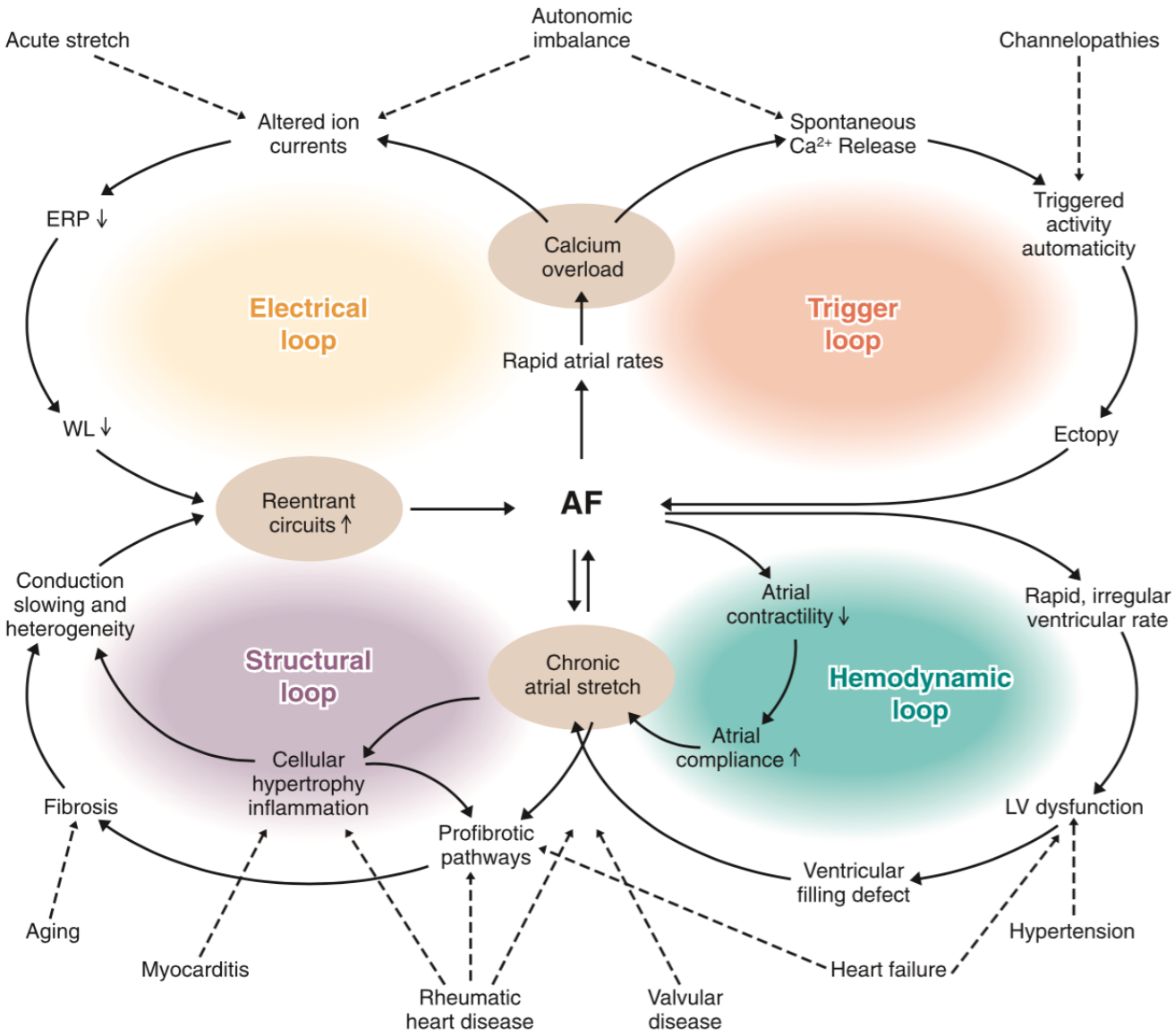
Atriyal Fibrilasyon Tedavisinde Patogenetik Hedefler

Emin Evren Özcan
Dokuz Eylül Üniversitesi

Atriyal Fibrilasyon Ablasyonunda Patogenetik Hedefler

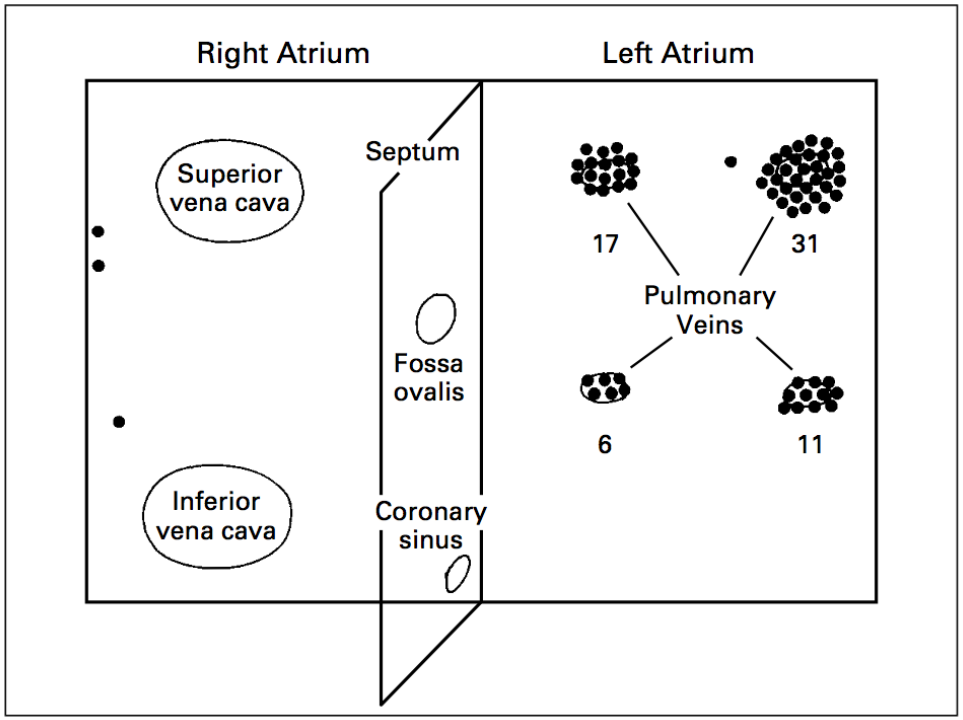
Emin Evren Özcan
Dokuz Eylül Üniversitesi



SCHOTTEN ET AL. Pathophysiological Mechanisms of Atrial Fibrillation. Physiol Rev 91: 265–325, 201.

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

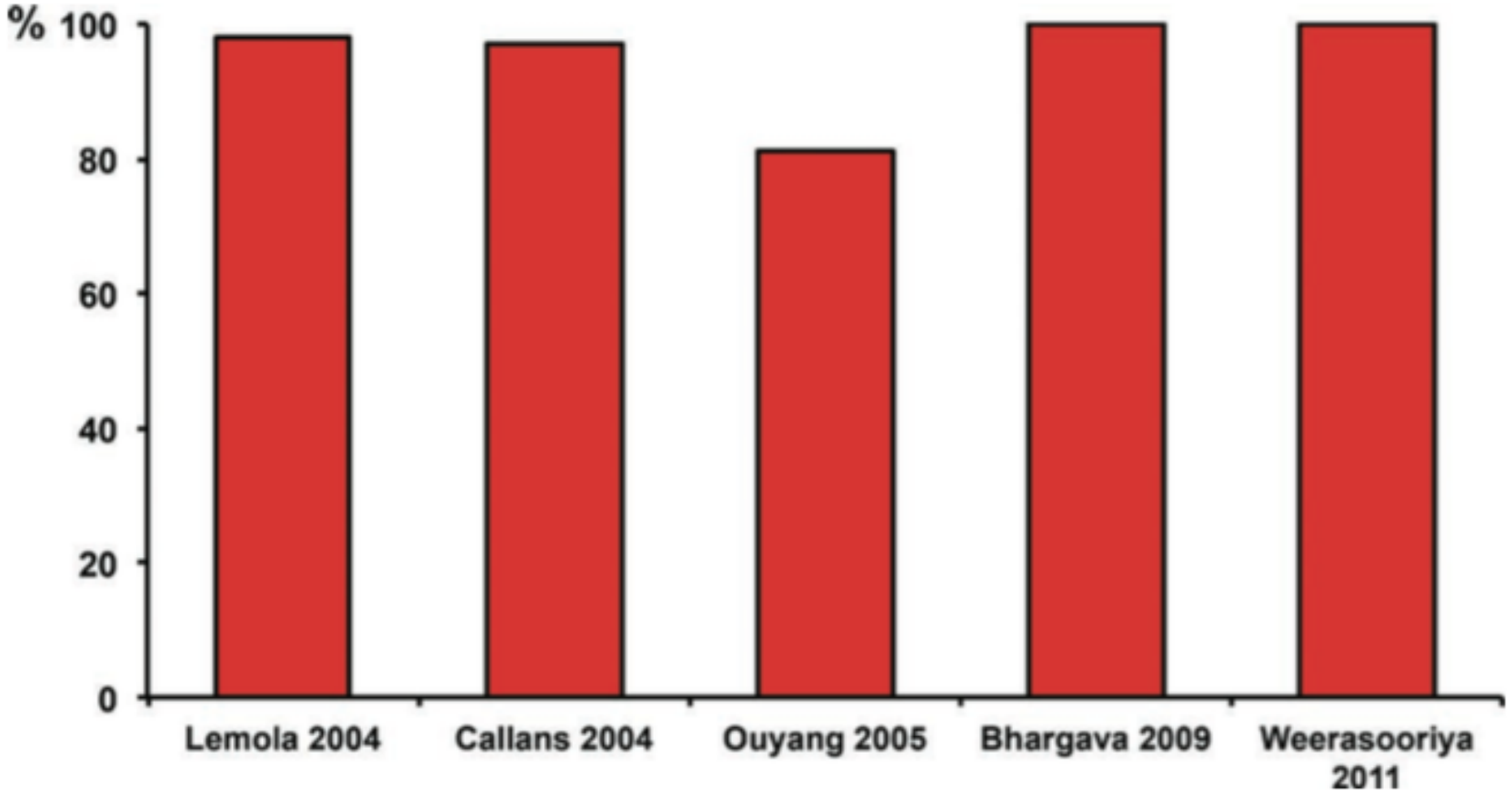
MICHEL HAÏSSAGUERRE, M.D., PIERRE JAÏS, M.D., DIPEN C. SHAH, M.D., ATSUSHI TAKAHASHI, M.D., MÉLÈZE HOCINI, M.D., GILLES QUINIOU, M.D., STÉPHANE GARRIGUE, M.D., ALAIN LE MOUROUX, M.D., PHILIPPE LE MÉTAYER, M.D., AND JACQUES CLÉMENTY, M.D.



Hastaların %94'ünde AF tetikleyicileri Pulmoner Venlerden kaynaklanmakta

Haïssaguerre M et al. N Engl J Med. 1998 Sep 3;339(10):659-66.

Pulmoner Ven Rekonneksiyonu



Electrophysiologic Findings and Long-Term Outcomes in Patients Undergoing Third or More Catheter Ablation Procedures for Atrial Fibrillation

DAVID LIN, M.D., PASQUALE SANTANGELI, M.D., ERICA S. ZADO, P.A-C., RUPA BALA, M.D., MATHEW D. HUTCHINSON, M.D., MICHAEL P. RILEY, M.D., PH.D., DAVID S. FRANKEL, M.D., FERMIN GARCIA, M.D., SANJAY DIXIT, M.D., DAVID J. CALLANS, M.D., and FRANCIS E. MARCHLINSKI, M.D.

