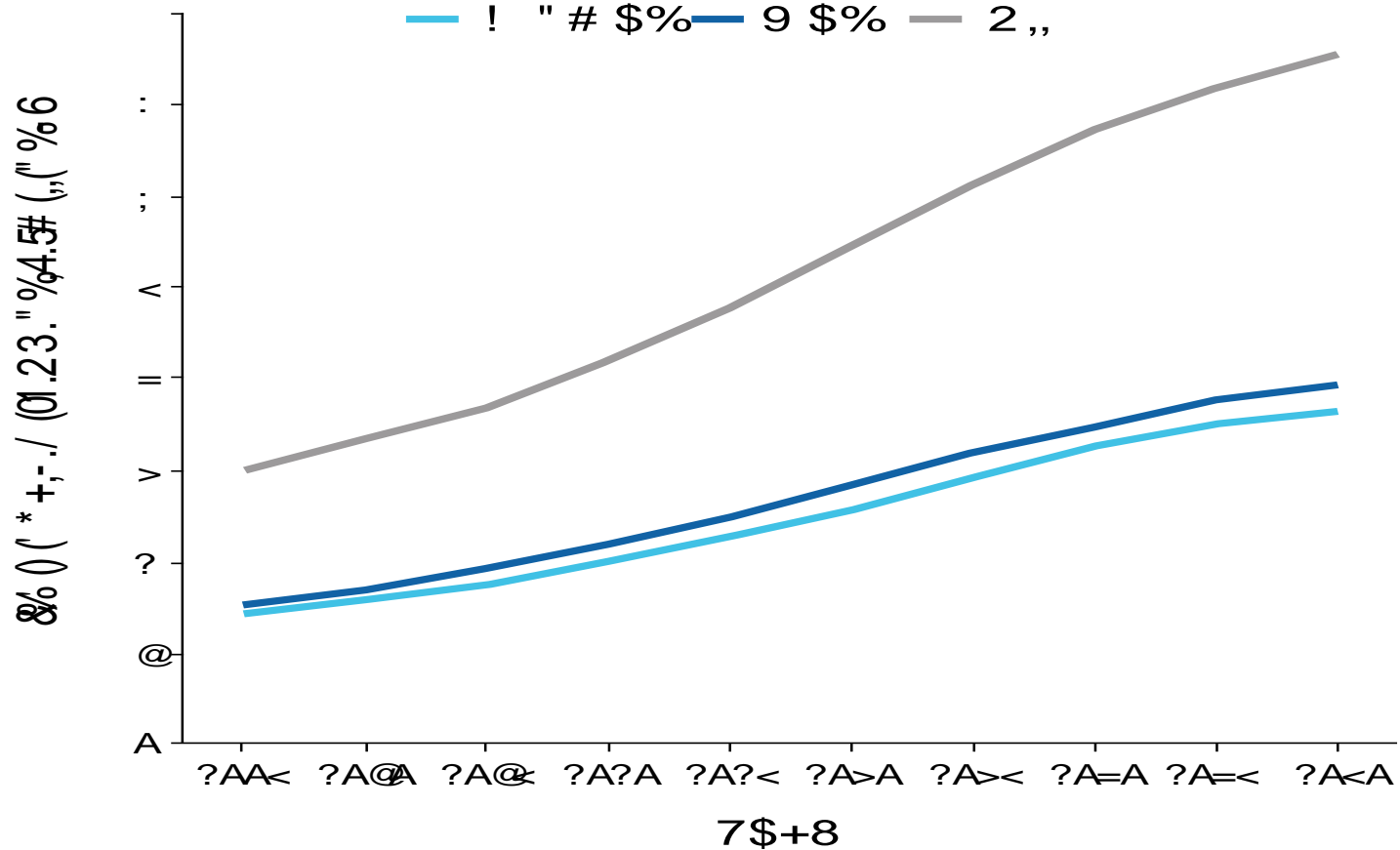


CRAYO ABLASYON SONRASI REKÜRREN AF`YE YAKLAŞIM

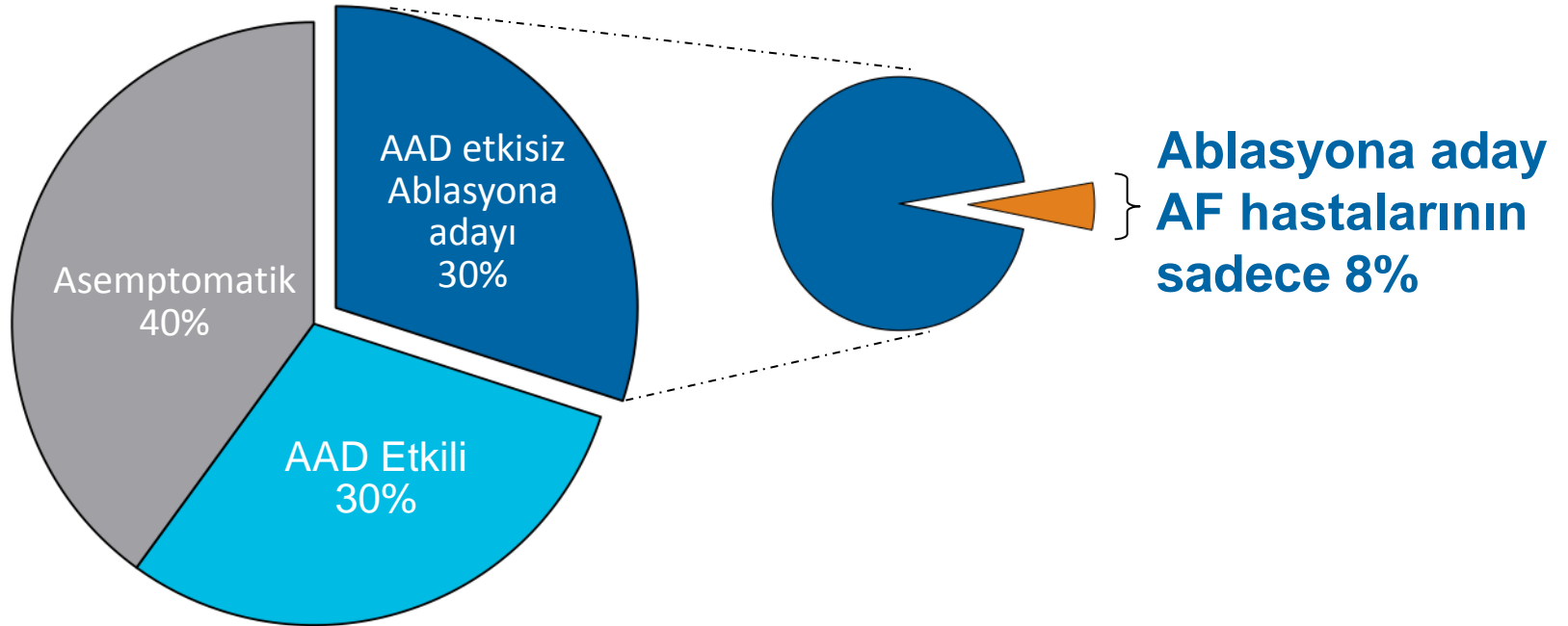
DR.Harun EVRENGÜL
PAMUKKALE ÜNİVERSİTESİ KARDİYOLOJİ AD

AF Prevelansı



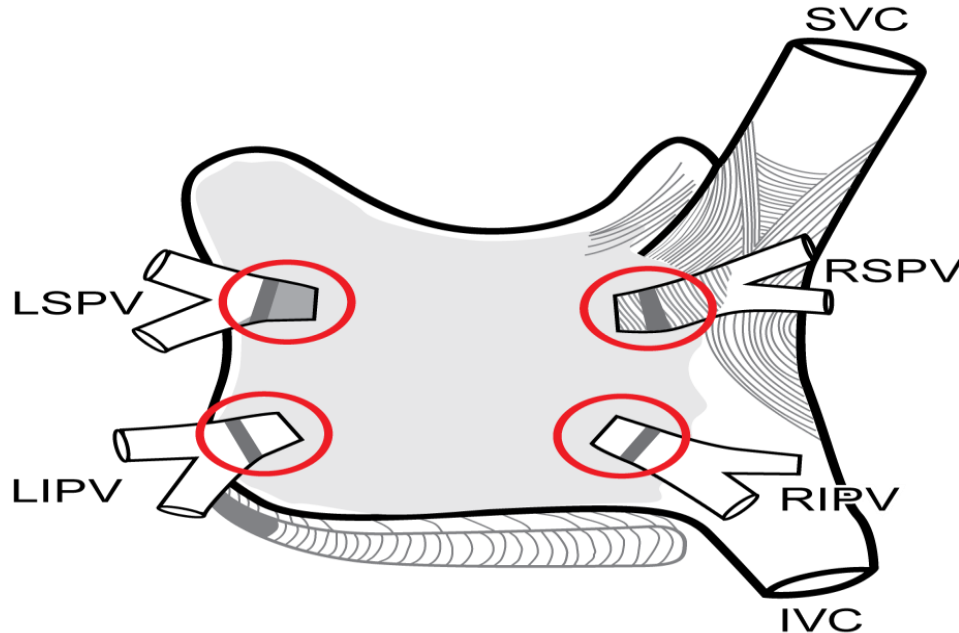
¹Naccarelli GV, et al. *Am J Cardiol.* December 2009;104(11):1534-1539.
²Miyasaka Y, et al. *Circulation.* July 2006;114(2):119-125.

