

# Atrial fibrilasyonun ablasyonu

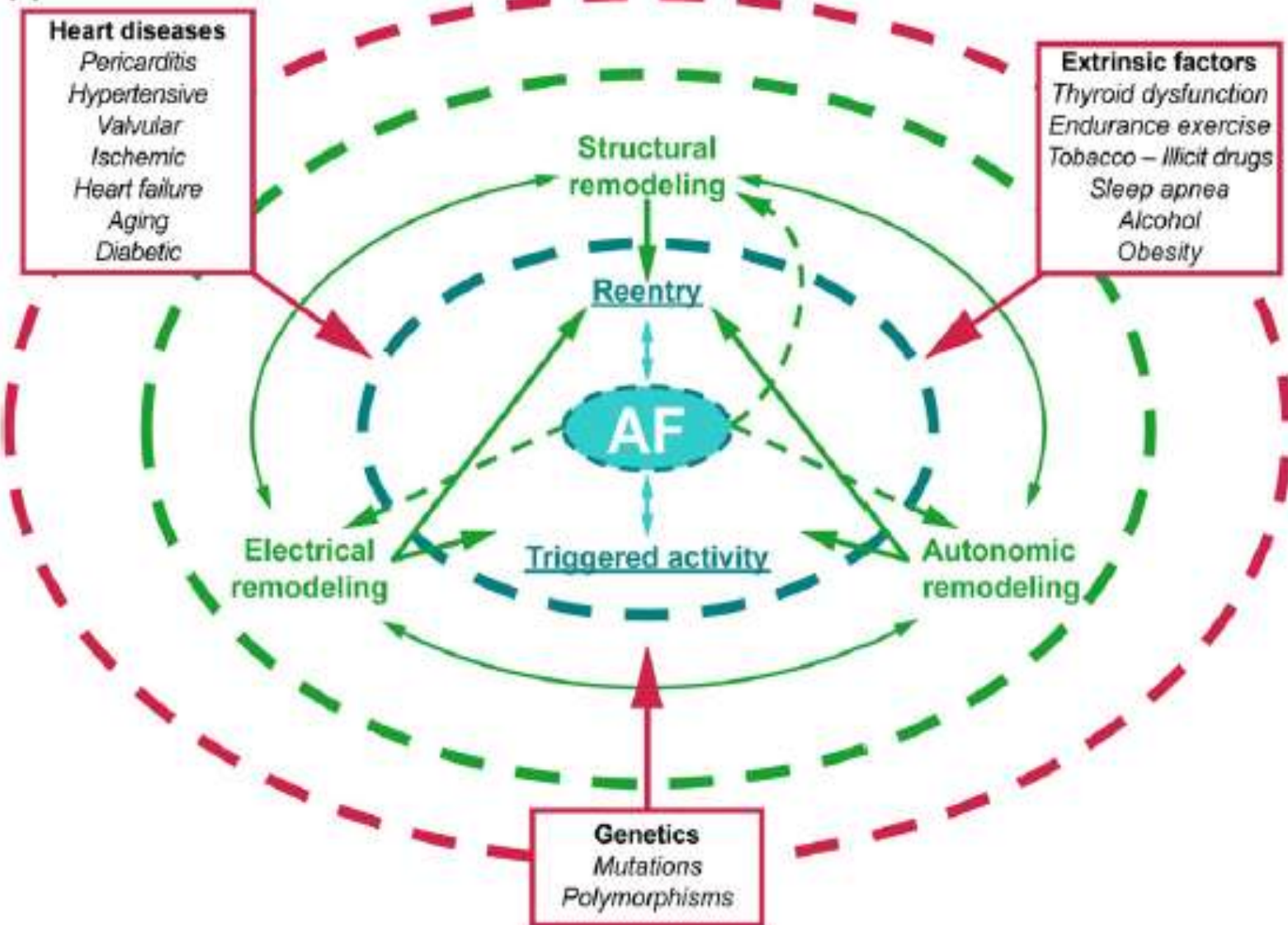
Mustafa KARACA

İKÇÜ

Kardiyoloji Kliniđi

İzmir

A



# AF HEDEF

- Stroke riskini azaltmak
- Kalp yetmezliğini önlemek
- Semptomları azaltmak

# Tercih (AFFIRM,RACE)

- Hız kontrol
- Ritim kontrol
  - AAİ (Sinüs ritminde tutma olasılığı, yan etki ?)
  - AF Ablasyonu

# Ablasyonun Rolü

- Tartışmalı
  - Heterojen gruplar
  - Değişik ablasyon teknikleri
  - Takip sorunları
  - Sonucun değerlendirilmesi

# Atriyal Fibrilasyon Ablasyonu için Uzlaşma Önerileri – ESC 2012

	SINIF	KANIT DÜZEYİ
En az 1 Sınıf I veya III antiaritmik ilaca dirençli / ilacın tolere edilemediği Semptomatik Atriyal Fibrilasyon olguları		
Paroksismal ( <i>önerilir !</i> )	<b>I</b>	<b>A</b>
Persistan ( <i>önerilebilir</i> )	<b>IIa</b>	<b>B</b>
Uzun süreli persistan ( <i>düşünülebilir</i> )	<b>IIb</b>	<b>B</b>



# Atriyal Fibrilasyon Ablasyonu için Uzlaşma Önerileri - ESC 2012

	SINIF	KANIT DÜZEYİ
İlaç tedavisi başlanmamış Semptomatik Atriyal Fibrilasyon olguları		
Paroksizmal ( <i>önerilebilir</i> )	<b>IIb</b>	<b>B</b>
Persistan ( <i>düşünülebilir</i> )	<b>IIb</b>	<b>C</b>
Uzun süreli persistan ( <i>düşünülebilir</i> )	<b>IIb</b>	<b>C</b>



January, CT et al.  
2014 AHA/ACC/HRS Atrial Fibrillation Guideline

**5.6. AF Catheter Ablation to Maintain Sinus Rhythm: Recommendations**

**Class I**

1. AF catheter ablation is useful for symptomatic paroxysmal AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication when a rhythm control strategy is desired (154-160). *(Level of Evidence: A)*
2. Prior to consideration of AF catheter ablation, assessment of the procedural risks and outcomes relevant to the individual patient is recommended. *(Level of Evidence: C)*

**Class IIa**

1. AF catheter ablation is reasonable for selected patients with symptomatic persistent AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication (157, 161-163). *(Level of Evidence: A)*
2. In patients with recurrent symptomatic paroxysmal AF, catheter ablation is a reasonable initial rhythm control strategy prior to therapeutic trials of antiarrhythmic drug therapy, after weighing risks and outcomes of drug and ablation therapy (164-166). *(Level of Evidence: B)*

**Class IIb**

1. AF catheter ablation may be considered for symptomatic long-standing (>12 months) persistent AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication, when a rhythm control strategy is desired (154, 167). *(Level of Evidence: B)*
2. AF catheter ablation may be considered prior to initiation of antiarrhythmic drug therapy with a class I or III antiarrhythmic medication for symptomatic persistent AF, when a rhythm control strategy is desired. *(Level of Evidence: C)*

**Class III: Harm**

1. AF catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and following the procedure. *(Level of Evidence: C)*
2. AF catheter ablation to restore sinus rhythm should not be performed with the sole intent of obviating the need for anticoagulation. *(Level of Evidence: C)*



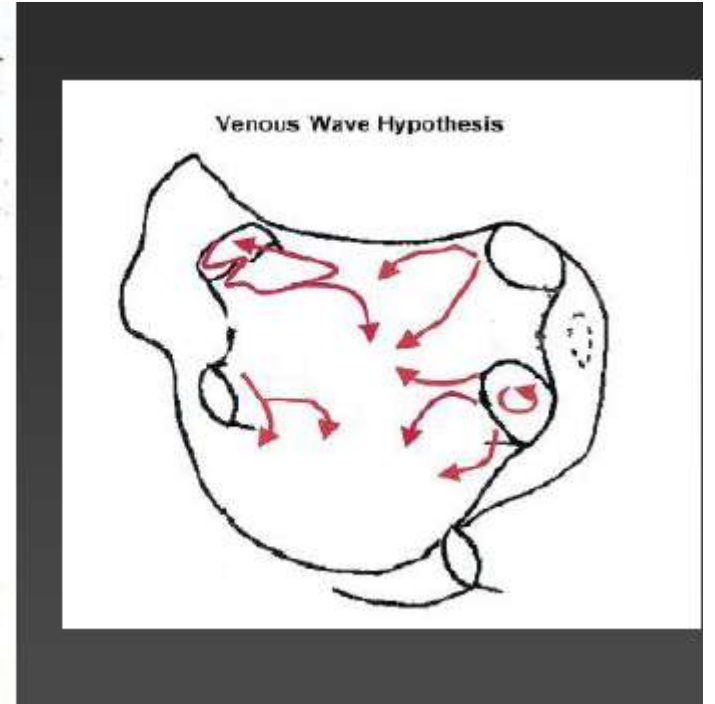
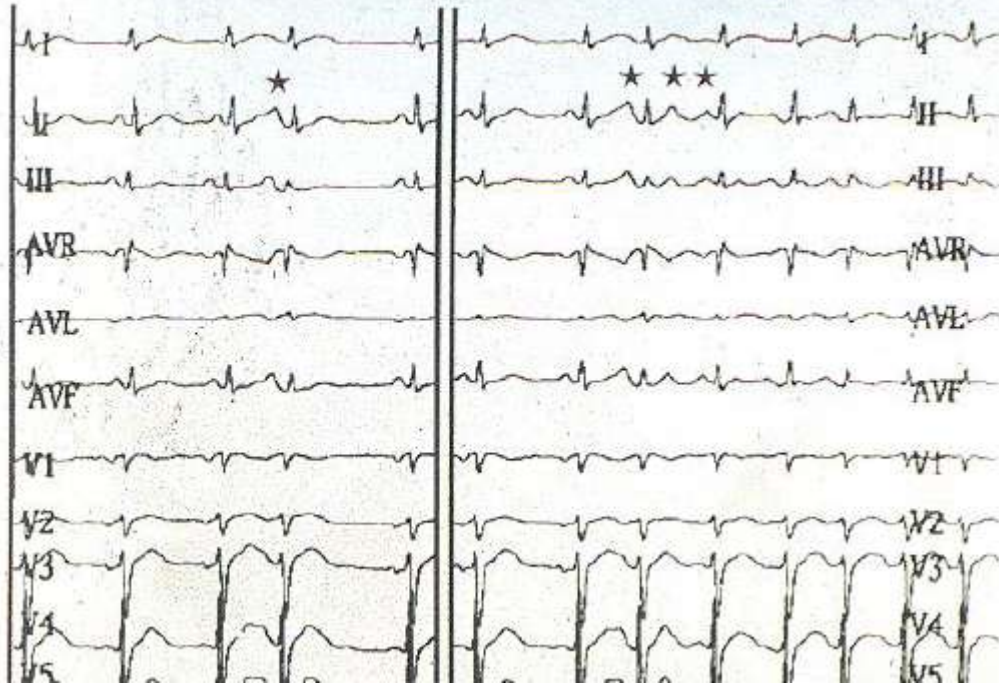
# Ablasyon Teknikleri