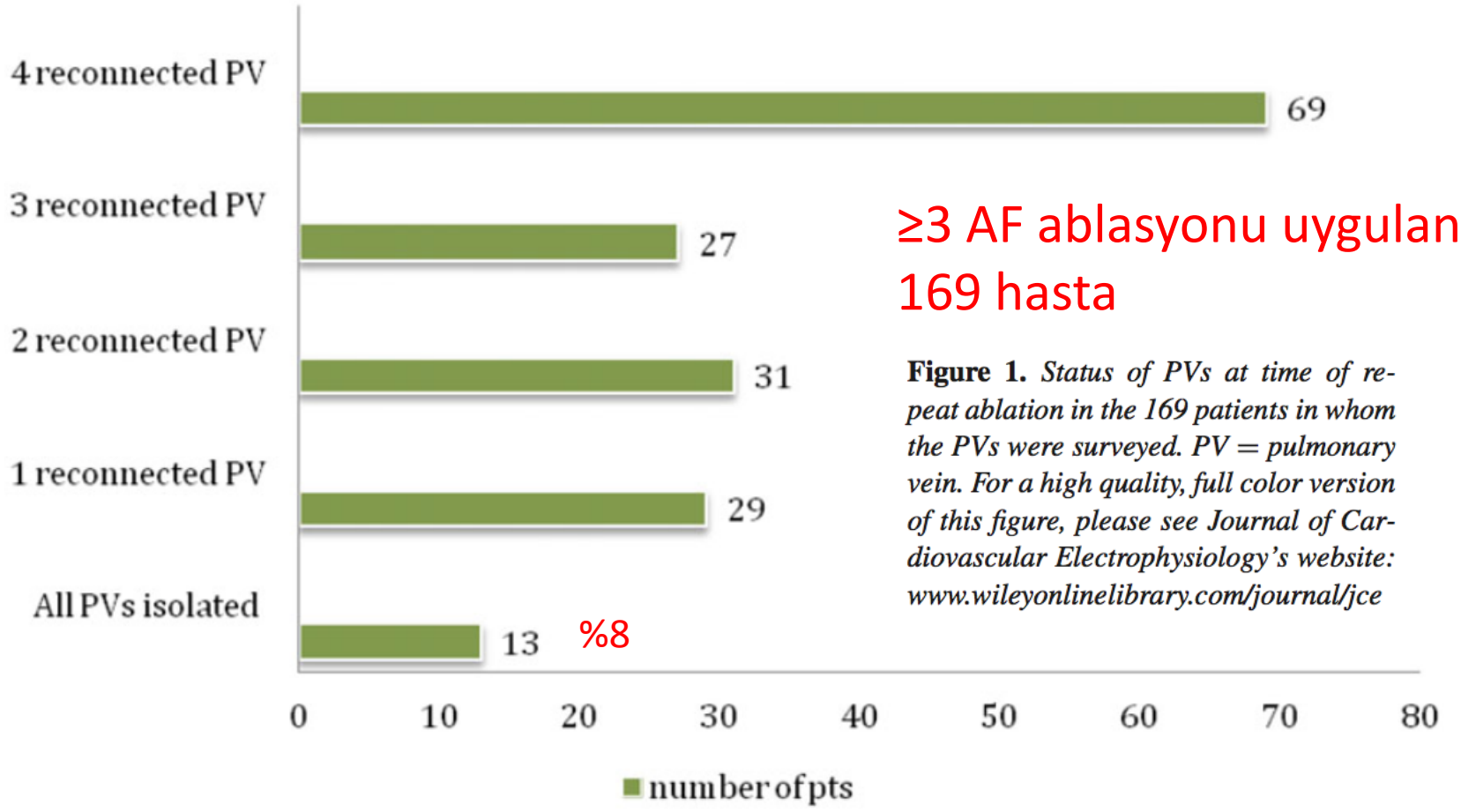
From the Electrophysiology Section Cardiovascular Division, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, USA

Outcomes After Third or More Catheter Ablation for Atrial Fibrillation. ***Introduction:*** **Pulmonary vein (PV) status, arrhythmia sources, and outcomes with ≥3 ablation procedures have not been characterized.**

Methods and Results: **All patients with ≥3 procedures were included and underwent antral reisolation of reconnected PVs and ablation of non-PV triggers. Of 2,886 patients who underwent PVI, 181 (6%) had more than 2 ablation procedures (3 procedures in 146 and ≥4 procedures in 35). In 12 patients, the clinical arrhythmia was other than AF. Of the remaining 169 patients, 69 (41%) had 4 reconnected PVs, 27 (16%) had 3, 31 (18%) had 2, and 29 (17%) had 1. Only 13 (8%) had all PVs still isolated. Provocative techniques in 127 patients initiated PV triggers in 92 patients, including AF or PV atrial tachycardia in 64 (50%), and reproducible PV APDs in 28 (22%). Thirty-six (20%) had a new non-PV trigger targeted. At a mean of 36 months (12–119 months) after last procedure, 63 patients (47%) had no AF off antiarrhythmic drugs (AAD); 28 (21%) had no AF with AAD; and 18 (13%) had rare AF with good symptom control; 26 patients (19%) had recurrent AF.**

Conclusions: **At time of third or greater AF ablation, PV reconnection is the rule (92%) and PV triggers initiating AF can be demonstrated. Following repeat PVI and targeting non-PV triggers, 81% of patients had clinical AF control. Our findings suggest that PV reisolation and attempts to identify and eliminate non-PV triggers are effective and support the role of multiple repeat procedures for AF recurrence.**
(J Cardiovasc Electrophysiol, Vol. 26, pp. 371-377, April 2015)

AF nüksünde kural:PV rekonneksiyonu



≥3 AF ablasyonu uygulanan 169 hasta

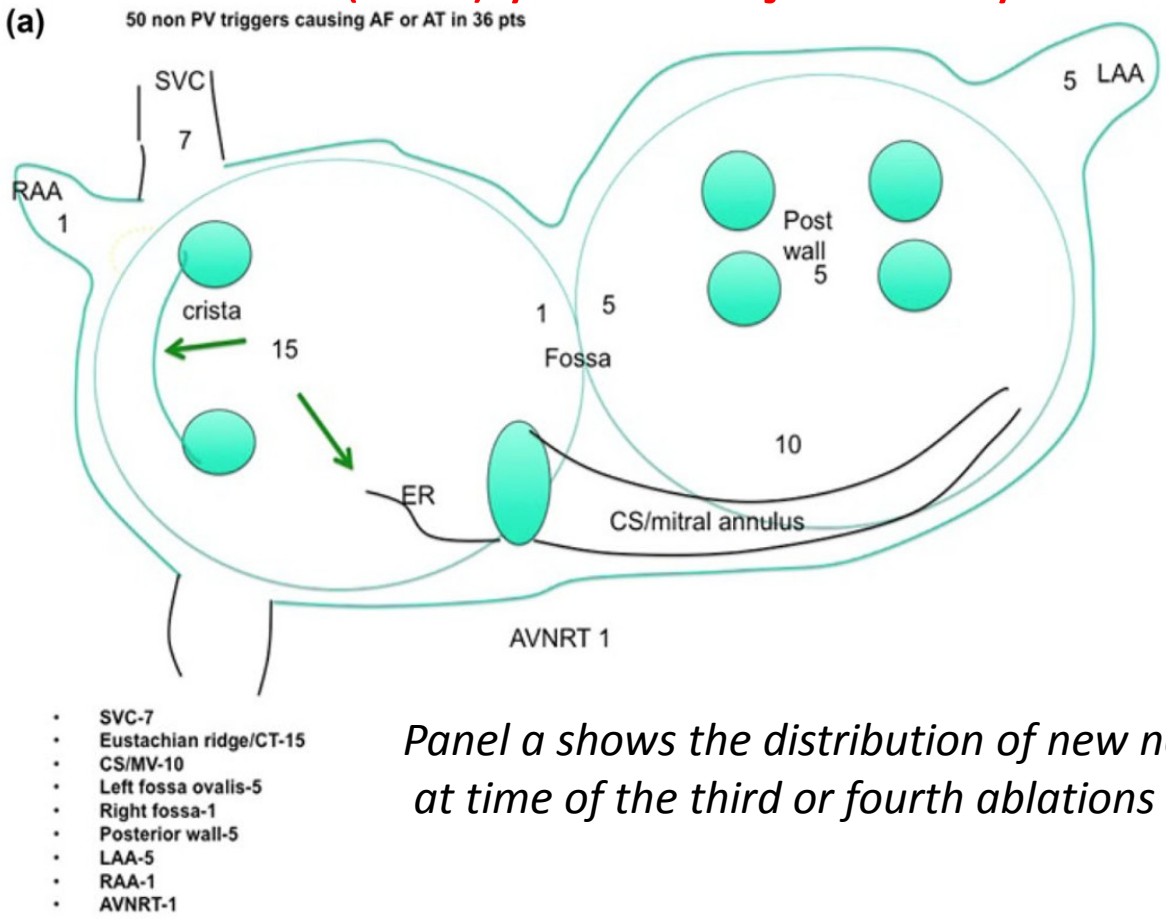
Figure 1. *Status of PVs at time of repeat ablation in the 169 patients in whom the PVs were surveyed. PV = pulmonary vein. For a high quality, full color version of this figure, please see Journal of Cardiovascular Electrophysiology's website: www.wileyonlinelibrary.com/journal/jce*

Semmelweis Egyetem KARDIOLÓGIAI KÖZPONT

Lin et al. Outcomes After Third or More Catheter Ablation for Atrial Fibrillation
Journal of Cardiovascular Electrophysiology Vol. 26, No. 4, April 2015

PV dışı tetikleyiciler

36 hastada (%20) yeni PV dışı tetikleyici



Panel a shows the distribution of new non-PV triggers at time of the third or fourth ablations

Lin et al. Outcomes After Third or More Catheter Ablation for Atrial Fibrillation
Journal of Cardiovascular Electrophysiology Vol. 26, No. 4, April 2015

Incidence of pulmonary vein conduction recovery in patients without clinical recurrence after ablation of paroxysmal atrial fibrillation: Mechanistic implications

Ru-hong Jiang, MS,* Sunny S. PO, MD, PhD,† Roderick Tung, MD, FHRS,‡ Qiang Liu, MS,* Xia Sheng, MD,* Zu-wen Zhang, BS,* Ya-xun Sun, PhD,* Lu Yu, MD,* Pei Zhang, MS,* Guo-sheng Fu, MD,* Chen-yang Jiang, MD*