....Ablasyona Aday AF topluluđu



2012 HRS/EHRA/ECAS Expert Consensus Statement on Catheter and Surgical Ablation of Atrial Fibrillation: Recommendations for Patient Selection, Procedural Techniques, Patient Management and Follow-up, Definitions, Endpoints, and Research Trial Design

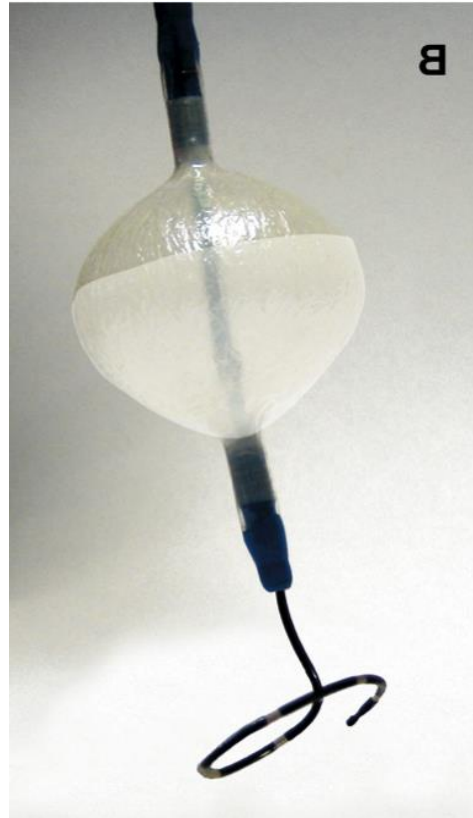
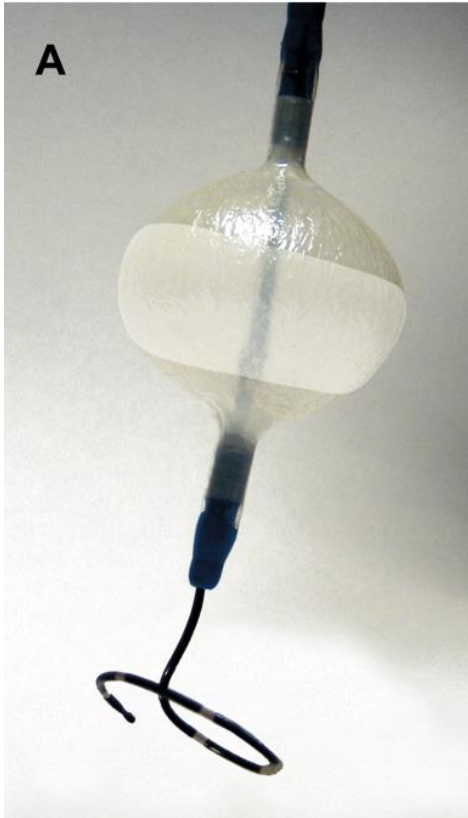
“Hemen hemen tüm ablasyon prosedürlerinde temel hedef Pulmoner Venlerin izolasyonudur.”



Cryobalon ablasyon kateteri (Arctic Front®)

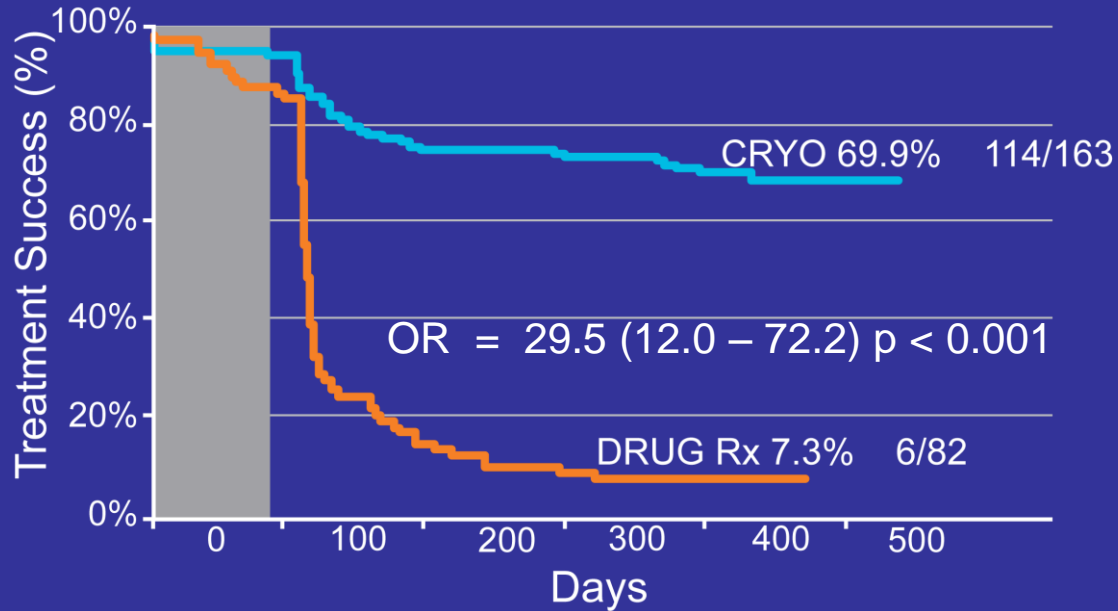
23 mm ve 28 mm balon kateterleri tüm hedef pulmoner venlerin izolasyonunda yeterlidir:

- Vakaların > 80% 28 mm balon kateteri kullanılır.
- Antral PVI



STOP AF Cryoballoon Ablasyon sonuçları

Primary Effectiveness Analysis Treatment Success • n = 245

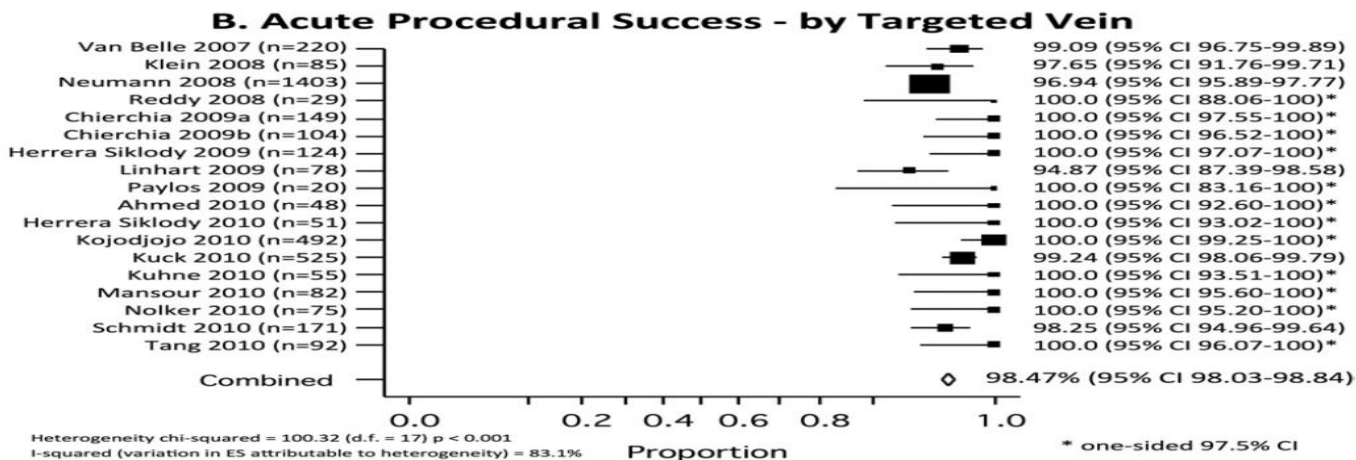
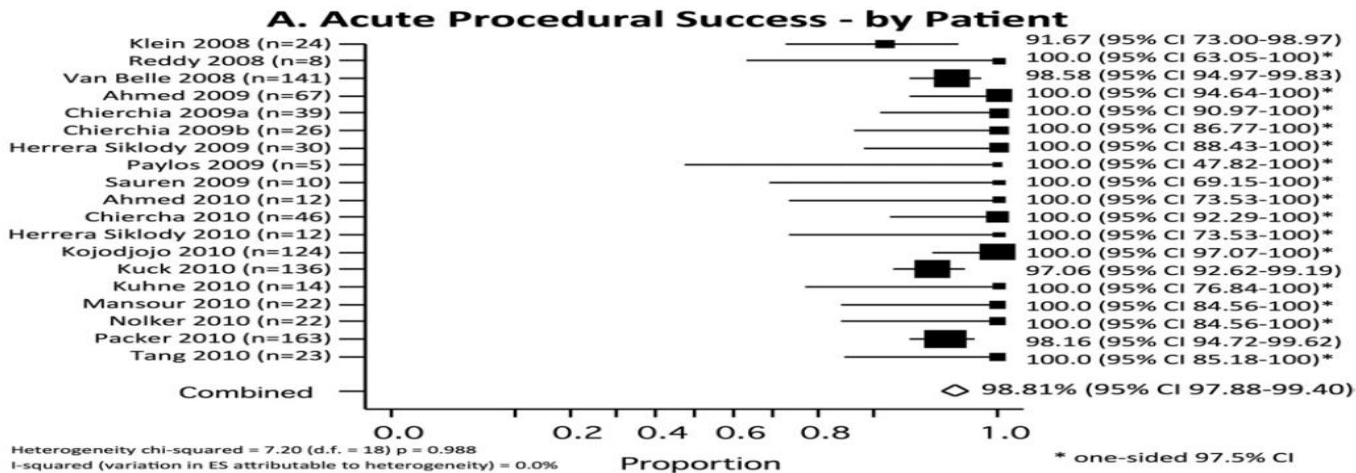


