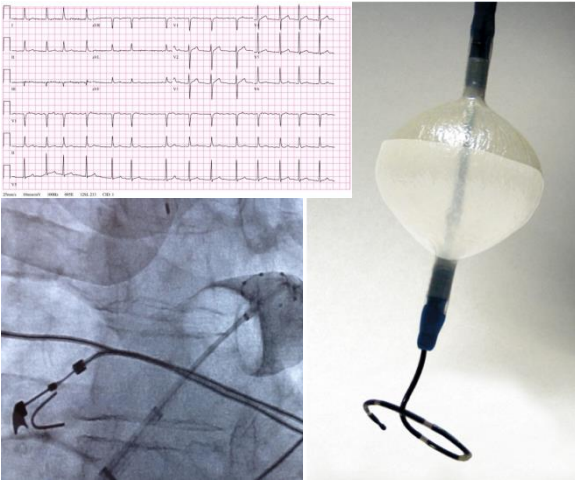
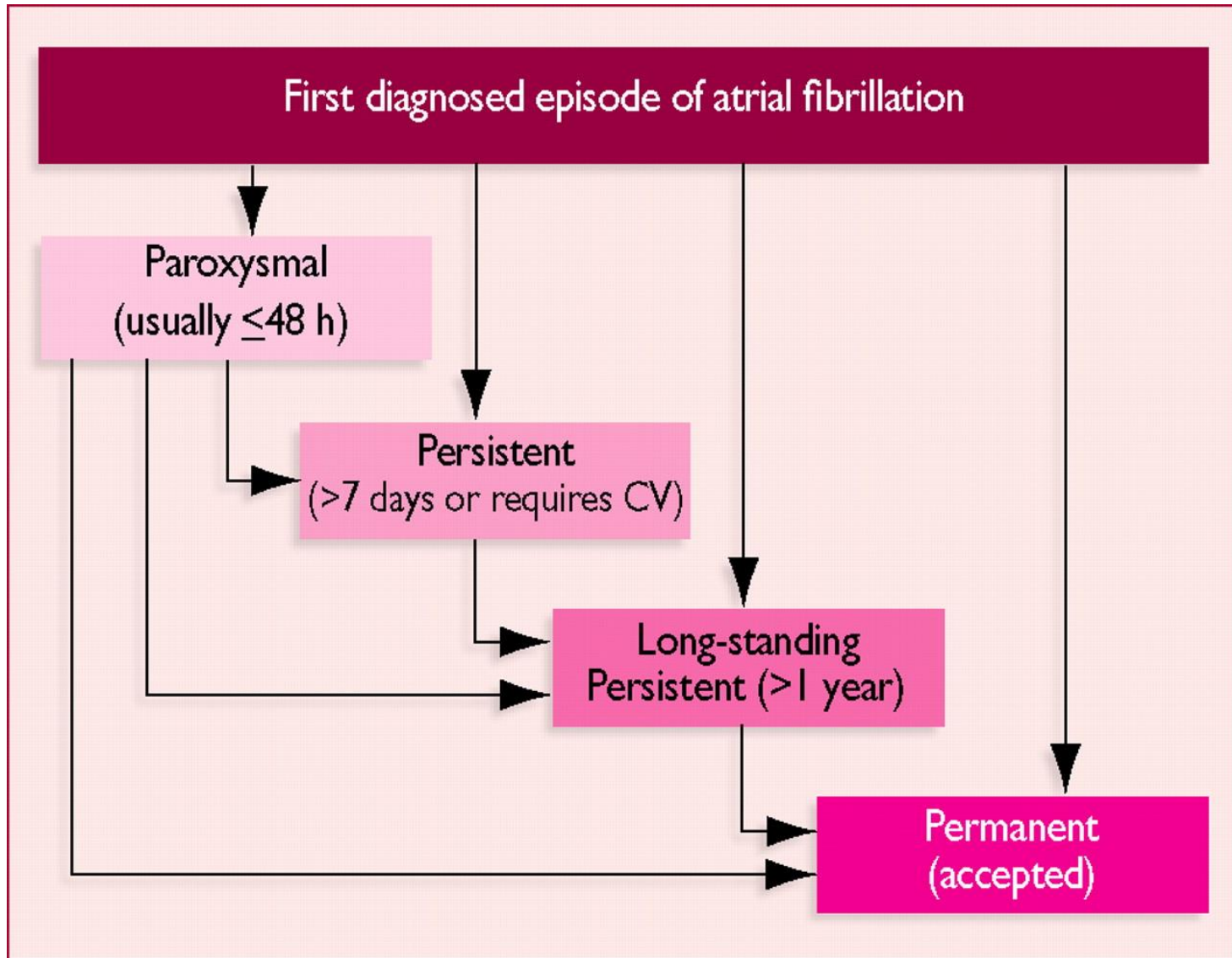


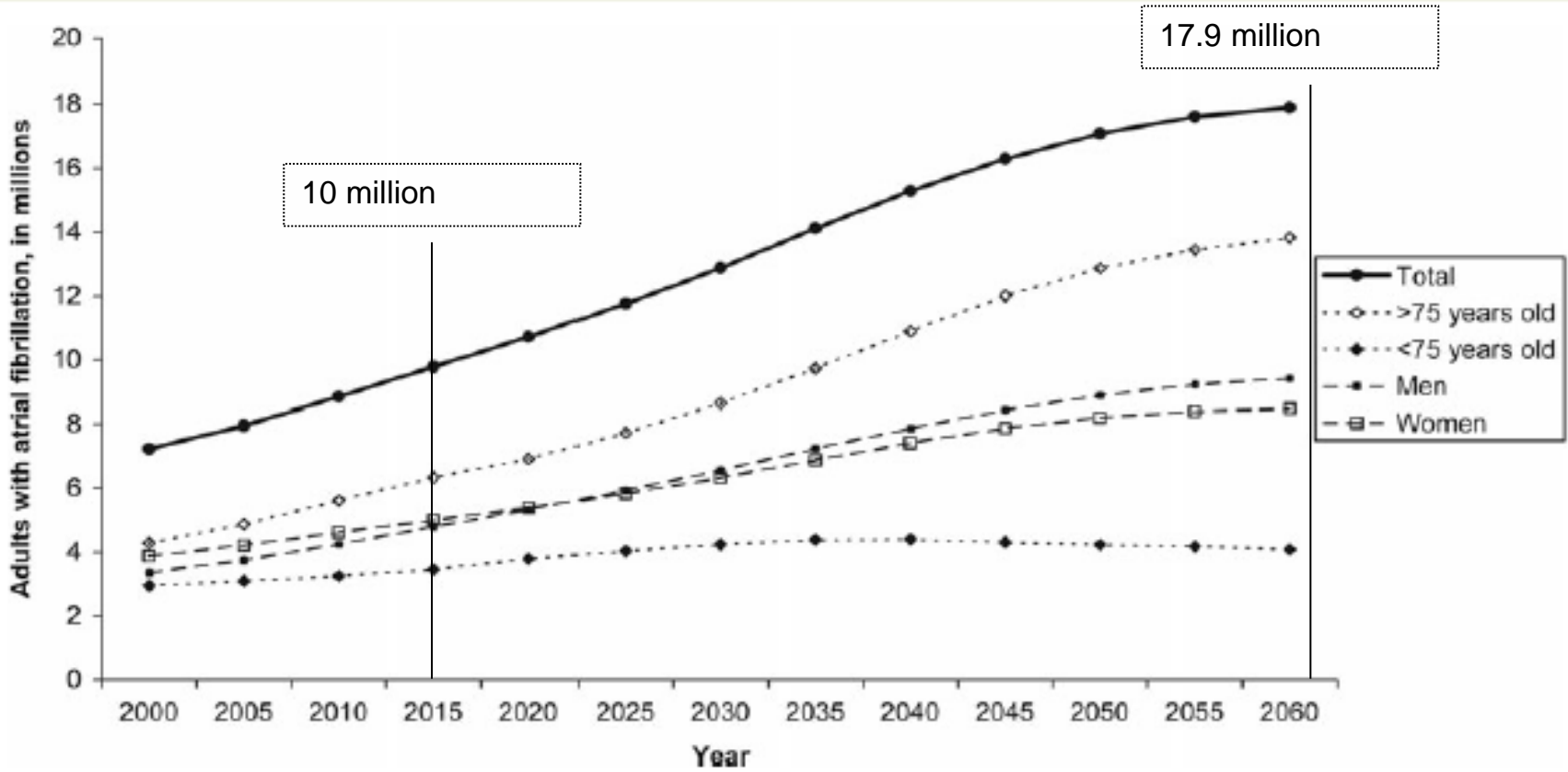
PERSİSTAN AF'DE KRİYOABLASYON YAPILMALIDIR



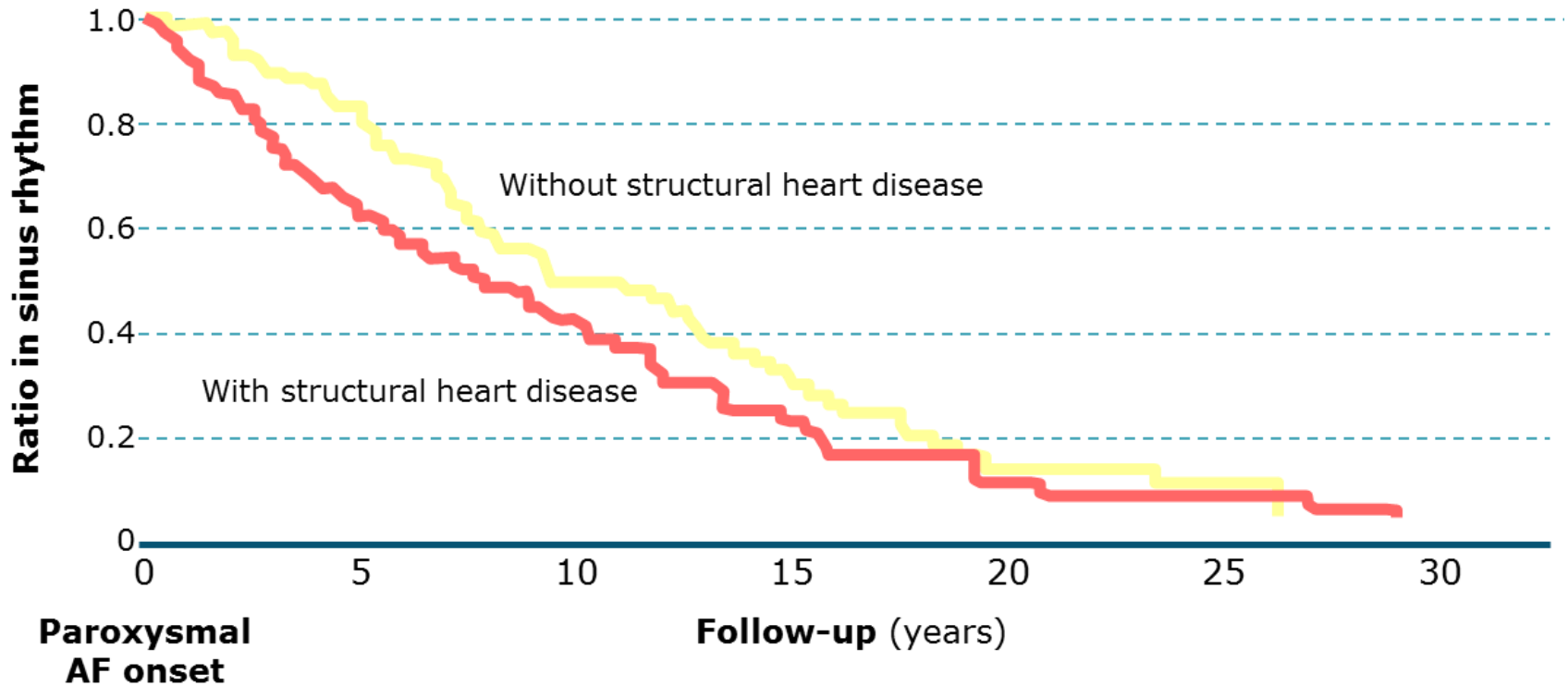
Dr Timuçin Altın
AÜTF Kardiyoloji ABD
AF Zirvesi, Antalya
12.02.2016



Avrupa'da AF Prevalansı



Paroksizmal AF'lerin her yıl %5'i persistan AF'ye döner



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

AF Ablasyon İndikasyonlari

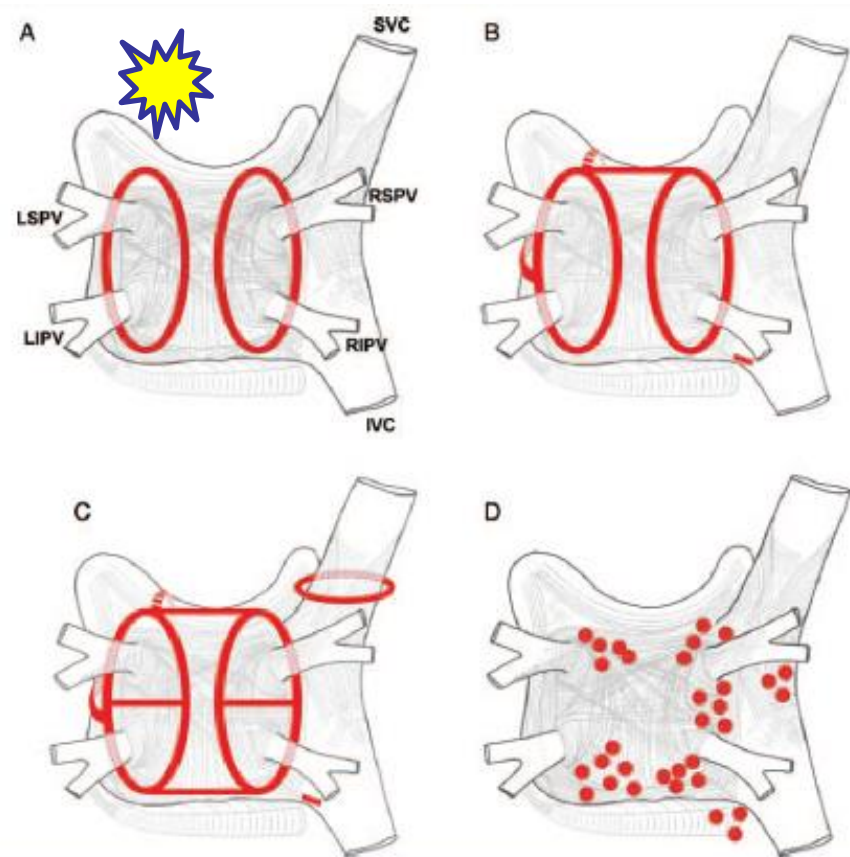
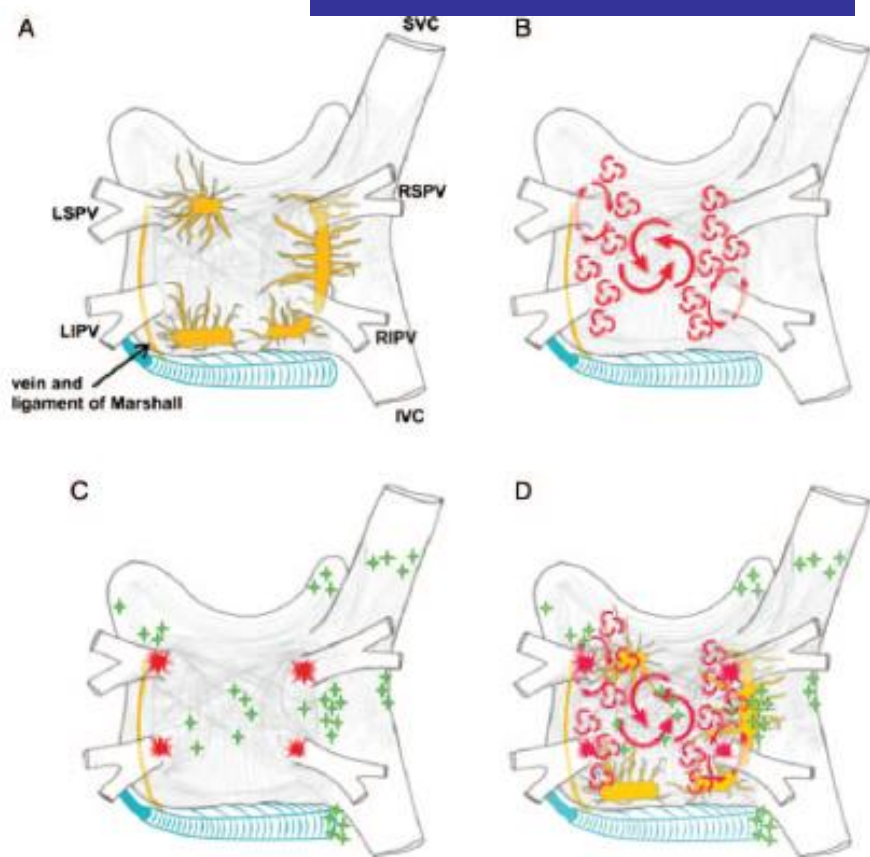
TABLE 2: CONSENSUS INDICATIONS FOR CATHETER AND SURGICAL ABLATION of AF