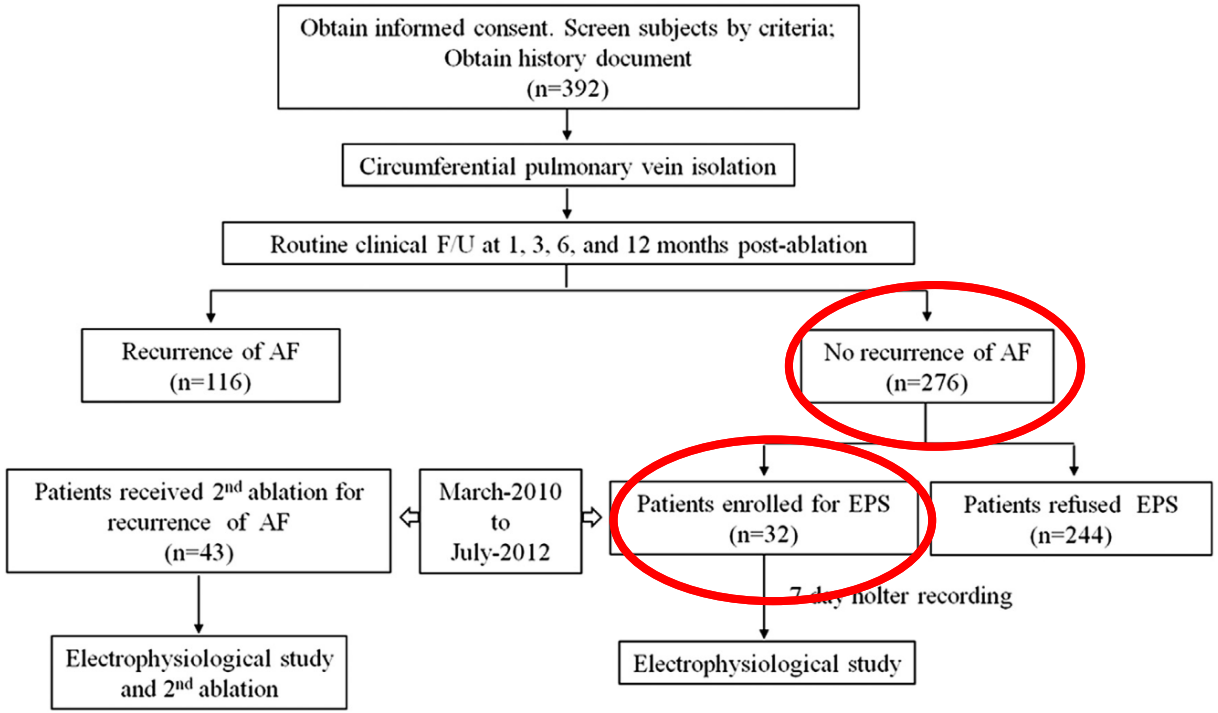
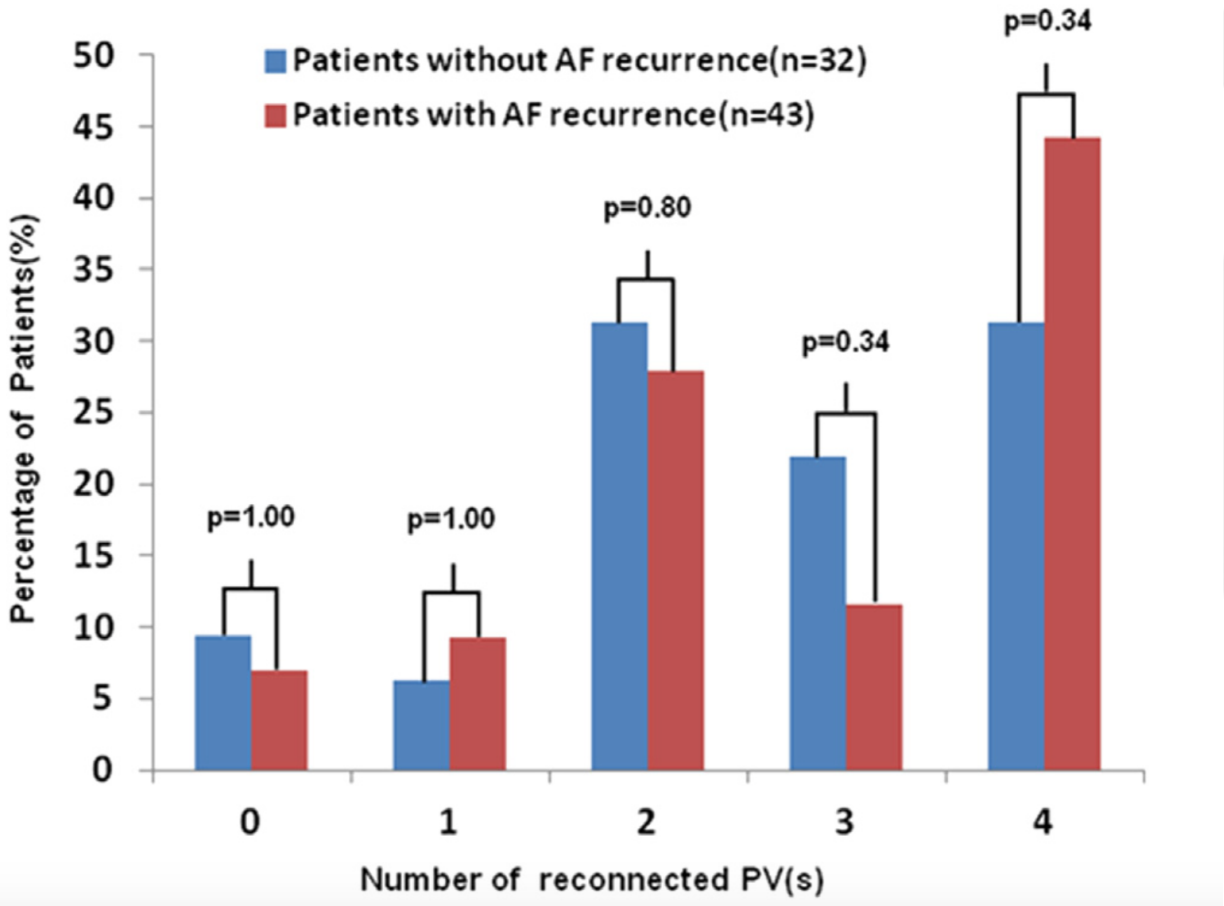


Figure 2 Flowchart of the study design. AF = atrial fibrillation; EPS = electrophysiological study; F/U = follow-up.

PVI AF Ablasyonunda köşe taşı mı?



Jiang et al. Heart Rhythm, Vol 11, No 6, June 2014

A New Approach for Catheter Ablation of Atrial Fibrillation: Mapping of the Electrophysiologic Substrate

Koonlawee Nademanee, MD, FACC,* John McKenzie, MD,* Erol Kosar, MD,* Mark Schwab, MD,* Buncha Sunsaneewitayakul, MD,† Thaveekiat Vasavakul, MD,* Chotikorn Khunnawat, MD,* Tachapong Ngarmukos, MD‡

Inglewood, California; and Bangkok, Thailand

OBJECTIVES We sought to test the hypothesis that complex fractionated electrograms (CFAEs) recorded during atrial fibrillation (AF) could be used as target sites for catheter ablation of AF.

BACKGROUND Mapping of AF in humans has shown that areas of CFAEs correlate with areas of slowed conduction and pivot points of reentrant wavelets. We hypothesized that such areas of CFAEs could be identified in patients with AF and might serve as target sites for catheter ablation to maintain sinus rhythm.

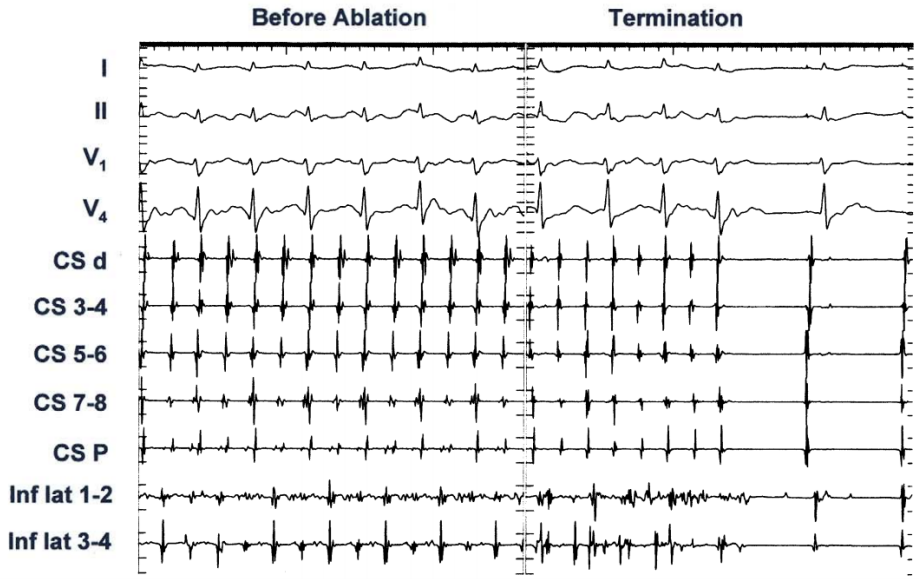
METHODS The study population included 121 patients (29 females; mean age, 63 years) with refractory AF (57 paroxysmal, 64 chronic). All patients underwent nonfluoroscopic electroanatomic mapping (CARTO) during AF. Using CARTO, the biatrial replica, displayed in a three-dimensional color-coded voltage map, was created during AF, and areas associated with CFAEs were identified. Radiofrequency ablation of the area with CFAEs was performed, aiming to eliminate CFAE and/or convert to sinus rhythm.

RESULTS Complex fractionated atrial electrograms were found in seven of nine regions of both atria, but were mainly confined to the interatrial septum, pulmonary veins, roof of left atrium, and left posteroseptal mitral annulus and coronary sinus ostium. Ablations of the areas associated with CFAEs resulted in termination of AF without external cardioversion in 115 of the 121 patients (95%); 32 (28%) required concomitant ibutilide treatment. At the one-year follow-up, 110 (91%) patients were free of arrhythmia and symptoms, 92 after one ablation and 18 after two.

CONCLUSIONS Areas with CFAEs represent a defined electrophysiologic substrate and are ideal target sites for ablations to eliminate AF and maintain normal sinus rhythm. (J Am Coll Cardiol 2004; 43:2044–53)

Nademanee K. A new approach for catheter ablation of atrial fibrillation: mapping of the elec- trophysiologic substrate. J Am Coll Car- diol 2004;43:2044-53.