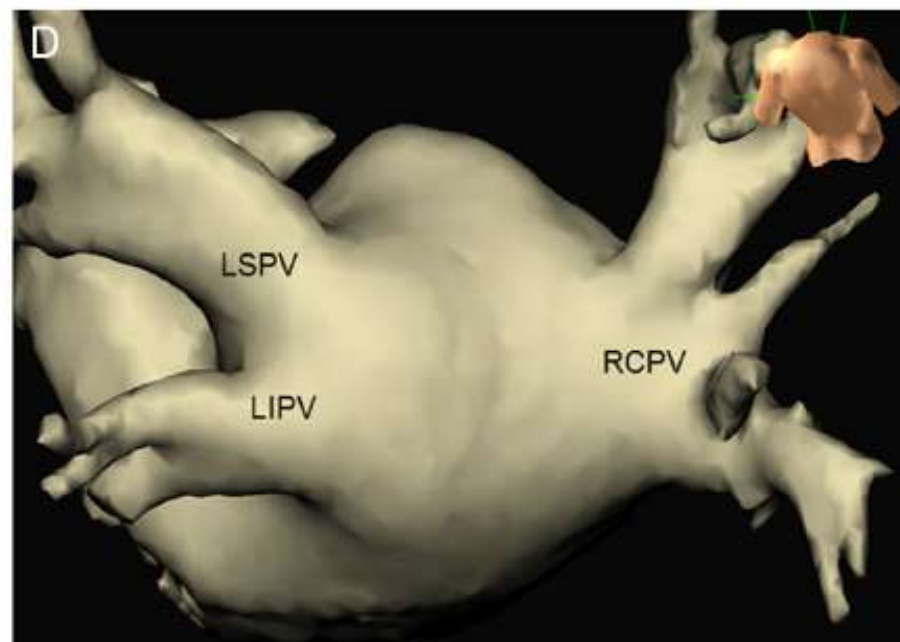
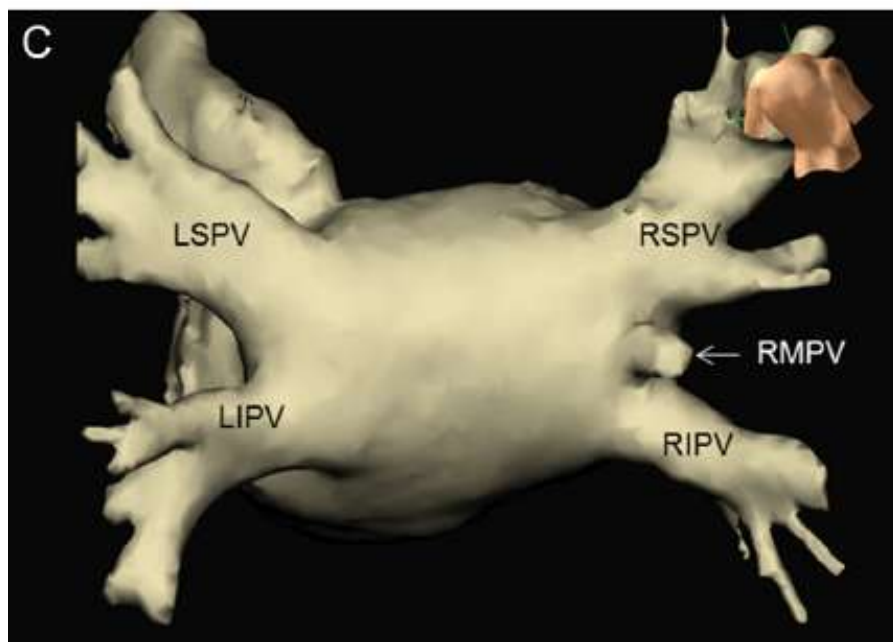
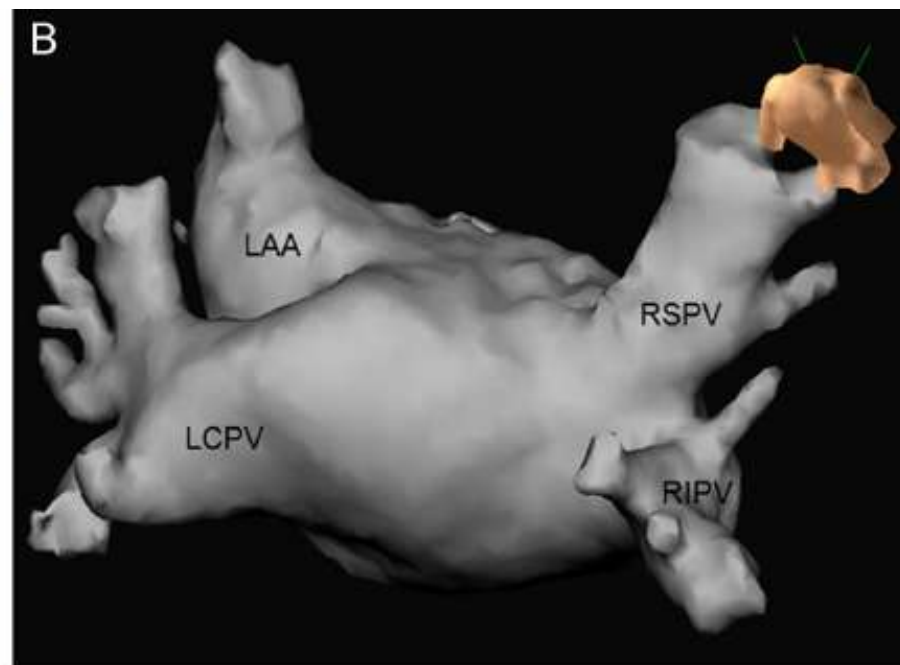
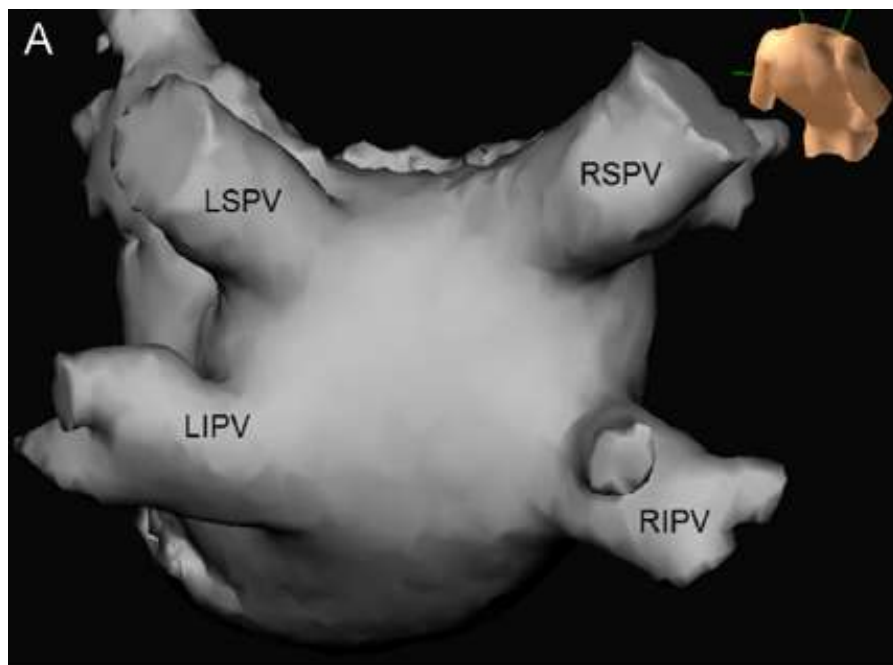
## Anatomik orgin