- Semptomatik, AAD refrakter PAF

- 98.2% akut işlem başarısı
- 69.9% 12 ay sonra AF`siz hasta oranı
- 60.1% tek işlem başarı oranı

Efficacy and safety of cryoballoon ablation for atrial fibrillation: A systematic review of published studies

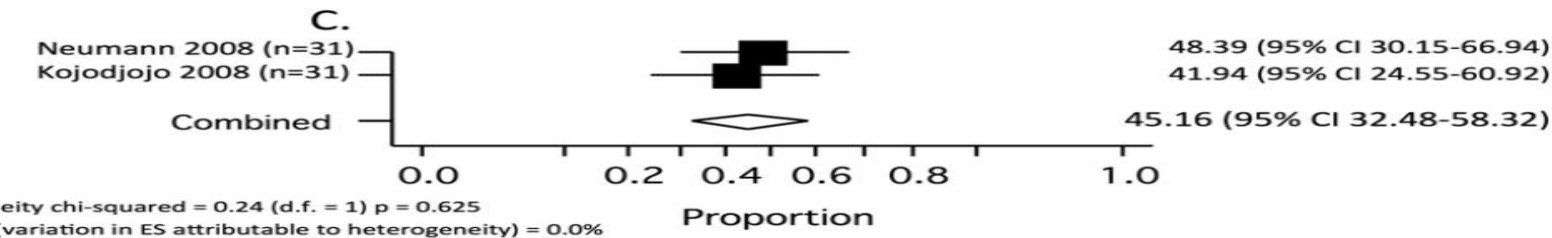
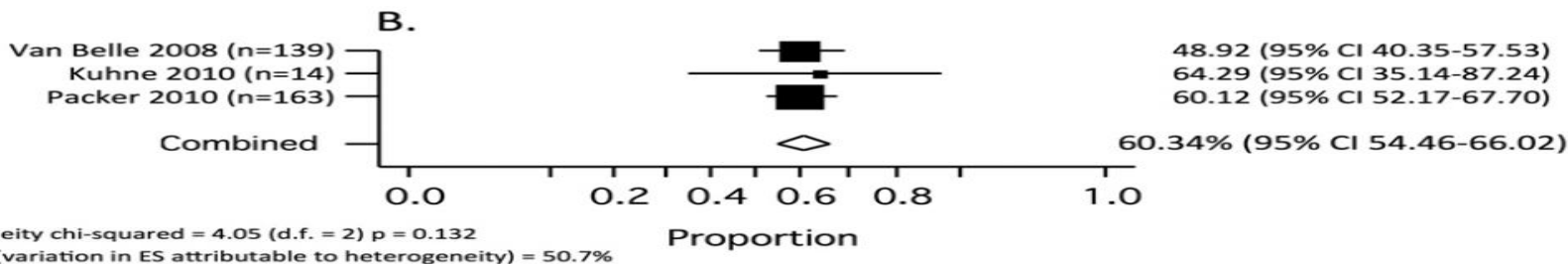
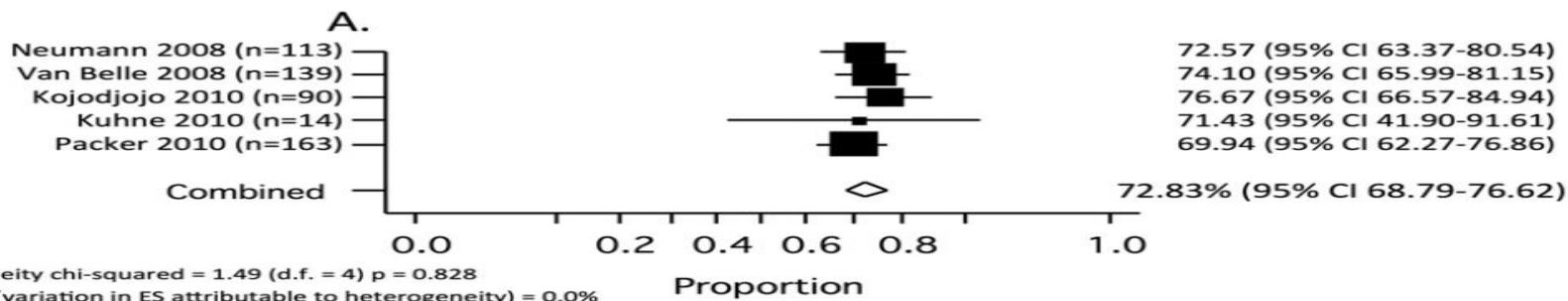
Jason G. Andrade, MD,* Paul Khairy, MD, PhD,* Peter G. Guerra, MD,* Marc W. Deyell, MD, MSc,[†] Lena Rivard, MD,* Laurent Macle, MD,* Bernard Thibault, MD, FHRS,* Mario Talajic, MD, FHRS,* Denis Roy, MD, FHRS,* Marc Dubuc, MD, FHRS*



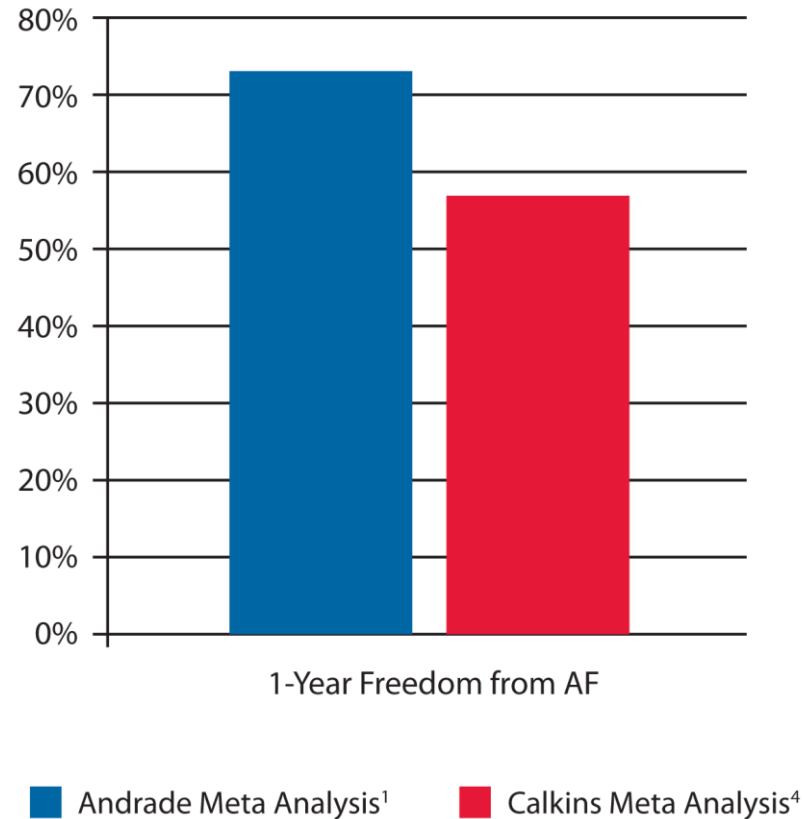
Efficacy and safety of cryoballoon ablation for atrial fibrillation: A systematic review of published studies

Jason G. Andrade, MD,* Paul Khairy, MD, PhD,* Peter G. Guerra, MD,* Marc W. Deyell, MD, MSc,[†] Lena Rivard, MD,* Laurent Macle, MD,* Bernard Thibault, MD, FHRS,* Mario Talajic, MD, FHRS,* Denis Roy, MD, FHRS,* Marc Dubuc, MD, FHRS*

1 year freedom from AF



Cryobalon ve RF kateter ablasyonu etkinlik karşılaştırma



¹ Andrade JG, et al. *Heart Rhythm*. Published online March 30, 2011.