	CLASS	LEVEL
INDICATIONS FOR CATHETER ABLATION of AF		
Symptomatic AF refractory or intolerant to at least one Class 1 or 3 antiarrhythmic medication		
Paroxysmal: Catheter ablation is recommended*	I	A
Persistent: Catheter ablation is reasonable	IIa	B
Longstanding Persistent: Catheter ablation may be considered	IIb	B
Symptomatic AF prior to initiation of antiarrhythmic drug therapy with a Class 1 or 3 antiarrhythmic agent		
Paroxysmal: Catheter ablation is reasonable	IIa	B
Persistent: Catheter ablation may be considered	IIb	C
Longstanding Persistent: Catheter ablation may be considered	IIb	C

AF Mekanizmaları

Trigger

Substrat



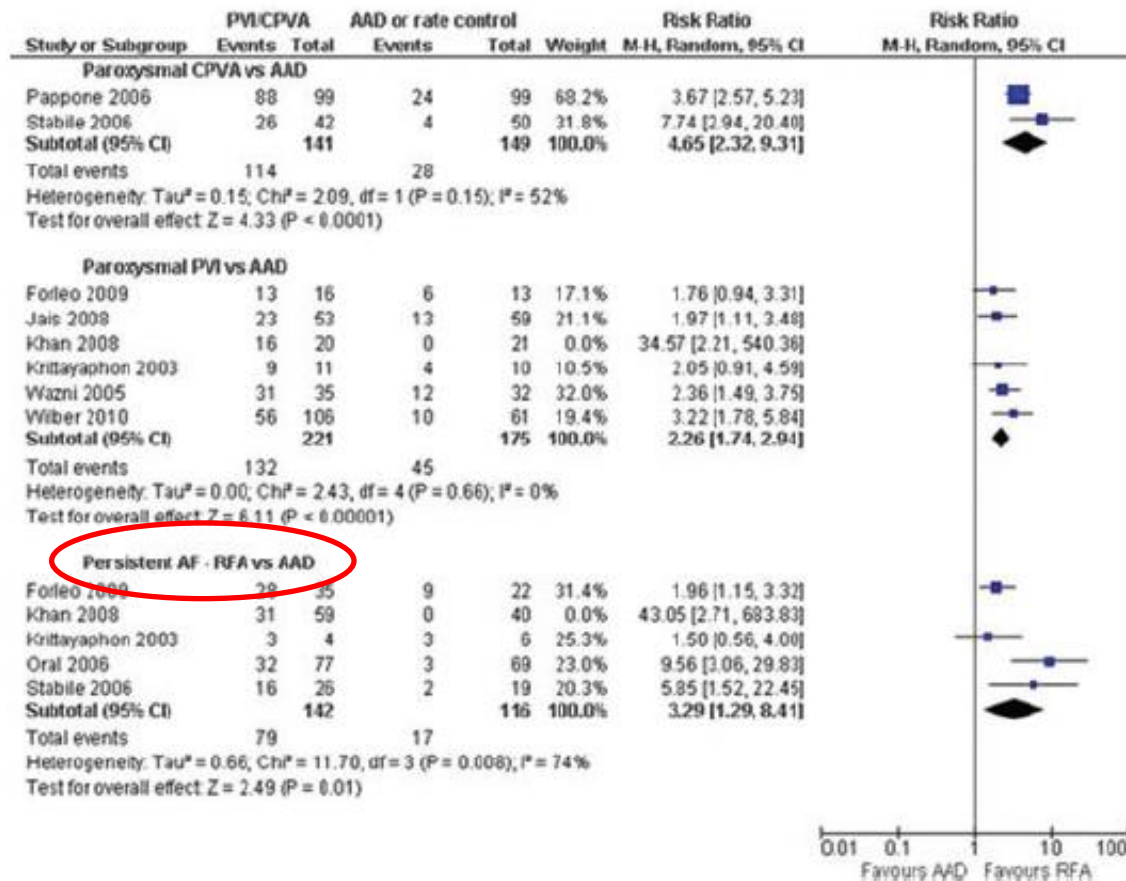
Approach to the Catheter Ablation Technique of Paroxysmal and Persistent Atrial Fibrillation: A Meta-Analysis of the Randomized Controlled Trials

RATIKA PARKASH, M.D., M.Sc.,* ANTHONY S.L. TANG, M.D.†

JOHN L. SAPP, M.D.,* and GEORGE WELLS, Ph.D.‡

From the *Queen Elizabeth II Health Sciences Centre, Halifax, Canada; †Royal Jubilee Hospital, Victoria, Canada; and ‡University of Ottawa Heart Institute, Ottawa, Canada

AAI vs RF Ablasyon



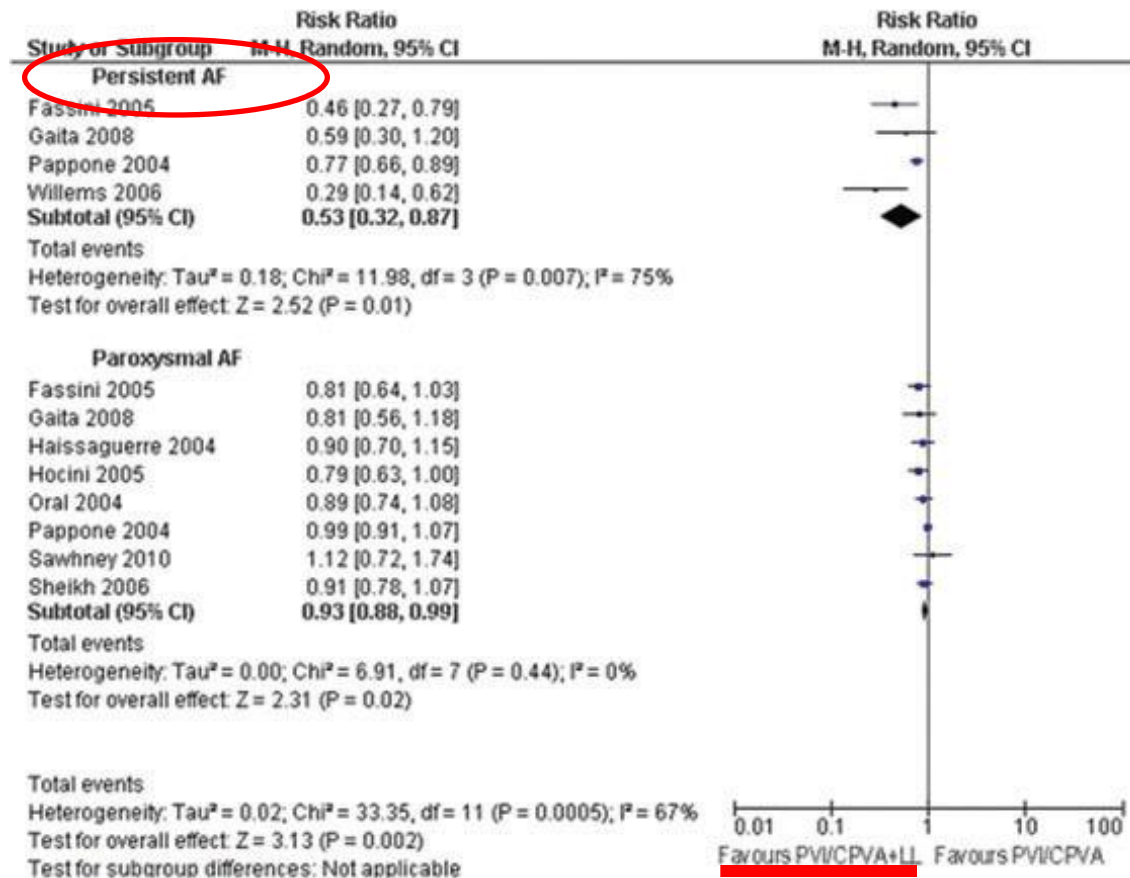
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PVI vs PVI+LL



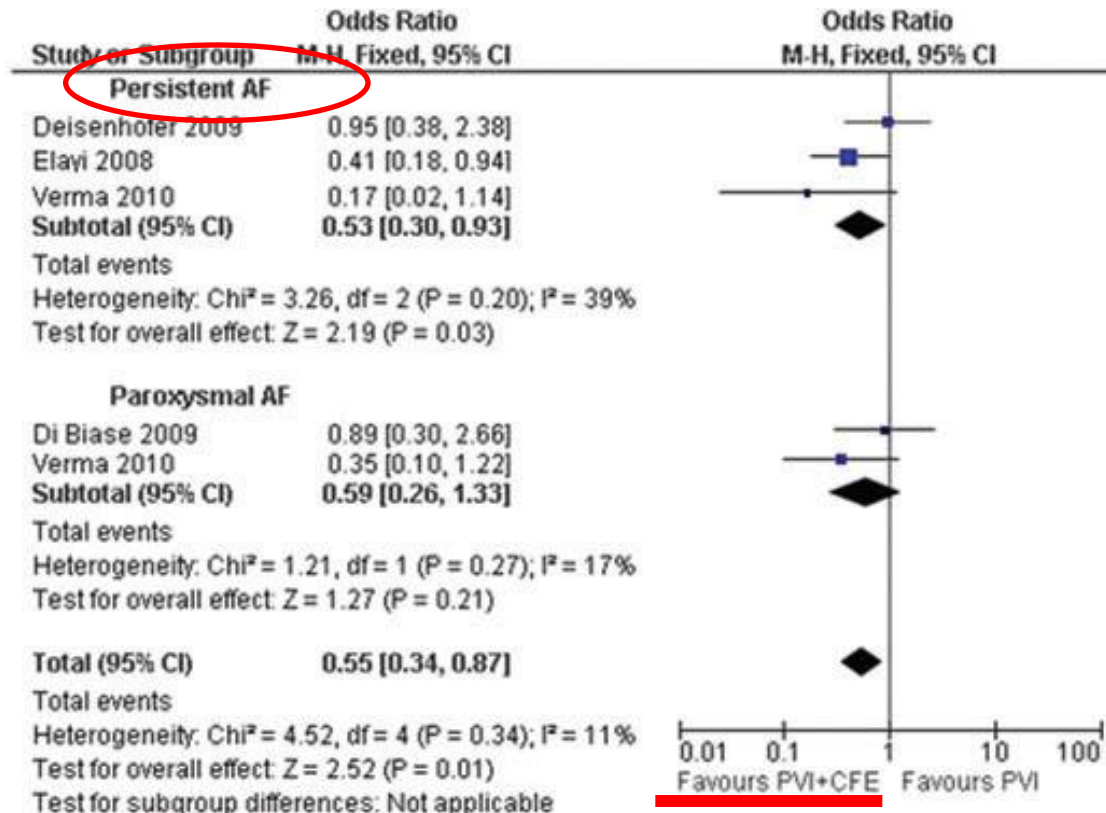
Approach to the Catheter Ablation Technique of Paroxysmal and Persistent Atrial Fibrillation: A Meta-Analysis of the Randomized Controlled Trials

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PVI vs PVI+ CFAE



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

Pulmoner ven izolasyonu AF ablasyonunun olmazsa olmazı!!!

