

PULMONER VEN İZOLASYONU

3 Boyutlu Haritalama Teknikleri İle

Dr. Sedat Köse

3. Atriyal Fibrilasyon Zirvesi 2014

Antalya

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

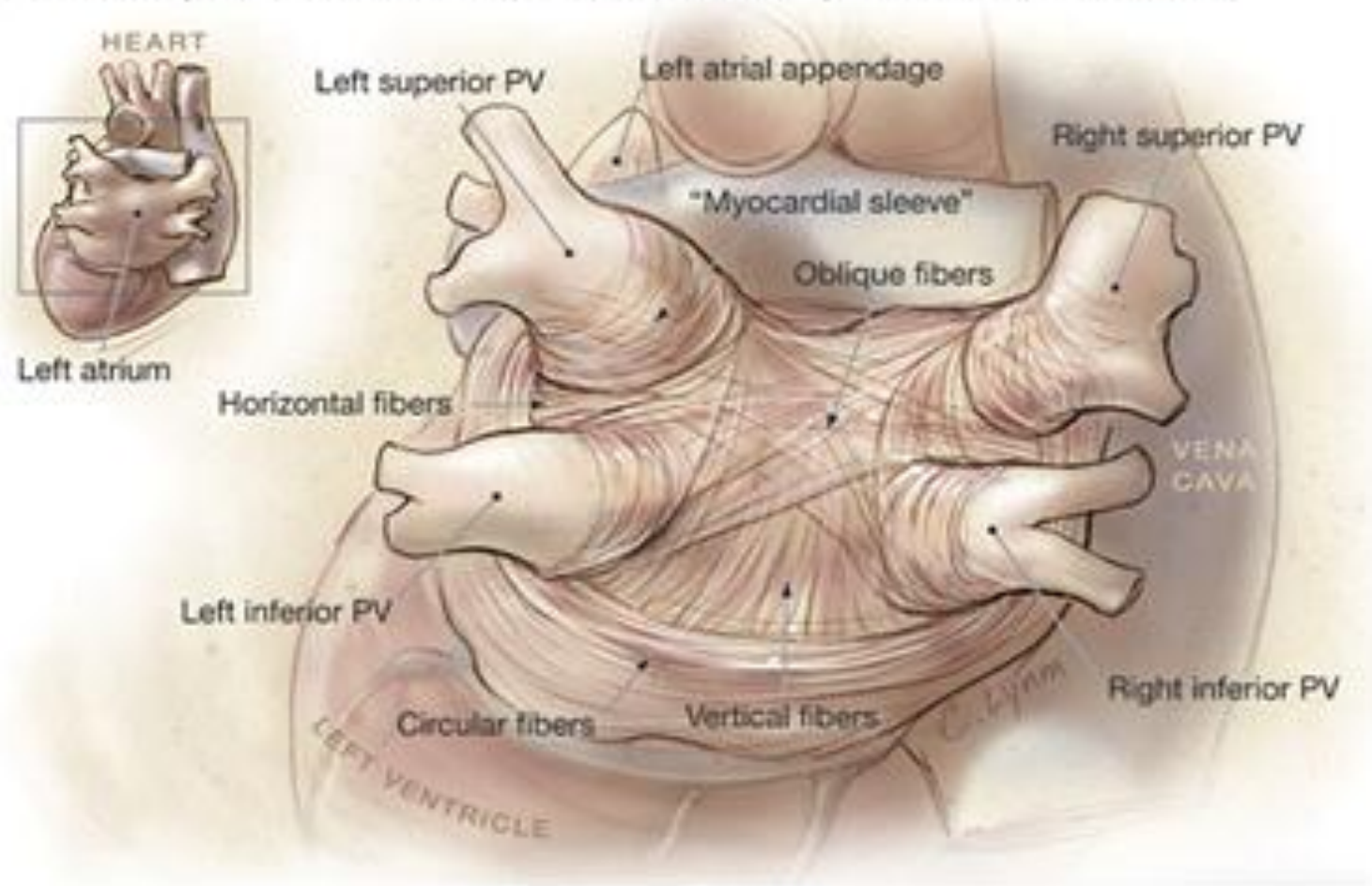
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GILLES QUINIOU, M.D., STÉPHANE GARRIGUE, M.D., ALAIN LE MOUROUX, M.D., PHILIPPE LE MÉTAYER, M.D.,
AND JACQUES CLÉMENTY, M.D.

ABSTRACT

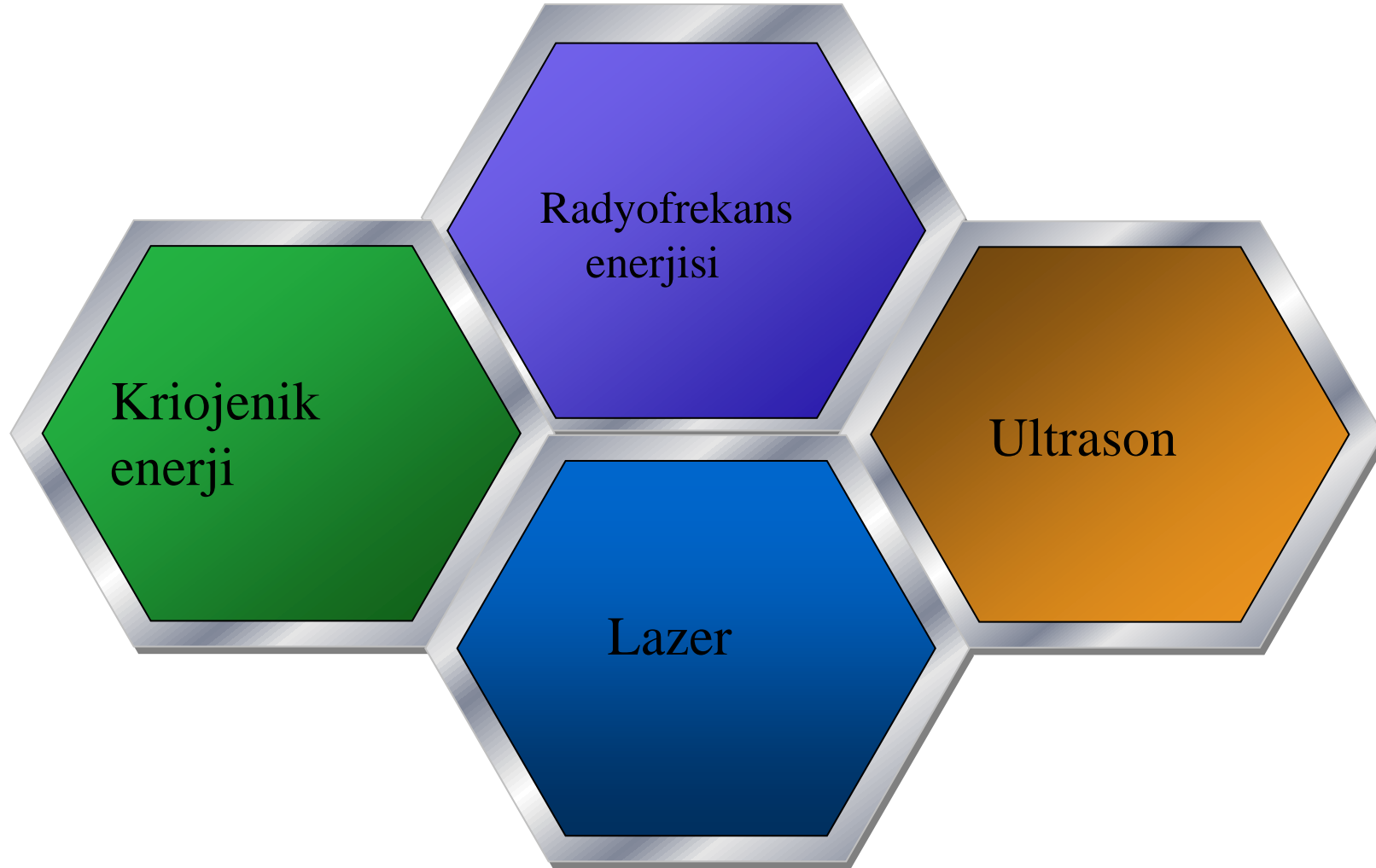
Background Atrial fibrillation, the most common sustained cardiac arrhythmia and a major cause of stroke, results from simultaneous reentrant wavelets. Its spontaneous initiation has not been studied.

Methods We studied 45 patients with frequent episodes of atrial fibrillation (mean [\pm SD] duration, 344 ± 326 minutes per 24 hours) refractory to drug therapy. The spontaneous initiation of atrial fibrillation was mapped with the use of multielectrode catheters designed to record the earliest electrical activity preceding the onset of atrial fibrillation and associated atrial ectopic beats. The accuracy of the mapping was confirmed by the abrupt disappearance of triggering atrial ectopic beats after ablation with local radio-frequency energy.