CFAE

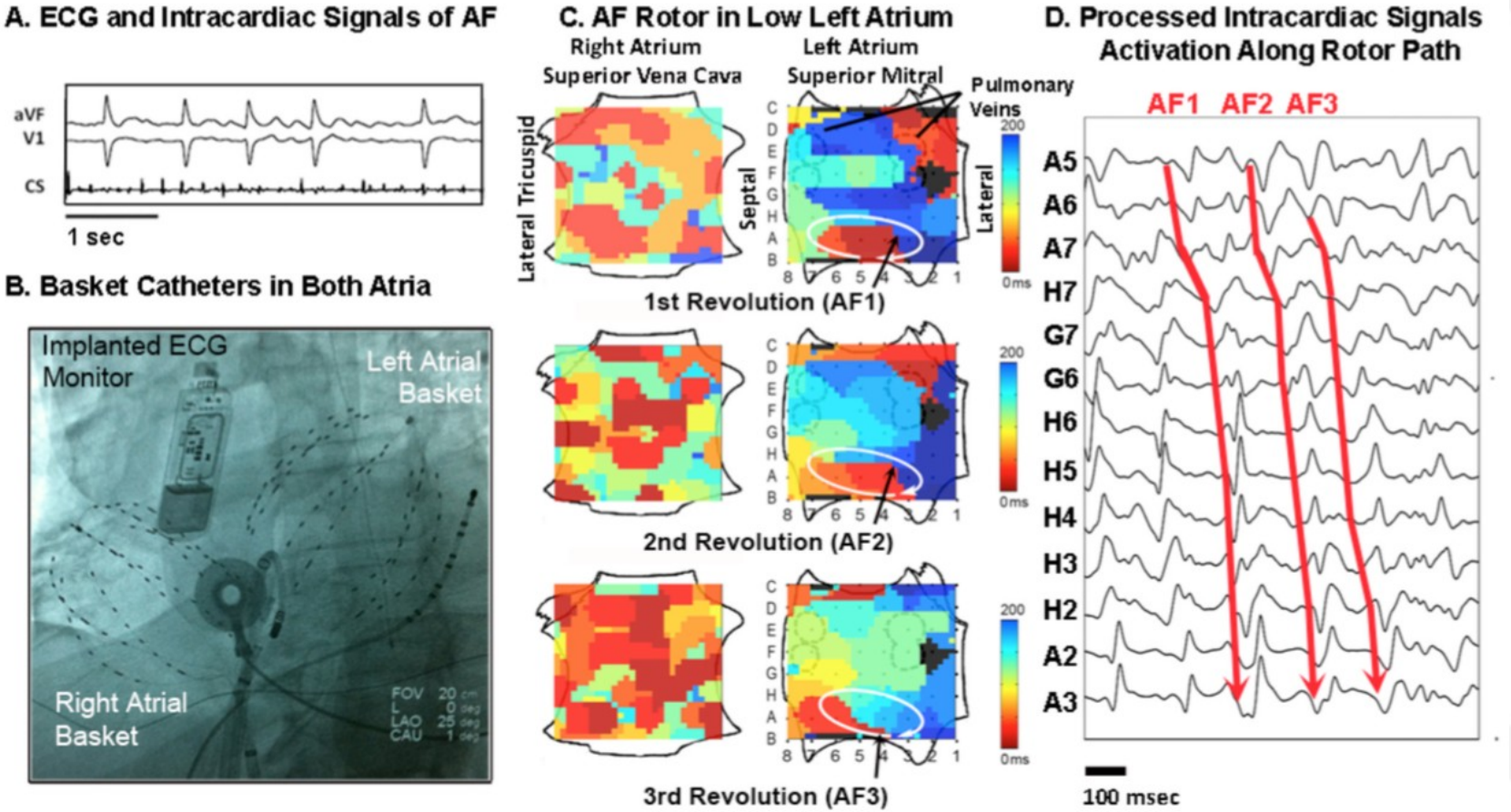


%95 olguda
DCCV uygulamadan
Sinüs Ritmi

Çoğu CFAE alanı pasif

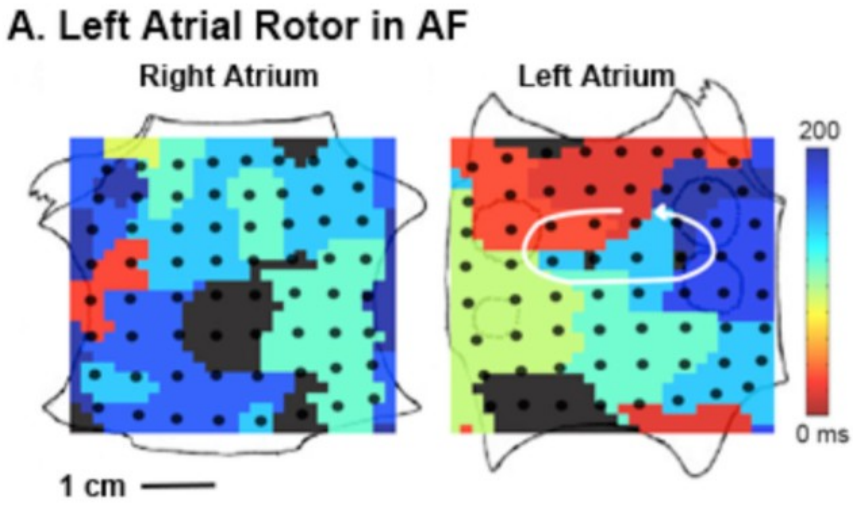
- Rotorların sürüklendiği alanlar
- Dalgaların çarpışma yerleri
- Fibrozis alanları
- Bipolar kayıt artefaktları

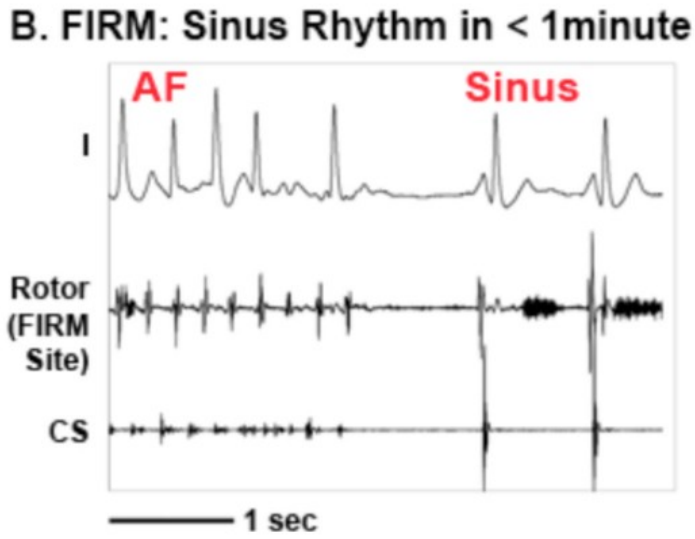
Fokal Impuls ve Rotor Modülasyonu



Narayan SM et al. Treatment of atrial fibrillation by the ablation of localized sources: CONFIRM trial. J Am Coll Cardiol 2012;**60**:628–36.

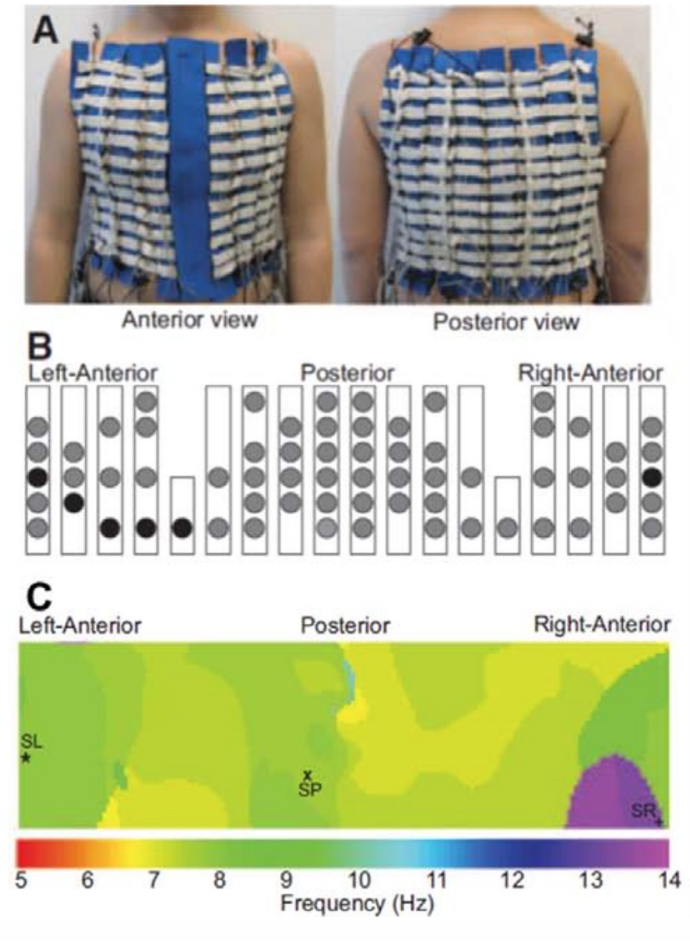
Fokal Impuls ve Rotor Modülasyonu

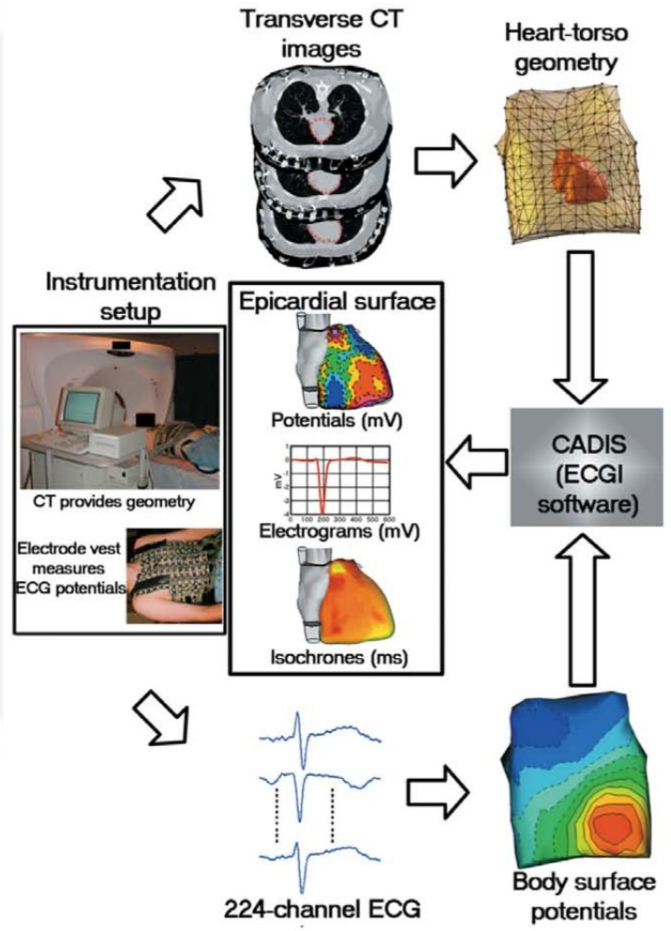




Narayan SM et al. Treatment of atrial fibrillation by the ablation of localized sources: CONFIRM trial. J Am Coll Cardiol 2012;**60**:628–36.