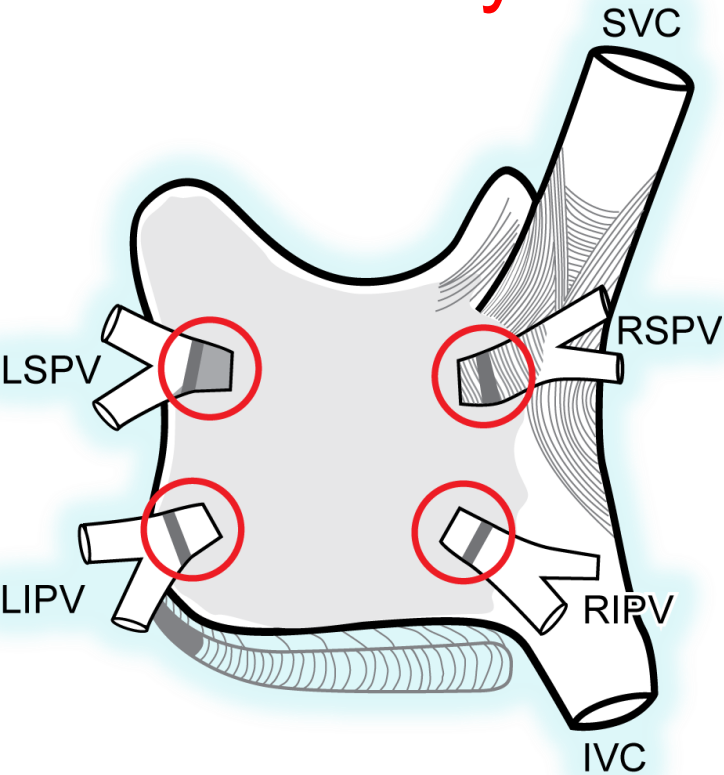
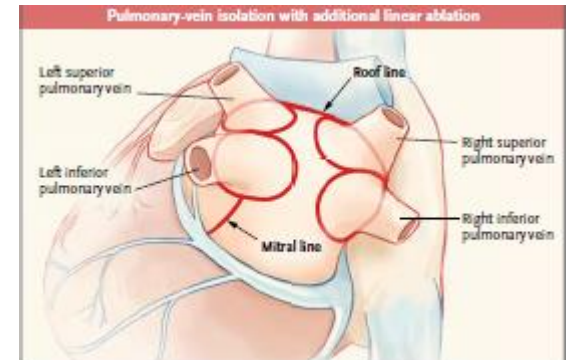
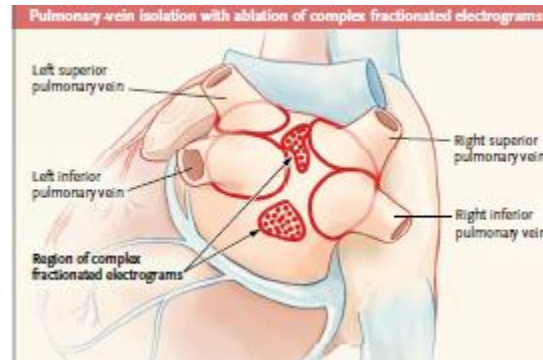
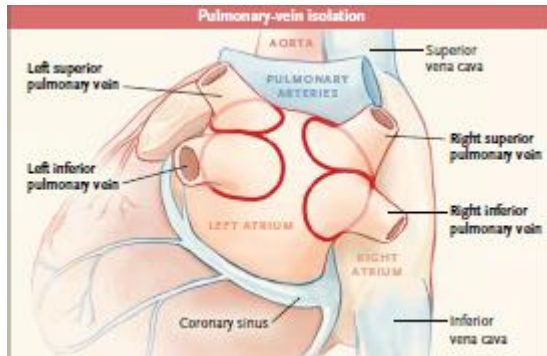


TABLE 3: RECOMMENDATIONS REGARDING ABLATION TECHNIQUE

- Ablation strategies that target the PVs and/or PV antrum are the cornerstone for most AF ablation procedures.
- If the PVs are targeted, electrical isolation should be the goal.
- Achievement of electrical isolation requires, at a minimum, assessment and demonstration of entrance block into the PV.
- Monitoring for PV reconduction for 20 minutes following initial PV isolation should be considered.
- For surgical PV isolation, entrance and/or exit block should be demonstrated.
- Careful identification of the PV ostia is mandatory to avoid ablation within the PVs.
- If a focal trigger is identified outside a PV at the time of an AF ablation procedure, ablation of that focal trigger should be considered.
- If additional linear lesions are applied, operators should consider using mapping and pacing maneuvers to assess for line completeness.
- Ablation of the cavotricuspid isthmus is recommended in patients with a history of typical atrial flutter or inducible cavotricuspid isthmus dependent atrial flutter.
- If patients with long standing persistent AF are approached, operators should consider more extensive ablation based on linear lesions or complex fractionated electrograms.
- It is recommended that RF power be reduced when creating lesions along the posterior wall near the esophagus.

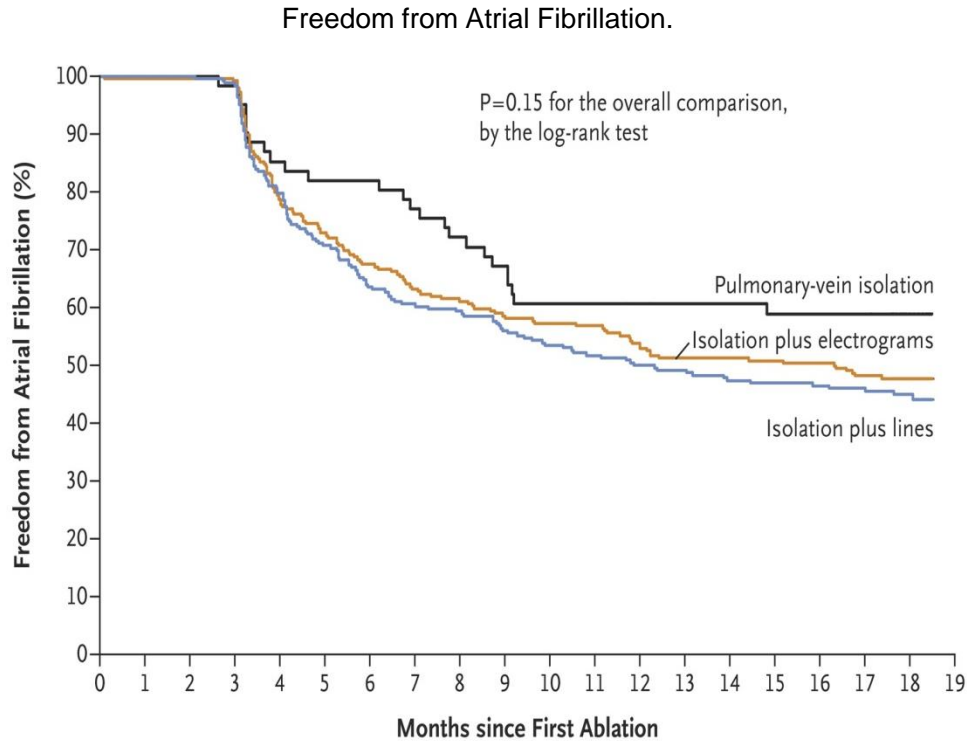
STAR AF II: In Ablation of Persistent AF

“Less May be More”



STAR AF II: In Ablation of Persistent AF

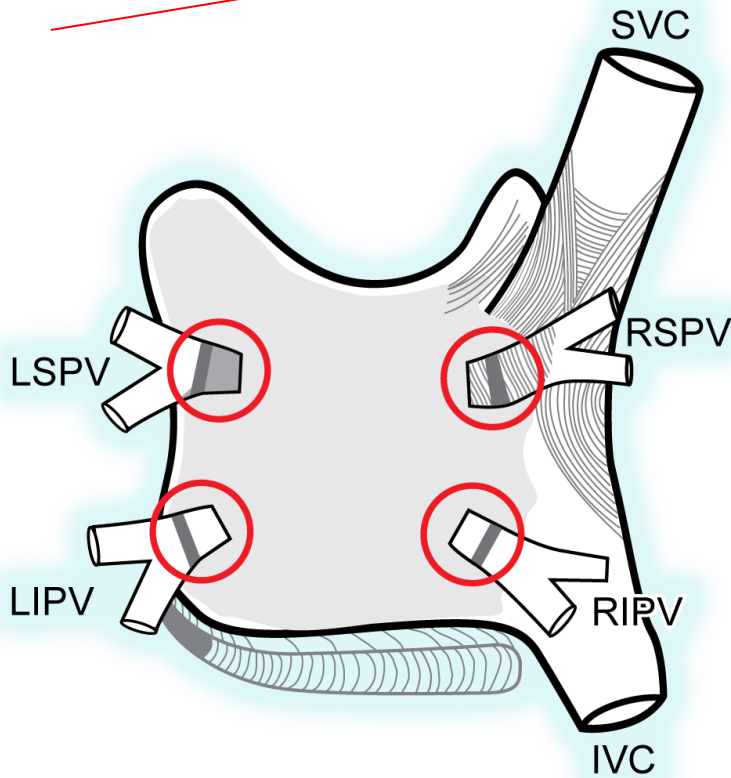
“Less May be More”



- 12 ülkeden 589 hasta
- 1:4:4 oranında PVI, PVI+CFE, PVI+Lineer lezyon şeklinde randomizasyon
- Dahil olma kriteri:
 - Persistent AF (>7 days < 3 yıl)
 - AAI'a refrakter
 - İlk ablasyon
 - LA < 60mm

Pulmoner ven izolasyonu AF ablasyonunun olmazsa olmazıdır!!!

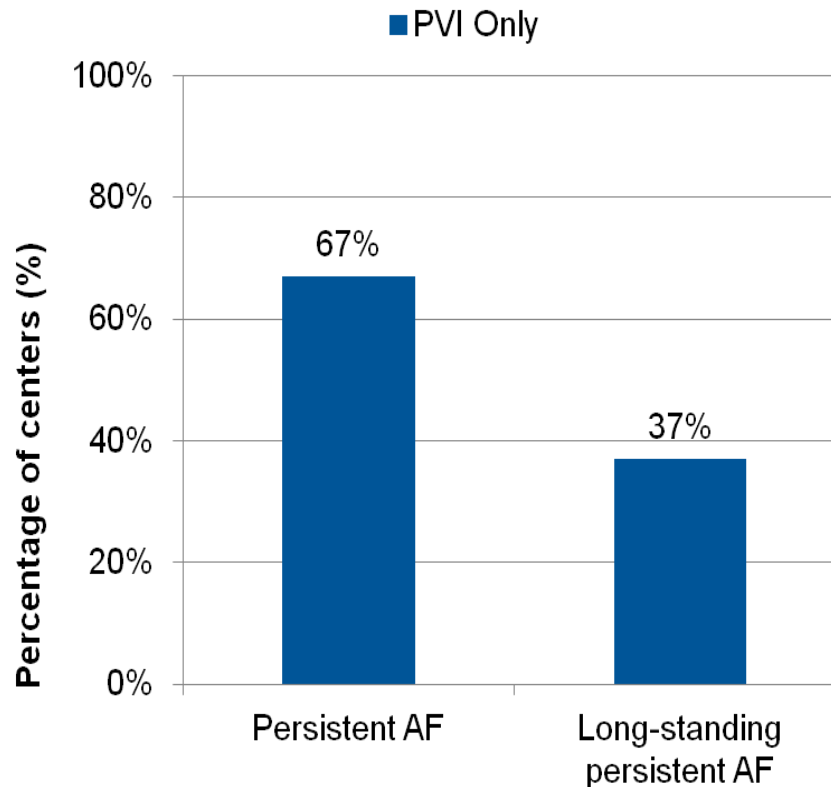
~~2012 consensus recommendation: “operators should consider more extensive ablation based on linear lesions or complex fractionated electrograms” for ablation of persistent AF. ????????~~



Current ablation techniques for persistent atrial fibrillation: results of the European Heart Rhythm Association Survey

Nikolaos Dagres^{1*}, Maria Grazia Bongiorni², Torben Bjerregaard Larsen³, Antonio Hernandez-Madrid⁴, Laurent Pison⁵, and Carina Blomström-Lundqvist⁶
Conducted by the Scientific Initiatives Committee, European Heart Rhythm Association

EHRA SURVEY: Avrupa'da PVI ilk ablasyon stratejisi olarak uygulayan merkez oranları



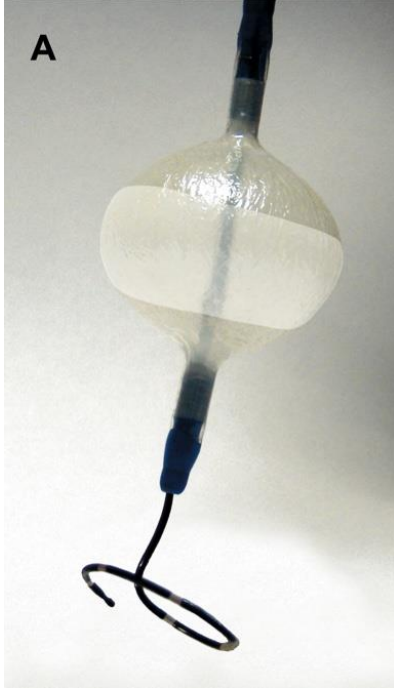
Persistan AF 'de Ablasyon metodu

- RF ??
- Kriyobalon ??

HİPOTEZ:

- İlk girişim, PVI olması gerektiğine göre CB da uygulanabilir.

Kriyobalon Teknolojisi



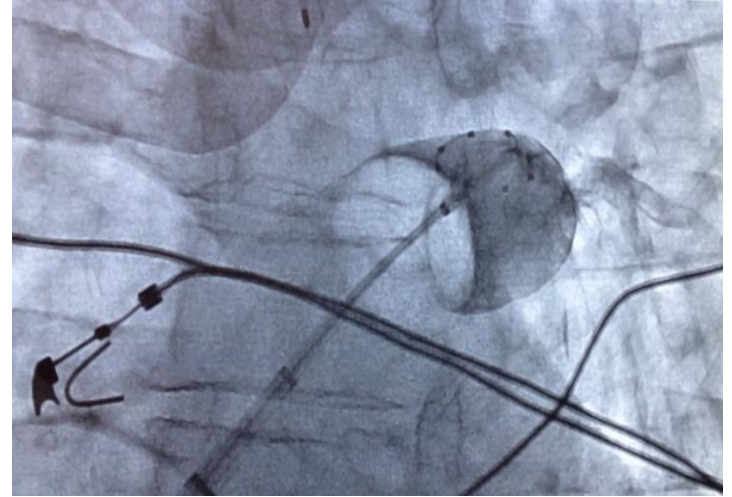
CB-1 (2010)

- Ekvatorial soğutma
- 4 injeksiyon tüpü



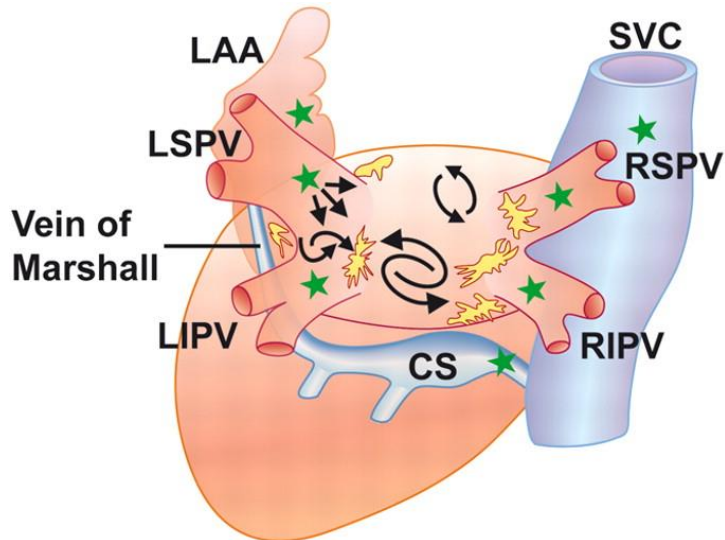
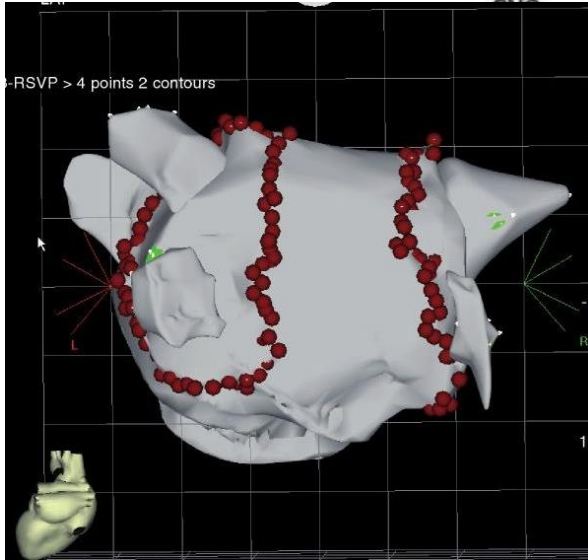
CB-2 (2012)