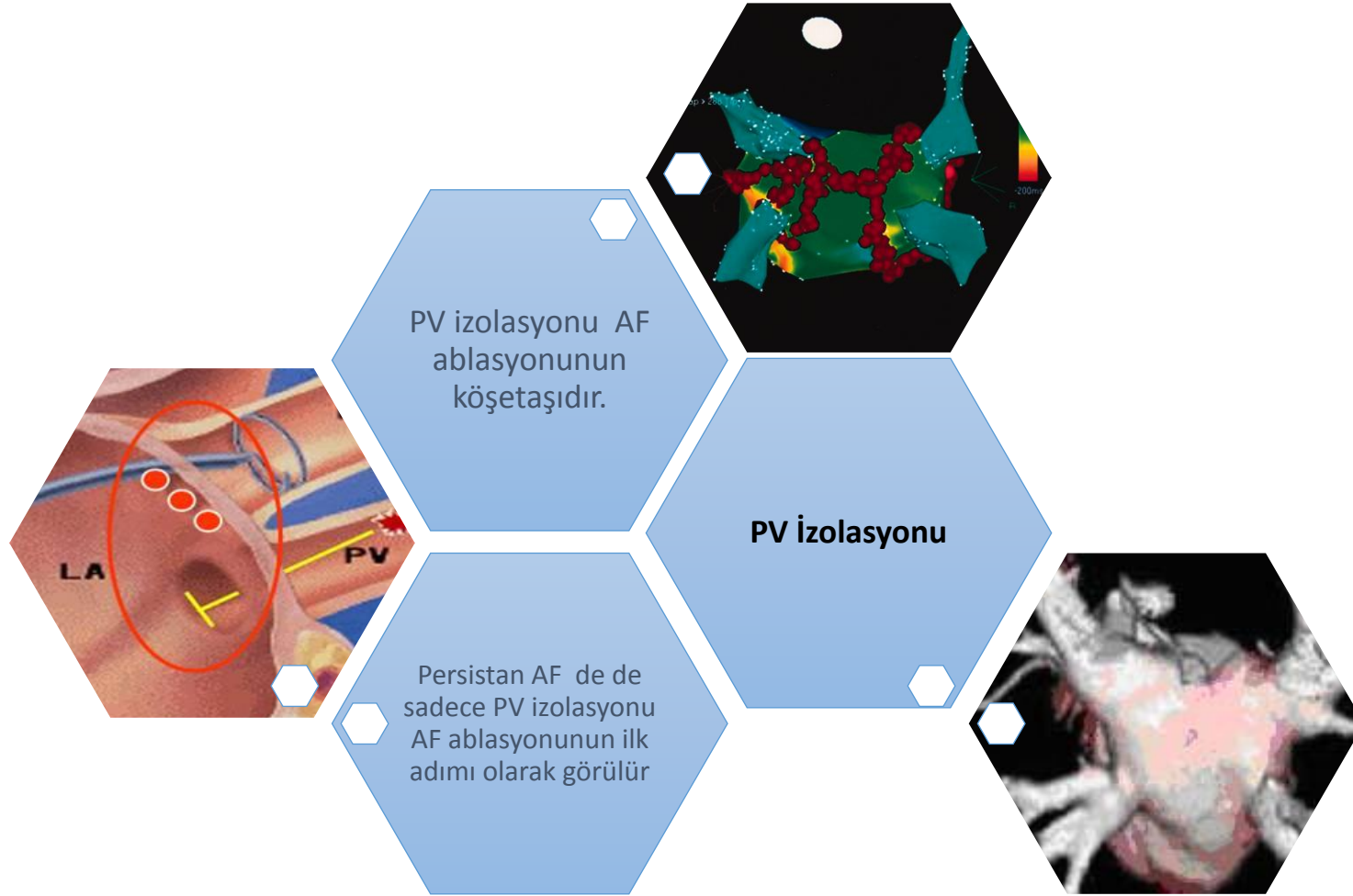
Pattern of Myocardial Fibers of Left Atrium and Pulmonary Vein Trunks (Posterior View)



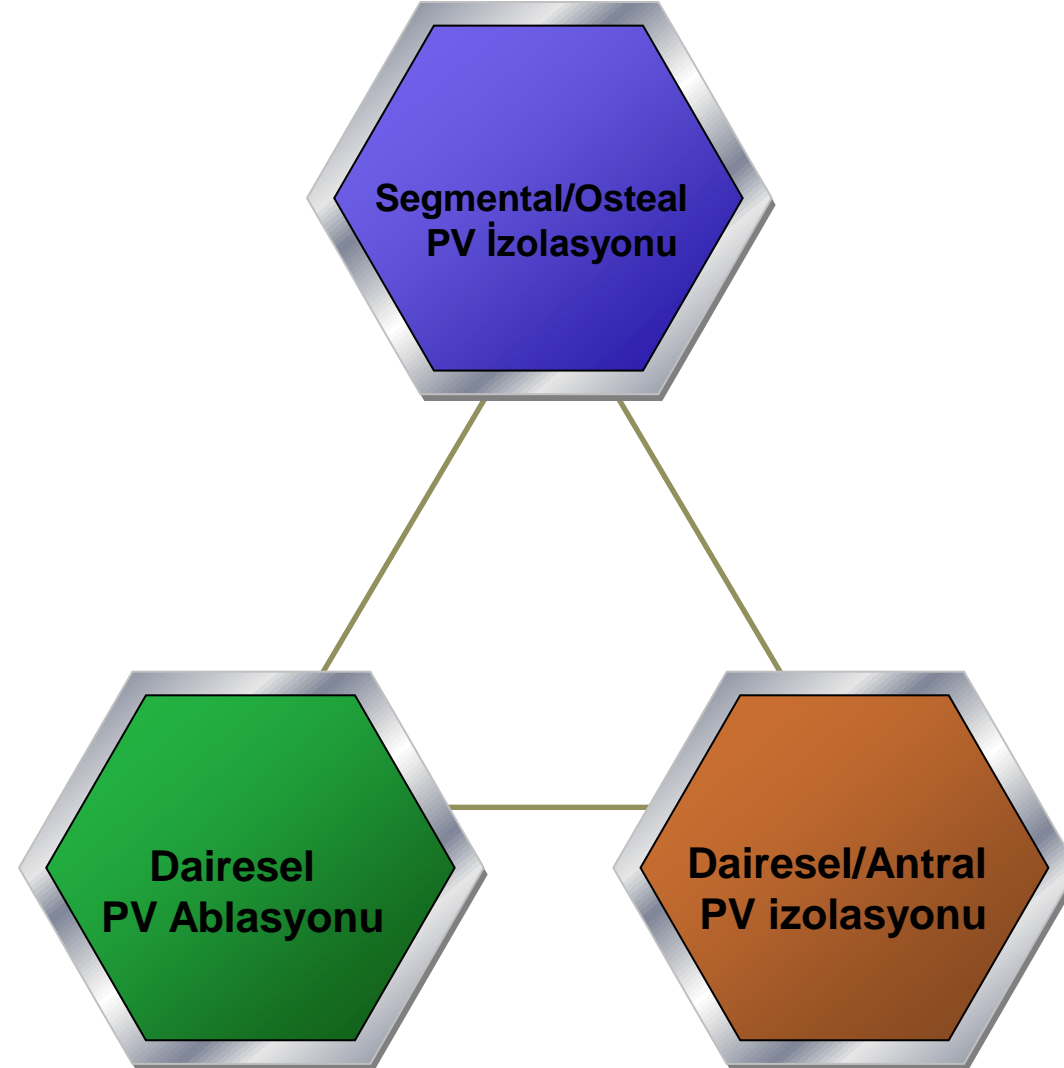
AF Ablasyonunda Kullanılan Enerji Türleri