Vücut Yüzeyi Potansiyel Haritalama

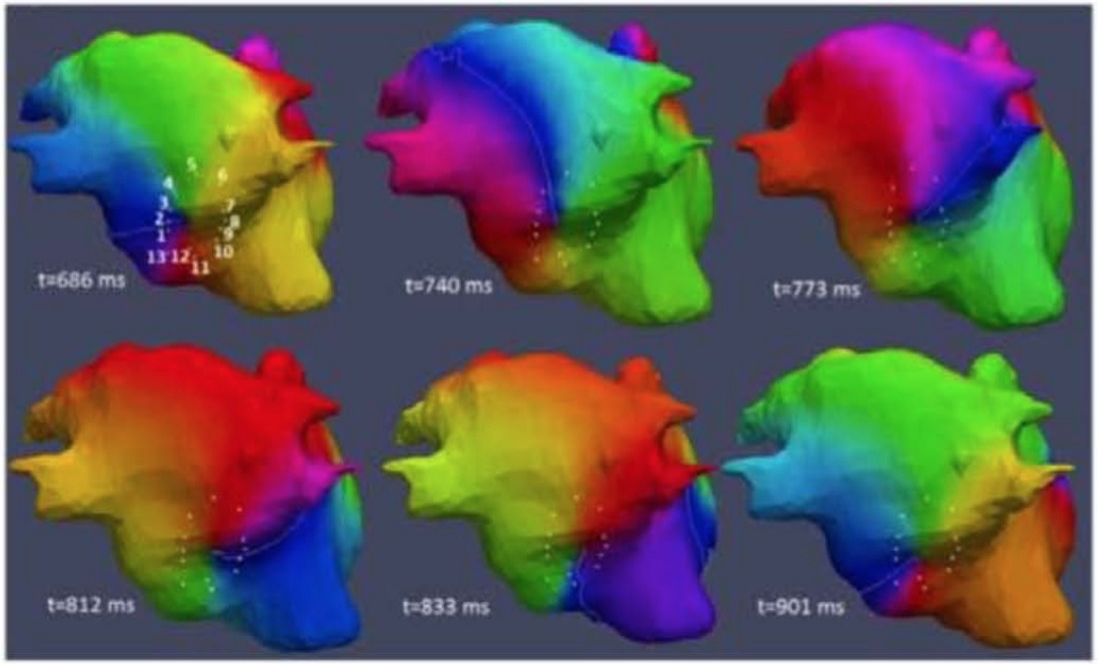


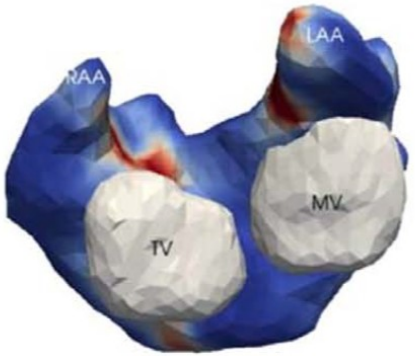


Semmelweis Egyetem KARDIOLÓGIAI KÖZPONT

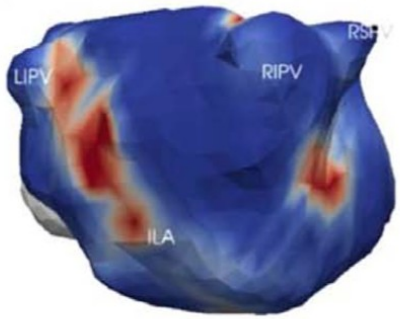
Guillem MS. Noninvasive localization of maximal frequency sites of atrial fibrillation by body surface potential map- ping. Circ Arrhythm Electrophysiol. 2013;6:294–301.

Elektrokardiyografik Görüntüleme





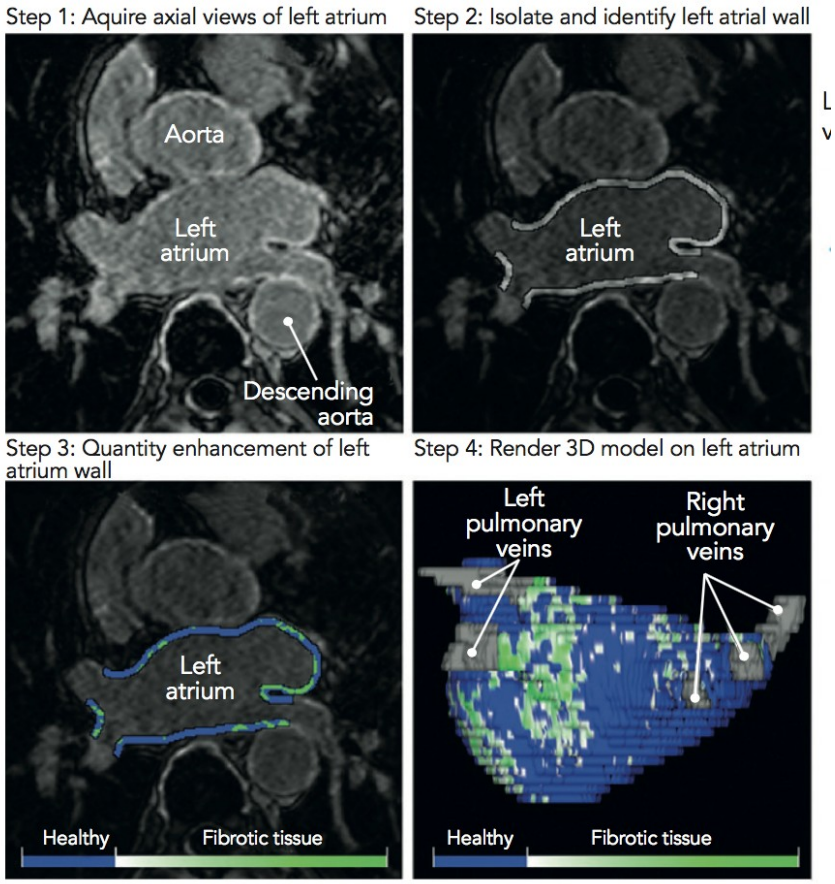
Anterior

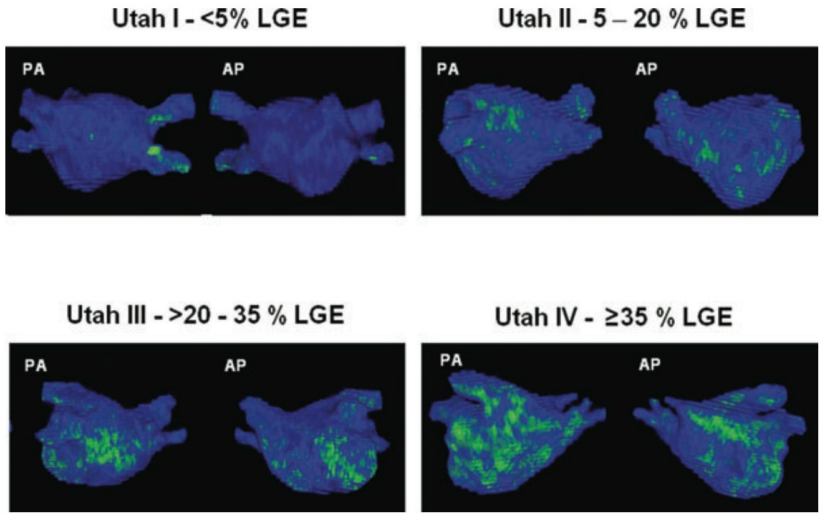


Posterior

Haissaguerre M. Driver domains in persistent atrial fibrillation. Circulation. 2014;130:530–538.

Atriyal Fibrozis ve AF





Marrouche NF et al. Association of atrial tissue fibrosis identified by delayed enhancement MRI and atrial fibrillation catheter ablation: The decaaf study. *JAMA* 2014;**311**:498–506.

Box Isolation of Fibrotic Areas (BIFA): A Patient-Tailored Substrate Modification Approach for Ablation of Atrial Fibrillation

HANS KOTTKAMP, M.D., JAN BERG, M.D., RODERICH BENDER, M.D.,
ANDREAS RIEGER, M.D., and DOREEN SCHREIBER, M.D.

From the Hirslanden Hospital, Department of Electrophysiology, Zurich, Switzerland

Substrate Modification BIFA in AF Ablation. ***Background:*** **Catheter ablation strategies beyond pulmonary vein isolation (PVI) for treatment of atrial fibrillation (AF) are less well defined. Increasing clinical data indicate that atrial fibrosis is a critical common left atrial (LA) substrate in AF patients (pts).**

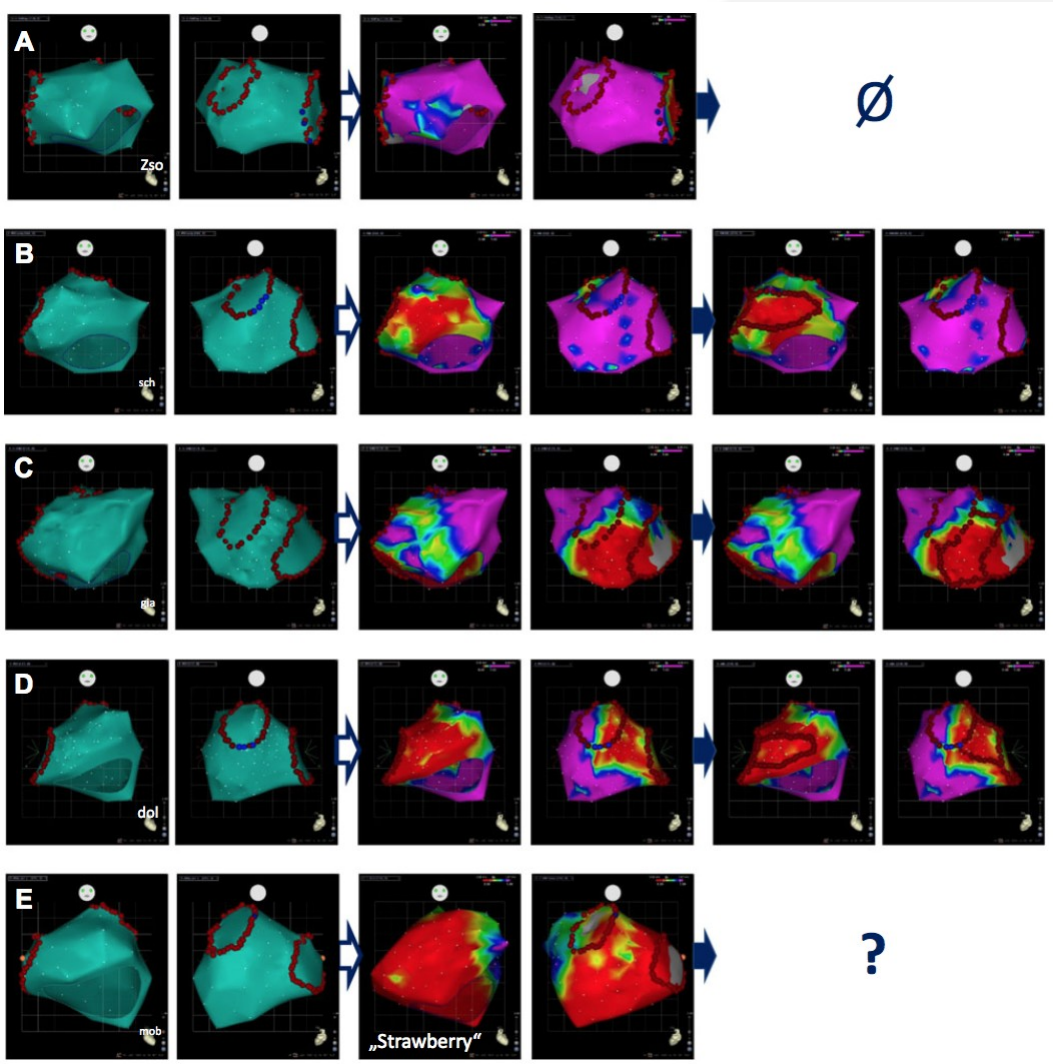
Objective: **We applied a new substrate modification concept according to the individual fibrotic substrate as estimated from electroanatomic voltage mapping (EAVM) in 41 pts undergoing catheter ablation of AF.**