- Tetikleyici
- Duyarlı atriyal doku

# AF Ablasyonu – Gelişimi

- Pulmoner venleri hedefleyen yaklaşımlar
  - Pulmoner venlerin tetikleyici olarak tanımlanması
    - Tetikleyicinin doğrudan ablasyonu (“Fokal yaklaşım”)  
(Haissaguerre 1994, 1997, 1998)





# Mekanizma

## Paraximal AF

- PV içinden gelen kas fibrillerineneden kaynaklanan tetikleyici ektopik atımlar AF tetikler
- %90 nında yapısal kalp hst yok
- Çoğunda 1-2 fokus
- %94 2-4 cm PV içinde, en sık sol üst
- Nadiren başka fokuslar en az Sup Vena cava

Bu bulgularla Fokal Ablasyona yönelindi

# Fokal Ablasyon

## Limitasyonlar

- Tetikleyici aktivitenin EPS sırasında devamlı oluşturulamaması
- Ablasyon için en uygun lokasyon ?
- Pulmoner stenoz

## SEGMENTAL ABLASYON

PV ostiyumu ya da yanındaki Atriyal dokudan

# SEGMENTAL ABLASYON

- PV – LA elektrik izolasyonunu sağlamak
- PV tam dairesel ablasyonu yapılmadan da elektriki izolasyon yapılabilir
- Lasso kateri ile elektriksel aktivasyonun yeri ve LA ile izolasyonu sağlanır
- Hem anatomik hemde elektriksel lokalizasyona göre ablasyon noktaları değerlendirilir
- Bazen ek çizgiler anatomik yapılara birleştirilerek yapılabilir

- Selektif Pvi
  - İşlem süresini kısaltmak
  - Radyasyon maruziyetini azaltmak
  - Ampirik 4 PVi göre rekürrens sık
  - Fazla kullanılmıyor

# Dairesel SA Ablasyon

## Geniř Alanlı SA Ablasyon

- Genellikle Sol ve sađ PV iine alan 2 byk daire izilir
- Genellikle anatomik referanslar rehberliđinde yapılır, EP kayıtlar dikkate alınmaz
- Nispeten daha kolay
- Sıklıkla AFL'den korunmak iin mitral anulusla birleřtiren abl. hattı izilir



# Segmental vs Dairesel Abl.

Segmental

Başarı ++

Dairesel

Başarı ++

LA AFL

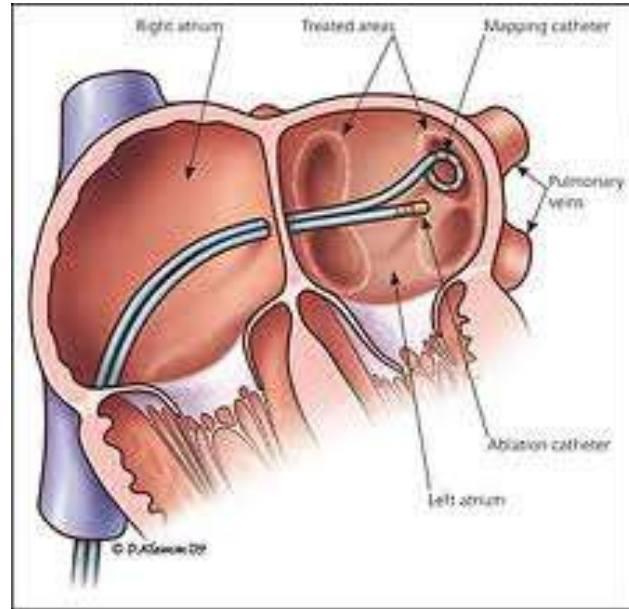
Perikardiyal efüzyon

Atriyoözafagial fistül

GİS yan etkileri

# Başarı

- PV ile SA arasında gerçek elektriki izolasyonun sağlanması







# Pulmonary vein isolation: The impact of pulmonary venous anatomy on long-term outcome of catheter ablation for paroxysmal atrial fibrillation

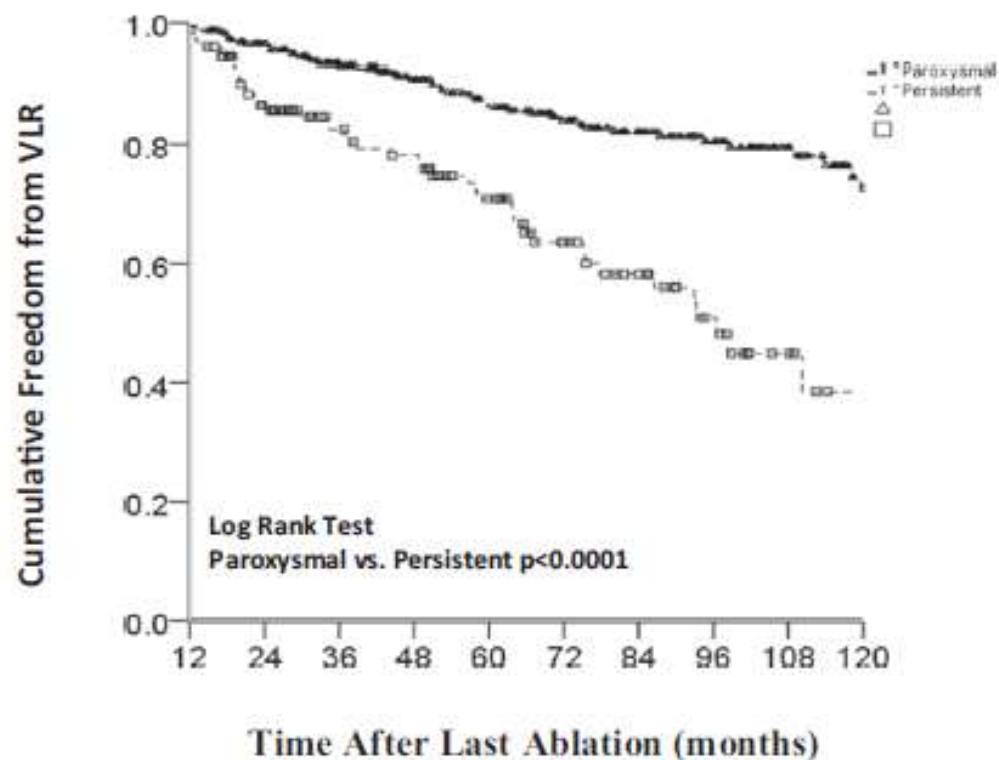
Alex J.A. McLellan, MBBS,<sup>\*†‡</sup> Liang-han Ling, MBBS,<sup>\*†‡</sup> Diego Ruggiero, MBBS,<sup>\*†</sup>  
Michael C.G. Wong, MBBS,<sup>\*‡</sup> Tomos E. Walters, MBBS,<sup>\*‡</sup> Ashley Nisbet, MBChB, PhD,<sup>\*‡</sup>  
Anoop K. Shetty, BSc, MBChB, MD,<sup>\*‡</sup> Sonia Azzopardi, RN,<sup>\*†</sup> Andrew J. Taylor, MBBS, PhD,<sup>\*†</sup>  
Joseph B. Morton, MBBS, PhD,<sup>‡§</sup> Jonathan M. Kalman, MBBS, PhD,<sup>‡§</sup>  
Peter M. Kistler, MBBS, PhD<sup>\*†‡§</sup>

*From the <sup>\*</sup>Alfred Heart Centre, Alfred Hospital, Melbourne, Victoria, Australia, <sup>†</sup>Baker IDI Heart and Diabetes Research Institute, Melbourne, Victoria, Australia, <sup>‡</sup>Department of Cardiology, Royal Melbourne Hospital, Parkville, Victoria, Australia, and <sup>§</sup>Melbourne Private Hospital, Parkville, Victoria, Australia.*