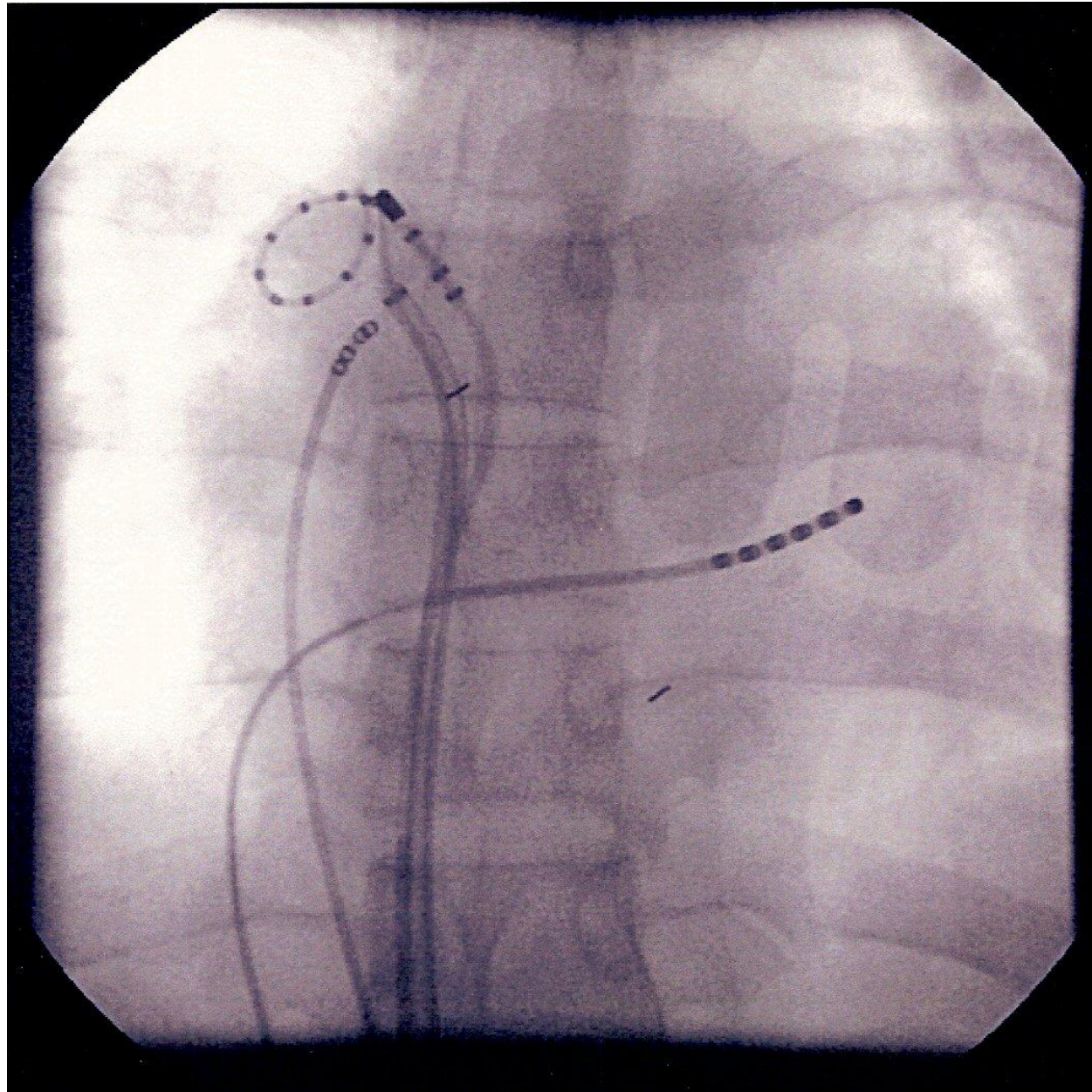


Atriyal Fibrilasyon Ablasyonu



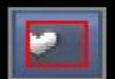
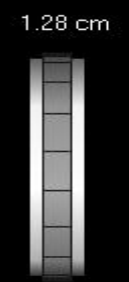
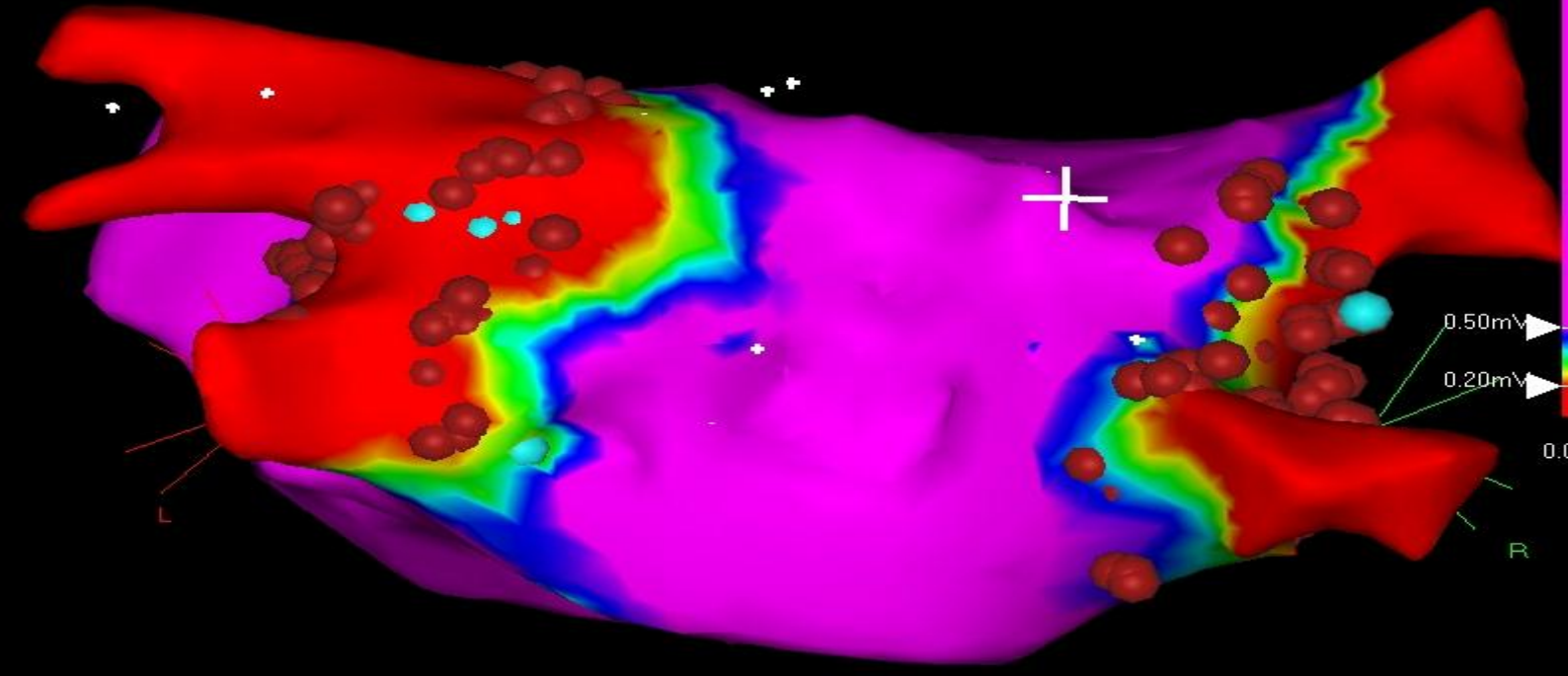
Pulmoner Ven İzolasyon Teknikleri

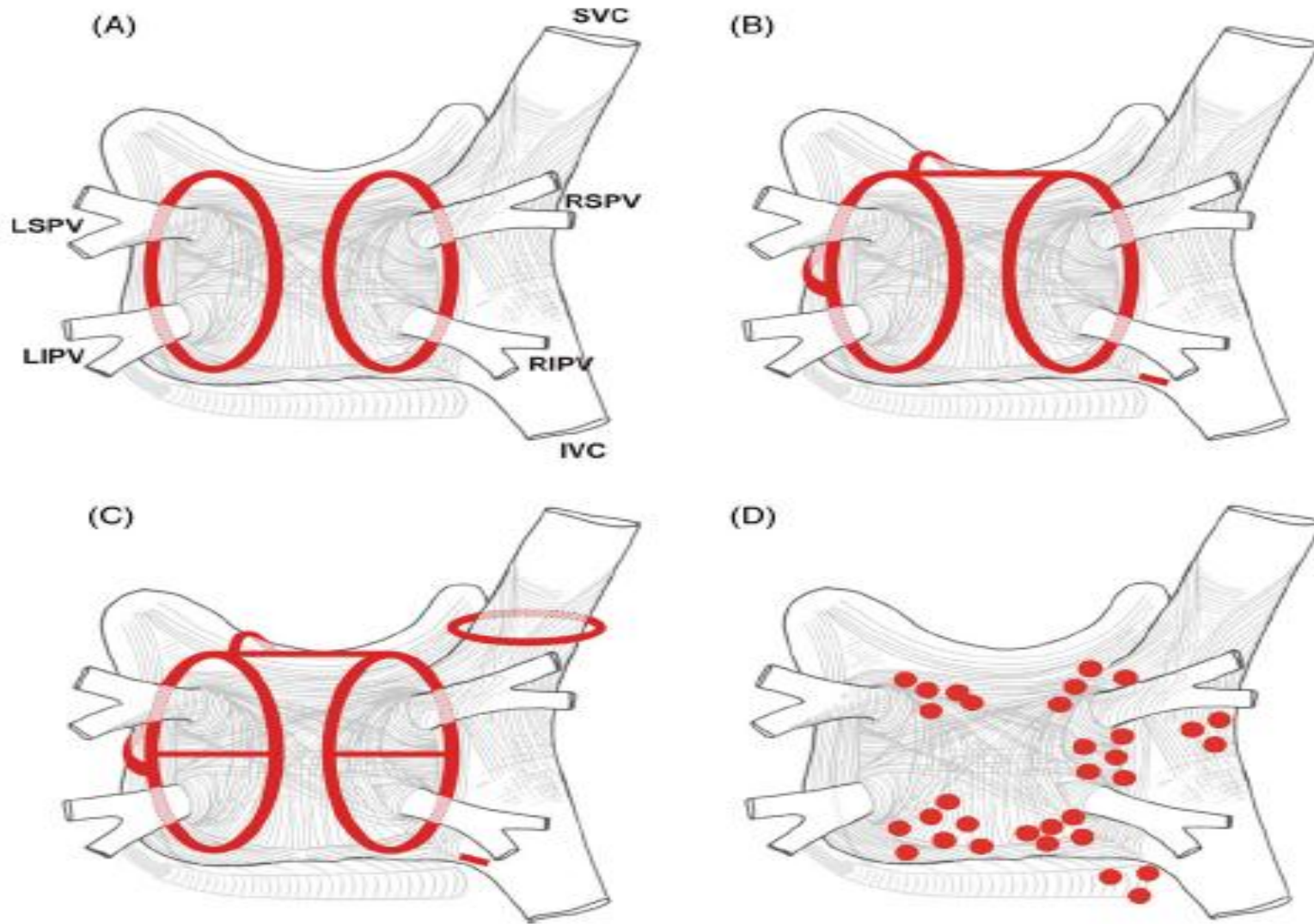






Bipolar
2-Map > 437 Points





AF ablasyonunda uygulanan lezyon modelleri

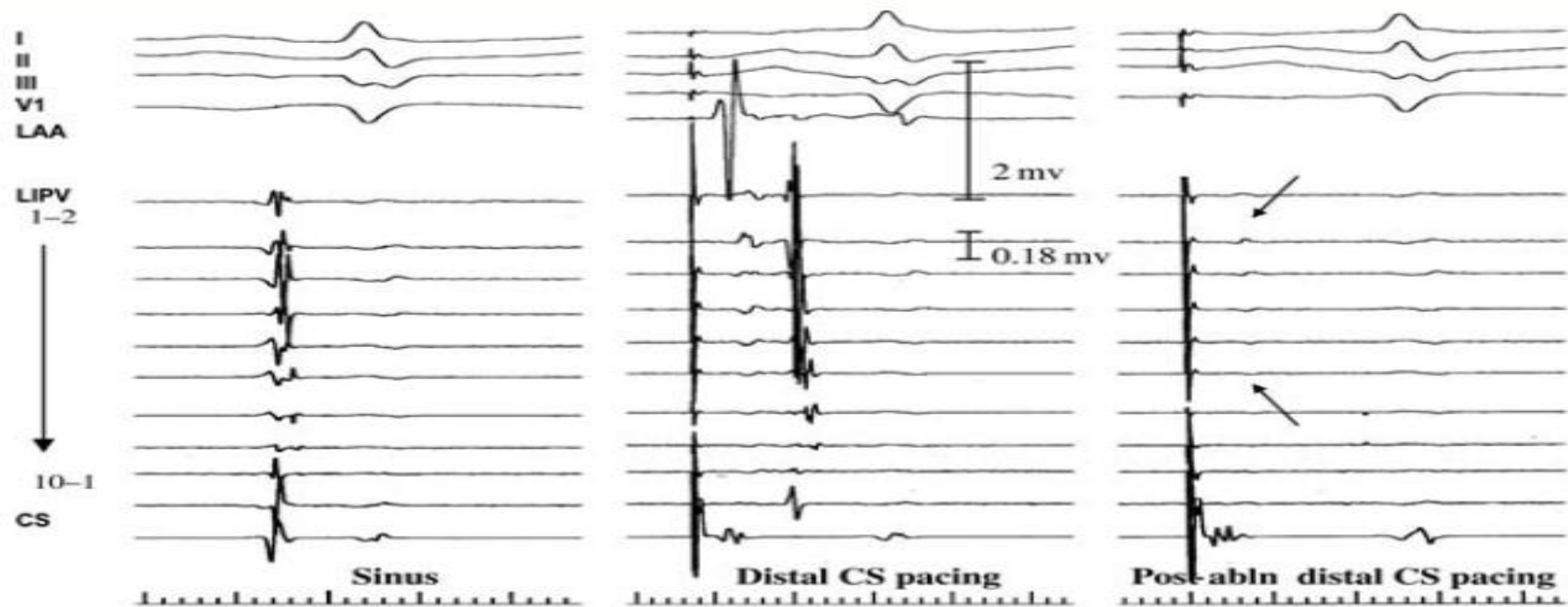
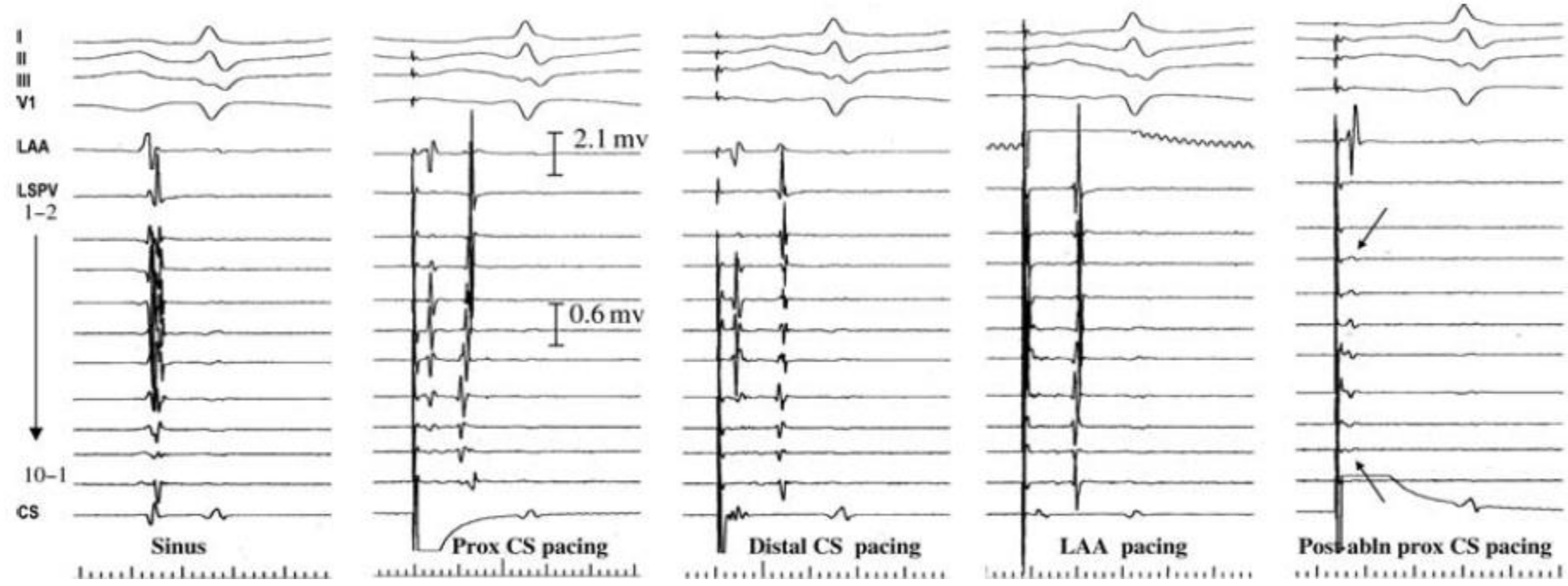