Results: **First, EAVM during sinus rhythm was done in redo cases of 10 pts with paroxysmal AF despite durable PVI. Confluent low-voltage areas (LVA) were found in all pts and were targeted with circumferential isolation, so-called box isolation of fibrotic areas (BIFA). This strategy led to stable sinus rhythm in 9/10 pts and was transferred prospectively to first procedures of 31 pts with nonparoxysmal AF. In 13 pts (42%), no LVA (<0.5 mV) were identified, and only PVI was performed. In 18 pts (58%), additional BIFA strategies were applied (posterior box in 5, anterior box in 7, posterior plus anterior box in 5, no box in 1 due to diffuse fibrosis). Mean follow-up was 12.5 ± 2.4 months. Single-procedure freedom from AF/atrial tachycardia was achieved in 72.2% of pts and in 83.3% of pts with 1.17 procedures/patient.**

Conclusions: **In approximately 40% of pts with nonparoxysmal AF, no substantial LVA were identified, and PVI alone showed high success rate. In pts with paroxysmal AF despite durable PVI and in approximately 60% of pts with nonparoxysmal AF, individually localized LVA were identified and could be targeted successfully with the BIFA strategy.** *(J Cardiovasc Electrophysiol, Vol. 27, pp. 22-30, January 2016)*

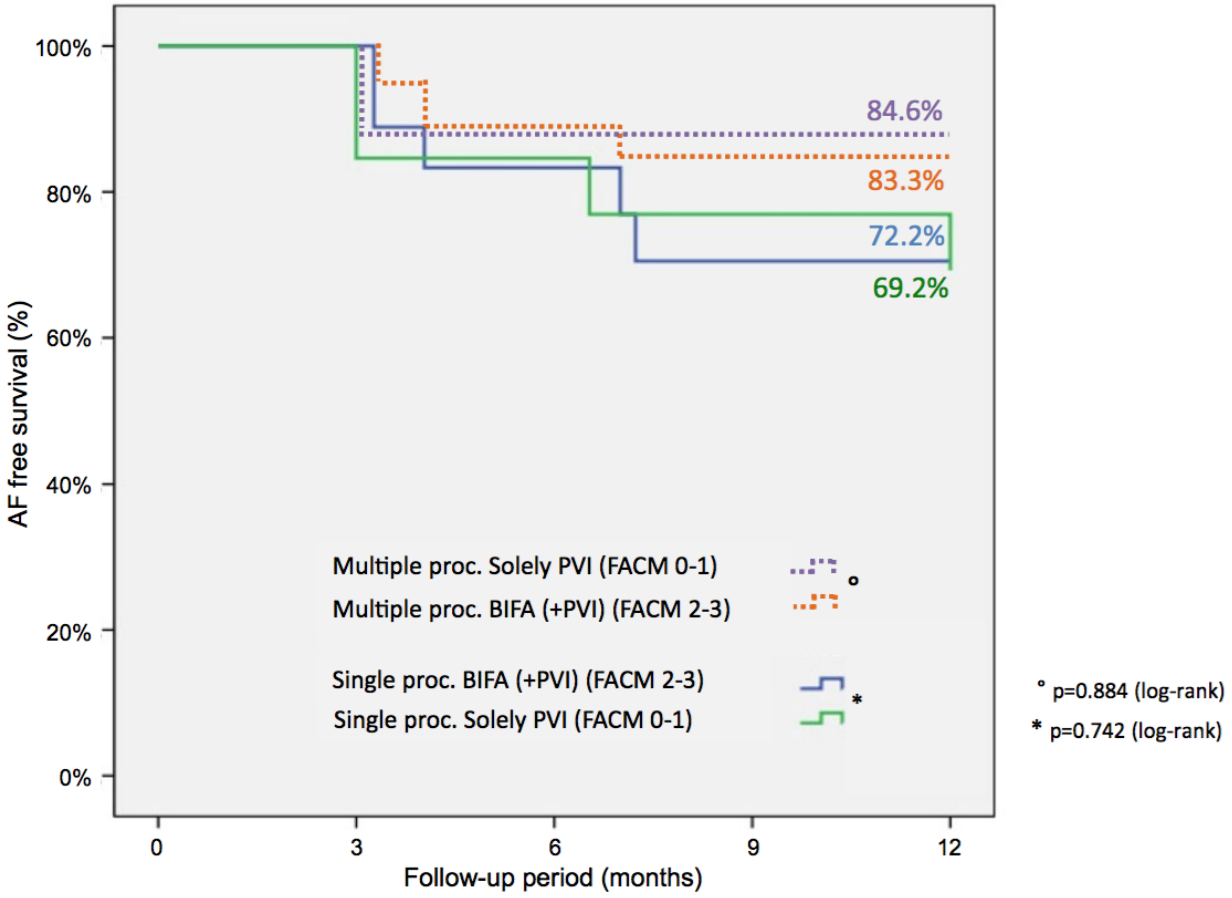
Kottkamp H. Box Isolation of Fibrotic Areas (BIFA): J Cardiovasc Electrophysiol. 2016 Jan;27(1):22-30.

BIFA

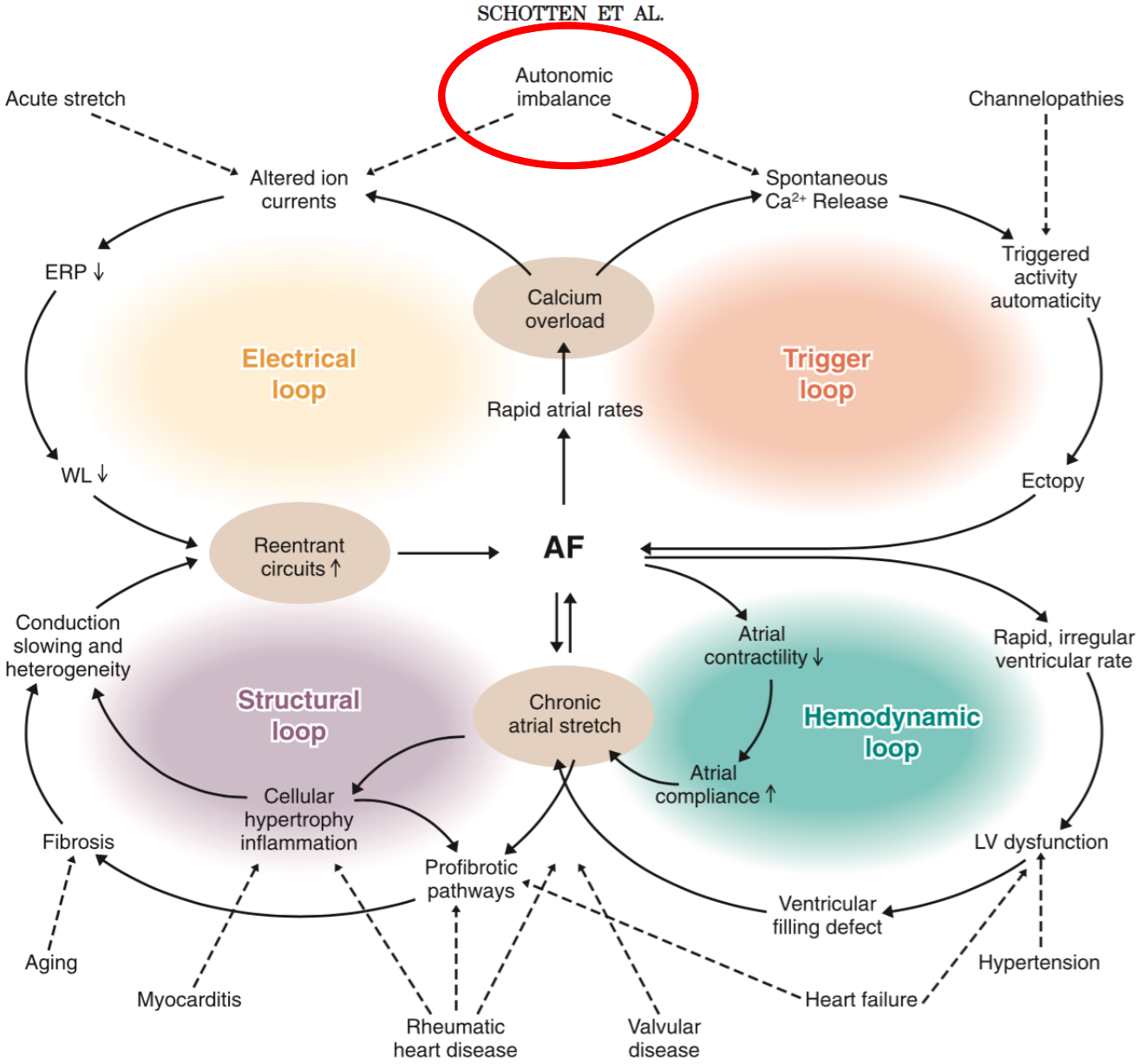


Kottkamp H. Box Isolation of Fibrotic Areas (BIFA): J Cardiovasc Electrophysiol. 2016 Jan;27(1):22-30.

BIFA

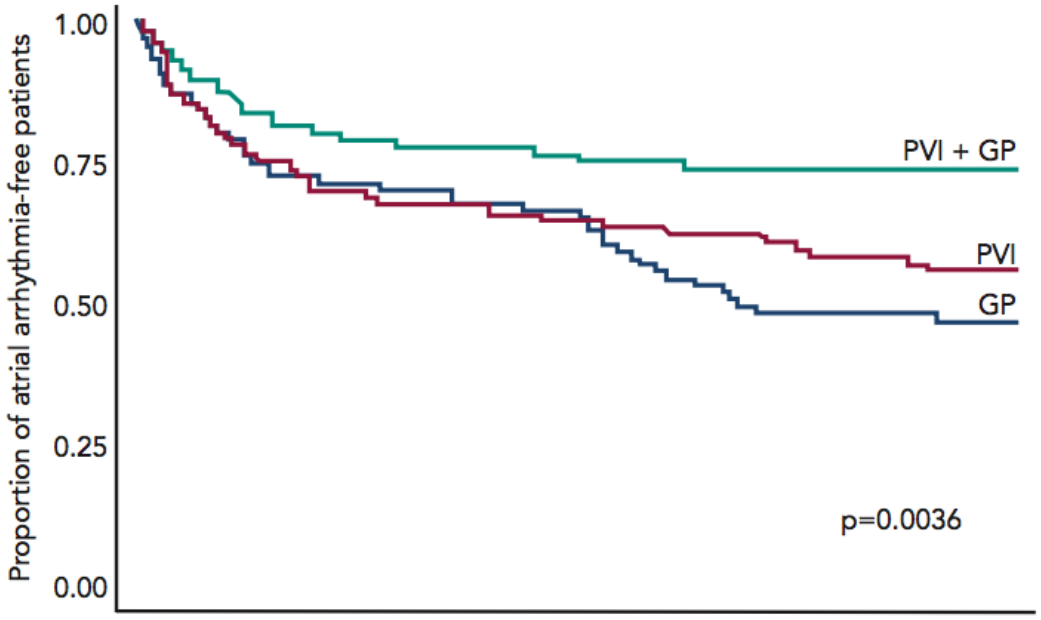


Kottkamp H. Box Isolation of Fibrotic Areas (BIFA): J Cardiovasc Electrophysiol. 2016 Jan;27(1):22-30.



SCHOTTEN ET AL. Pathophysiological Mechanisms of Atrial Fibrillation. Physiol Rev 91: 265–325, 201.