⁴ Calkins H, et al. *Circ Arrhythm Electrophysiol*. August 2009;2(4):349-361.

2012 HRS/EHRA/ECAS Expert Consensus Statement on Catheter and Surgical Ablation of Atrial Fibrillation: Recommendations for Patient Selection, Procedural Techniques, Patient Management and Follow-up, Definitions, Endpoints, and Research Trial Design

Recurrent AF

Recurrent AF/AFL/AT is defined as AF/AFL/AT of at least 30 seconds' duration that is documented by an ECG or device recording system and occurs following catheter ablation. Recurrent AF/AFL/AT may occur within or following the post ablation blanking period. Recurrent AF/AFL/AT that occurs within the post ablation blanking period is not considered a failure of AF ablation.

Early Recurrence of AF

Early recurrence of AF is defined as a recurrence of atrial fibrillation within three months of ablation. Episodes of atrial tachycardia or atrial flutter should also be classified as a "recurrence."

Recurrence of AF

Recurrence of AF post ablation is defined as a recurrence of atrial fibrillation more than 3 months following AF ablation. Episodes of atrial tachycardia or atrial flutter should also be classified as a "recurrence."

Late recurrence of AF

Late recurrence of AF is defined as a recurrence of atrial fibrillation 12 months or more after AF ablation. Episodes of atrial tachycardia or atrial flutter should also be classified as a "recurrence."

Blanking Period

A blanking period of three months should be employed after ablation when reporting efficacy outcomes. Thus, early recurrences of AF/AFL/AT within the first 3 months should not be classified as treatment failure. If a blanking period of less than 3 months is acceptable and if is chosen, it should be pre-specified and included in the methods section.

CONTEMPORARY REVIEW

Efficacy and safety of cryoballoon ablation for atrial fibrillation: A systematic review of published studies

Jason G. Andrade, MD,* Paul Khairy, MD, PhD,* Peter G. Guerra, MD,* Marc W. Deyell, MD, MSc,[†]
Lena Rivard, MD,* Laurent Macle, MD,* Bernard Thibault, MD, FHRS,* Mario Talajic, MD, FHRS,*
Denis Roy, MD, FHRS,* Marc Dubuc, MD, FHRS*

- İkincil ablasyon işlemine alınan 71 hastanın daha önce izole edilen 270 pulmoner veni değerlendirildi.
- Hasta başına ortalama 2.7 vende elektriksel olarak rekonneksiyon saptandı.
- Sol taraflı pulmoner venlerde rekonneksiyon daha sık bulundu.

- AF ablasyonu sonrası en sık rekürrens 6-12 aylar arasında oluşur.
- Bu rekürrensin kesin nedeni tam olarak bilinmemesine rağmen ikinci kez ablasyon işlemine alınan tüm hastalarda bir veya daha fazla PV`de elektriksel rekonneksiyon tek bulgudur.
- ***Bu nedenle PV`lerin elektriksel rekonneksiyonu AF rekürrensının temel mekanizması olarak kabul edilir.***

- Ablasyon sonrası AF rekürrensının diđer olası mekanizmaları ise;
 - ***İnflamasyon,***
 - İlk ablasyon prosedürü sırasında hedeflenmeyen ***non-pulmoner odaklar***
 - Kalp ve PV`lerin ablasyon sonrası ***otonomik innervasyonundaki deđişiklik.***
 - Yaşlanma, kalp yetmezliđi, inflamasyon ve diabet gibi ***ko-morbit durumların neden olduđu atriumun elektriksel instabilitesi.***
- Persistan AF ye zemin hazırlayan uyku apneli, hipertansif ve hiperlipidemik hastalar geđ rekürrens için en yüksek risk grubunu oluşturur.

Erken Rekürrens

- Ablasyon sonrası erken AF rekürrensi kullanılan kateter ve teknolojiden bağımsız olarak oldukça sıktır.
- Hastaların 15%,inde ablasyondan sonraki ilk günde ablasyon öncesi döneme göre daha sık AF atağı gözlenir.
- Erken rekürrens başarısız ablasyon için bağımsız bir risk faktörü olsa da bu hastalarda erken re-ablasyon hemen düşünülmemelidir.
- Çünkü hastaların 60%`ında ablasyondan sonraki ilk ayda AF rekürrensi gözlenebilir, ancak hastaların çoğunda uzun dönemde bu aritmi tekrarlamaz.

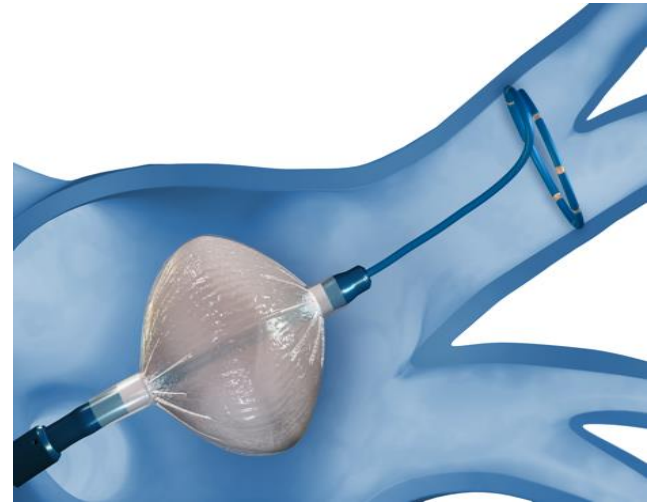
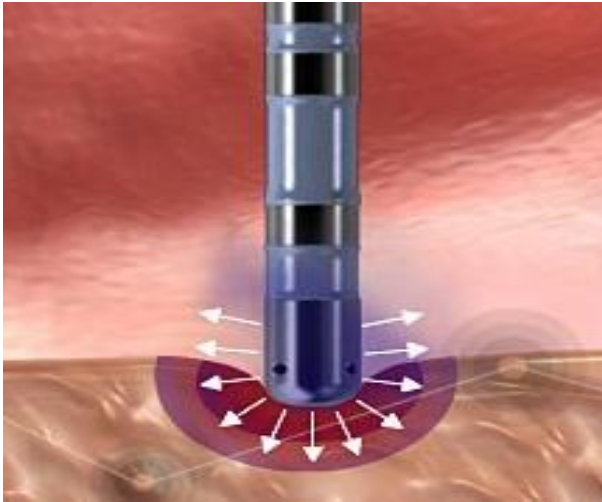
Prevalence, Predictors, and Prognosis of Atrial Fibrillation Early After Pulmonary Vein Isolation: Findings from 3 Months of Continuous Automatic ECG Loop Recordings

SANDEEP JOSHI, M.D.,* ANDREW D. CHOI, M.D.,* GANESH S. KAMATH, M.D., M.P.H.,*

- PVI sonrası ilk iki hafta AF prevalansı en yüksektir (54%) ve 12. haftada 22% ye düşer.
- ***Hastaları 65%`i en az bir AF epizodu geçirir ve bu atakları 85%`i ilk haftada oluşur.***
- *İlk iki haftada atak geçirmeyen hastaların 85%`i 12. ayın sonuna komplete responder olarak tanımlanır ve hiçbir AF atağı gözlenmez.*
- AF ataklarının **34%`ü asemptomatiktir.**
- İlk üç ay içinde gözlenen AF atağı işlem başarısı veya başarısızlığı ile ilişkili değildir.