Table 2. Distribution of Centers and Patients According to Performed Ablation Technique

Technique	No. of Centers	No. of Patients	%*
RAC	8	75	0.5
CA-TF	10	222	1.6
OED	34	3889	27.4
Carto			
w/o PV isolation	15	1460	10.3
w/ PV isolation	37	5394	37.9
3D noncontact	11	663	4.7
Basket	10	150	1.1
CFAEs	16	349	2.4
Other	5	968	6.8
Combination	19	1048	7.4
Total	165	14 218	100.0

RAC indicates right atrial compartmentalization; CA-TF, catheter ablation of the triggering focus; OED, Lasso-guided ostial electrical disconnection of pulmonary veins; PV, pulmonary vein; CFAE, catheter ablation of fragmented atrial electrograms.

*Proportion of patients undergoing CA of AF with the use of the indicated technique.

- En sık kullanılan 3D haritalama yöntemleri;
 - Carto (Biosense Webster, Diamond Bar, CA, USA)
 - NavX (St. Jude Medical Inc., Saint Paul, MN, USA)

Neden 3 boyutlu haritalama?

- Floroskopi süresinde ciddi azalma sağlar
- İşlem süresini kısaltır
- İşlem güvenliğini arttırır
- Üç boyutlu – gerçek zamanlı (3D-Real-Time) anatomiye elde etmeyi sağlar
- Lokasyon hafızası oluşturur, ilgili odağa tekrar ulaşma imkanı verir.
- Konvansiyonel yöntemlerle tedavi edilemeyen aritmilerin tedavisine olanak sağlar.

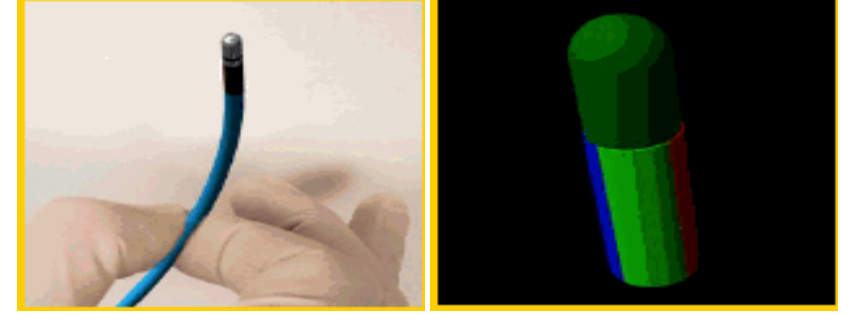
Ensite NavX

- Yüzey temelli empedans deęişikliğine dayalı görüntüleme sistemidir.
- 3 çift yüzey elektrodundan yayılan elektrik sinyalleri ile katater hareketine baęlı patchler arasındaki empedans deęişikliği 3 boyutlu ekseninde görüntünün temelini oluşturur (8 katater ve 128 elektroda kadar kullanılabilir).

Karto sistemi

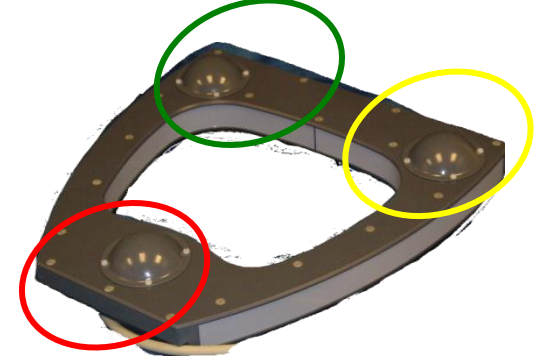
❖ NAVISTAR Kateter

İçinde minyatür manyetik sensor bulunan kateter



❖ Lokasyon Altlığı (Location Pad)

Ultra düşük manyetik alan yayan 3 lü sargılı yapı.



❖ Patient Interphase Unit (PIU)

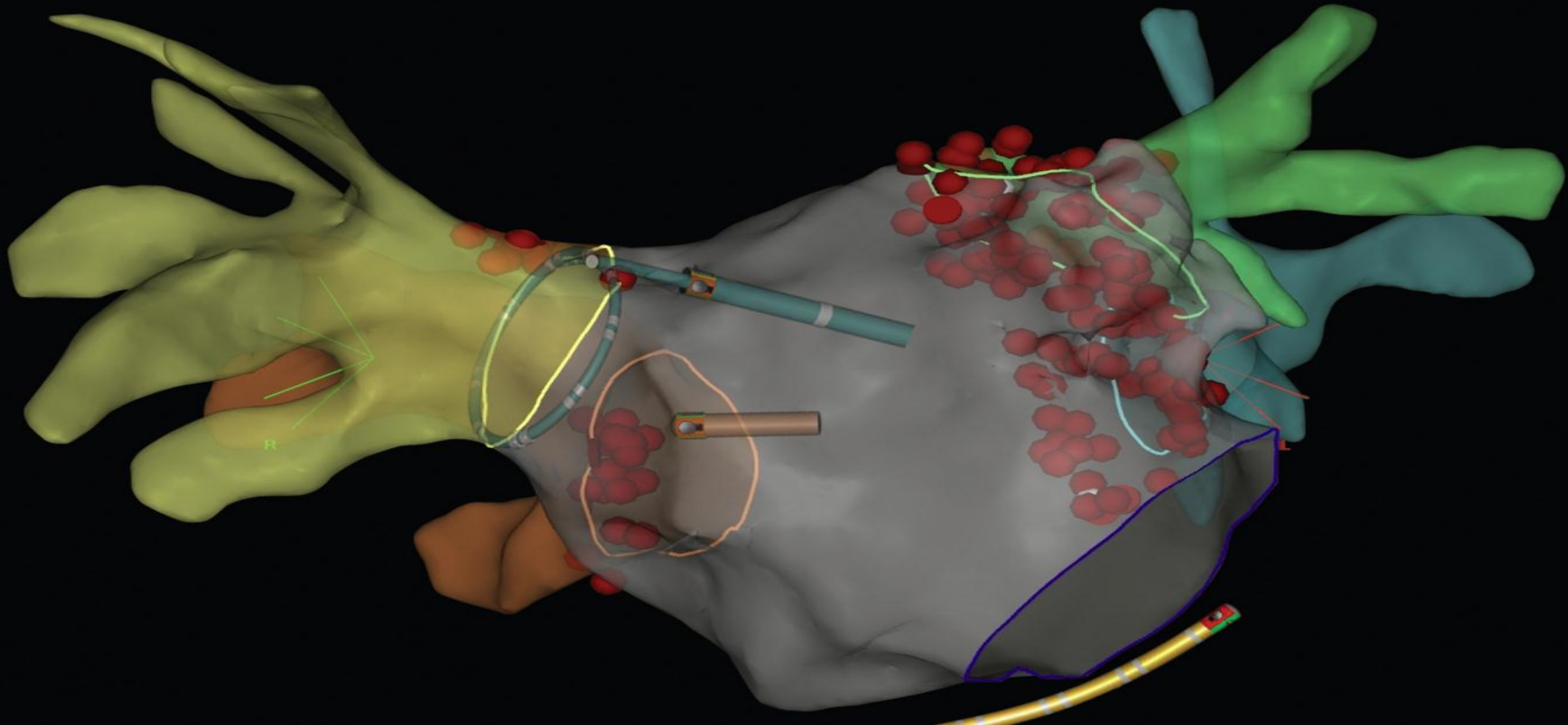
Tüm EP sistemleri, RF jenerator, kateterler ve lokasyon altlığı arasında kominikasyonu sağlayan birim