Otonom Gangliyon Pleksus Ablasyonu



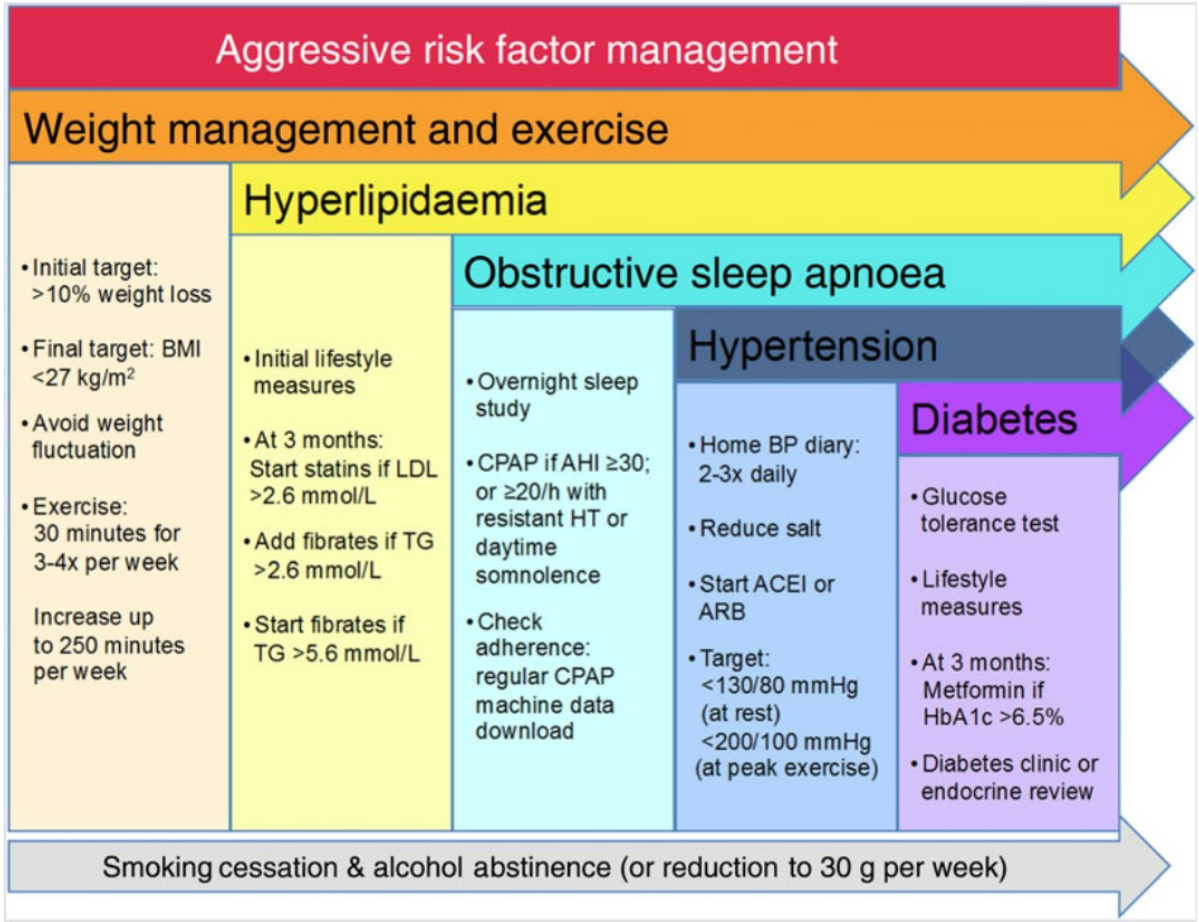
Number at risk

GP	82	59	55	40	39
PVI	78	55	51	48	44
PVI + GP	82	65	63	61	60

Comparison was performed using the log-rank test stratified by study site. GP = ganglionated plexi; PVI = pulmonary vein isolation. Reproduced with permission from Katritsis, et al.[34]

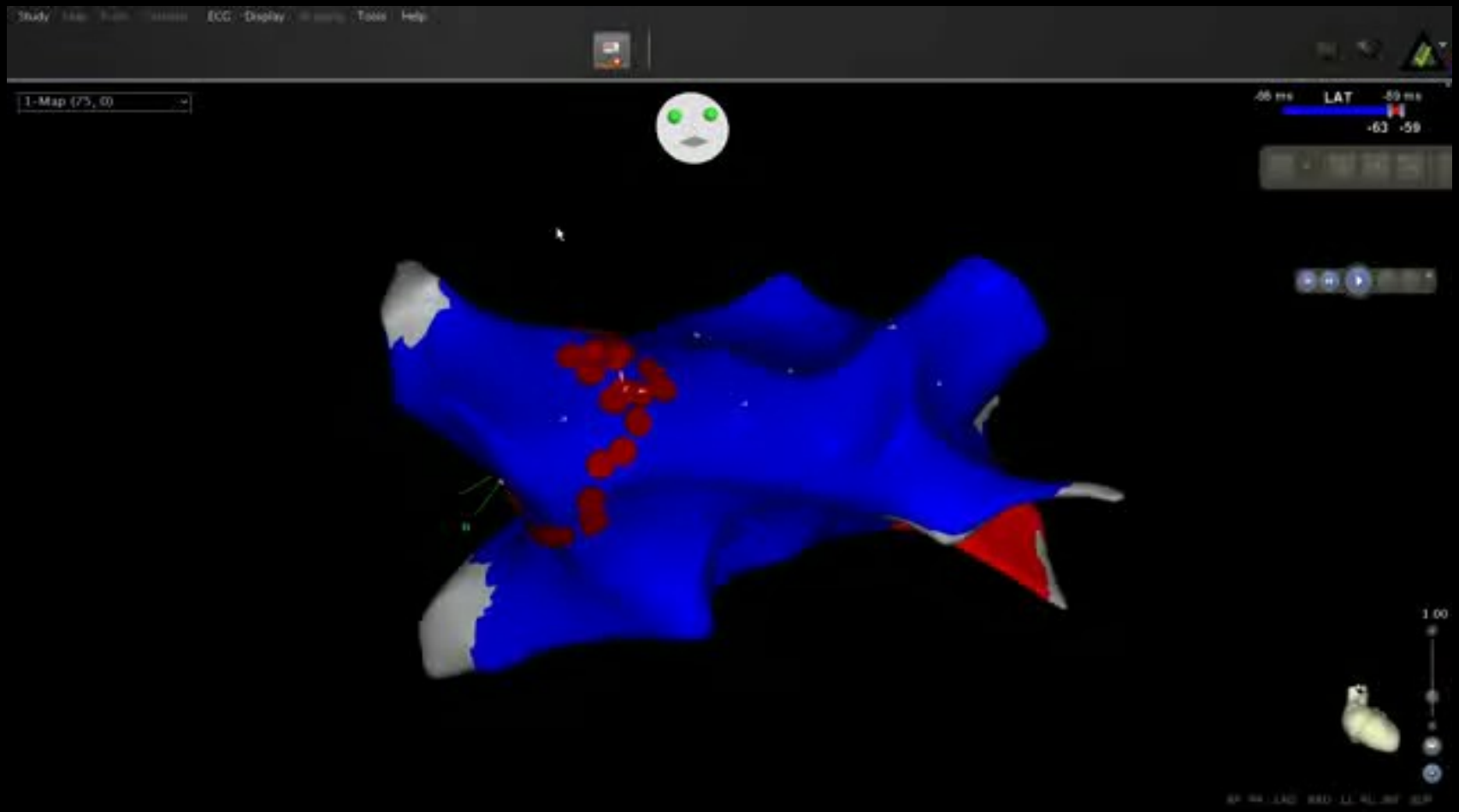
Nakagawa H, et al. Pathophysiologic basis of autonomic ganglionated plexus ablation in patients with atrial fibrillation. Heart Rhythm 2009;6:S26-34.

Bireysel Tedavi Hedefleri



Özet

- Bireysel ablasyon hedefleri
- Kalıcı PVI AF ablasyonunun köşetaşı
- Geniş Antral Çevresel Ablasyon
- Non-PV tetikleyiciler
- Fibrotik atriyumlarda BIFA
- Rotorlar: Hedefi görüyoruz- Ablasyon sonuçları?
- Ampirik hatların hedefi?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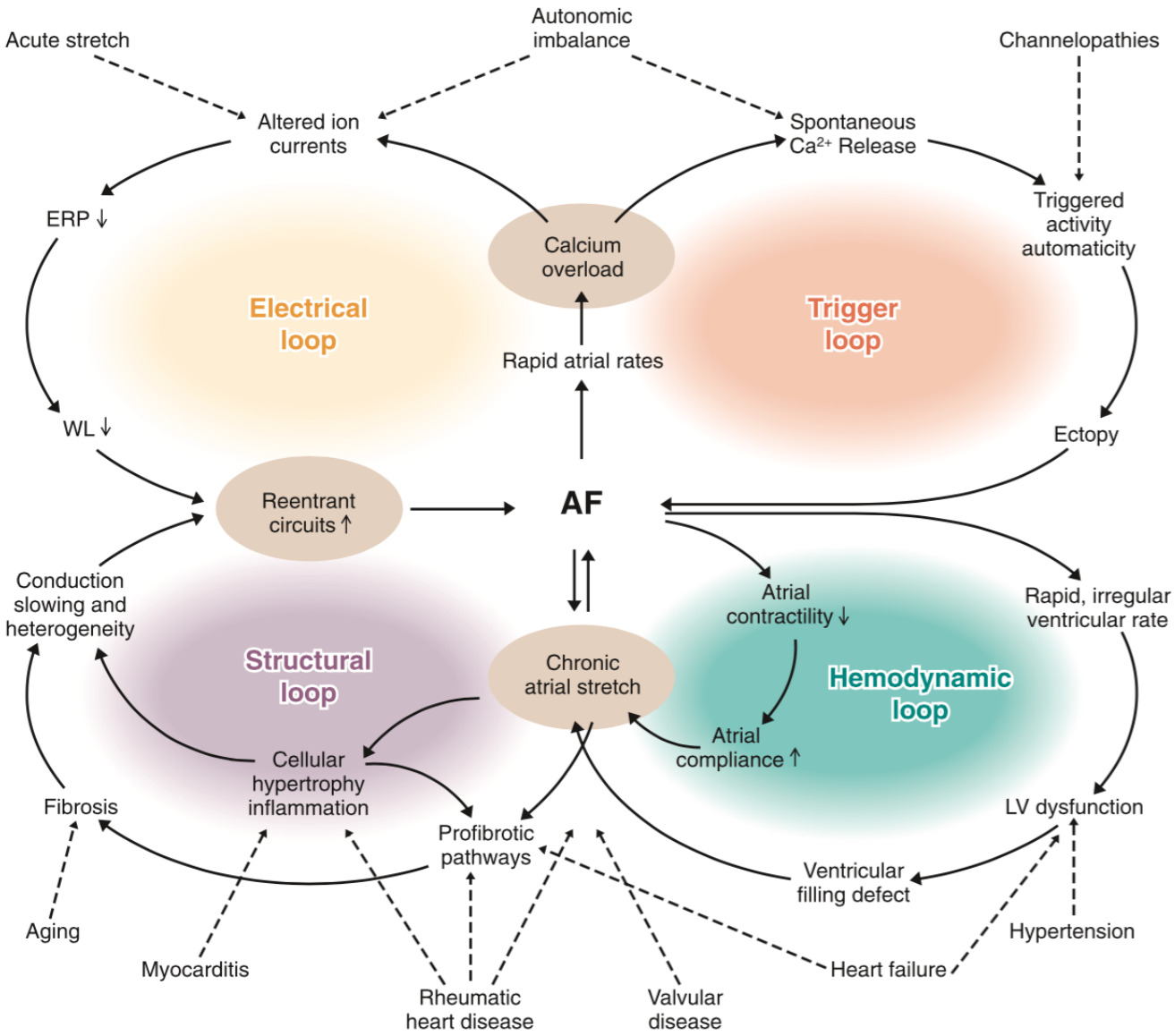


SCHOTTEN ET AL. Pathophysiological Mechanisms of Atrial Fibrillation. Physiol Rev 91: 265–325, 201.