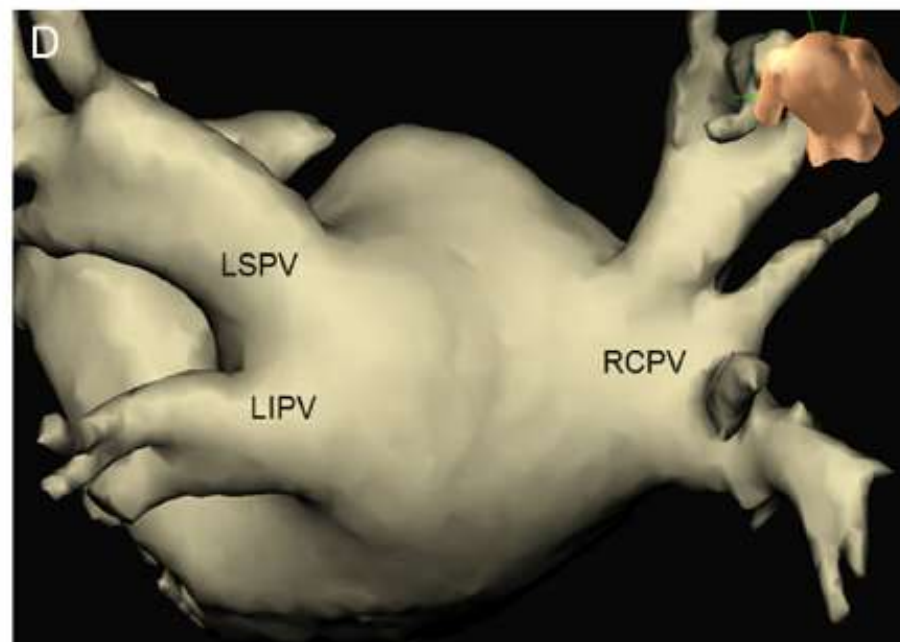
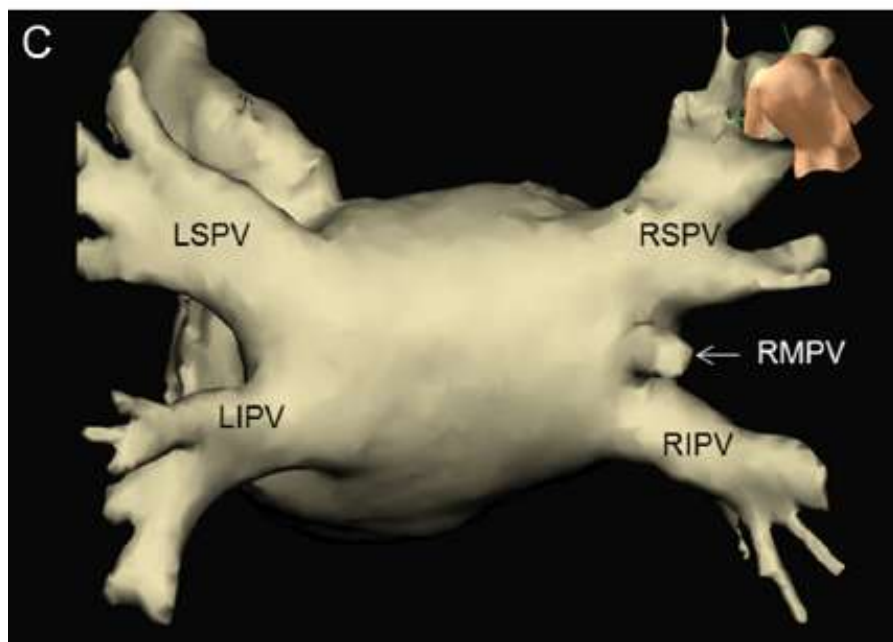
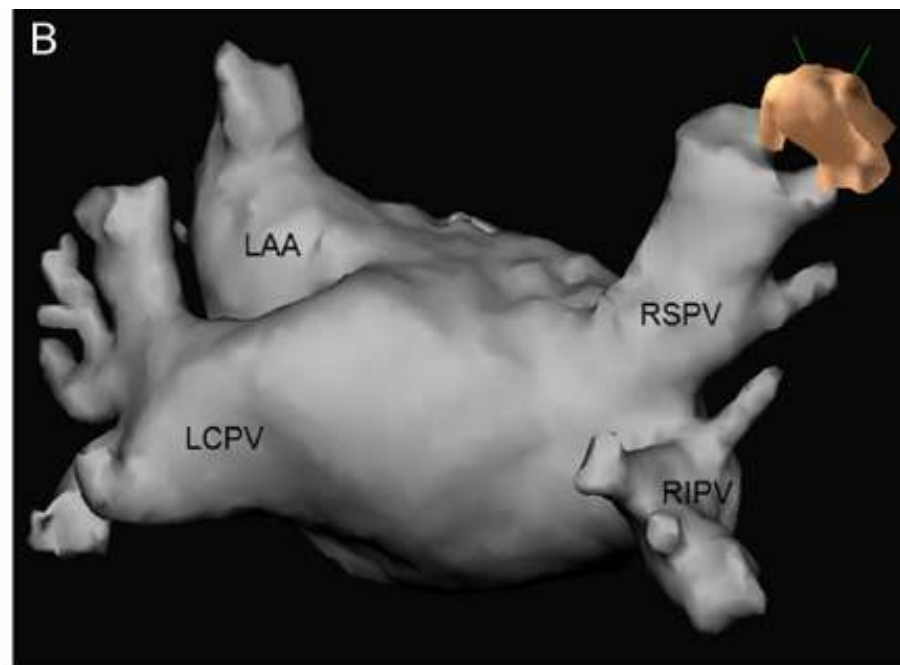
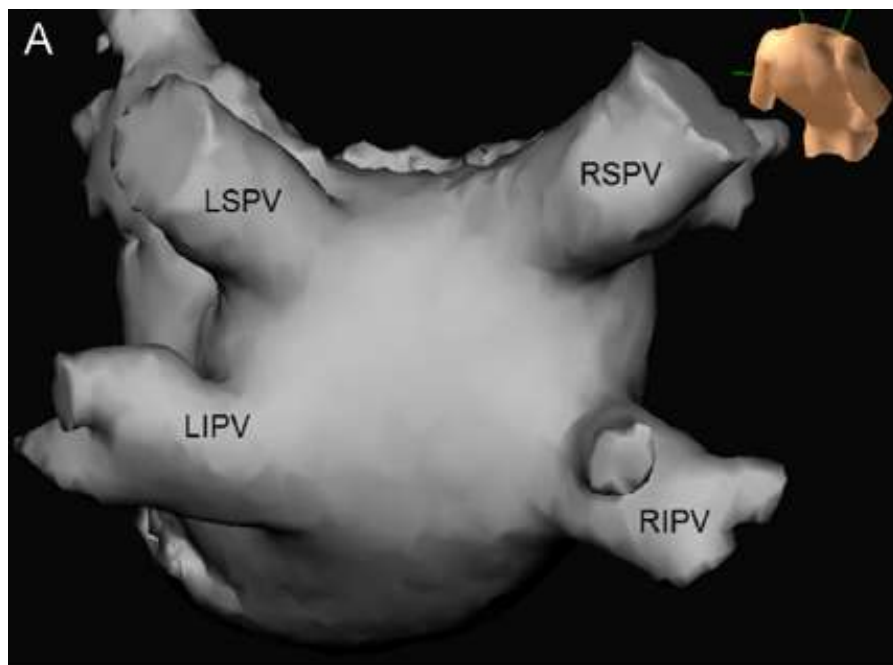
# **Very long-term outcome after initially successful catheter ablation of atrial fibrillation**

Jonathan S. Steinberg, MD, FHRS, Rachel Palekar, BA, Tina Sichrovsky, MD, Aysha Arshad, MD, Mark Preminger, MD, Dan Musat, MD, Richard E. Shaw, PhD, Suneet Mittal, MD, FHRS

*From the Arrhythmia Institute, Valley Health System, New York, New York.*

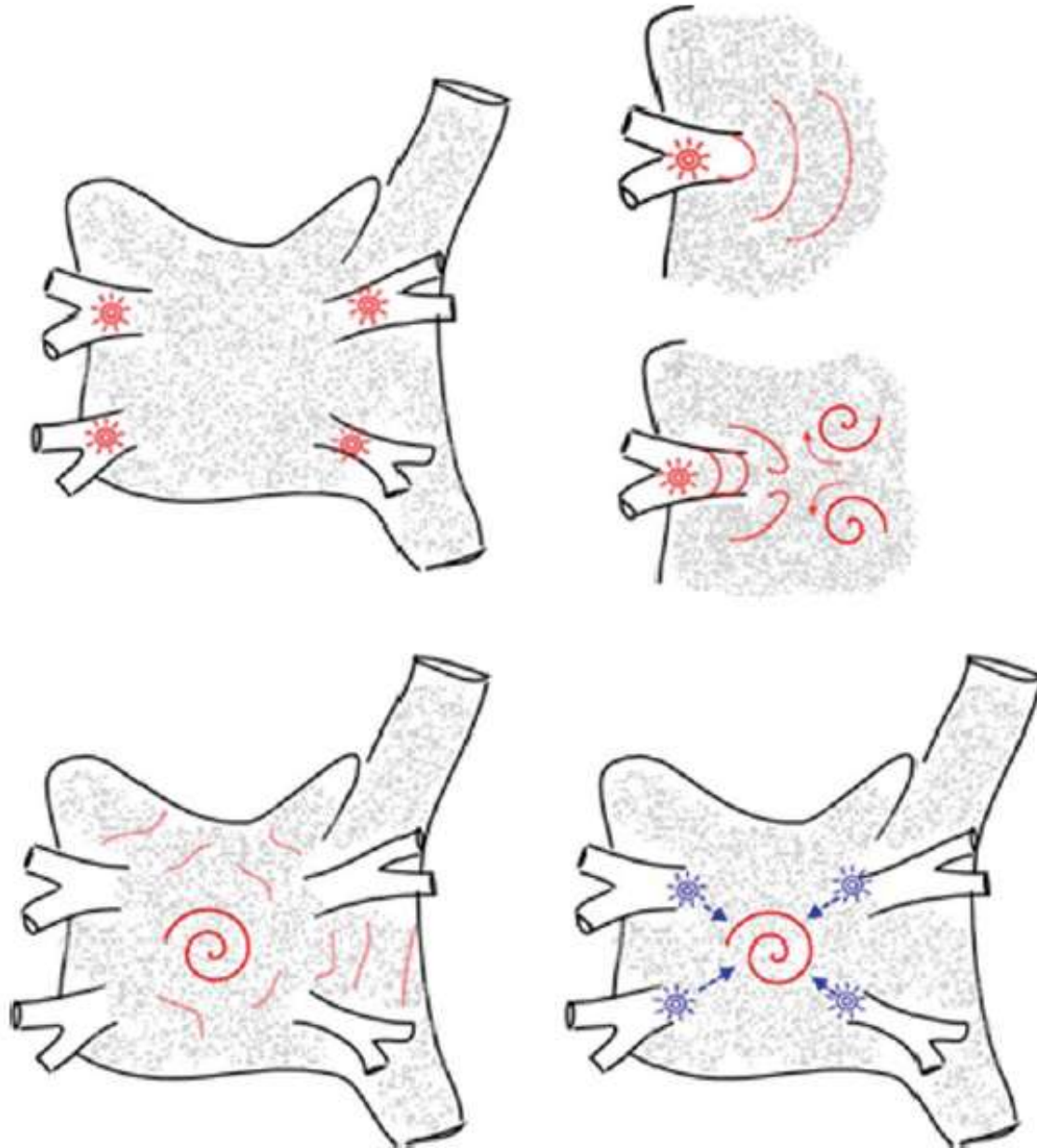


**Figure 2** Kaplan-Meier plot for freedom from atrial fibrillation contrasting outcomes of patients with paroxysmal (n = 305) and persistent (n = 126) patterns of arrhythmia preablation. VLR = very late recurrence.