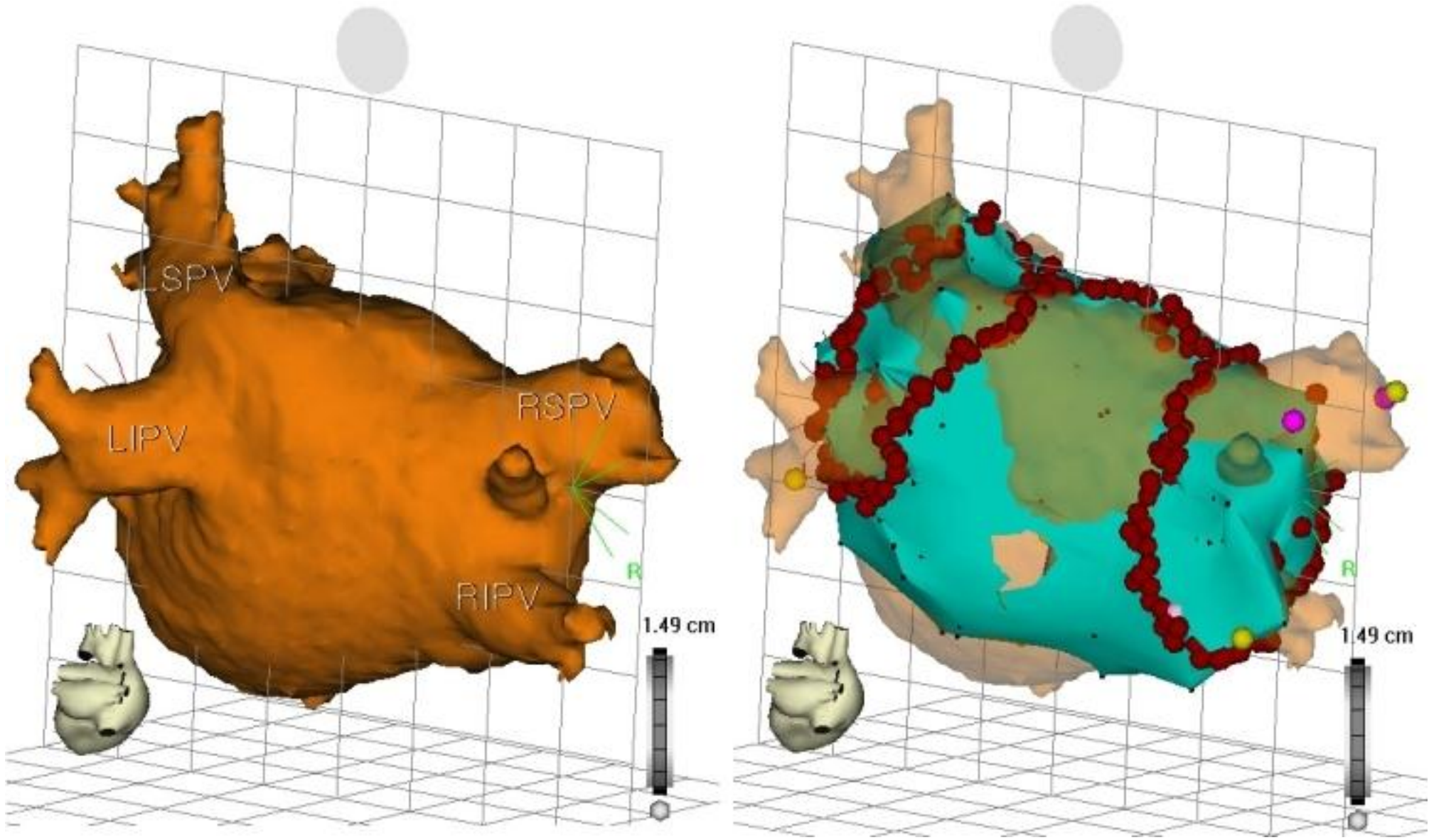


Elektroanatomik haritalamanın sağladığı veriler

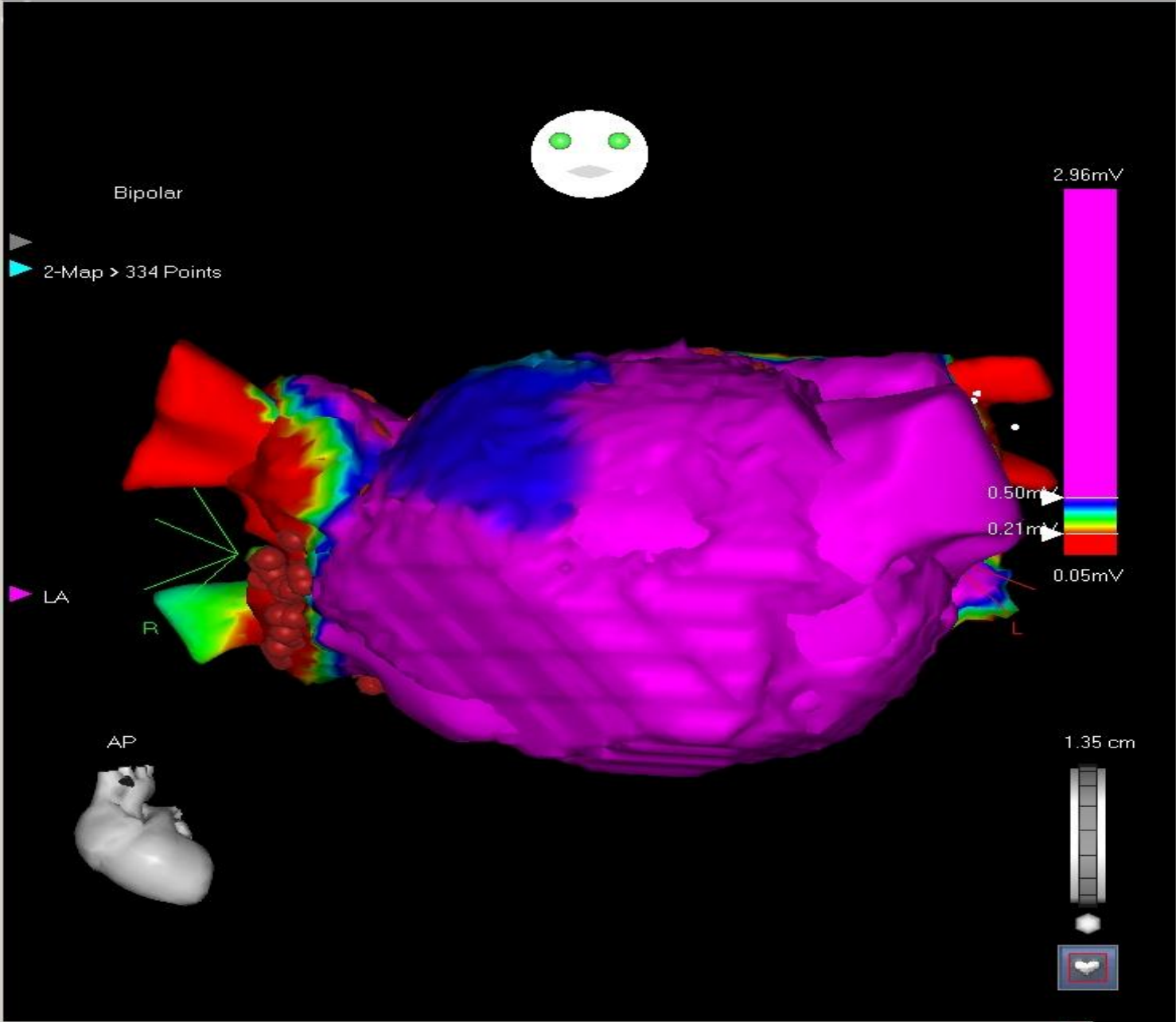
- Kardiyak boşlukların yapılandırılması
- Önemli anatomik noktaların ve ablasyon lezyonlarının işaretlenmesi
- Diagnostik ve haritalama kateterlerinin floroskopi kullanılmadan görüntülenmesi
- Aktivasyon ve voltaj haritaları
- GP ve CFAE ablasyonu

KARTO 3 GÖRÜNTÜSÜ





Map Viewer



Registration Tools

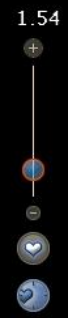
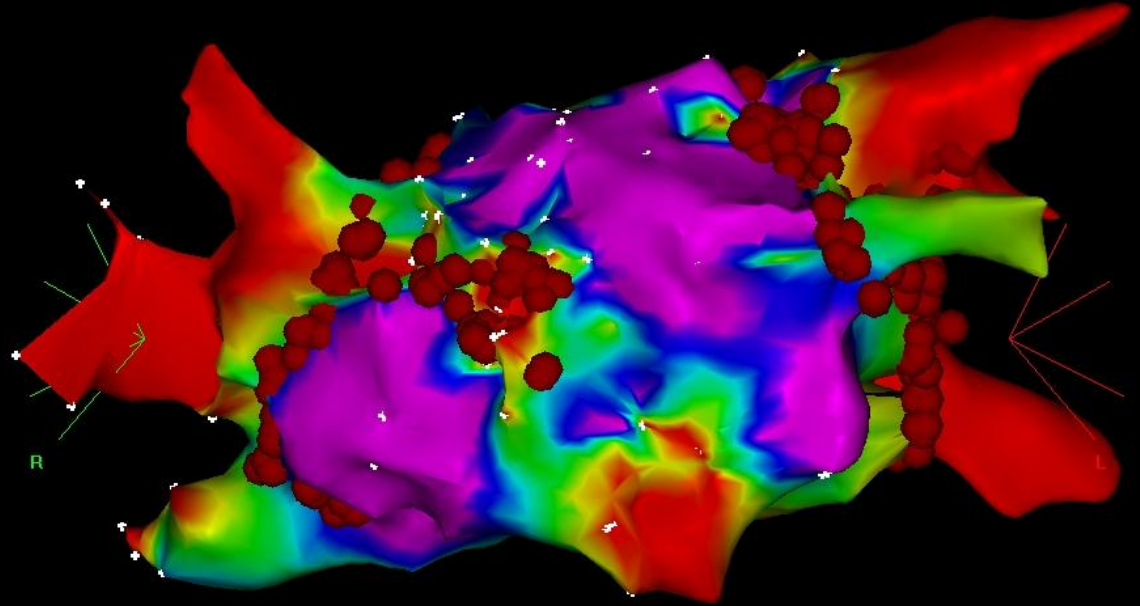
Registration Tools

Navigation icons: Home, Rotate, Pan, Zoom, Show/Hide, Active Only, Undo, Redo.

