
- Erken ablasyon
- Devam eden çalışmalar



TEŞEKKÜRLER