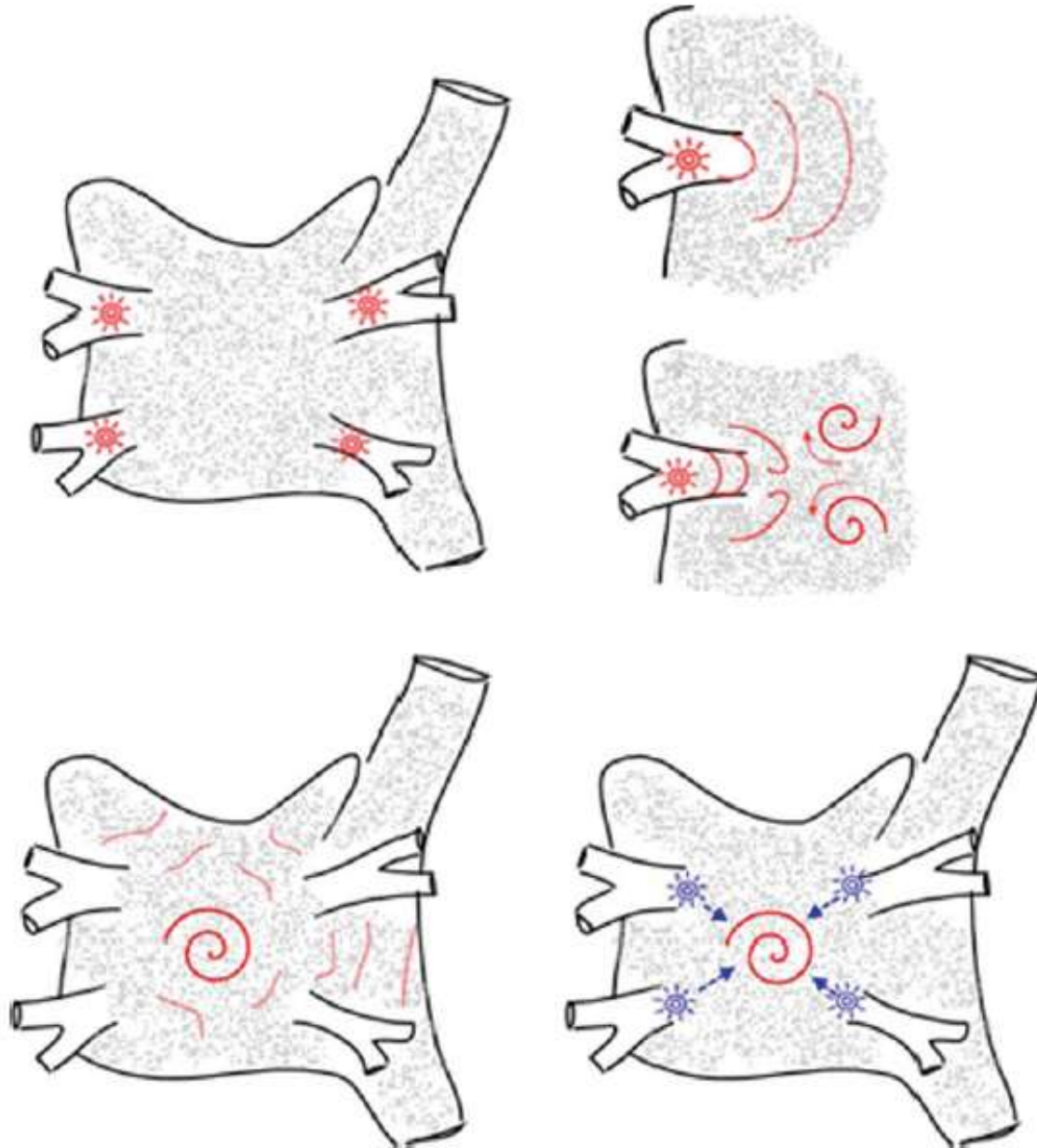




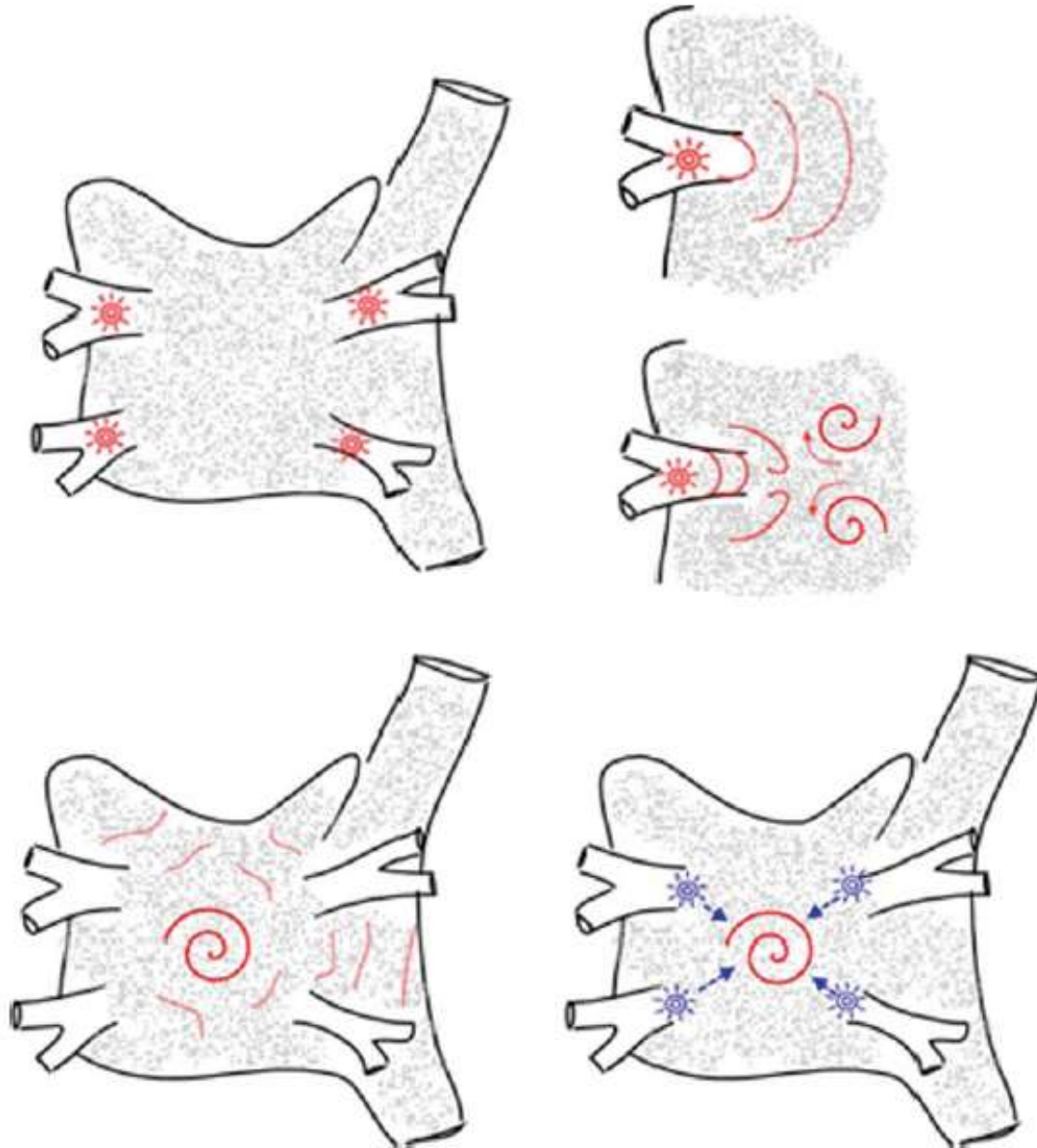