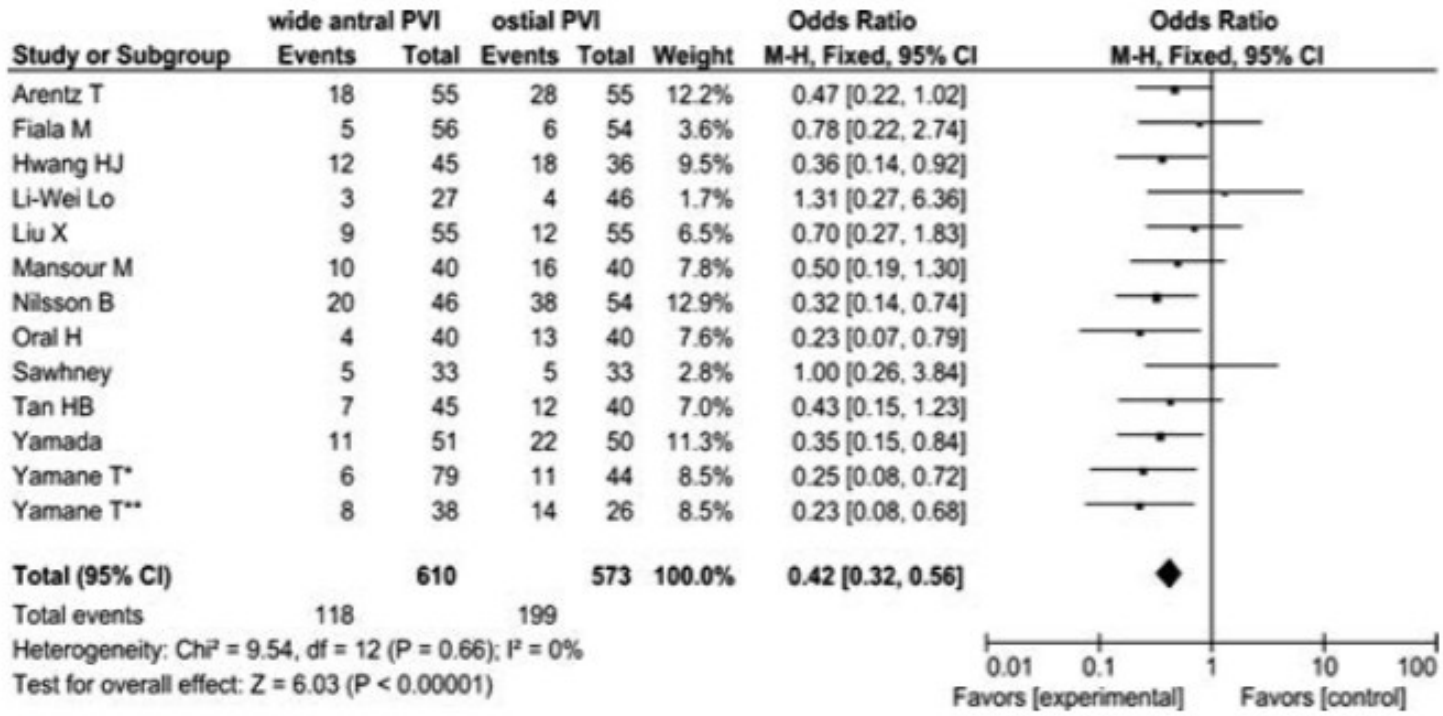
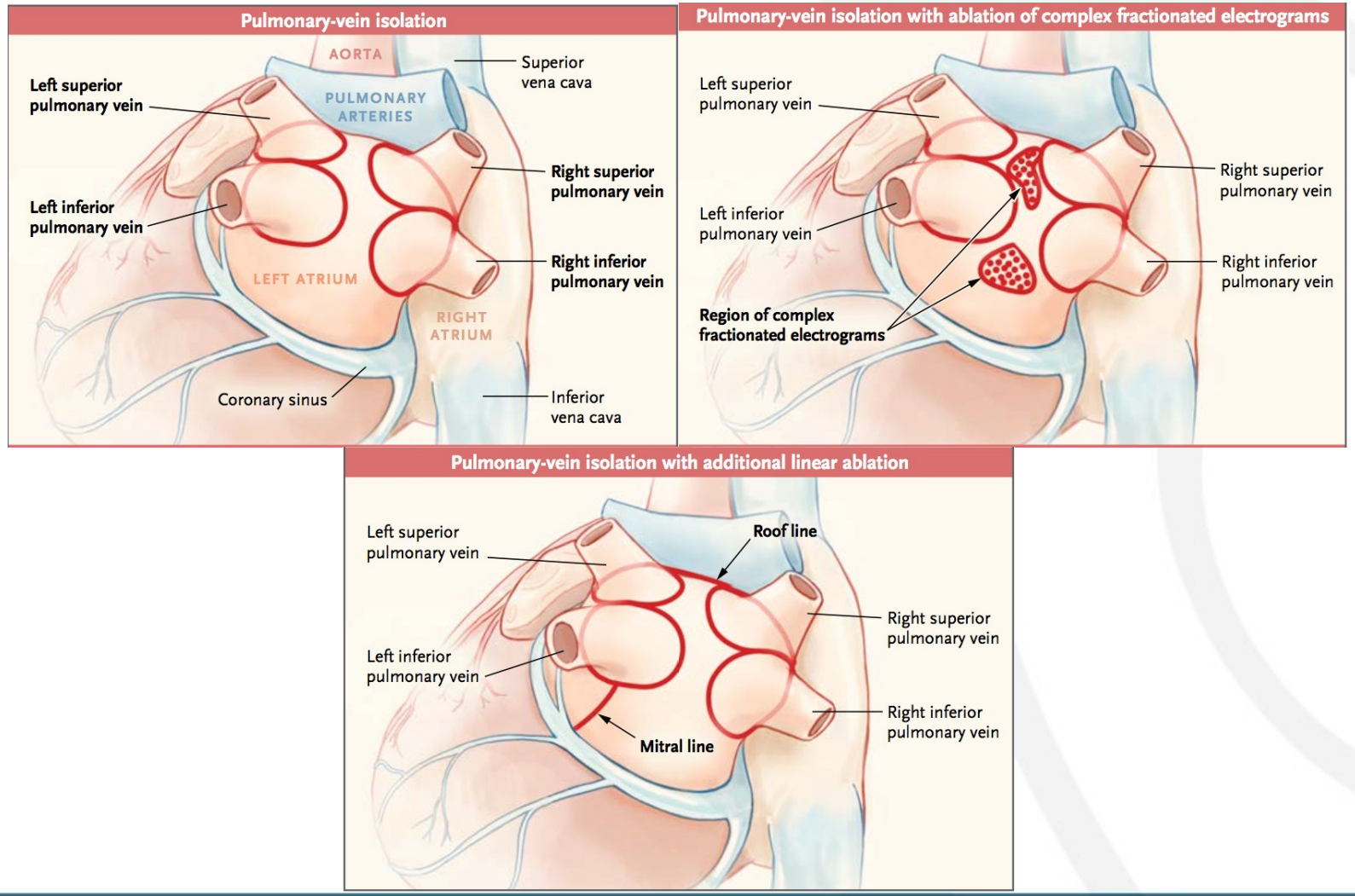


Figure 1. Combined evidence that wide antral pulmonary vein isolation improves long-term arrhythmia-free survival compared to ostial pulmonary vein isolation. From Proietti et al. with permission.[21]

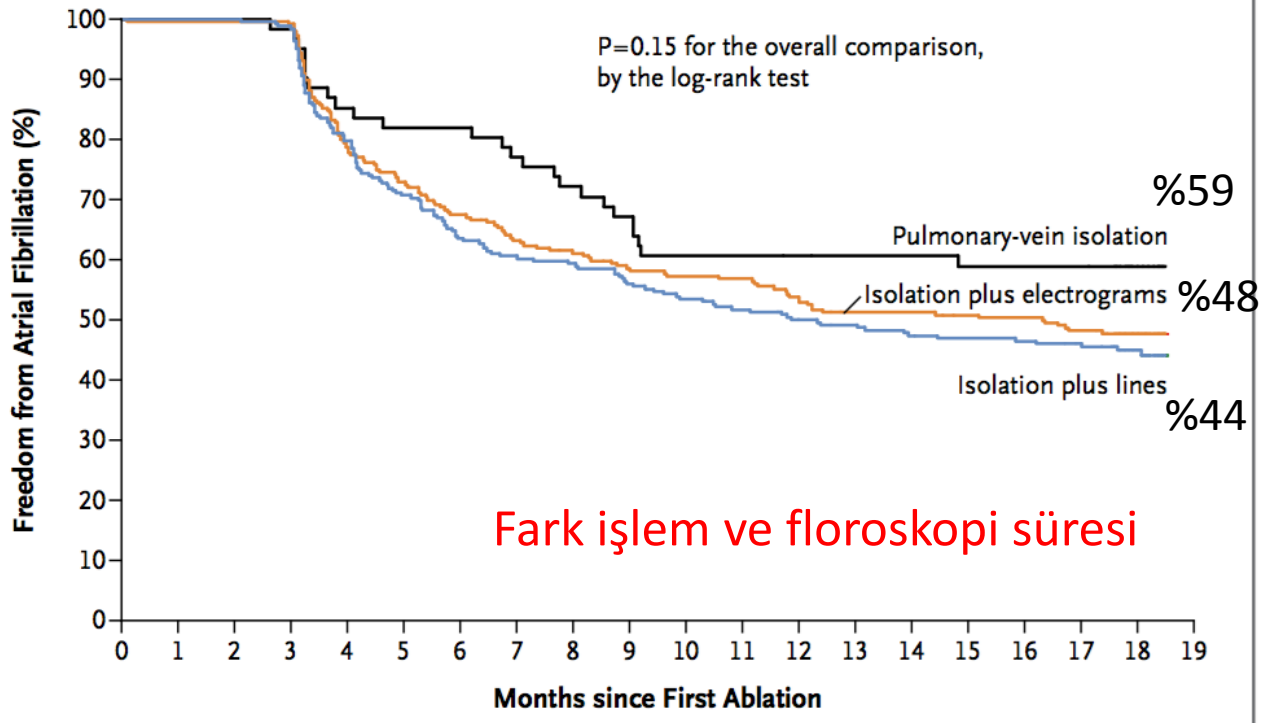
Proietti R et al. Comparative effectiveness of wide antral versus ostial pulmonary vein isolation: Circ Arrhythm Electrophysiol. 2014 Feb;7(1):39-45.

STAR AF II



Verma A Approaches to catheter ablation of persistent atrial fibrillation. N Engl J Med 2015;372:1812-1822.

STAR AF II



Fark işlem ve floroskopi süresi

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

Verma A. N Engl J Med 2015;372:1812-22.