- Distal hemisfer
- 8 injeksiyon tüpü
- Daha hızlı ve etkili soğutma
- Daha geniş alanda (**28 mm**) (antral) soğutma



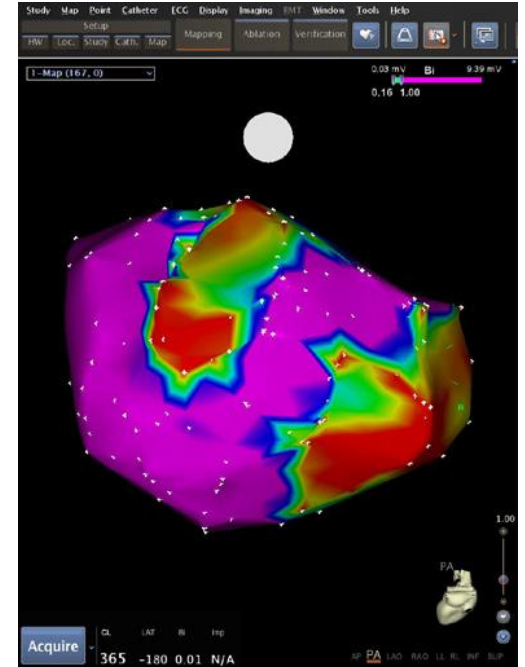
RF

Antral PVI



CB2 (Arctic Front Advance 28 mm)

Geniş, antral



PAF (CB VS RF)

Cryoballoon Versus Open Irrigated Radiofrequency Ablation in Patients With Paroxysmal Atrial Fibrillation

The Prospective, Randomized, Controlled, Noninferiority FreezeAF Study

Armin Luik, MD; Andrea Radzewitz, PsyD; Meinhard Kieser, ScD; Marlene Walter;
Peter Bramlage, MD; Patrick Hörmann, MD; Kerstin Schmidt, MD; Nicolas Horn, MD;
Maria Brinkmeier-Theofanopoulou, MD; Kevin Kunzmann, MSc; Tobias Riexinger, MD;
Gerhard Schymik, MD; Matthias Merkel, MD; Claus Schmitt, MD

Circulation. 2015;132:1311-1319.

Point-by-Point Radiofrequency Ablation Versus the Cryoballoon or a Novel Combined Approach: A Randomized Trial Comparing 3 Methods of Pulmonary Vein Isolation for Paroxysmal Atrial Fibrillation (The Cryo Versus RF Trial)

ROSS J. HUNTER, PH.D., F.E.S.C., VICTORIA BAKER, M.Sc., MALCOLM C. FINLAY, M.R.C.P.,
PH.D., EDWARD R. DUNCAN, M.R.C.P., PH.D., MATTHEW J. LOVELL, M.R.C.P., PH.D.,
MUZAHIR H. TAYEBJEE, M.D., M.R.C.P., WAQAS ULLAH, M.R.C.P., M. SHOAI B SIDDIQUI,
M.R.C.P., AILSA McLEAN, M.Sc., LAURA RICHMOND, M.Sc., CLAIRE KIRKBY, M.Sc.,
MATTHEW R. GINKS, M.D., M.R.C.P., MEHUL DHINOJA, M.R.C.P., SIMON SPORTON, M.D.,
F.R.C.P., MARK J. EARLEY, M.D., F.R.C.P., and RICHARD J. SCHILLING, M.D., F.R.C.P.

From the Barts Heart Centre, St. Bartholomew's Hospital, Barts Health NHS Trust, London, UK

(J Cardiovasc Electrophysiol, Vol. 26, pp. 1307-1314, December 2015)

PERSİSTAN AF CB ?? RF ??

- Randomize çalışma yok !!
- Küçük çaplı, tek merkezli çalışmalar
- Metaanaliz (Karşılaştırmalı değil)
- Karşılaştırmalı çalışma az.

Pulmonary vein isolation as index procedure for persistent atrial fibrillation: One-year clinical outcome after ablation using the second-generation cryoballoon ^{CP}

Giuseppe Ciconte, MD,^{*} Luca Ottaviano, MD,[†] Carlo de Asmundis, MD, PhD, FHRS,^{*} Giannis Baltogiannis, MD, PhD,^{*} Giulio Conte, MD,^{*} Juan Sieira, MD,^{*} Giacomo Di Giovanni, MD,^{*} Yukio Saitoh, MD,^{*} Ghazala Irfan, MD,^{*} Giacomo Mugnai, MD,^{*} Cesare Storti, MD,[‡] Annibale Sandro Montenero, MD, PhD,[†] Gian-Battista Chierchia, MD, PhD,^{*} Pedro Brugada, MD, PhD^{*}

n=63 hasta; ort AF süresi: 7,2 ay ****CB2 1 YILLIK DEĞERLENDİREN İLK ÇALIŞMA****

	Overall (n = 63)
Procedural time (minutes)	87.1 ± 38.2
Fluoroscopy time (minutes)	14.9 ± 6.1
Mean number of freeze-thaw cycles	1.7 ± 0.4
Left superior PV	
Temperature at isolation (°C)	-33.0 ± 8.9
Nadir temperature (°C)	-50.3 ± 4.5
Left inferior PV	
Temperature at isolation (°C)	-26.2 ± 5.3
Nadir temperature (°C)	-46.5 ± 8.6
Right superior PV	
Temperature at isolation (°C)	-29.4 ± 9.4
Nadir temperature (°C)	-53.5 ± 4.6
Right inferior PV	
Temperature at isolation (°C)	-30.7 ± 7.1
Nadir temperature (°C)	-47.5 ± 11.2
Complications	6 (9.5)
Phrenic nerve palsy	4 (6.3)

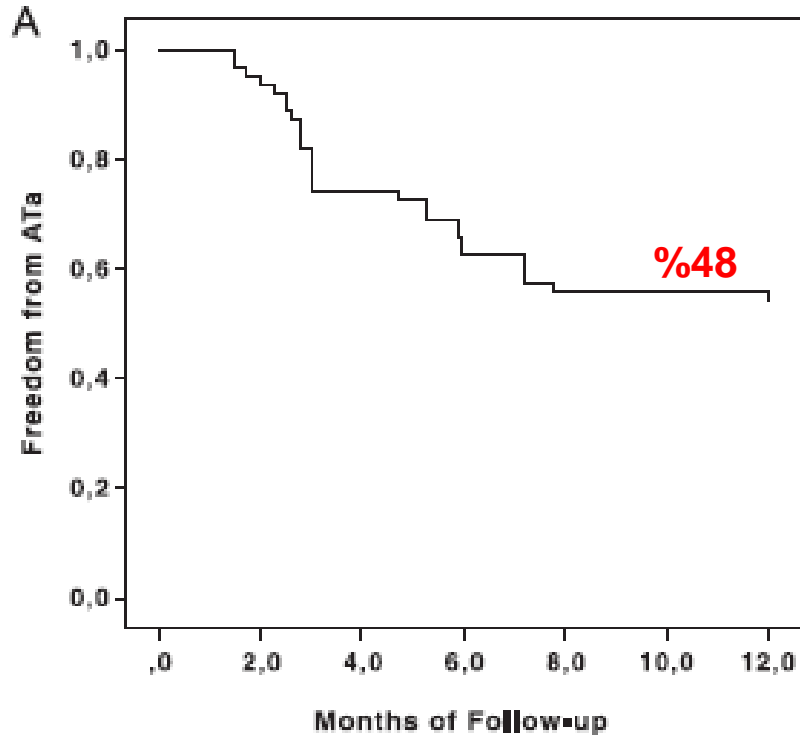
Data are given as mean ± SD or n (%).

PV = pulmonary vein.

Pulmonary vein isolation as index procedure for persistent atrial fibrillation: One-year clinical outcome after ablation using the second-generation cryoballoon ^{CP}

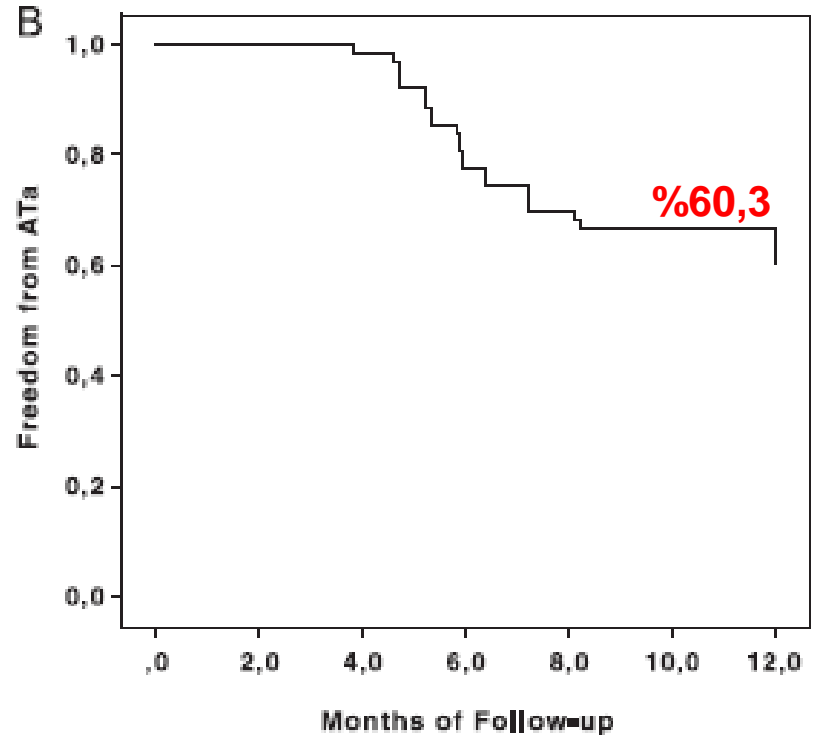
Giuseppe Ciconte, MD,^{*} Luca Ottaviano, MD,[†] Carlo de Asmundis, MD, PhD, FHRS,^{*} Giannis Baltogiannis, MD, PhD,^{*} Giulio Conte, MD,^{*} Juan Sieira, MD,^{*} Giacomo Di Giovanni, MD,^{*} Yukio Saitoh, MD,^{*} Ghazala Irfan, MD,^{*} Giacomo Mugnai, MD,^{*} Cesare Storti, MD,[‡] Annibale Sandro Montenero, MD, PhD,[†] Gian-Battista Chierchia, MD, PhD,^{*} Pedro Brugada, MD, PhD^{*}

****CB2 1 YILLIK DEĞERLENDİREN İLK ÇALIŞMA****



N° at risk 63 59 45 38 34 34 33

BP (<3 ay) dahil



N° at risk 63 63 62 49 44 42 38

BP (<3 ay) hariç

Circumferential pulmonary vein isolation as index procedure for persistent atrial fibrillation: a comparison between radiofrequency catheter ablation and second-generation cryoballoon ablation

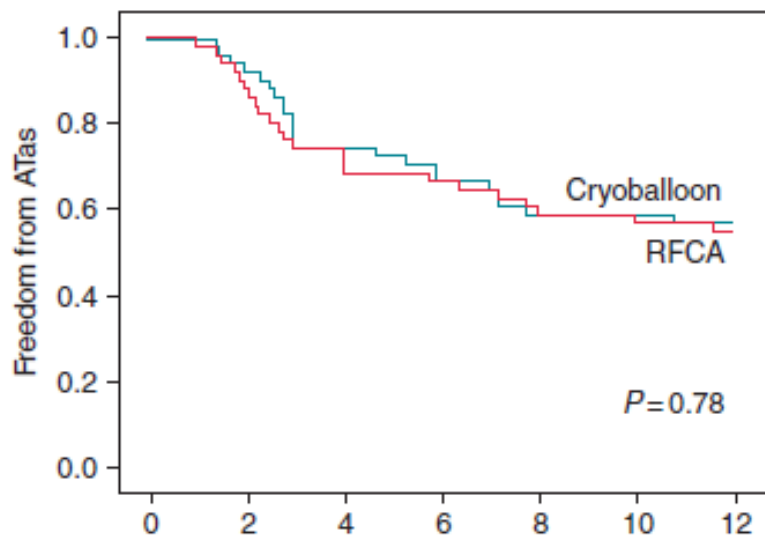
****CB2 CF-RF KARŞILAŞTIRAN İLK ÇALIŞMA*****

Giuseppe Ciconte^{*†}, Giannis Baltogiannis[†], Carlo de Asmundis, Juan Sieira, Giulio Conte, Giacomo Di Giovanni, Yukio Saitoh, Ghazala Irfan, Giacomo Mugnai, Burak Hunuk, Gian-Battista Chierchia[‡], and Pedro Brugada[‡]

	CB-Adv (n = 50)	RFCA (n = 50)	P value
Age, years	62.4 ± 9.8	62.4 ± 9.5	0.98
Male, n	36 (72%)	38 (76%)	0.82
BMI	27.5 ± 3.4	28.7 ± 4.0	0.12
Hypertension, n	26 (52%)	34 (68%)	0.15
Dyslipidemia, n	9 (18.8%)	14 (28%)	0.34
Diabetes, n	4 (8%)	7 (14%)	0.52
HF, n	1 (2%)	3 (6%)	0.62
CAD, n	2 (4%)	5 (10%)	0.44
LVEF, %	57.5 ± 3.7	56.3 ± 4.1	0.21
LA size, mm	46.0 ± 7.2	47.2 ± 6.2	0.36
CHA2DS2-Vasc score, n	1.4 ± 1.3	1.8 ± 1.2	0.11
Total AF duration, months	32.7 ± 37.6	26.7 ± 23.7	0.35
Persistent AF duration, months	7.2 ± 2.2	7.6 ± 1.8	0.33
Procedure duration, minutes	90.5 ± 41.7	140.2 ± 46.9	<0.01
Fluoroscopy duration, minutes	14.5 ± 6.6	19.8 ± 6.8	<0.01