# AF Ablasyonu

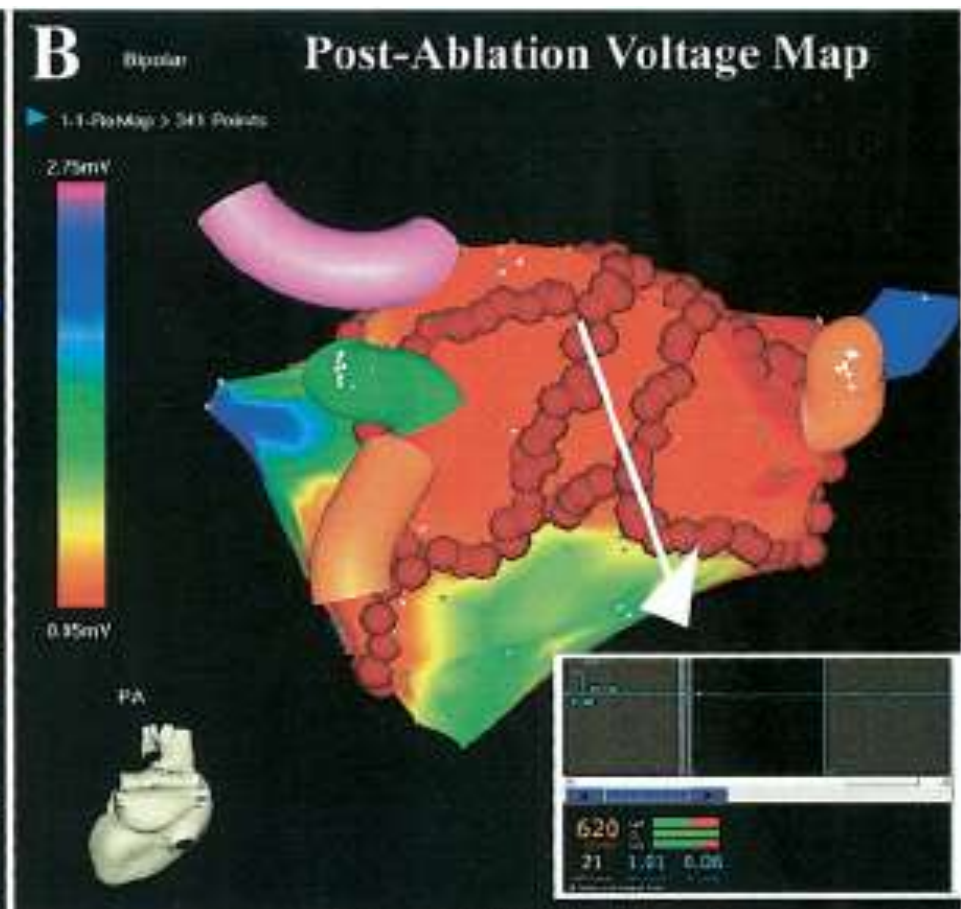
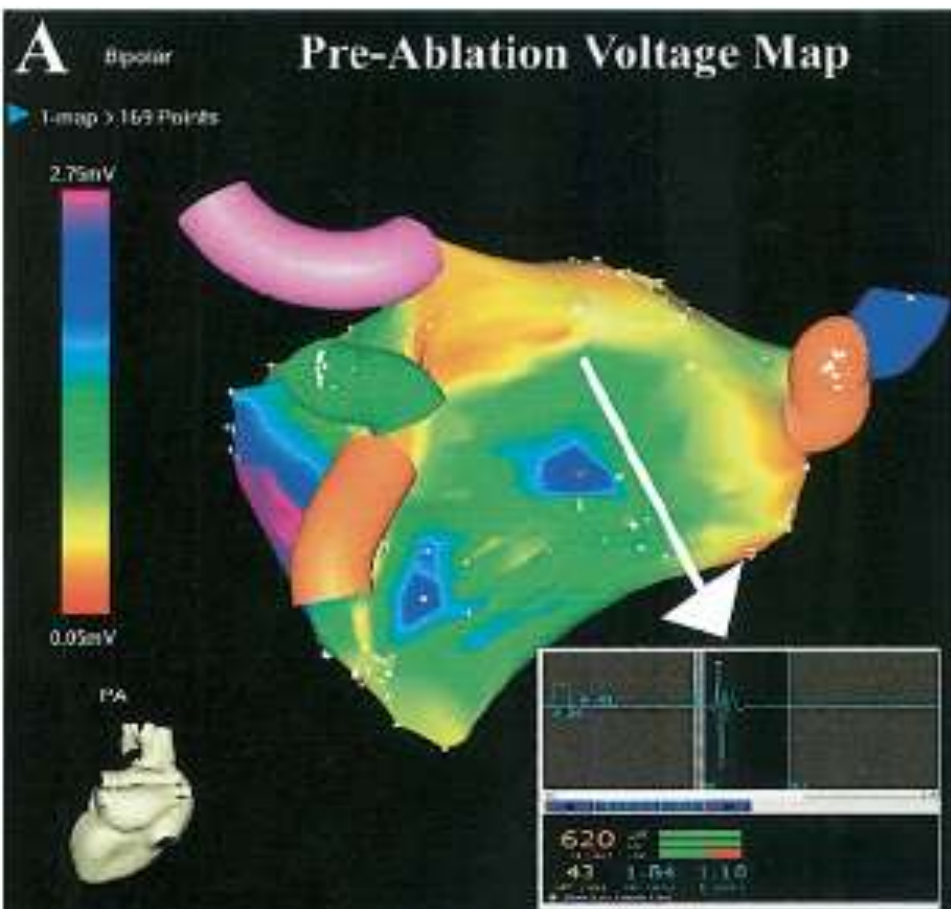