AF Rekürrensinde Tedavi Seçenekleri

- Farmakolojik
- Elektriksel KV
- Kateter Ablasyonu
 - **RF**
 - **Cryoablasyon**



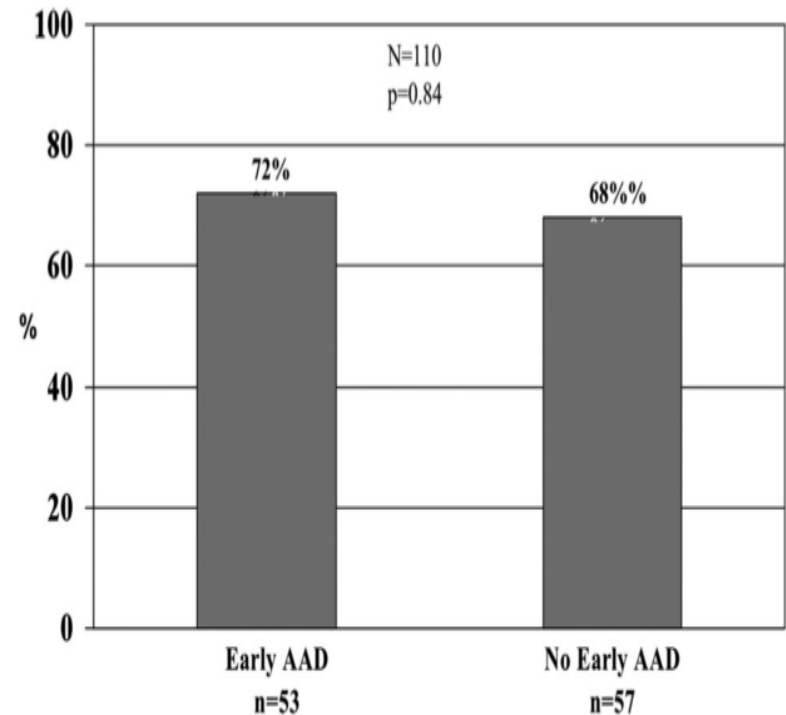
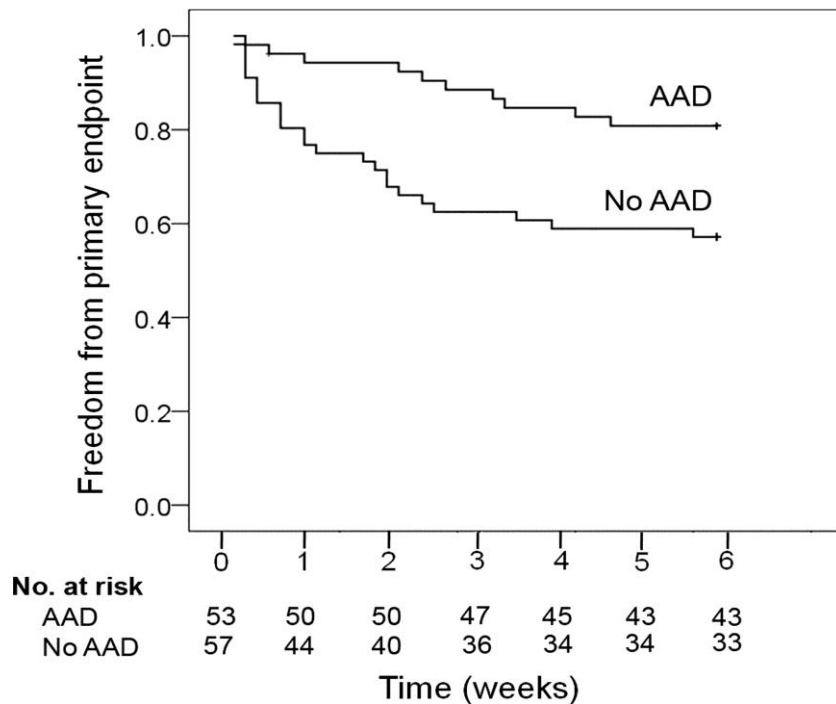
Antiarrhythmics After Ablation of Atrial Fibrillation (5A Study)

Six-Month Follow-Up Study

Peter Leong-Sit, MD; Jean-Francois Roux, MD; Erica Zado, PA-C; David J. Callans, MD;

(Circ Arrhythm Electrophysiol. 2011;4:11-14.)

AF ablasyonu sonrası kısa süreli AAD kullanılması erken rekürrensi azaltır fakat 6. ayda ki AF rekürrensi üzerine etkisi yoktur.



Time to Cardioversion of Recurrent Atrial Arrhythmias After Catheter Ablation of Atrial Fibrillation and Long-Term Clinical Outcome

TIMIR S. BAMAN, M.D., SANJAYA K. GUPTA, M.D., SREEDHAR R. BILLAKANTY, M.D.,
KARL J. ILG, M.D., ERIC GOOD, D.O., THOMAS CRAWFORD, M.D.,
KRIT JONGNARANGSIN, M.D., MATT EBINGER, D.O., FRANK PELOSI JR., M.D.,
FRANK BOGUN, M.D., AMAN CHUGH, M.D., FRED MORADY, M.D., and HAKAN ORAL, M.D.

From the Division of Cardiovascular Medicine, University of Michigan, Ann Arbor, Michigan, USA

Time to Cardioversion After Catheter Ablation. *Introduction:* It is unclear whether early restoration of sinus rhythm in patients with persistent atrial arrhythmias after catheter ablation of atrial fibrillation (AF) facilitates reverse atrial remodeling and promotes long-term maintenance of sinus rhythm. The purpose of this study was to determine the relationship between the time to restoration of sinus rhythm after a recurrence of an atrial arrhythmia and long-term maintenance of sinus rhythm after radiofrequency catheter ablation of AF.

Methods and Results: Radiofrequency catheter ablation was performed in 384 consecutive patients (age 60 ± 9 years) for paroxysmal (215 patients) or persistent AF (169 patients). Transthoracic cardioversion was performed in all 93 patients (24%) who presented with a persistent atrial arrhythmia: AF ($n = 74$) or atrial flutter ($n = 19$) at a mean of 51 ± 53 days from the recurrence of atrial arrhythmia and 88 ± 72 days from the ablation procedure. At a mean of 16 ± 10 months after the ablation procedure, 25 of 93 patients (27%) who underwent cardioversion were in sinus rhythm without antiarrhythmic therapy. Among the 46 patients who underwent cardioversion at ≤ 30 days after the recurrence, 23 (50%) were in sinus rhythm without antiarrhythmic therapy. On multivariate analysis of clinical variables, time to cardioversion within 30 days after the onset of atrial arrhythmia was the only independent predictor of maintenance of sinus rhythm in the absence of antiarrhythmic drug therapy after a single ablation procedure (OR 22.5; 95% CI 4.87–103.88, $P < 0.001$).

Conclusion: Freedom from AF/flutter is achieved in approximately 50% of patients who undergo cardioversion within 30 days of a persistent atrial arrhythmia after catheter ablation of AF. (*J Cardiovasc Electrophysiol*, Vol. 20, pp. 1321-1325, December 2009)

- AF ablasyonu sonrası gözlenen persistan AF`nin ilk 30 gün içinde kardiyoversiyon ile hemen sinüs ritmine döndürülmesi kardiyoversiyonun ertelendiği hastalara göre uzun dönemde AF sız yaşam sansını artırır.

- ***İlk üç ayda gelişen AF`nin mekanizması klinik AF mekanizmasından farklıdır.*** Erken rekürrens neden olan bu geçici faktörler zamanla tamamen ortadan kalkar.
- Bu nedenle genellikle tüm hastalar ilk üç ay AAD ile tedavi edilir.
- AAD`lar ablasyon öncesi başarısız olan ***flecainide,propafenone, sotalol, dofetilide, dronedarone*** veya ***amiodarondur.***
- *Bu ilaçların kısa süreli kullanımı ilk üç aydaki erken rekürrensi azaltır ancak uzun süreli rekürrens üzerine etkisi yoktur.*

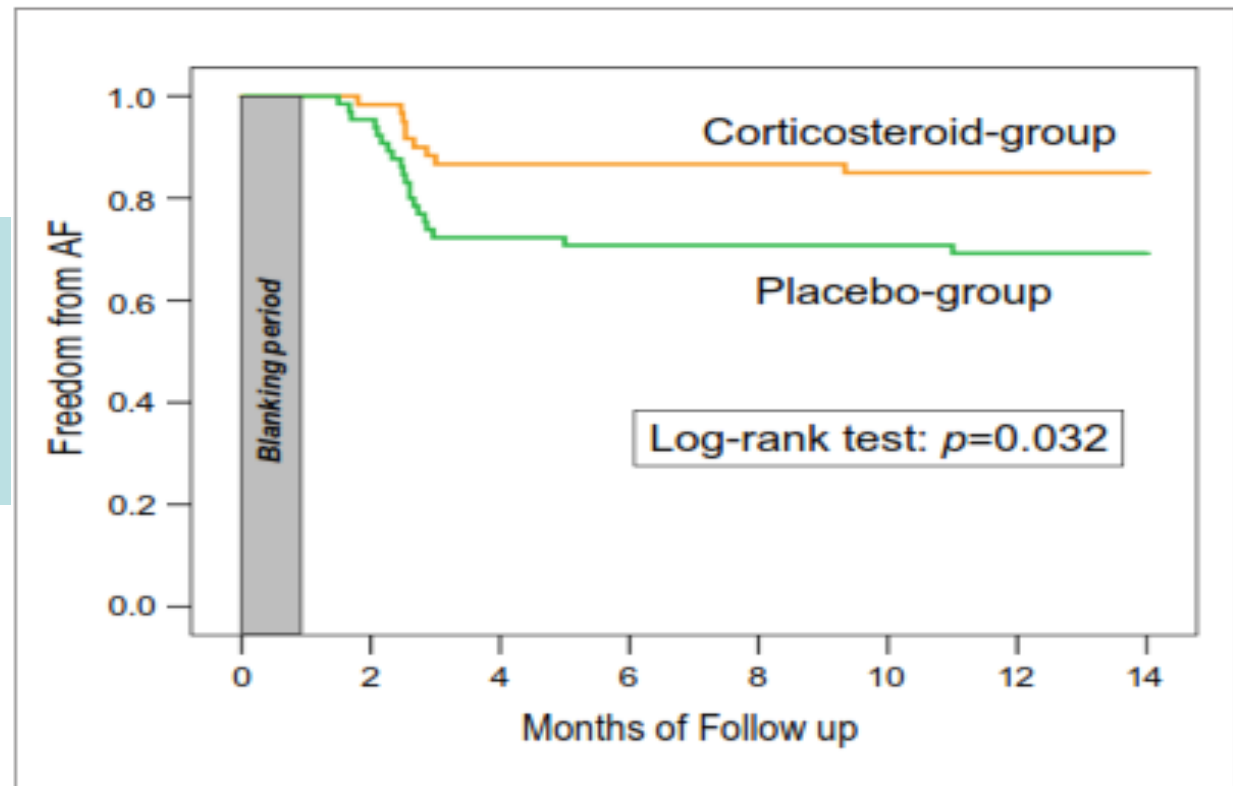
Prevention of Atrial Fibrillation Recurrence With Corticosteroids After Radiofrequency Catheter Ablation