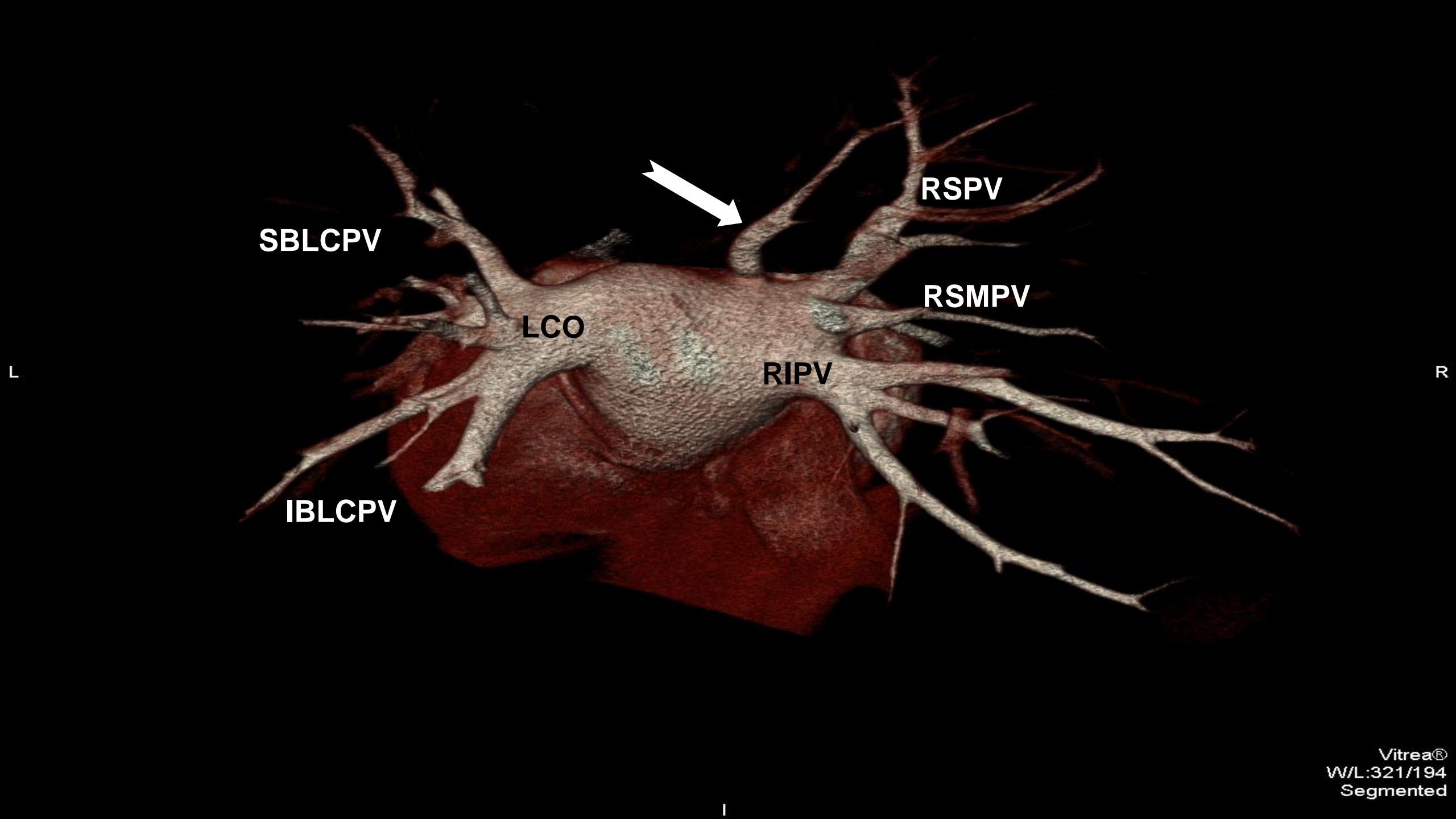
Show Hide Active Only

1-Map (637, 0)

0.03 mV Bi 1.91 mV
0.20 0.50



AP PA LAO RAO LL RL INF SUP



SBLCPV

LCO

RIPV

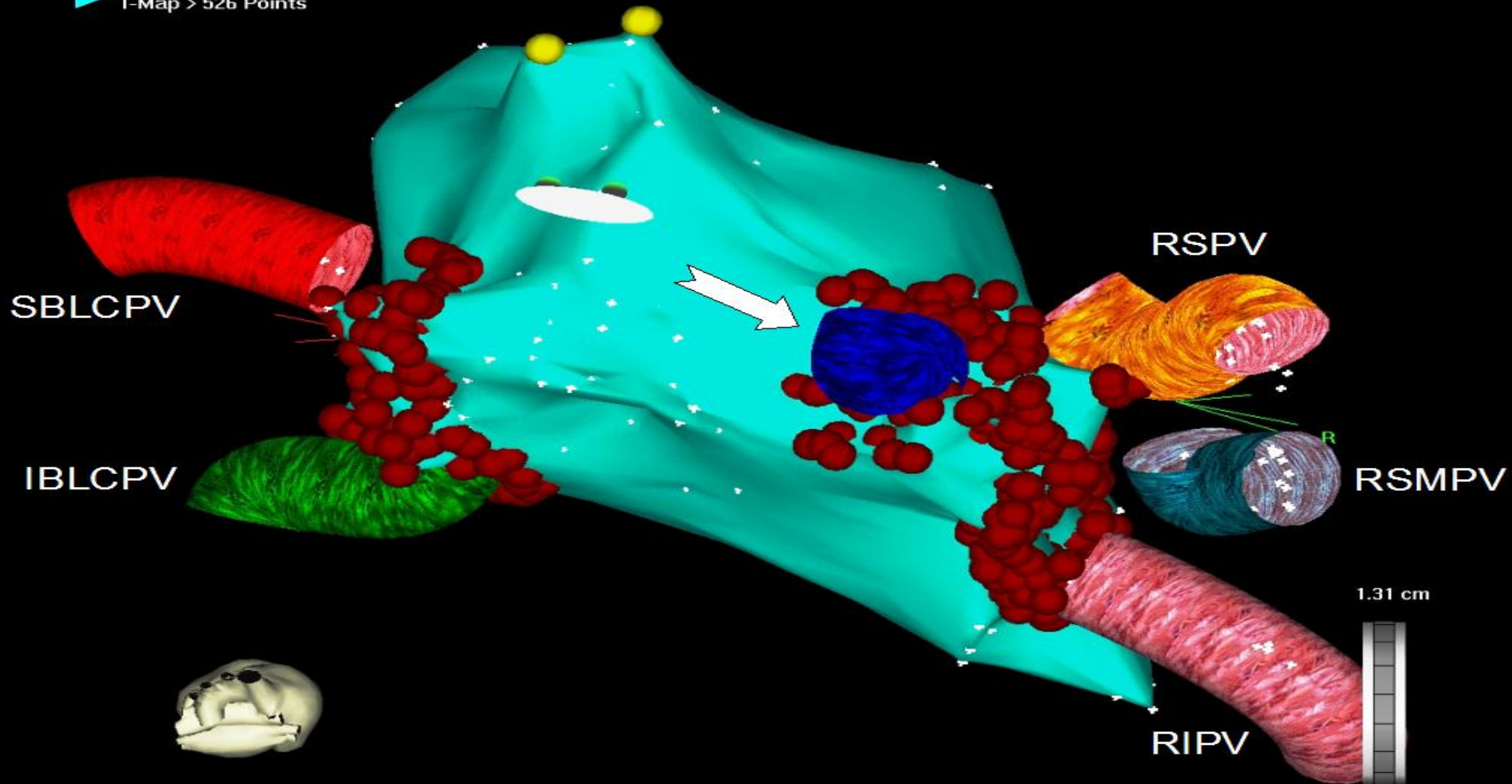
RSPV

RSMPV

IBLCPV

LAT

▶ 1-Map > 526 Points



- Cartomerge ve NavX fusion tekniklerinin karşılaştıran randomize klinik çalışmada (CAVERN çalışması) *
 - 6 ay aritmisiz kalma her iki grupta benzer (p=0.76)
 - 3D görüntü kayıtları Cartomerge grubunda daha hızlı (C:24 dk, N:33 dk p=0.0001)
 - Cartomerge ile daha az floroskopi görüntüleme (C:11 dk, N:15 dk p=0.039) ve floroskopi dozu (C:840 mGyCm² , N:1,415 mGyCm² p=0.043)
- Ancak bütünüyle bakıldığında her iki grupta prosedürel zaman ve klinik sonuçlar benzer bulundu.

* A randomised comparison of Cartomerge vs. NavX fusion in the catheter ablation of atrial fibrillation: The CAVERN Trial. Malcolm C. Finlay et al. J Interv Card Electrophysiol (2012) 33:161–169 DOI 10.1007/s10840-011-9632-7

KALICI PVI SAĞLAMADA NE YAPABİLİRİZ

- Yeni katater tasarımları(CF)
- Steerable kılıflar
- Adenozin uygulaması
- Pace and ablate tekniđi
- İşlem sonrası bekleme süresinin uzatılması

PULMONER VEN IZOLASYONU (PVI) Kateterler

- Contact-force (CF)
 - CF guided sirkumfrensiyel pulmoner ven izolasyonunun , non-guided PVI'ya göre ¹
 - İşlem zamanında kısalma
 - İlave 'touch-up' ablasyonda azalma
 - Klinik sonuçlarda iyileşme sağladığı
 - CF guided PVI'nin kardiyak perforasyonu öngörebileceği düşünülmektedir ²

1. Kimura M et al. Comparison of lesion formation between contact force-guided and non-guided circumferential pulmonary vein isolation: A prospective, randomized study. Heart Rhythm 2014 Mar 18. pii: S1547-5271(14)00300-2. doi: 10.1016/j.hrthm.2014.03.019.
2. Nazeri A. et al. Contact-Force Recovery Can Predict Cardiac Perforation during Radiofrequency Ablation. Pacin Clin Electrophysiol 2014 May 4. doi:10.1111/pace.12409.

- Akut rekonneksiyonu önlemek için ortalama CF > 10 g ve lezyonlar arası mesafe < 5mm olmalıdır ¹.
 - TOCCATA çalışmasında ise en iyi başarı oranı >20 g olan grupta saptanıp, <10 g işlem başarısızlığı ile korele saptanmış ².
-
- ¹ Park CI et al. Mechanisms of Pulmonary Vein Reconnection After Radiofrequency Ablation of Atrial Fibrillation: The Deterministic Role of Contact Force and Interlesion Distance. J Cardiovasc Electrophysiol. 2014 Feb 27. doi: 10.1111/jce.12396.
 - ² Reddy VY et al. The relationship between contact force and clinical outcome during radiofrequency catheter ablation of atrial fibrillation in the TOCCATA study. Heart Rythm 2012 Nov;9(11):1789-95.