# AF Ablasyonu

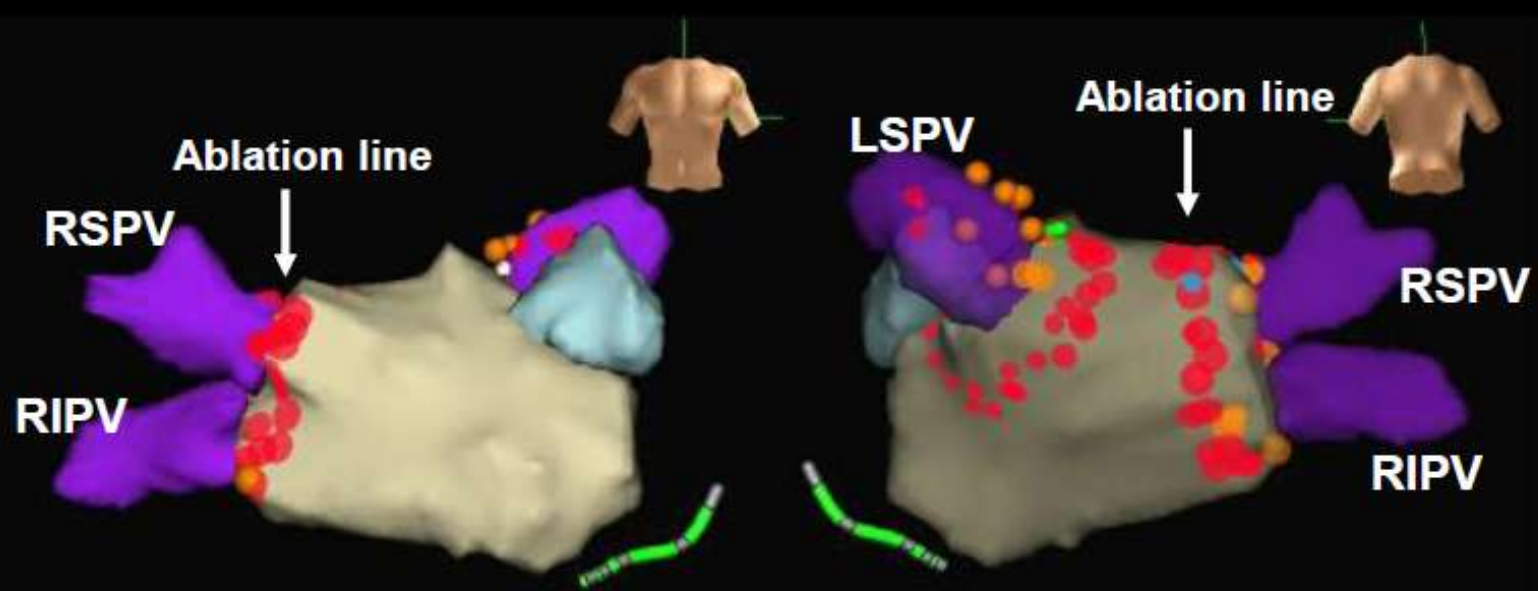


# AF Ablasyonu

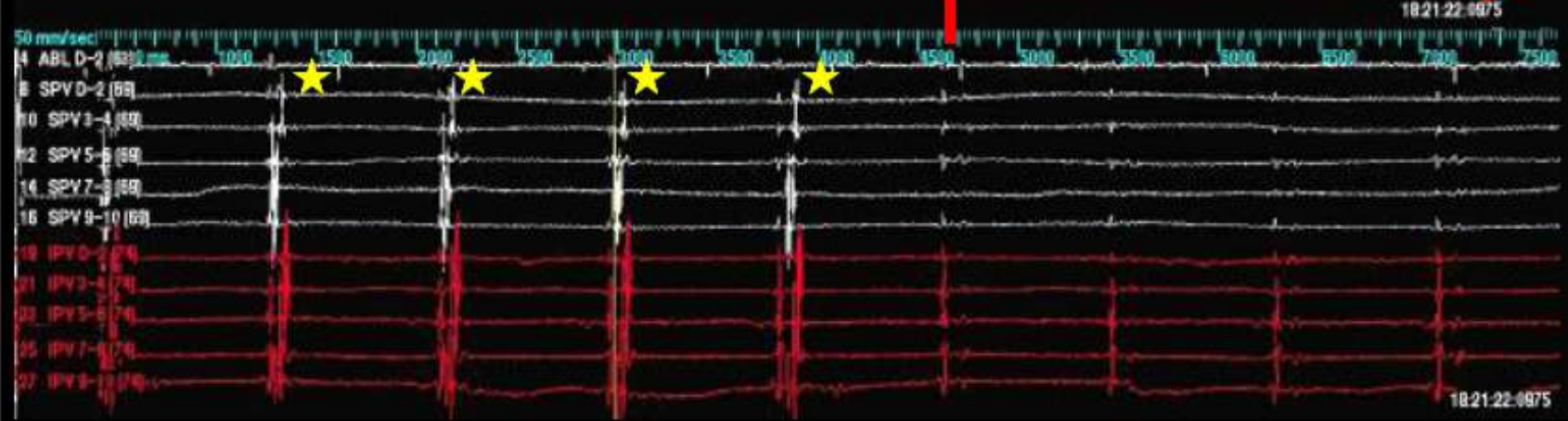




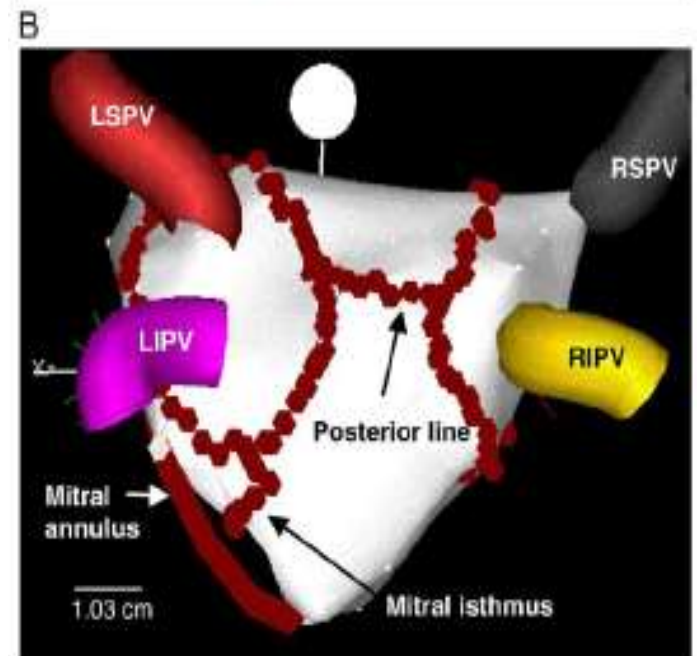
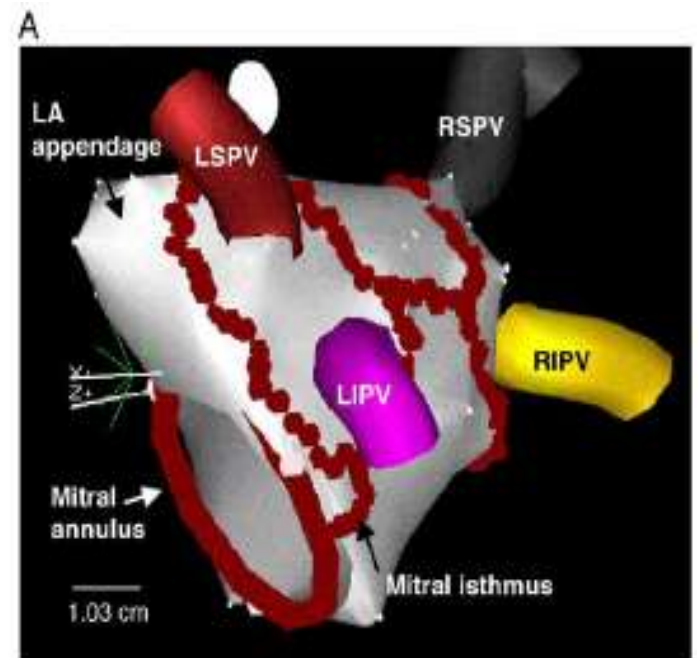
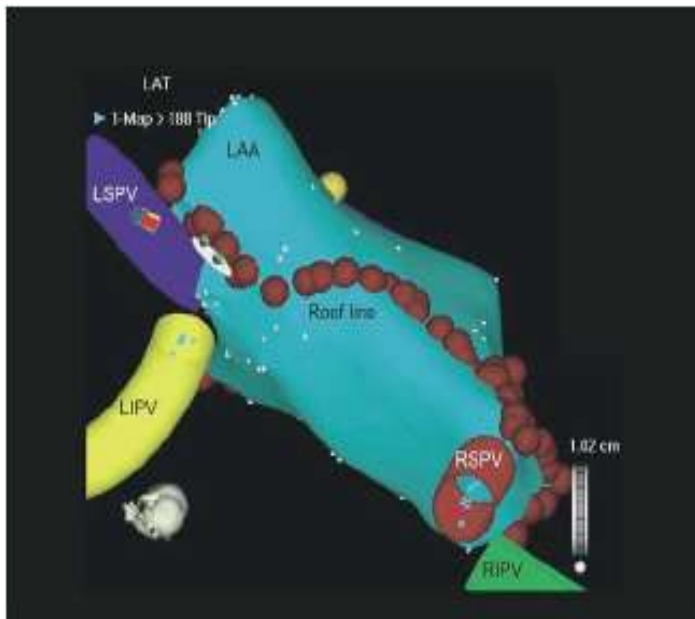
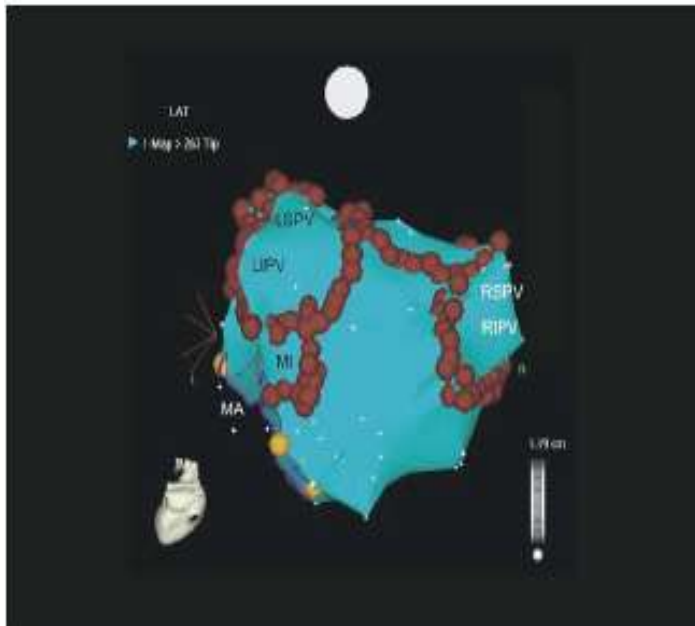