A Randomized Controlled Trial

Takashi Koyama, MD, Hiroshi Tada, MD, Yukio Sekiguchi, MD, Takanori Arimoto, MD, Hiro Yamasaki, MD, Kenji Kuroki, MD, Takeshi Machino, MD, Kazuko Tajiri, MD, Xu Dong Zhu, MD, Miyako Kanemoto-Igarashi, MD, Aiko Sugiyasu, MD, Keisuke Kuga, MD, Yoshio Nakata, PHD, Kazutaka Aonuma, MD

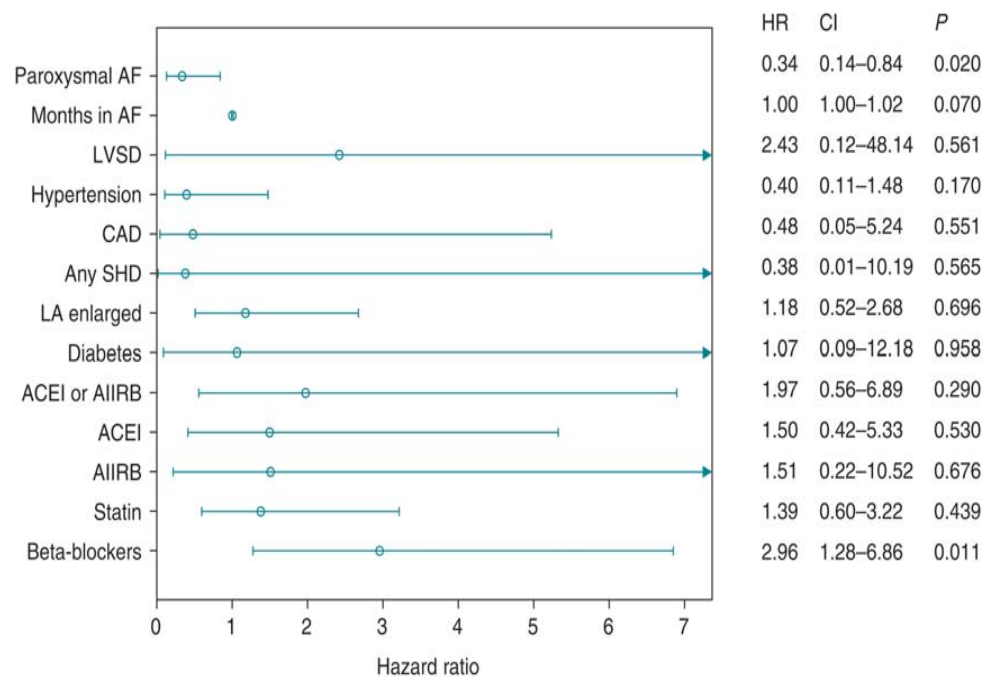
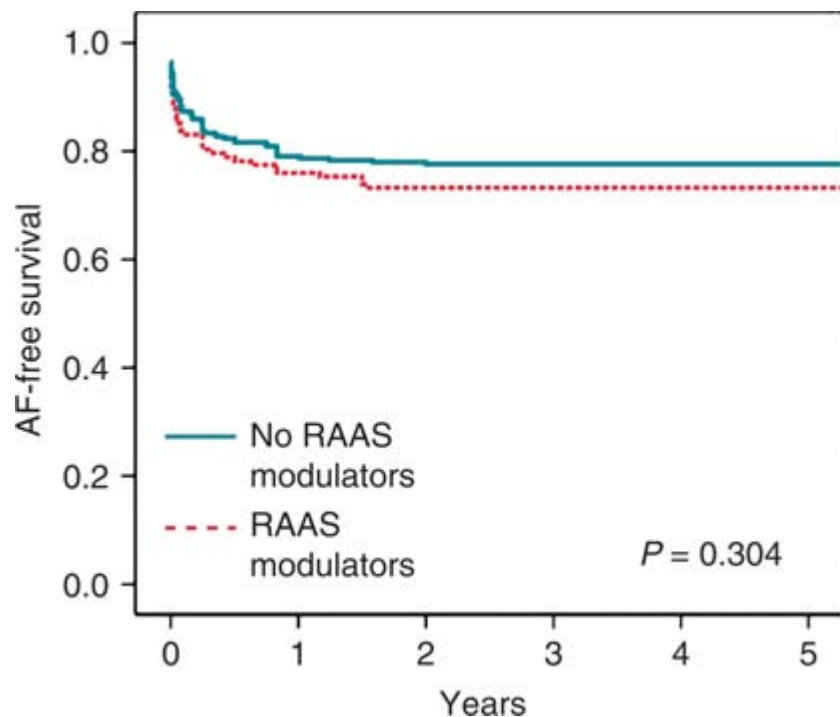
Tsukuba, Japan

- Ablasyon günü İV hidrokortizon ve sonrasında üç gün oral prednizolon verilen hastalarda AF rekürrensi belirgin olarak azalır (7% vs 31%).



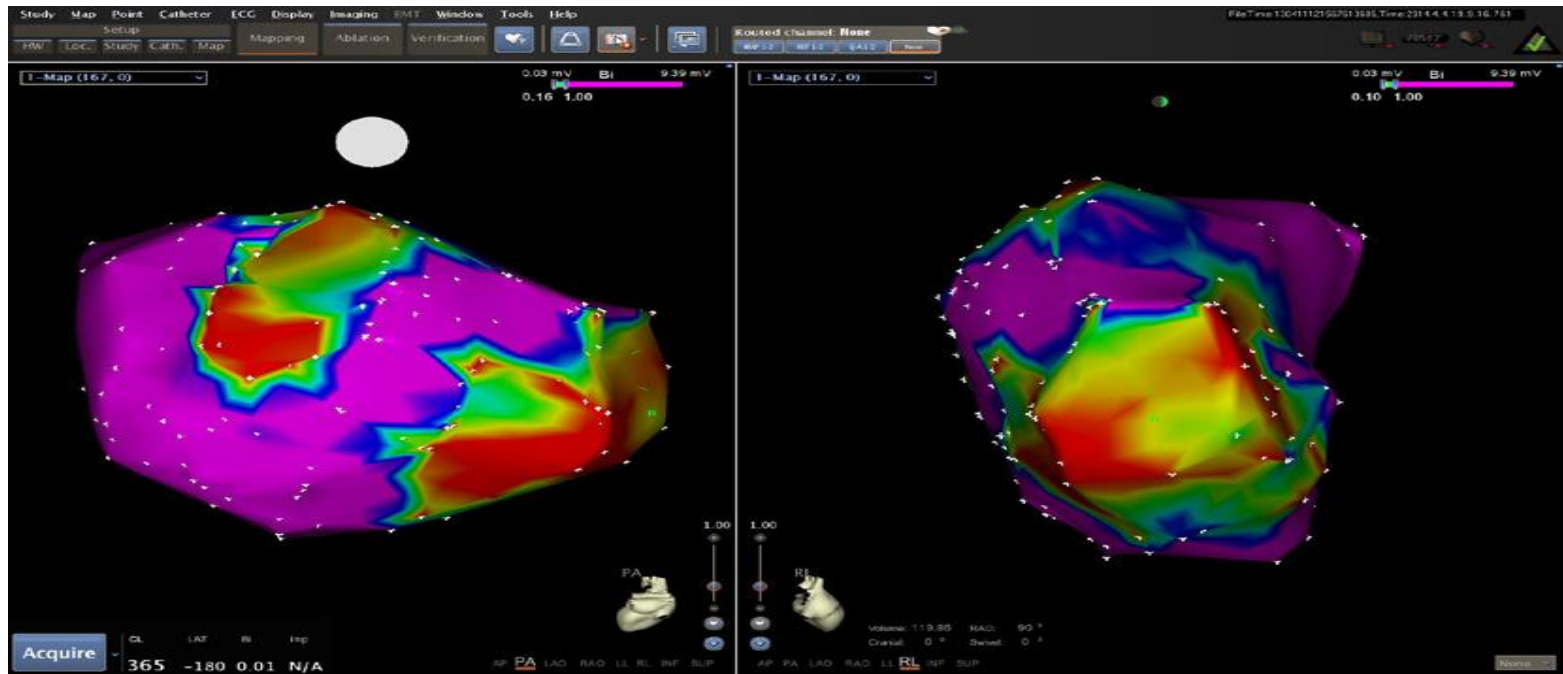
Impact of angiotensin-converting enzyme-inhibitors and angiotensin receptor blockers on long-term outcome of catheter ablation for atrial fibrillation