'PACE AND ABLATE'

- Standart PVI ile 'Pace and ablate' stratejisi karşılaştırıldığında izolasyon sonrası bolus 30mg adenosine ile PV rekonneksiyonu standart PVI grubunda daha fazla *

* : Okumura et al. The effects of standard electrical PV isolation vs. "pace and ablate" on ATP-provoked PV reconnections. J. Interv Card Electrophysiol. 2014 Feb 25

- Steerable sheath: daha iyi kateter stabilitesi
daha iyi doku teması
daha yüksek başarı oranı
daha az komplikasyon oranı
daha az floroskopi zamanı avantajları sağlar ¹.

¹: Piorkowski C et al. **Steerable versus nonsteerable sheath technology in atrial fibrillation ablation: a prospective, randomized study.** Circ Arrhythm Electrophysiol 2011 Apr;4(2):157-65

Adenosine

- Çalışmalarda bolus dozlar farklı (18-30mg)
- PVI sonrası adenosine bolus ile gösterilen dormant PV ektopisi AF rekürrensini öngördürür ¹

• ¹Cheung JW et al. Adenosine-induced pulmonary vein ectopy as a predictor of recurrent atrial fibrillation after pulmonary vein isolation. Circ Arrhythm Electrophysiol 2013 Dec;6(6):1066-73

PVI sonrası ne kadar beklemeliyiz?

- İsole edilen pulmoner venlerde akut rekonneksiyonun en sık 30-60 dk arasında olduğu gösterildiğinden işlem sonrası 60 dk beklenmesi tavsiye edilmekte ¹ .
- Fakat 1 sat bekleme akut işlem başarısını artırsa da uzun dönem AF rekürrensi üzerine etkisiz.

- ¹ Jiang CY et al. Early detection of pulmonary vein reconnection after isolation in patients with paroxysmal atrial fibrillation: a comparison of ATP-induction and reassessment at 30 minutes postisolation. J. Cardiovasc Electrophysiol. 2009 Dec;20(12):1382-7

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

BACKGROUND Pulmonary vein (PV) isolation has become the mainstay acute procedural end point for paroxysmal atrial fibrillation (AF) ablation.

OBJECTIVE To examine the incidence of conduction recovery in the PVs in patients without clinical recurrence of AF after paroxysmal AF ablation.

METHODS From August 2008 to March 2011, 392 patients with drug-refractory PAF underwent catheter ablation in our center, a wide area circumferential ablation approach guided with a circular mapping catheter was performed with the intended endpoint of entrance block in all PVs. 276 (70.4%) of them were free from recurrence at one year follow-up, and 32 of them were enrolled to assess the incidence of PV reconnection. Forty-three patients with clinical recurrence after ablation were analyzed for comparison. The regions of gap were mapped and characterized in all of the reconnected PVs.

RESULTS Among patients without recurrence, recovery of PV conduction was observed in 29 of 32 (90.6%) patients: 10/32 (31.2%) reconnection in 4 veins, 7/32 (21.9%) in 3 veins, 10/32 (31.2%) in 2 veins, and 2/32 (6.2%) in 1 vein. No anatomic propensity was seen because reconnection was evenly distributed throughout all veins

(left superior pulmonary vein 21, left inferior pulmonary vein 20, right superior pulmonary vein 19, and right inferior pulmonary vein 23). When compared to patients with recurrence, no significant differences were seen in the proportion of patients with reconnection ($P = 1.0$) or in left atrium-PV intervals (73.4 ± 43.3 ms vs 61.9 ± 31.8 ms; $P > .05$).

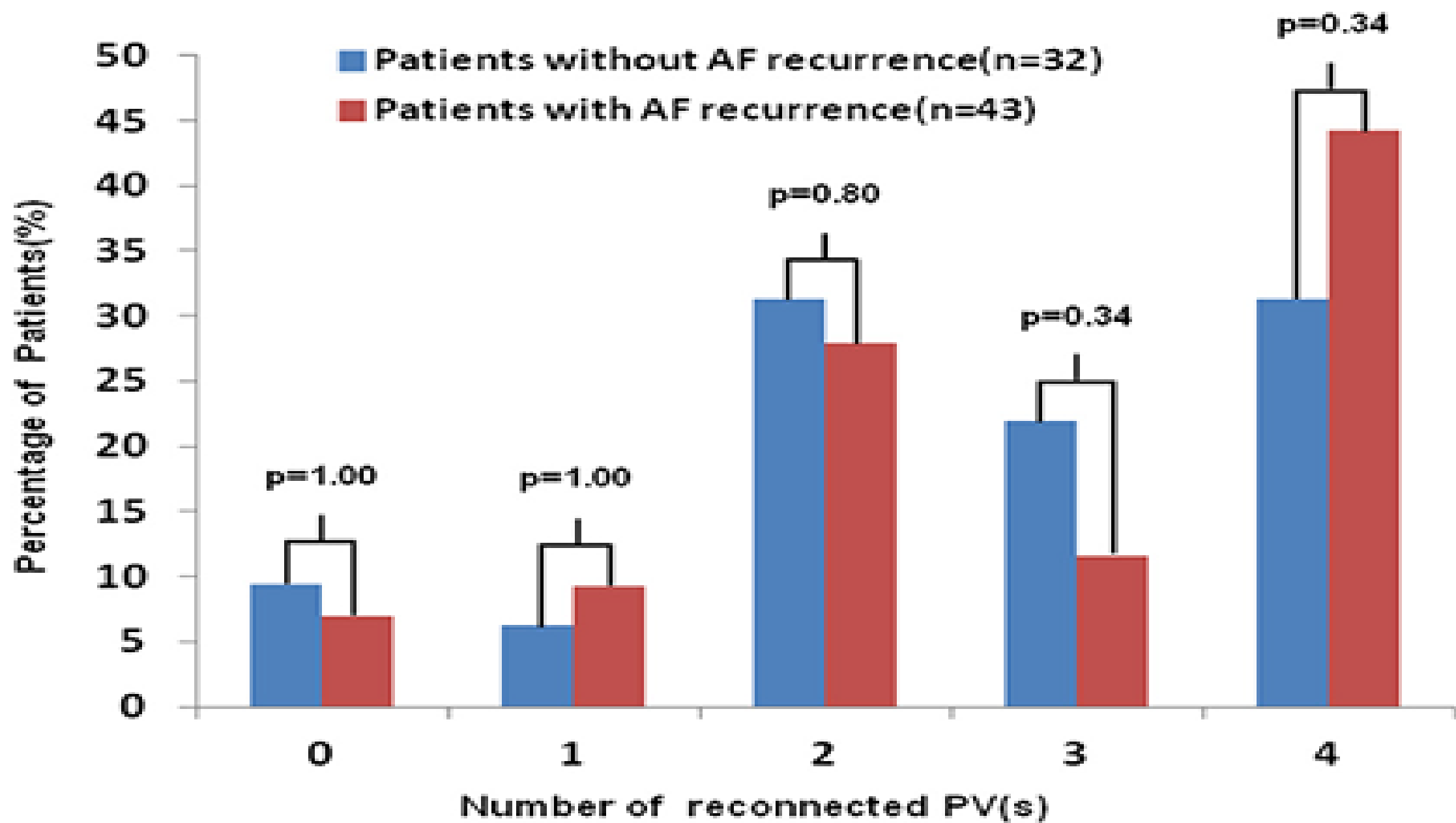
CONCLUSION A high incidence of PV reconnection was similarly observed in patients with and without recurrence of AF, suggesting that sustained PV isolation may not be required for freedom from clinical recurrence of AF.

KEYWORDS Atrial fibrillation; Ablation; Pulmonary vein; Conduction recovery; Reconnection; Recurrence

ABBREVIATIONS AF = atrial fibrillation; AFL = atrial flutter; AT = atrial tachycardia; EP = electrophysiological; GP = ganglionated plexus; LA = left atrium/atrial; LIPV = left inferior pulmonary vein; LSPV = left superior pulmonary vein; PV = pulmonary vein; RIPV = right inferior pulmonary vein

(Heart Rhythm 2014;11:969–976) © 2014 Heart Rhythm Society. All rights reserved.

- Çalışmada PAF nedeni ile PVI yapılan 392 hastadan 276 kişide rekürren AF saptanmamış.
- Rekürren AF gelişmeyen 32 hastaya EPS yapıp değerlendirilmiş (AF'si olmayan diğer hastalar EPS'yi kabul etmemiş).
- Hastaların 29'unda PV rekonneksiyonu tespit edilmiş (29/32).