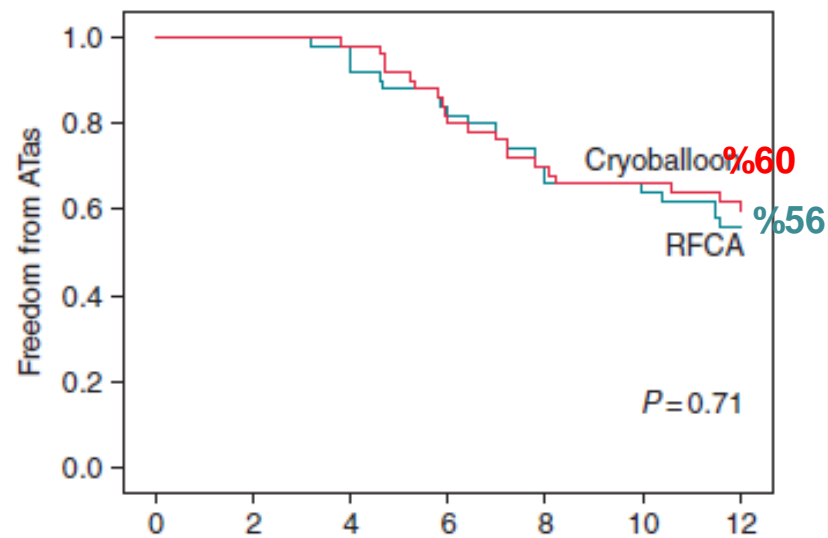
Circumferential pulmonary vein isolation as index procedure for persistent atrial fibrillation: a comparison between radiofrequency catheter ablation and second-generation cryoballoon ablation

Giuseppe Ciconte^{*†}, Giannis Baltogiannis[†], Carlo de Asmundis, Juan Sieira, Giulio Conte, Giacomo Di Giovanni, Yukio Saitoh, Ghazala Irfan, Giacomo Mugnai, Burak Hunuk, Gian-Battista Chierchia[‡], and Pedro Brugada[‡]



N [*] at risk		Months of follow-up						
		0	2	4	6	8	10	12
Cryoballoon	50	46	37	33	29	29	28	
RFCA	50	44	34	33	29	28	27	

BP (<3 ay) dahil



N [*] at risk		Months of follow-up						
		0	2	4	6	8	10	12
Cryoballoon	50	50	49	40	35	33	30	
RFCA	50	50	49	41	33	32	28	

BP (<3 ay) hariç

Circumferential pulmonary vein isolation as index procedure for persistent atrial fibrillation: a comparison between radiofrequency catheter ablation and second-generation cryoballoon ablation

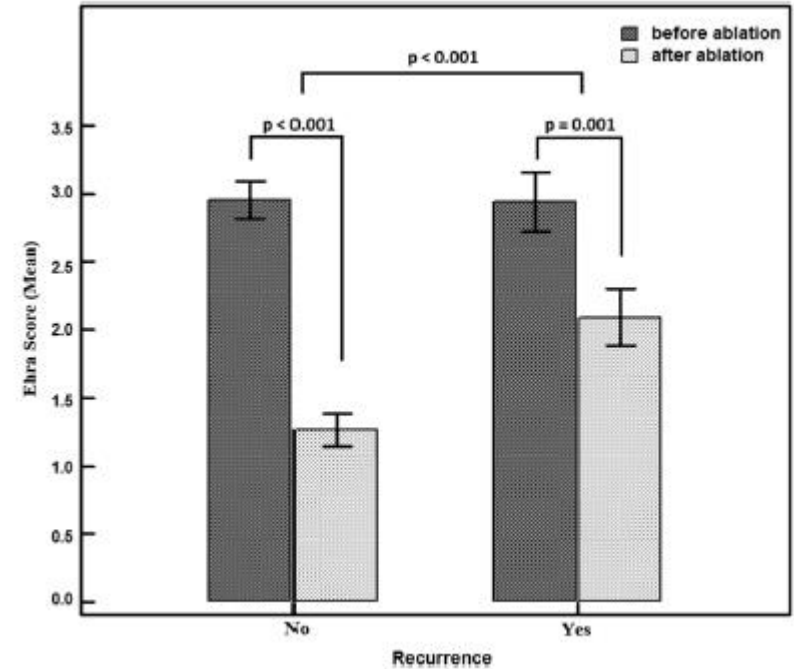
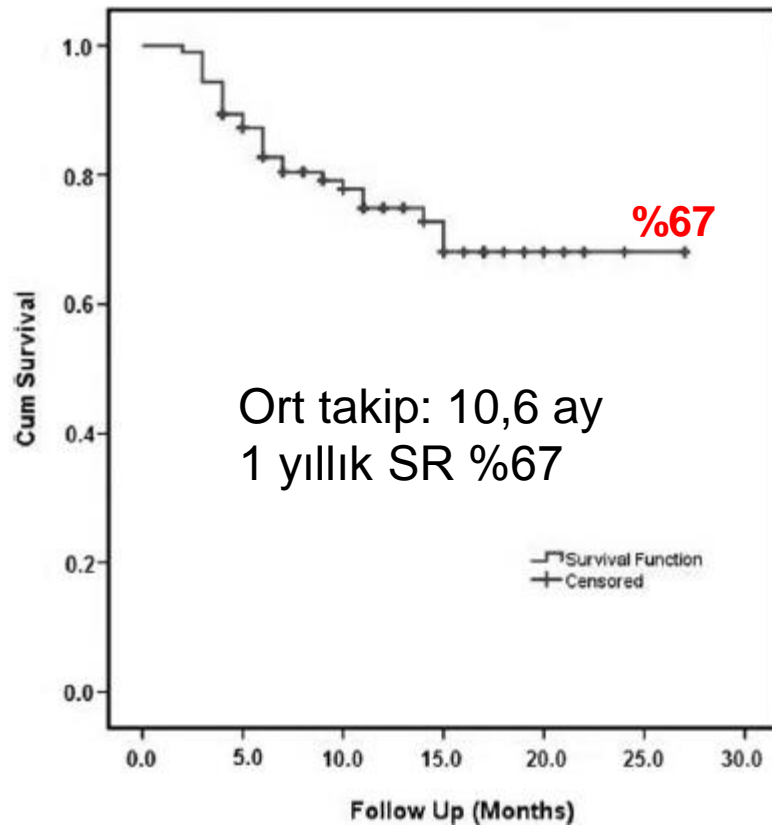
Giuseppe Ciconte^{*†}, Giannis Baltogiannis[†], Carlo de Asmundis, Juan Sieira, Giulio Conte, Giacomo Di Giovanni, Yukio Saitoh, Ghazala Irfan, Giacomo Mugnai, Burak Hunuk, Gian-Battista Chierchia[‡], and Pedro Brugada[‡]

	CB	RF
Tamponad, n (%)	-	1 (2)
Femoral psödoanevrizma, n (%)	1 (2)	1 (2)
Frenik sinir paralizi n (%)	2 (4)	-

Cryoballoon Ablation for Pulmonary Vein Isolation in Patients With Persistent Atrial Fibrillation One-Year Outcome Using Second Generation Cryoballoon

Buelent Koektuerk, MD; Hikmet Yorgun, MD; Oezlem Hengeoerz, MD; Cem H. Turan, MD;
Alina Dahmen, MD; Alexander Yang, MD; Paul M. Bansmann, MD; Eduard Gorr, MD;
Christian Hoppe, MD; Ramazan G. Turan, MD; Marc Horlitz, MD

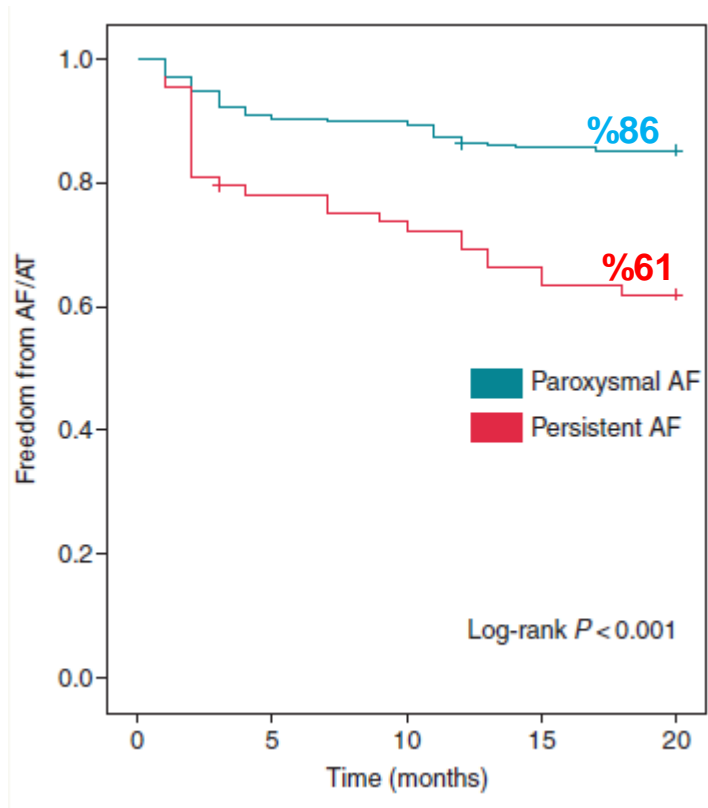
n= 100 hasta, ort AF süresi: 5,5 ay



One-year follow-up after second-generation cryoballoon ablation for atrial fibrillation in a large cohort of patients: a single-centre experience

Ghazala Irfan^{1†}, Carlo de Asmundis^{1†}, Giacomo Mugnai¹, Jan Poelaert², Christian Verborgh², Vincent Umbrain², Stefan Beckers², Ebru Hacioglu¹, Burak Hunuk¹, Vedran Velagic¹, Erwin Stroker¹, Pedro Brugada¹, and Gian-Battista Chierchia^{1*}

n=393; 62 HASTA (%16) PERSİSTAN AF



Komplikasyonlar

	Total procedures (n = 393)
Death related to the procedure	0
Atrial-oesophageal fistula	0
Neurologic complications	0
Transient ST elevation	1 (0.25%)
Cardiac tamponade	1 (0.25%)*
Severe PV stenosis	0
Retroperitoneal haematoma	1 (0.25%)
Groin complications	
Femoral pseudoaneurysm	5 (1.27%)**
Symptomatic persisting PNP	1 (0.25%)
Total	9 (2.29%)

Erken Öğrenme Eğrisi

Efficacy of Cryoballoon Pulmonary Vein Isolation in Patients with Persistent Atrial Fibrillation

Emily N Guhl MD, Donald Siddoway MD, Evan Adelstein MD, Andrew Voigt MD, Samir Saba MD, Sandeep K Jain MD

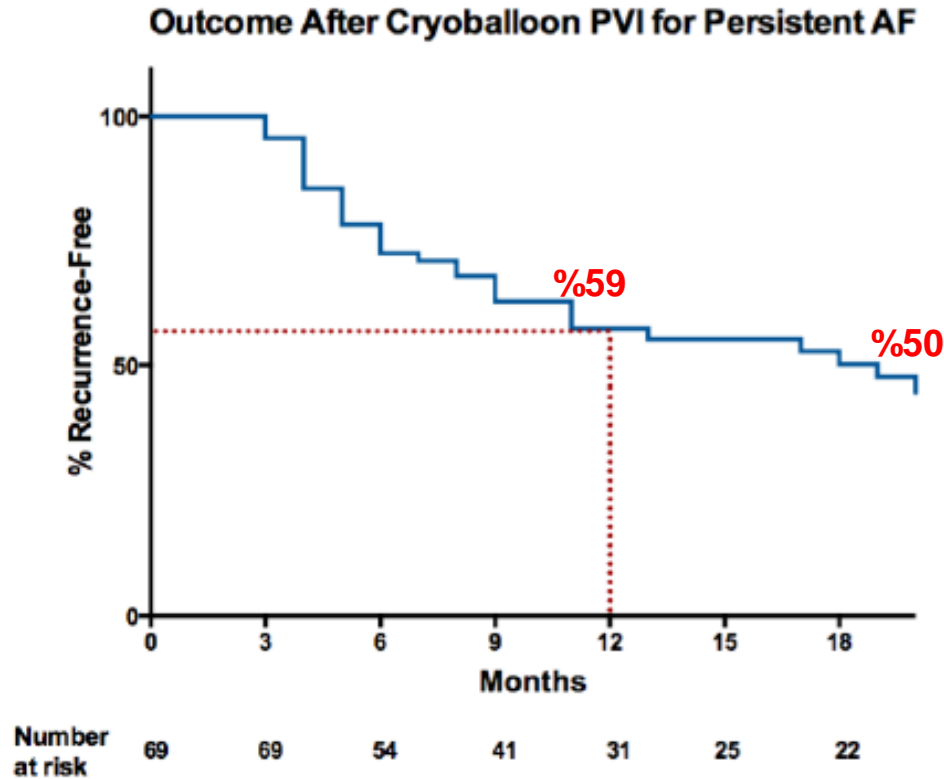
	Persistent AF Cryoballoon Ablation
Procedure Duration (min)	147 ± 45
Fluoroscopy Time (minutes)	44.5 ± 20.2
Complications	6 temporary PNI
Freedom from AF at 365 days	58.5%
% of recurrence-free who were AAD Free at 365 days	82.9%
LA Dwell Time (min)	100 ± 32
Total IV Contrast	51 ± 34
2 nd generation Cryoballoon	88% (n = 61/69)

Erken Öğrenme Eğrisi

Efficacy of Cryoballoon Pulmonary Vein Isolation in Patients with Persistent Atrial Fibrillation

Emily N Guhl MD, Donald Siddoway MD, Evan Adelstein MD, Andrew Voigt MD, Samir Saba MD, Sandeep

K Jain MD

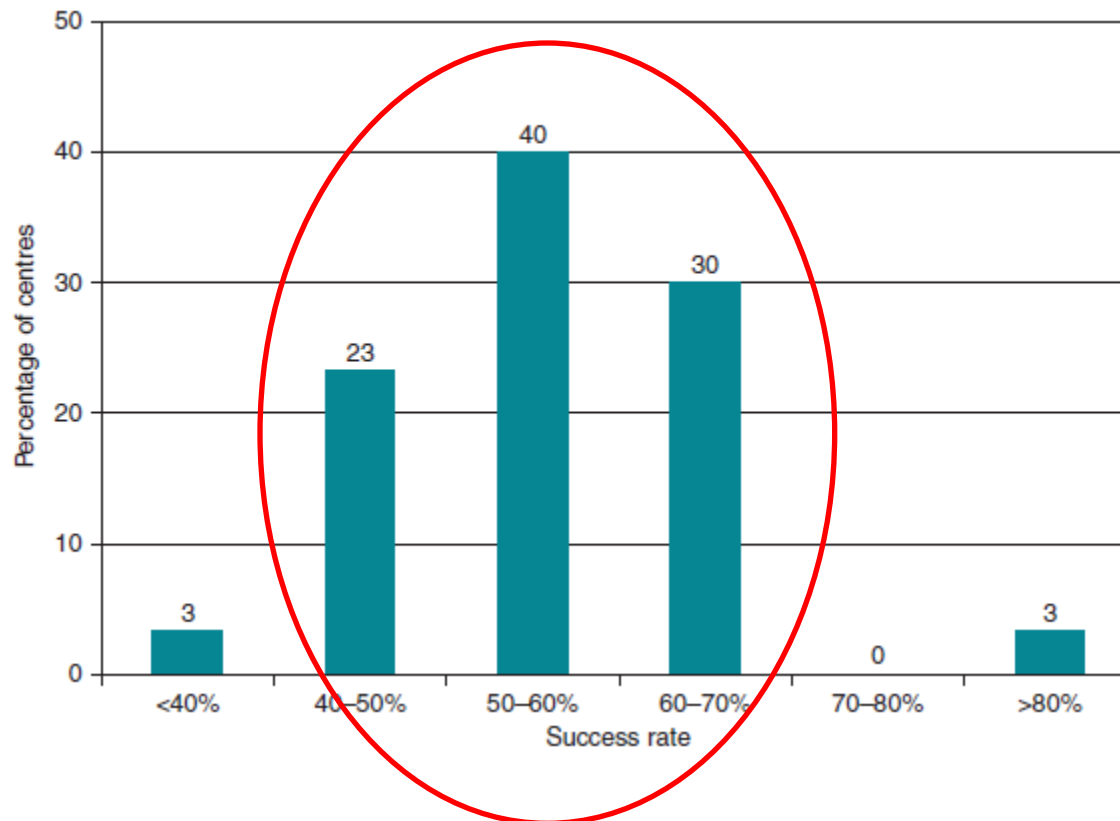


İşlem ve Floroskopi Süreleri

	İşlem süresi	Floroskopi süresi
Ciconte ve ark, 2015	87,1±38,2	14,9±6,1
Ciconte ve ark, 2015	90,5±41,7	14,5±6,6
Kokturk ve ark, 2015	96,2±21,3	19,7±6,7
Irfan ve ark, 2015	87,1±38,2	14,9±6,1
Guhl ve ark, 2016	147±45	45±2,2