- Ablasyon sonrası ACEİ ve ARB kullanımının sinüs ritminin idamesi üzerine etkisi yoktur.
- Aynı şekilde upstream tedavisi olarak adlandırılan tedavilerinde AF ablasyonu sonrası reverse remodeling ile açıklanan olumlu etkileri hala kanıtlanmış değildir.
- ACEİ ve ARB lerin aynı zamanda HT, DM ve KKY de kullanımının da işlem başarısı üzerine etkisi yoktur.



Tekrarlayan Atrial Fibrilasyon Ablasyonu

- İlk ablasyon sonrası hastaların 20% to 40%`ı ikinci bir ablasyon prosedürüne alınır.
- İlk üç ayda gözlenen erken rekürrensini çoğu spontan olarak düzelir. Bu nedenle ikinci bir ablasyon kararı vermeden önce en az üç ay beklenmelidir.
- Hastaların çok az bir kısmında ilk üç ayda gelişen AF ciddi şekilde semptomatik olabilir ve AAD veya hız kontrolü başarılı olmayabilir. Bu hastalarda en iyi yaklaşımı reablamyondur.



- İlk ablasyon işleminin başarısız olduğu ve reablasyon işlemine alınan hastaların hemen hemen hepsinde PVler dışında yeni aritmojenik odaklardan ziyade daha önce izole edilen ***PV`de rekonneksiyon saptanır.***
- *Bu nedenle ikinci ablasyon prosedüründe ilk yapılması gereken tüm pulmoner venlerin rekondüksiyon açısından kontrolüdür.*
- Eğer rekondüksiyon yaygın olarak saptanırsa temel hedef PV lerin reizolasyonu olmalıdır.
- PV rekondüksiyonu saptanmayan hastalarda non-PV odakları araştırılmalı ve daha çok substrat modifikasyon teknikleri kullanılmalıdır.

GEÇ REKÜRRENS

- İlk işlem sonrası **geç rekürrens sıklığı 11% ile 29%** arasındadır.
- İkinci ablasyon sonrası ise geç rekürrens 7%-24% civarındadır.
- **Geç rekürrensin en önemli prediktörü persistan AF`dir.**
- Diğer prediktörler ise;
 - Yaş, sol atrium boyutu, diabet, kapak hastalığı ve non-iskemik DKMP, dir.
- *Geç rekürrenste gelişen hastalarda da ikinci ablasyon prosedürü sırasında ki temel bulgu PV rekonneksiyonudur.*
- Bununla beraber non-PV fokuslar ve önceden uygulanan ablasyon hatlarındaki gapler de rekürrensten sorumlu olabilir.
- Bu son mekanizma özellikle ikinci ablasyon sonrası rekürrens gelişen hastalarda sorumlu mekanizmadır.

Lessons From Radiofrequency Redo-Procedure After Cryoballoon Pulmonary Vein Isolation for Paroxysmal Atrial Fibrillation

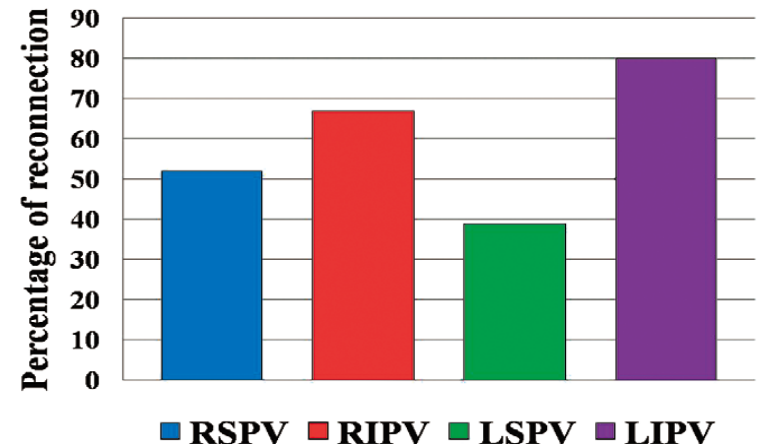
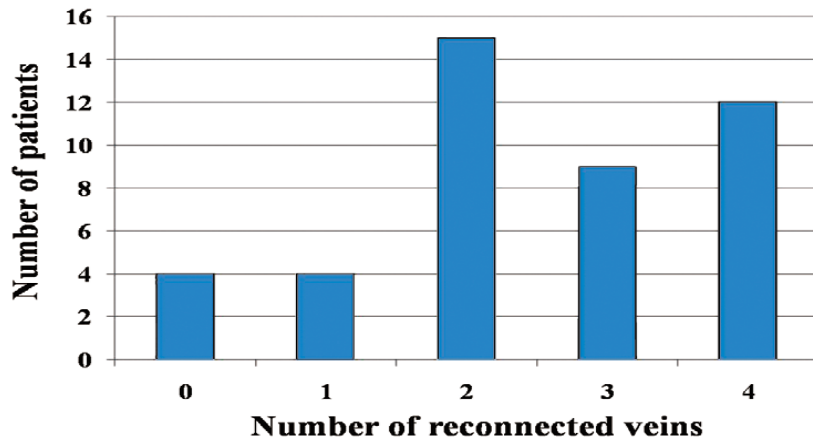
Bénédicte Godin, MD; Arnaud Savoure, MD; Kevin Gardey, MD; Frédéric Anselme, MD, PhD

Background: To gain further insights into mechanisms leading to atrial fibrillation (AF) recurrence after a first ablation procedure using cryoballoon technique, the data collected during redo procedure were analyzed.

Methods and Results: From a total of 112 patients who underwent cryoballoon pulmonary vein isolation (PVI) for paroxysmal AF, 44 had a second ablation procedure using radiofrequency catheter, because of recurrent atrial arrhythmia. PV reconnection was observed in 109 of the 171 initially isolated veins (64%). Conduction recovery was found, respectively, at the left inferior PV, right inferior PV, right superior PV and left superior PV in 35 patients (80%), 26 patients (67%), 23 patients (52%) and 17 patients (39%). The mean number of reconnected PVs per patient was significantly lower with the 23-mm cryoballoon as compared to the 28-mm. Conduction gaps were focal and located at inferior parts of inferior veins and at the ridge between left atrial appendage and left veins. Mean procedure and fluoroscopy time were 109 ± 32 min and 14.7 ± 8.3 min, respectively. A 3-D mapping system was used in only 8 patients (18%).

Conclusions: Atrial arrhythmia recurrences following cryoballoon PVI were associated with focal PV reconnections, occurring at preferential anatomical sites. These gaps were readily ablated with focal radiofrequency delivery, explaining the lack of need of 3-D mapping system and short procedure time. These results do not support the use of cryoballoon to perform redo procedures. (*Circ J* 2013; 77: 2009–2013)

Hastaların 39% ikinci ablasyon işlemine alındı.
Daha önce izole edilmiş venlerin 64% de ise rekonneksiyon saptandı.