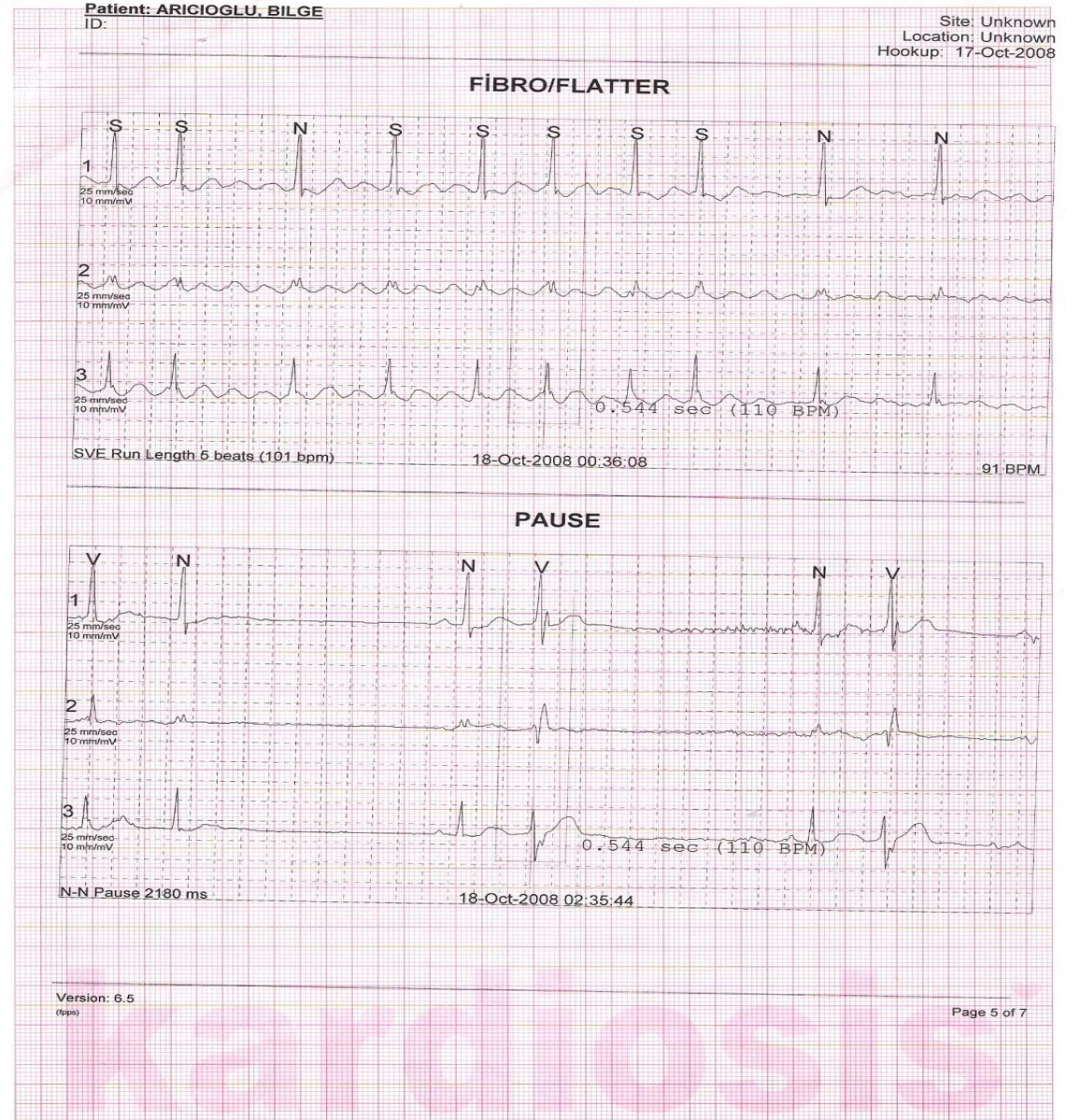
ABLASYON ÖNCESİ

65 yaşında kadın hasta

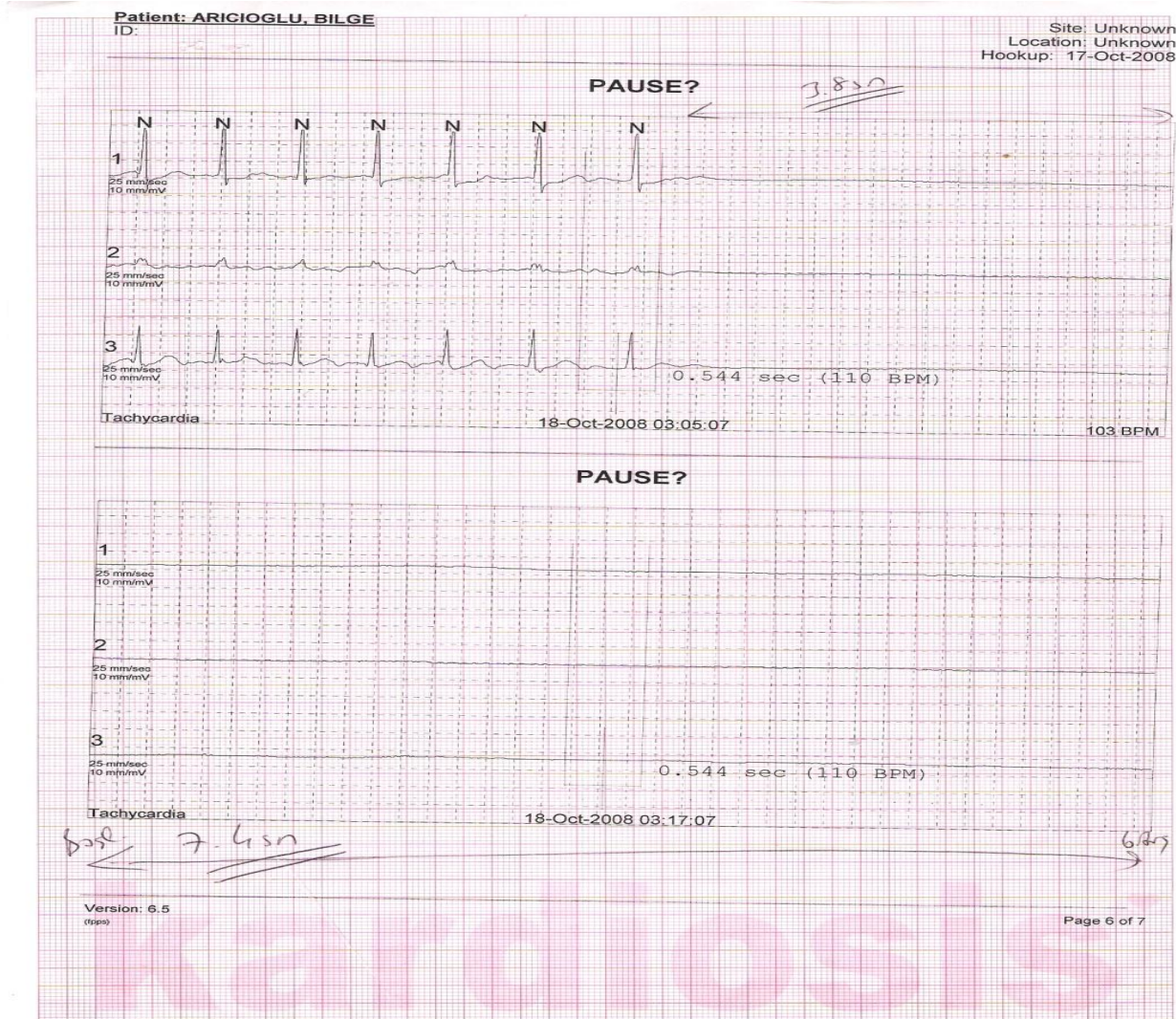
Antiaritmik ilaçlara

dirençli PAF ve asistoli

epizodları



ABLASYON ÖNCESİ

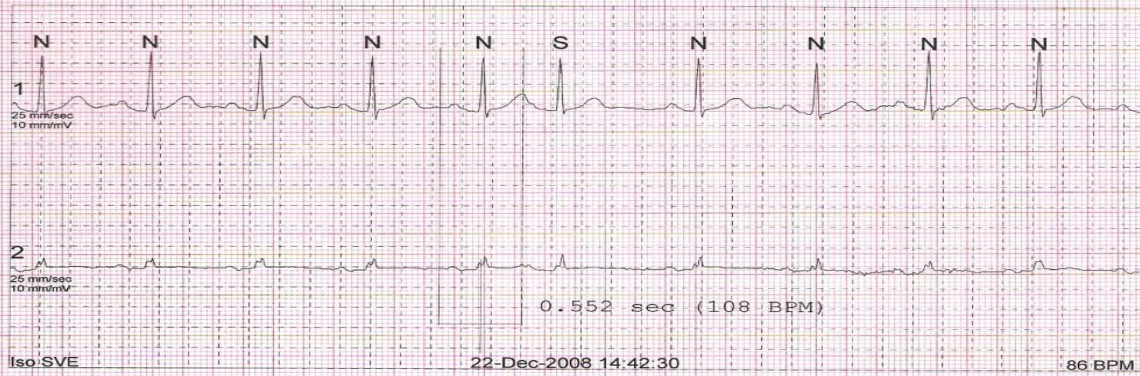


ABLASYON SONRASI

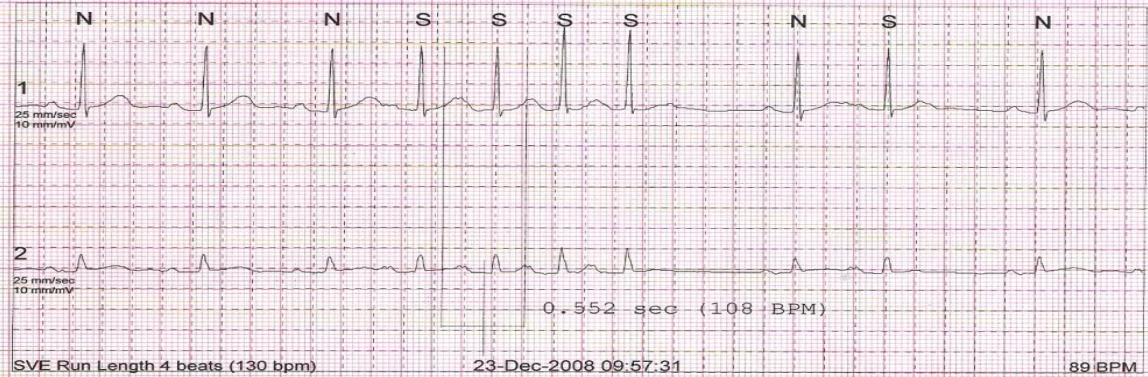
Patient: ARICIOGLU, BILGE
ID: 67

Site: Unknown
Location: Unknown
Hookup: 22-Dec-2008

İZOLE SVE



SVT RUN



Protokolümüz

- Sol atriyumda 2 uzun kılıf; tek yada çift transseptal giriş
- PVI : 3 Boyutlu haritalama lasso kılavuzlu
- PVI sonrası giriş ve çıkış bloğunun gösterilmesi
- Substrat mappingi
- PVI sonrası stimülasyon
- Erken rekürrens açısından 1 saatlik bekleme
- Ablasyon sonrası antiaritmik opsiyonel
- Tüm hastalara PPI ve antikoagulan tedavi

Sorunlar

- Ven aktif mi pasif mi?
- Vende potansiyel yok ne yapalım?
- Adenozin?
- Ablasyon sonrası ven de tek potansiyel kaldı ?
izole mi değilmi,ne yapalım?

Sonuç

- Ablasyonun temel taşı ve en önemli adımı hala pulmoner ven izolasyonudur.
- Özellikle PAF da sonuçlar yüz güldürücüdür.
- Hastalık daha ileri ve kompleks aşamalara ulaşmadan yapılan ablasyon tedavisi daha iyi sonuçlarla birlikte dir
- 3boyutlu haritalama teknikleri bu işlemlerde en sık kullanılan yöntemlerdendir.