Current ablation techniques for persistent atrial fibrillation: results of the European Heart Rhythm Association Survey

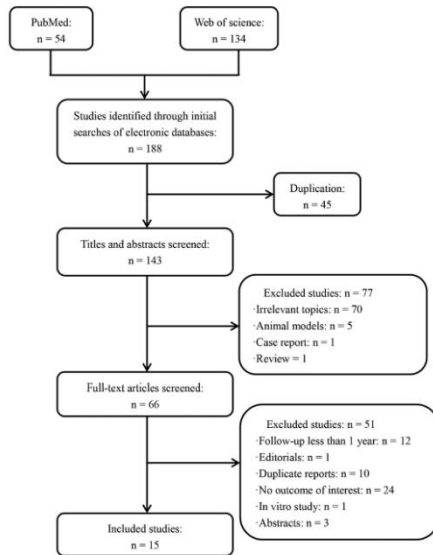
Nikolaos Dagues^{1*}, Maria Grazia Bongiorni², Torben Bjerregaard Larsen³, Antonio Hernandez-Madrid⁴, Laurent Pison⁵, and Carina Blomström-Lundqvist⁶
Conducted by the Scientific Initiatives Committee, European Heart Rhythm Association



One-Year Clinical Outcome of Pulmonary Vein Isolation Using the Second-Generation Cryoballoon: A Meta-Analysis

XIN HE, M.D.,* YILI CHEN, PH.D.,* YUE ZHOU, M.S.,* YIYI HUANG, M.S.,† and JIANGUI HE, PH.D.*

n=2563 hasta,
54 hasta PERSISTAN AF***



Study	Year	Location	Number of Patients	Follow-Up, Months	AF Type	Ablation Strategy
Aytemir et al. ¹⁷	2015	Turkey	109	10 (8–13)†	Mixed	“Bonus”
Kumar et al. ¹⁹	2015	Netherlands	90	12.4†	Mixed	“Bonus”
Metzner et al. ⁷	2014	Germany	49	14.7 ± 1.3†	Mixed	“Bonus”
Ciconte et al. ¹⁸	2015	Belgium	143	12.1 ± 4.4†	Mixed	“No-bonus”
Wissner et al. ²²	2015	Germany	44	13.1 ± 1.9†	Mixed	“No-bonus”
Aryana et al. ¹⁶	2015	United States	773	12‡	Mixed	Unknown
Liu et al. ²⁰	2015	Germany	68	12 ± 4†	Mixed	Unknown
Tebbenjohanns et al. ²¹	2015	Germany	192	15.3 ± 3.6†	Mixed	Mixed
Furnkranz et al. ⁶	2014	Germany	55	13.9 ± 2.5†	Paroxysmal	“Bonus”
Greiss et al. ¹¹	2015	Germany	188	15‡	Paroxysmal	“Bonus”
Jourda et al. ¹²	2015	France	75	12‡	Paroxysmal	“Bonus”
Squara et al. ¹³	2015	France	178	12 (10–18)†	Paroxysmal	“Bonus”
Chierchia et al. ¹⁰	2015	Belgium	287	11.5 ± 3.9†	Paroxysmal	Mixed
Ciconte et al. ¹⁴	2015	Belgium	63	12‡	Persistent	“Bonus”
Lemes et al. ¹⁵	2015	Germany	49	13.9 ± 5.9†	Persistent	Mixed

†Mean or median.

‡Maximum; Mixed, both paroxysmal and persistent AF were included or both the “no-bonus” strategy and the “bonus” strategy were adopted; Unknown, ablation strategies were not reported.

AF = atrial fibrillation.

One-Year Clinical Outcome of Pulmonary Vein Isolation Using the Second-Generation Cryoballoon: A Meta-Analysis

XIN HE, M.D.,* YILI CHEN, PH.D.,* YUE ZHOU, M.S.,* YIYI HUANG, M.S.,† and JIANGUI HE, PH.D.*

n=2563 hasta,
54 hasta PERSİSTAN AF***

CB2 - Persistan AF		
	Bonus	No-Bonus
1. Yıl AF'siz oran	% 63	%73 ***
Frenik sinir paralizi	%6,5	%4,6 ***

Uzun Dönem Takip - Kriyo

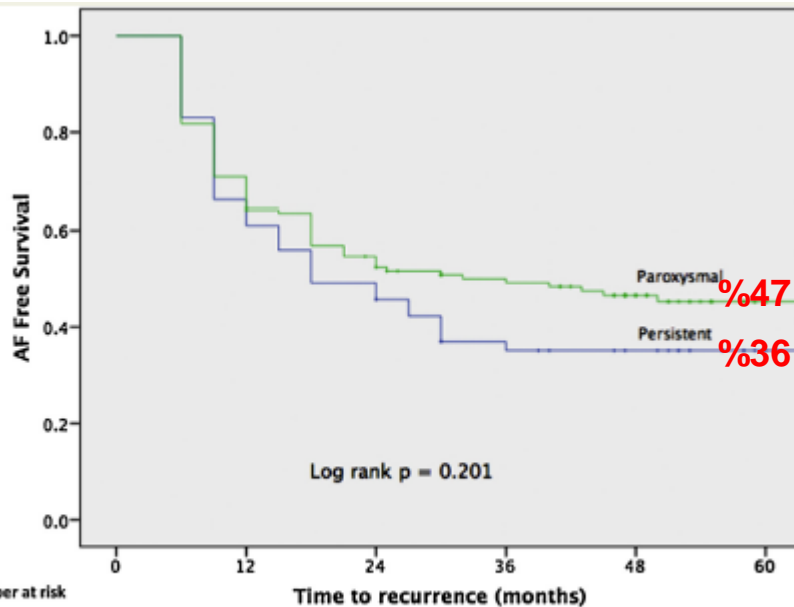
Long Term Follow-up of Pulmonary Vein Isolation using Cryoballoon Ablation

Allan J. Davies, MBBS^a, Nick Jackson, MBBS FRACP^b,
Malcolm Barlow, MBBS FRACP^{a*}, James Leitch, MBBS FRACP^a

^aCardiovascular Department, John Hunter Hospital, Newcastle, NSW, Australia

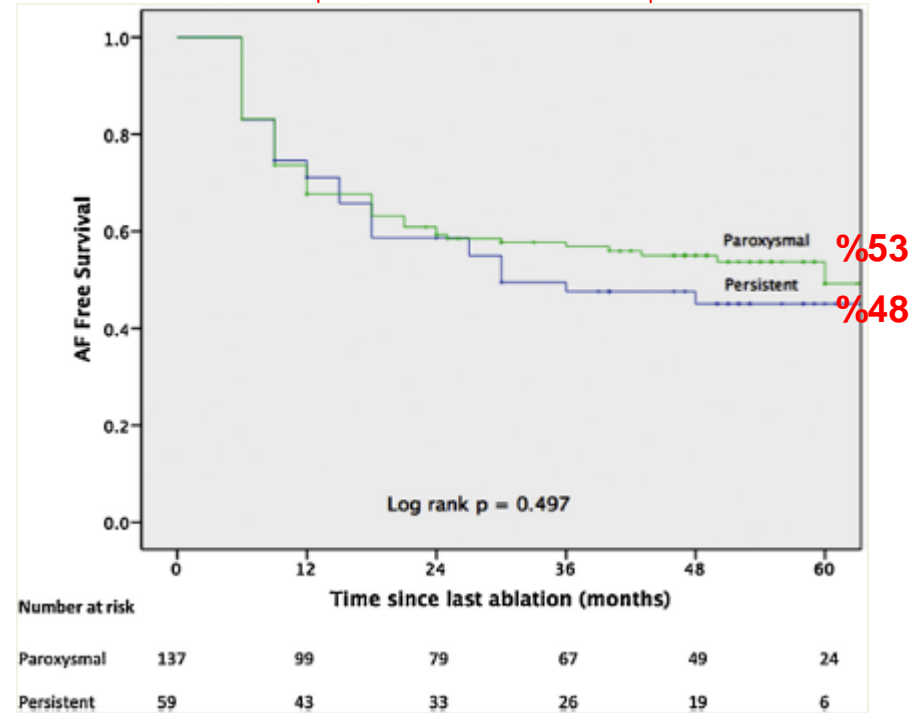
^bToronto General Hospital, Toronto, Ontario, Canada

Tek işlem



Number at risk	0	12	24	36	48	60
Paroxysmal	137	96	72	60	42	20
Persistent	59	39	28	19	15	4

Multipl işlem



Number at risk	0	12	24	36	48	60
Paroxysmal	137	99	79	67	49	24
Persistent	59	43	33	26	19	6

Uzun Dönem Takip - RF Ablasyon

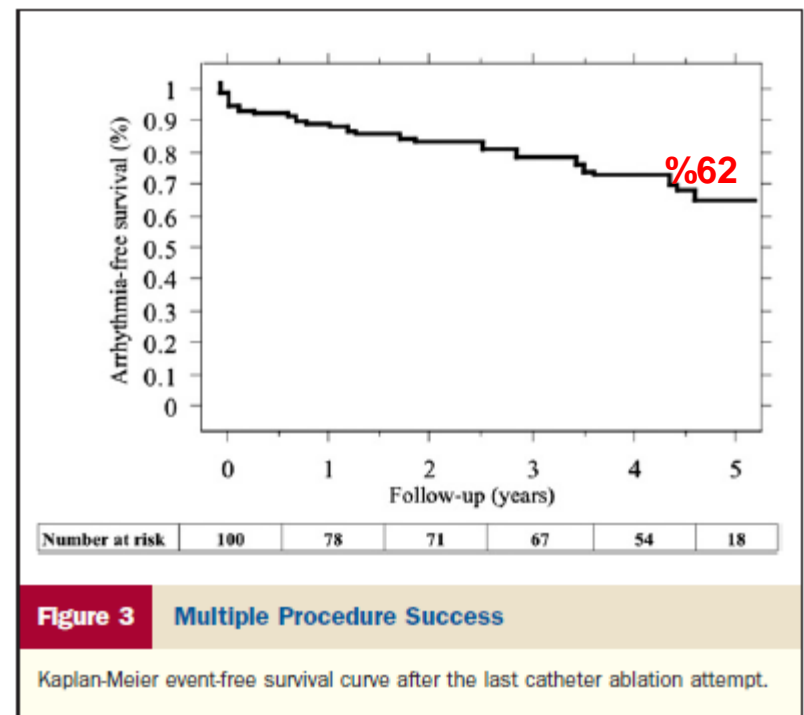
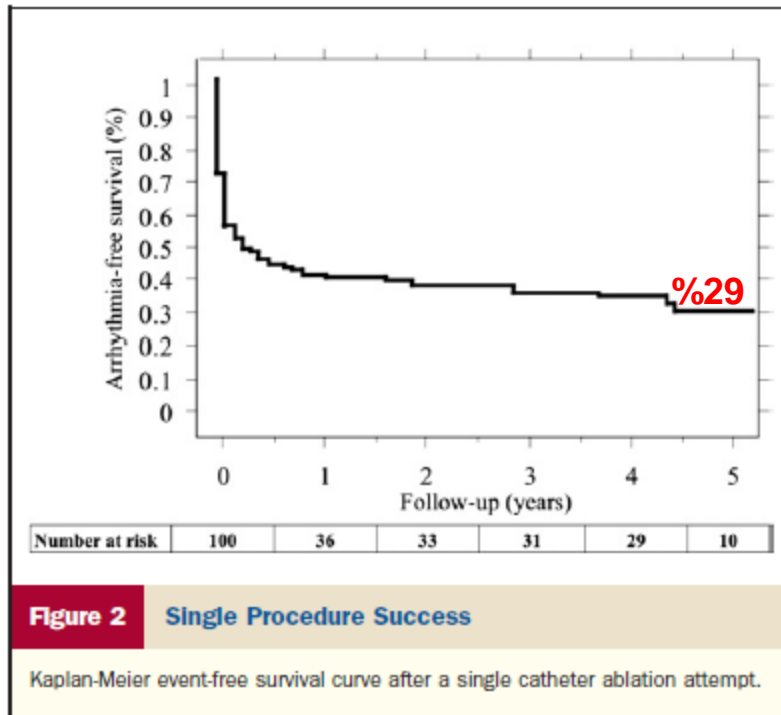
Catheter Ablation for Atrial Fibrillation

Are Results Maintained at 5 Years of Follow-Up?