Incidence and Significance of Early Recurrences of Atrial Fibrillation After Cryoballoon Ablation

Insights From the Multicenter Sustained Treatment of Paroxysmal Atrial Fibrillation (STOP AF) Trial

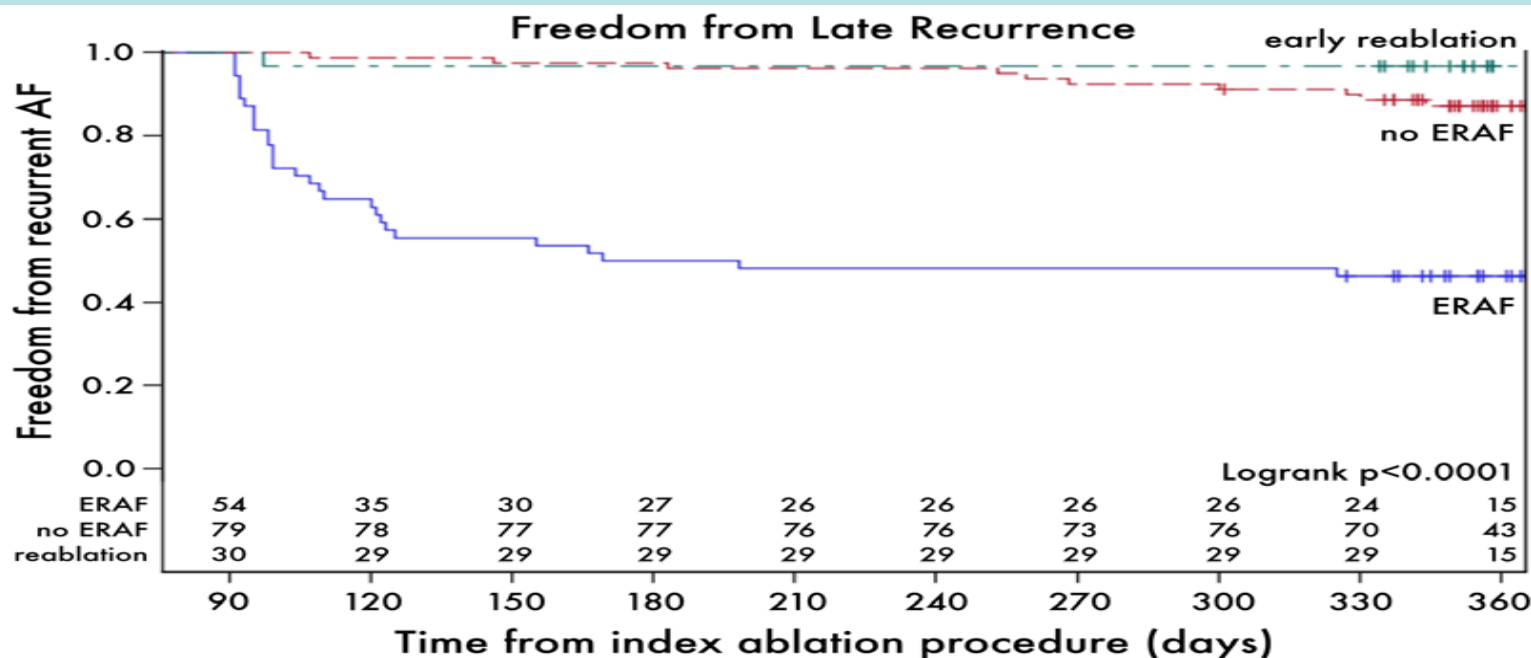
Jason G. Andrade, MD; Paul Khairy, MD, PhD; Laurent Macle, MD; Doug L. Packer, MD; John W. Lehmann, MD, MPH; Richard G. Holcomb, PhD; Jeremy N. Ruskin, MD; Marc Dubuc, MD

Background—Early recurrence of atrial fibrillation (ERAF) is common after radiofrequency catheter ablation for AF. We sought to determine the incidence and prognostic significance of ERAF after cryoballoon ablation. Moreover, the benefit of early reablation for ERAF after cryoballoon ablation is undetermined.

Methods and Results—The Sustained Treatment of Paroxysmal Atrial Fibrillation (STOP AF) trial randomized 245 patients with paroxysmal AF to medical therapy versus cryoballoon-based pulmonary vein ablation. Patients were followed for 12 months. ERAF was defined as any recurrence of AF >30 seconds during the first 3 months of follow-up. Late recurrence (LR) was defined as any recurrence of AF >30 seconds between 3 and 12 months. Of the 163 patients randomized to cryoablation, 84 patients experienced ERAF (51.5%). The only significant factor associated with ERAF was male sex (hazard ratio [HR], 2.18; 95% confidence interval [CI], 1.03–4.61; $P=0.041$). LR was observed in 41 patients (25.1%), and was significantly related to ERAF (55.6% LR with ERAF versus 12.7% without ERAF; $P<0.001$). Among patients with ERAF, only current tobacco use (HR, 3.84; 95% CI, 1.82–8.11; $P<0.001$) was associated with LR. Conversely, early reablation was associated with greater freedom from LR (3.3% LR with early reablation versus 55.6% without; HR, 0.04; 95% CI, 0.01–0.32; $P=0.002$).

Conclusions—ERAF after cryoballoon ablation occurs in ≈50% of patients and is strongly associated with LR. Early reablation for ERAF is associated with excellent long-term freedom from recurrent AF. (*Circ Arrhythm Electrophysiol.* 2014;7:69-75.)

Cryobalon ablasyonu sonrası 51.5% erken rekürrens, 25.1% geç rekürrens.



Repeat procedure using radiofrequency energy for recurrence of atrial fibrillation after initial cryoballoon ablation: a 2-year follow-up

Giulio Conte*, Gian-Battista Chierchia, Juan Sieira, Moises Levinstein, Ruben Casado-Arroyo, Carlo De Asmundis, Andrea Sarkozy, Moises Rodriguez-Manero, Giacomo Di Giovanni, Giannis Baltogiannis, Kristel Wauters, and Pedro Brugada

Heart Rhythm Management Centre, UZ Brussel-VUB, Laarbeeklaan 101, 1090 Brussels, Belgium

Received 6 February 2013; accepted after revision 27 March 2013; online publish-ahead-of-print 19 April 2013

Aims

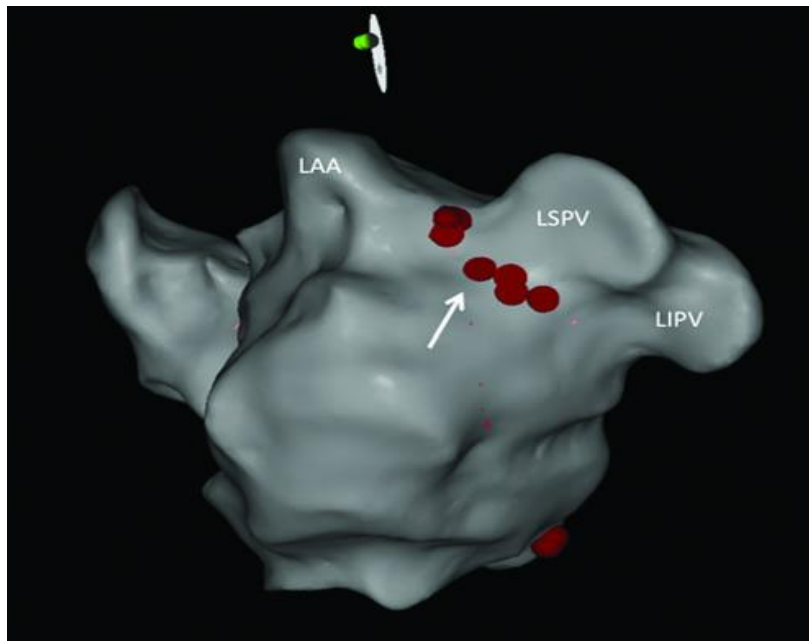
The ideal energy source needed to perform 're-isolation' of the pulmonary veins (PVs) during a repeat procedure for recurrence of paroxysmal atrial fibrillation (AF) has not been established yet. In this study we analysed the outcome of repeat procedure using radiofrequency (RF) energy after initial cryoballoon (CB) ablation at 2-year follow-up.

Methods and results

Consecutive patients having undergone PVs isolation as repeat procedure for recurrent AF after an initial CB ablation were eligible for this study. Twenty-nine patients (22 male 76%, mean age: 55 ± 17 years) were included. Mean time to repeat ablation was 12 ± 7 months. Recovered PV conduction could be documented in a mean 2.45 ± 0.7 veins in each patient. At mean 20.2 ± 10.7 months follow-up, a total of 16 patients (55%) were free of AF at without antiarrhythmic drugs (AADs). An adjunctive 31% was AF free with previously ineffective AADs. A major complication with no permanent clinical sequelae occurred only in one patient.

Conclusion

Repeat RF ablation following CB in case of AF recurrence is effective and safe.



- İkinci ablasyon proseduru sırasındaki anatomik CARTO map.
- LSPV-LAA bileşkesine RF uygulaması.

	Cryobalon		CARTO Ablasyon	
Cinsiyet	n	yaş	n	yaş
<i>Erkek</i>	68	29-81	56	32-84
<i>Kadin</i>	57	33-79	35	38-79
<i>Toplam</i>	125	29-81	91	32-84
Komplikasyon				
Perikardiyal efüzyon	3		4	
Tamponat	1		2	
AF rekürrens	11		34	
AT	6		14	
Pulmoner emboli	-		1	
Acil cerrahi	-		1	
Ex	-		2	
İşlem Yillari				
2012	11		-	
2013	24		-	
2014	34		38	
2015	44		45	
2016	12		8	