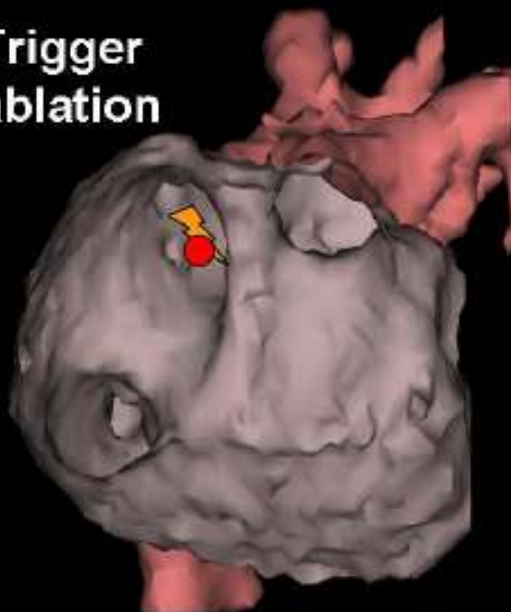
**Isolation** →



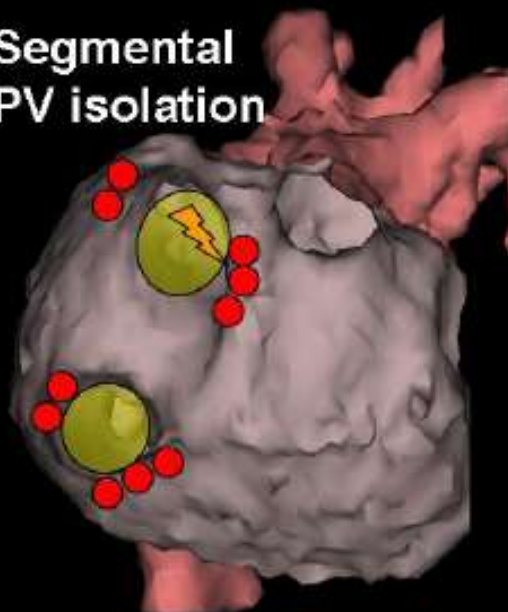
★ = PV spike



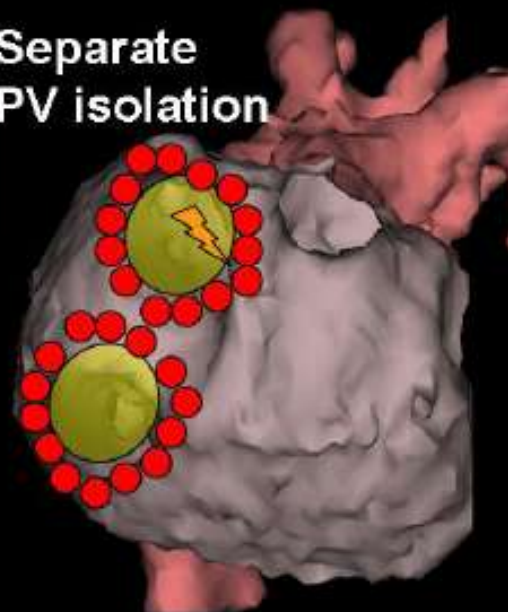
**Trigger  
ablation**



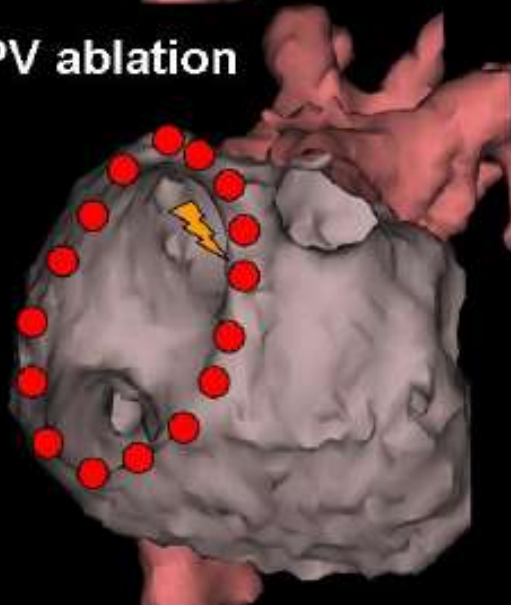
**Segmental  
PV isolation**



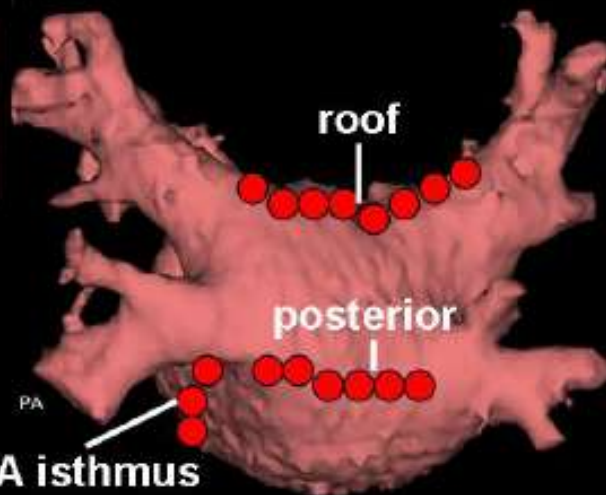
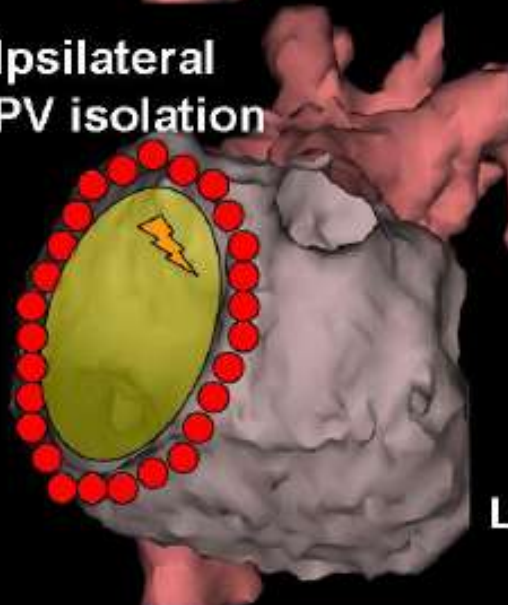
**Separate  
PV isolation**



**PV ablation**



**Ipsilateral  
PV isolation**



**Additional linear lesions**



# AF Ablasyonu – Hangi durumda hangi teknik ?

- **Paroksizmal AF ...**
  - **Antral PV izolasyonu**
    - **RF Ablasyon (3D görüntüleme kılavuzluğu)**
      - İrrigated tip
      - PVAC
    - **Kriyoablasyon**
      - Kriyo kateter
      - Kriyobalon
    - **Lazer ablasyon**
    - **Diğer ...**
- **Persistan AF ...** (*Permanent ???*)
  - **PV izolasyonu + lineer lezyonlar + CFAE-Ab ?**
    - **RF**
      - Yeni teknolojiler (“contact force”, “ECİ”, vb)
    - **Kriyobalon + RF ?**



# Long-Term Results of Catheter Ablation in Paroxysmal Atrial Fibrillation

## Lessons From a 5-Year Follow-Up

Feifan Ouyang, MD\*; Roland Tilz, MD\*; Julian Chun, MD; Boris Schmidt, MD;  
Erik Wissner, MD; Thomas Zerm, MD; Kars Neven, MD; Bulent Köktürk, MD;  
Melanie Konstantinidou, MD; Andreas Metzner, MD;  
Alexander Fuernkranz, MD; Karl-Heinz Kuck, MD

**Background**—Paroxysmal atrial fibrillation (AF) naturally progresses toward chronic AF at an estimated rate of 15% to 30% over a 1- to 3-year period. Pulmonary vein (PV) isolation is increasingly performed for the treatment of drug-refractory paroxysmal AF. The long-term data on clinical outcome after circumferential PV isolation are limited.

**Methods and Results**—From 2003 to late 2004, 161 patients (121 men; age,  $59.8 \pm 9.7$  years) with symptomatic paroxysmal AF and normal left ventricular function underwent circumferential PV isolation guided by 3-dimensional mapping and double Lasso technique. Right-sided and left-sided continuous circular lesions encircling the ipsilateral PVs were placed with irrigated radiofrequency energy. The procedure end point was the absence of all PV spikes for at least 30 minutes after PV isolation verified by 2 Lasso catheters placed within the ipsilateral PVs. Sinus rhythm was present in 75 patients (46.6%) after the initial procedure during a median follow-up period of 4.8 years (0.33 to 5.5 years). A second procedure was performed in 66 and a third procedure in 12 patients. Recovered PV isolation conduction was observed in 62 of 66 patients (94.0%) during the second and in 8 of 12 patients (66.7%) during the third procedure. After a median of 1 (1 to 3) procedure, stable sinus rhythm was achieved in 128 of 161 patients (79.5%), whereas clinical improvement occurred in an additional 21 of 161 patients (13.0%) during a median follow-up of 4.6 years (0.33 to 5.5 years). Four patients in stable sinus rhythm died during follow-up. Progression toward chronic AF was observed in 4 patients (2.4%); however, only 2 patients reported symptoms.

**Conclusion**—In patients with paroxysmal AF and normal left ventricular function, circumferential PV isolation results in stable sinus rhythm in the majority of patients, and low incidence of chronic AF was observed after ablation during up to 5 years of follow-up. (*Circulation*. 2010;122:2368-2377.)



# Long-Term Outcomes After Cryoballoon Pulmonary Vein Isolation

Results From a Prospective Study in 605 Patients

Jürgen Vogt, MD, Johannes Heintze, MD, Klaus J. Gutleben, MD, Bogdan Muntean, MD,  
Dieter Horstkotte, MD, PhD, Georg Nölker, MD

*Bad Oeynhausen, Germany*

## Objectives

The purpose of this study was to investigate long-term outcomes of freedom from atrial fibrillation (AF) after pulmonary vein (PV) isolation using cryoballoon ablation with balloon-size selection based on individual PV diameters.

## Background

Data are lacking on long-term outcomes from cryoablation and on the most effective balloon size.

## Methods

This was a prospective observational study involving 605 consecutively enrolled patients with symptomatic paroxysmal AF (n = 579) or persistent AF. Cryoballoon size was based on magnetic resonance imaging and/or conventional angiograms. Patients were followed up every 3 months during the first year after discharge and every 6 months in the second year. After 24 months, follow-up was on an outpatient basis with documented AF episodes recorded.

## Results

The PV isolation was achieved without touch-up in 91.1% of patients, using the smaller balloon in 26.7%, the larger balloon in 25.6%, and both balloons in 47.7% of patients. Follow-up data for >12 months (median 30 months; interquartile range 18 to 48 months) were available for 451 patients, 278 (61.6%) of whom were free of AF recurrence with no need for repeat procedures after the 3-month blanking period. Rates of freedom from AF after 1, 2, and 3 repeat procedures (using cryoballoon or radiofrequency ablation with similar success rates) were 74.9%, 76.2%, and 76.9%, respectively. Use of the smaller balloons or both balloons produced the highest rates of long-term freedom from AF. Phrenic nerve palsy occurred in 12 patients (2%), resolving within 3 to 9 months.

## Conclusions

Rates of long-term freedom from AF after cryoballoon ablation are similar to those reported for radiofrequency ablation. A choice between balloons may improve outcomes. (J Am Coll Cardiol 2013;61:1707-12) © 2013 by the American College of Cardiology Foundation

# AF ablasyonu

- “Başarısızlığın” potansiyel belirleyicileri
  - “Non-paroksizmal AF”
    - “Uzun süreli persistan AF”
  - Uyku-apne ve obezite
  - **Sol atriyum çapı / hacmi**
  - İlerlemiş yaş
  - HT
  - **Sol atriyumda fibrozis**