Rukshen Weerasooriya, BMEDSc(HONS), MBBS,*† Paul Khairy, MD, PhD,‡ Jean Litalien, MD,* Laurent Macle, MD,‡ Meleze Hocini, MD,* Frederic Sacher, MD,* Nicolas Lellouche, MD,* Sebastien Knecht, MD,* Matthew Wright, PhD, MD,* Isabelle Nault, MD,* Shinsuke Miyazaki, MD,* Christophe Scavee, MD,* Jacques Clementy, MD,* Michel Haissaguerre, MD,* Pierre Jais, MD*

Bordeaux-Pessac, France; Crawley, Western Australia; and Montreal, Quebec, Canada

n: 100; 36'sı persistan AF**



Complications in the setting of percutaneous atrial fibrillation ablation using radiofrequency and cryoballoon techniques: A single-center study in a large cohort of patients

Giacomo Mugnai ^{*}, Ghazala Irfan ¹, Carlo de Asmundis ¹, Giuseppe Ciconte ¹, Yukio Saitoh ¹, Burak Hunuk ¹, Vedran Velagic ¹, Erwin Stroker ¹, Paolo Rossi ¹, Lucio Capulzini ¹, Pedro Brugada ¹, Gian-Battista Chierchia ¹

Heart Rhythm Management Centre, UZ Brussel—VUB, Brussels, Belgium

	<u>Total procedures</u> (n = 1233)	<u>RF procedures</u> (n = 642)	<u>CB procedures</u> (n = 591)	p value
Female gender	345 (28)	169 (26)	176 (30)	0.2
Age (years)	59 ± 11	60 ± 10	58 ± 13	0.5
Duration of symptoms (months)	29 ± 45	31 ± 47	28 ± 42	0.5
Persistent AF	383 (31)	287 (45)	96 (16)	<0.001
-Long-standing persistent AF	87 (7)	74 (12)	13 (2)	<0.001
Previous AF ablation	223 (18)	168 (26)	55 (9)	<0.001
Hypertension	506 (41)	271 (42)	235 (40)	0.4
Dyslipidemia	429 (35)	236 (37)	193 (33)	0.1
Diabetes mellitus	92 (7)	52 (8)	40 (7)	0.4
Coronary artery disease	105 (9)	61 (10)	44 (7)	0.2
Dilated cardiomyopathy	71 (6)	43 (7)	28 (5)	0.1
Valvular disease	30 (2)	12 (2)	18 (3)	0.2
Absence of cardiomyopathy	951 (77)	483 (75)	468 (79)	0.1
Hypothyroidism	45 (4)	29 (5)	16 (3)	0.09
Oral anticoagulation	857 (70)	443 (69)	414 (70)	0.7
IC class antiarrhythmic drugs	380 (31)	209 (33)	171 (29)	0.09
Beta blockers	455 (37)	248 (39)	207 (35)	0.2
III class antiarrhythmic drugs	393 (32)	217 (34)	176 (30)	0.1
Calcium channel blockers	46 (4)	30 (5)	16 (3)	0.07
Left ventricular ejection fraction (%)	58 ± 6	57 ± 6	59 ± 13	0.2
Left atrial size (mm)	44 ± 7	46 ± 7	42 ± 7	<0.001
CHA ₂ DS ₂ -VASc score	1.42 ± 1.3	1.45 ± 1.3	1.37 ± 1.3	0.2
CHADS score	0.82 ± 0.58	0.84 ± 0.68	0.78 ± 0.69	0.1
HAS-BLED score	1.16 ± 1.01	1.19 ± 1.05	1.12 ± 1.02	0.2
Body mass index (kg/m ²)	27 ± 4	28 ± 4	27 ± 4	0.4
Roof line	205 (17)	198 (31)	7 (1)	<0.001
Mitral line	108 (9)	105 (16)	3 (0.5)	<0.001
Ablation of complex electrograms	112 (9)	110 (17)	2 (0.3)	<0.001

RF: radiofrequency; CB: cryoballoon; AF: atrial fibrillation.

Complications in the setting of percutaneous atrial fibrillation ablation using radiofrequency and cryoballoon techniques: A single-center study in a large cohort of patients

Giacomo Mugnai ^{*,1}, Ghazala Irfan ¹, Carlo de Asmundis ¹, Giuseppe Ciconte ¹, Yukio Saitoh ¹, Burak Hunuk ¹, Vedran Velagic ¹, Erwin Stroker ¹, Paolo Rossi ¹, Lucio Capulzini ¹, Pedro Brugada ¹, Gian-Battista Chierchia ¹

Heart Rhythm Management Centre, UZ Brussel—VUB, Brussels, Belgium

Procedural and fluoroscopy times in RF and CB ablation procedures.

	RF (PV isolation only)	RF (PV isolation + additional lines)	1st generation CB	2nd generation CB
Procedural time (min)	136.4 ± 51.8	169.7 ± 61.8	116.0 ± 36.9	65.2 ± 19.1
Fluoroscopy time (min)	28.4 ± 11.9	39.3 ± 20.2	24.3 ± 7.8	15.6 ± 6.5

Complications in the setting of percutaneous atrial fibrillation ablation using radiofrequency and cryoballoon techniques: A single-center study in a large cohort of patients

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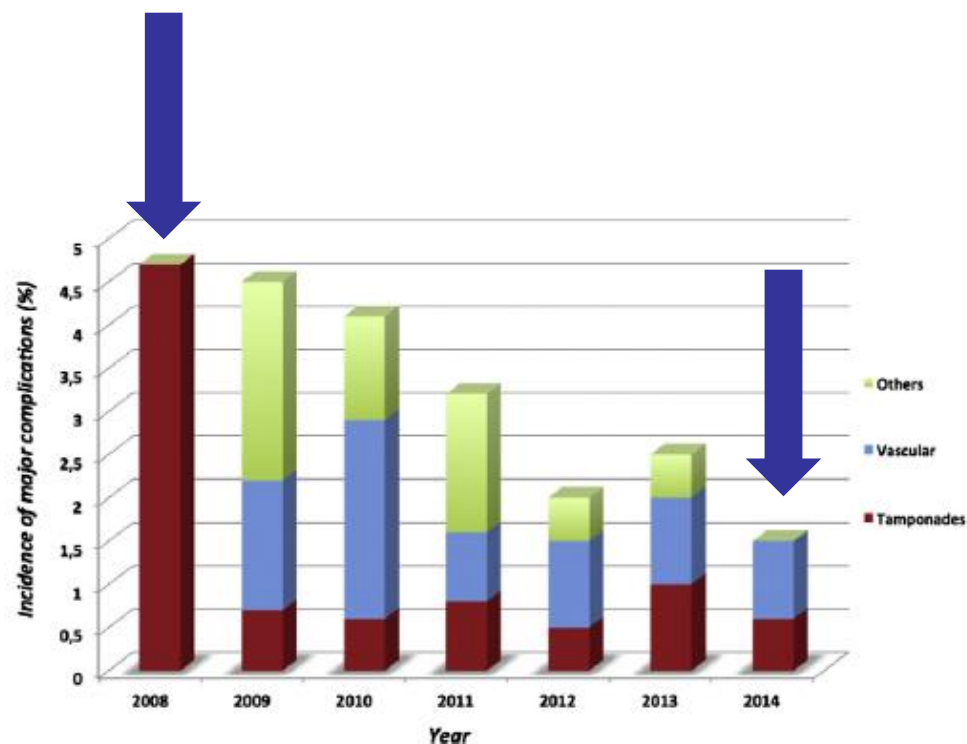
Heart Rhythm Management Centre, UZ Brussel–VUB, Brussels, Belgium

Adverse events in RF and CB ablation procedures.

	Total procedures (n = 1233)	RF procedures (n = 642)	CB procedures (n = 591)	p value
Serious adverse events				
Death related to the procedure	0	0	0	
Atrial-esophageal fistula	1 (0.08%)	1 (0.16%)	0	0.3
Thromboembolic complications				
– Stroke	1 (0.08%)	1 (0.16%)	0	0.3
– Transient ischemic attack	3 (0.24%)	2 (0.31%)	1 (0.17%)	0.6
Cardiac tamponade	13 (1.05%)	10 (1.56%)	3 (0.51%)	0.07
Severe PV stenosis	0	0	0	
PV intramural hematoma	1 (0.08%)	0	1 (0.17%)	0.3
Retroperitoneal hematoma	1 (0.08%)	0	1 (0.17%)	0.3
Groin complications				
– Femoral pseudoaneurysm	12 (0.97%)	8 (1.25%) ^a	4 (0.68%)	0.3
– Arteriovenous fistula	2 (0.16%)	1 (0.16%)	1 (0.17%)	0.9
Symptomatic persisting PNP	1 (0.08%)	0	1 (0.17%)	0.3
Pleural hematoma	1 (0.08%)	0	1 (0.17%)	0.3
Total	36 (2.92%)	23 (3.58%)	13 (2.20%)	0.1
Other adverse events				
Acute pericarditis	17 (1.38%)	12 (1.87%)	5 (0.85%)	0.12
Transient ST elevation	7 (0.57%)	4 (0.62%)	3 (0.51%)	0.75
Phrenic nerve palsy	48 (3.89%)	0	48 (8.12%)	0.0001
• Transient	37 (3.00%)	0	37 (6.26%)	0.0001
• Persistent	11 (0.89%)	0	11 (1.86%)	0.0003

RF: radiofrequency; CB: cryoballoon; PV: pulmonary vein; PNP: phrenic nerve palsy.

^a 2 femoral pseudoaneurysms were related to the left femoral artery approach, used until October 2009 to monitor arterial pressure and to assess the radiological position of the aorta.



Sessiz Serebral İskemi

	Irrigated-RF	Kriyobalon
<i>Herrera ve ark. J Am Coll Cardiol 2011</i>	%7,4	%4,3
<i>Gaita ve ark. J Cardiovasc Electrophsiol 2011</i>	%8,3	%5,6

ÖZET

	CB	RF
Etkinlik	++	++
Güvenlilik	++	++
İşlem süresi	+	++
Floroskopi süresi	+	++
Öğrenme eğrisi	+	+++
Deneyim	+	+++

Current ablation techniques for persistent atrial fibrillation: results of the European Heart Rhythm Association Survey

Nikolaos Dagues^{1*}, Maria Grazia Bongiorni², Torben Bjerregaard Larsen³, Antonio Hernandez-Madrid⁴, Laurent Pison⁵, and Carina Blomström-Lundqvist⁶
Conducted by the Scientific Initiatives Committee, European Heart Rhythm Association

Tercih Edilen Ablasyon Yöntemi

	CB	RF
Persistan AF	%20	%80
Uzun süreli Persistan AF	%10	%90

SONUÇ:

***PERSİSTAN AF'DE
KRİYOBALON
UYGULANMALIDIR***

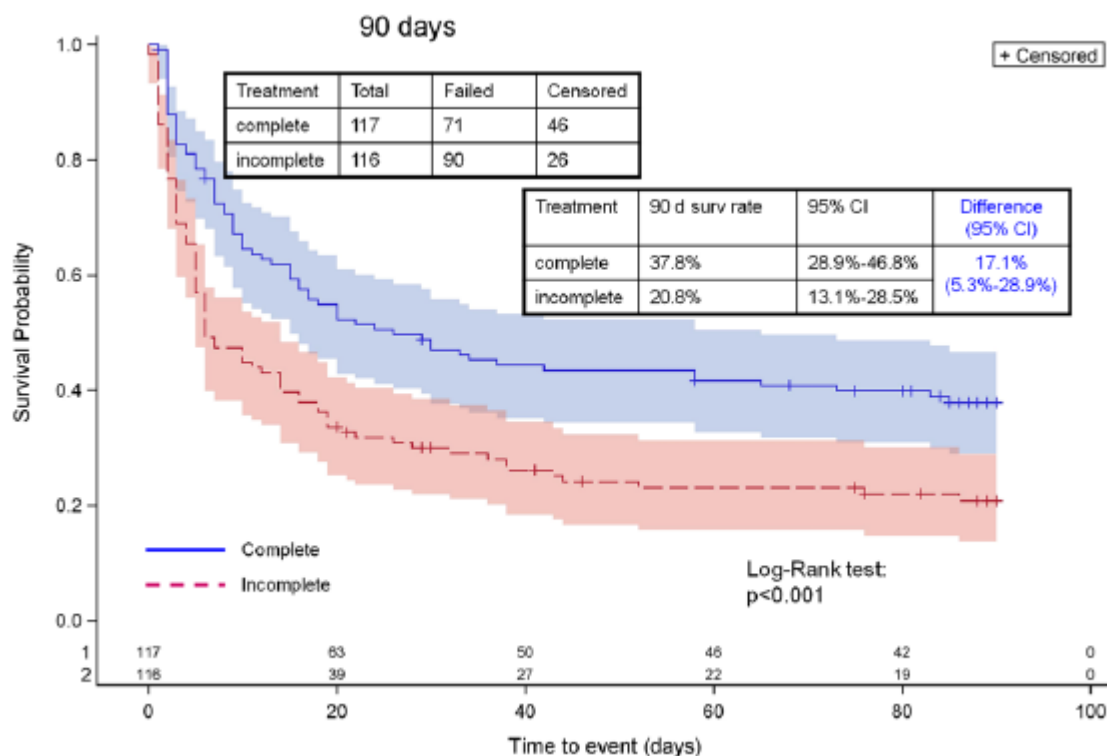
Teşekkür ederim...

Reconnection

Impact of Complete Versus Incomplete Circumferential Lines Around the Pulmonary Veins During Catheter Ablation of Paroxysmal Atrial Fibrillation

Results From the Gap-Atrial Fibrillation–German Atrial Fibrillation Competence Network 1 Trial

Karl-Heinz Kuck, MD; Boris A. Hoffmann, MD; Sabine Ernst, MD; Karl Wegscheider, PhD; Andras Treszl, MD; Andreas Metzner, MD; Lars Eckardt, MD; Thorsten Lewalter, MD; Günter Breithardt, MD; Stephan Willems, MD; for the Gap-AF–AFNET 1 Investigators*



Neden kriyobalon tercih edelim??:

- 1- Enerji daha dzenli ve devamlılık arzeden, daha geniř alanda lezyonlar oluřturur.
- 2- Skar daha homojen, bađ dokusu korunur, daha iyi yara iyileřmesi.
- 3- Daha az endotel hasarı
- 4- Tek septal ponksiyon
- 5- Erken đrenme eđrisi
- 6- İřlem ve floroskopi sresi kısa
- 7- Etkinlik ve gvenlilik RF'e benzer

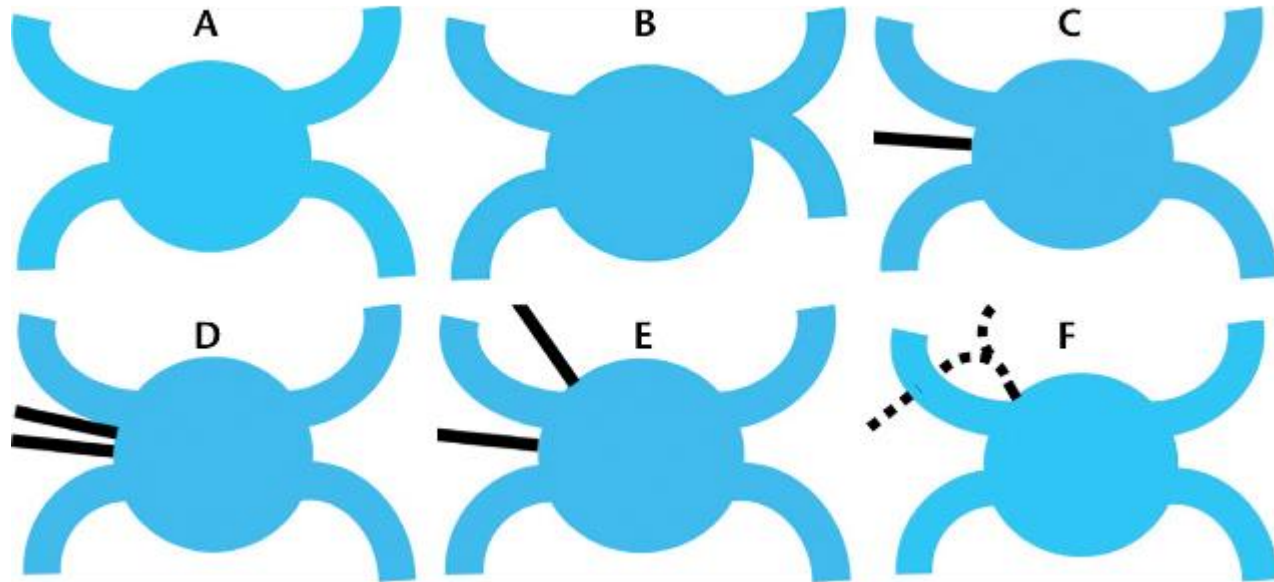
Kriyobalon

Avantaj

- Kısa işlem süresi
- Kısa floroskopi süresi
- Tek septal ponksiyon
- Hızlı öğrenme etkisi
- Lezyon devamlılığı, daha az endotel hasarı
- Etkin ve güvenli

Dezavantaj

- Kılıf sert ve kalın
- Anatomik zorluklar (common trunk vs)
- Kontrast madde
- Frenik sinir paralizi

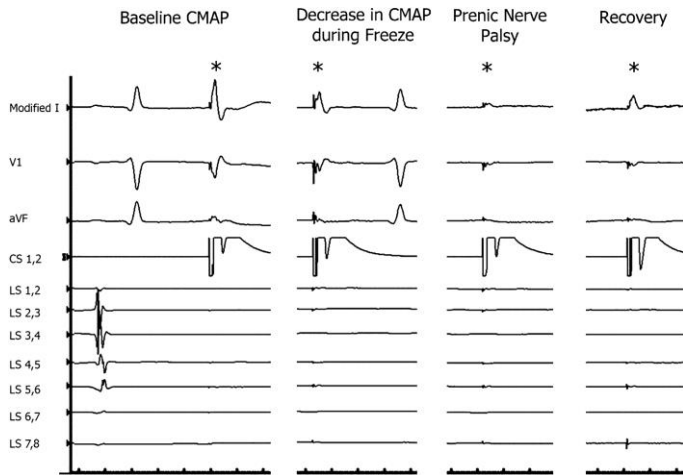


Kriyoda İşlem süresini kısaltmaya yönelik manevralar:

- No-bonus
- 3 dk freeze
- <30 sn PVI olursa 150 sn'de kesilebilir...
vs...
- Diyafram stim (CS kateter), en son sol dondurulurken yerleştir.

Kriyoda PNI Azaltmaya Yönelik manevralar:

- Yüksek voltaj pacing ve manual veya CMAP takip
- 28 mm balon
- CMAP



Kriyoda PNI Azaltmaya Yönelik manevralar:

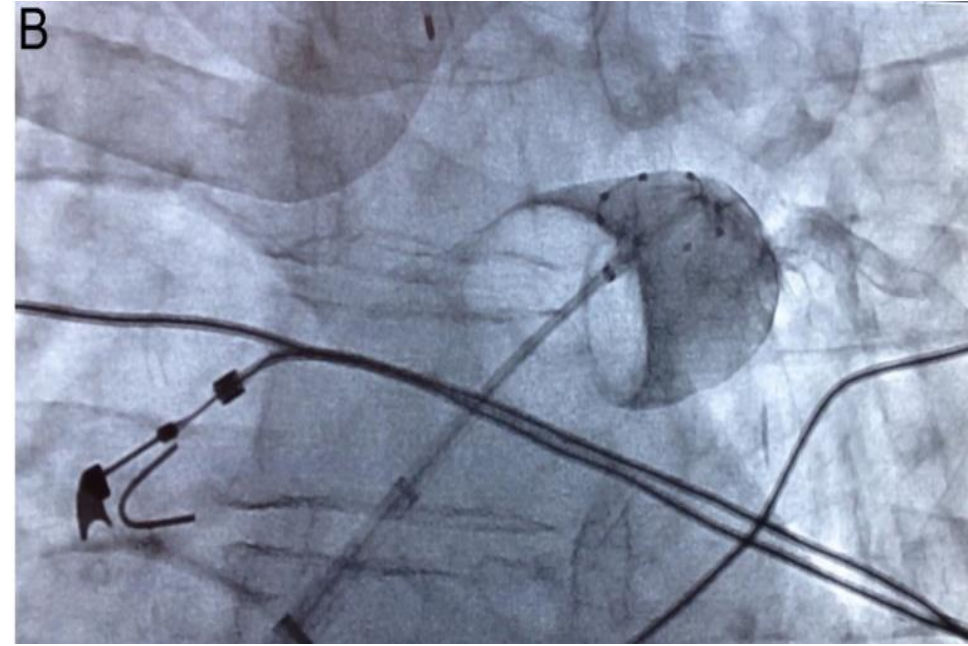
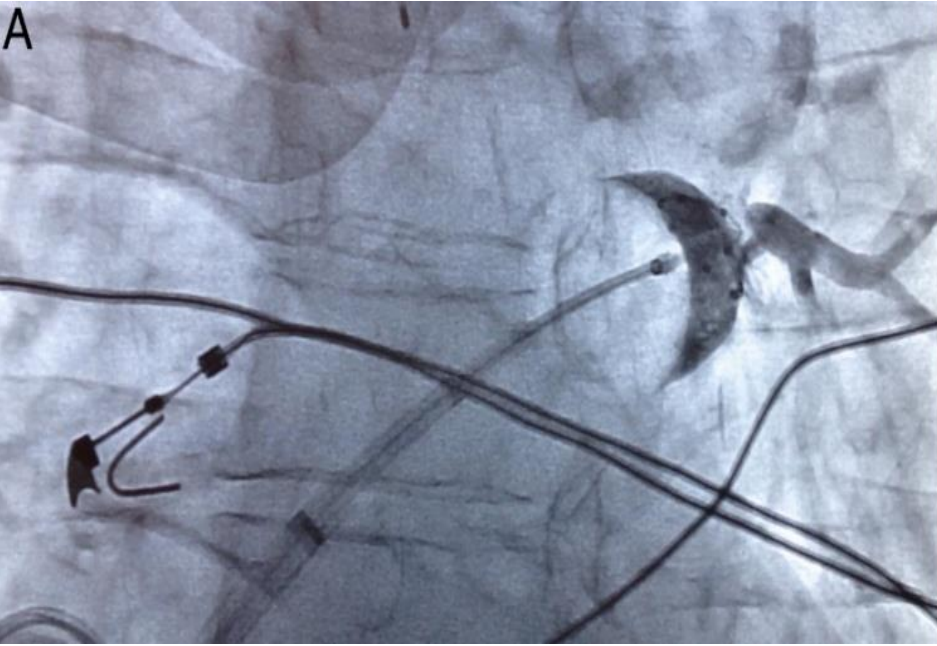


Figure 3

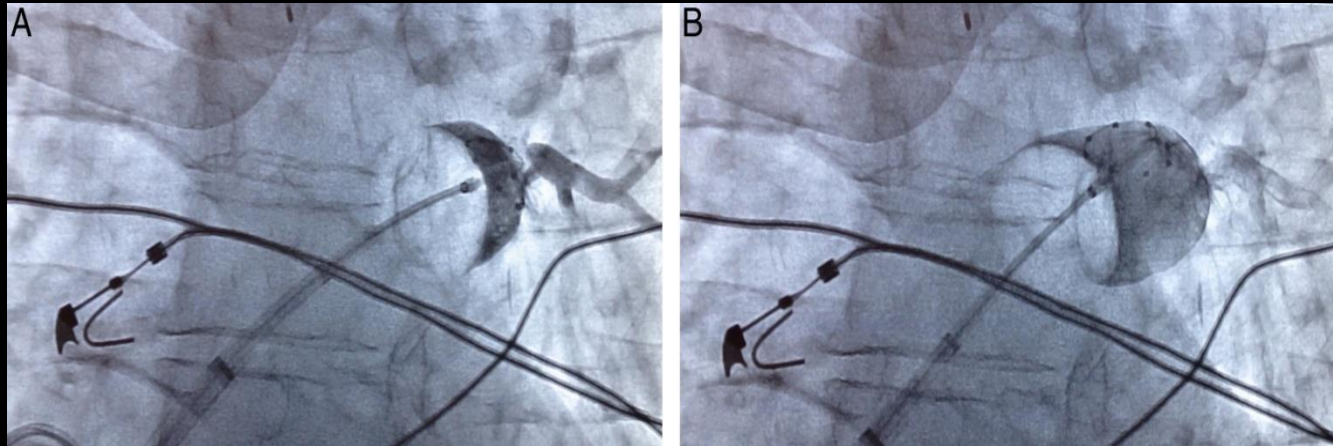


Figure 4

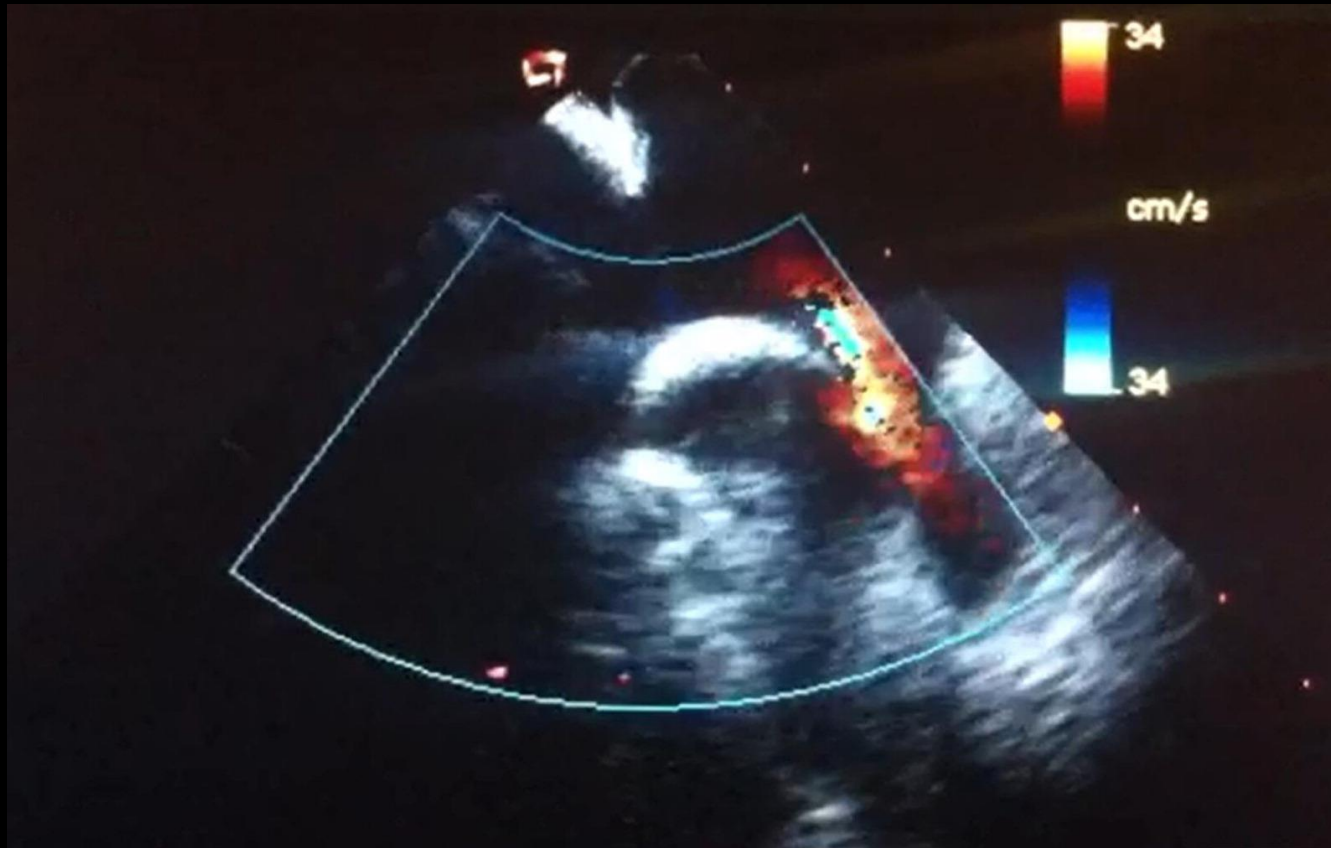
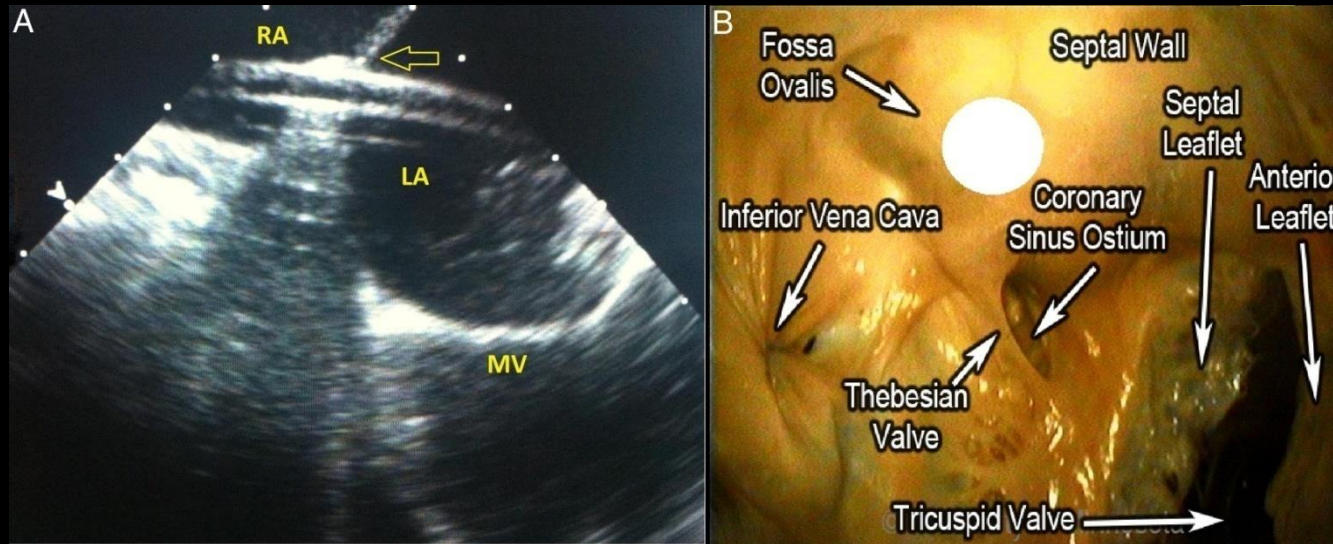
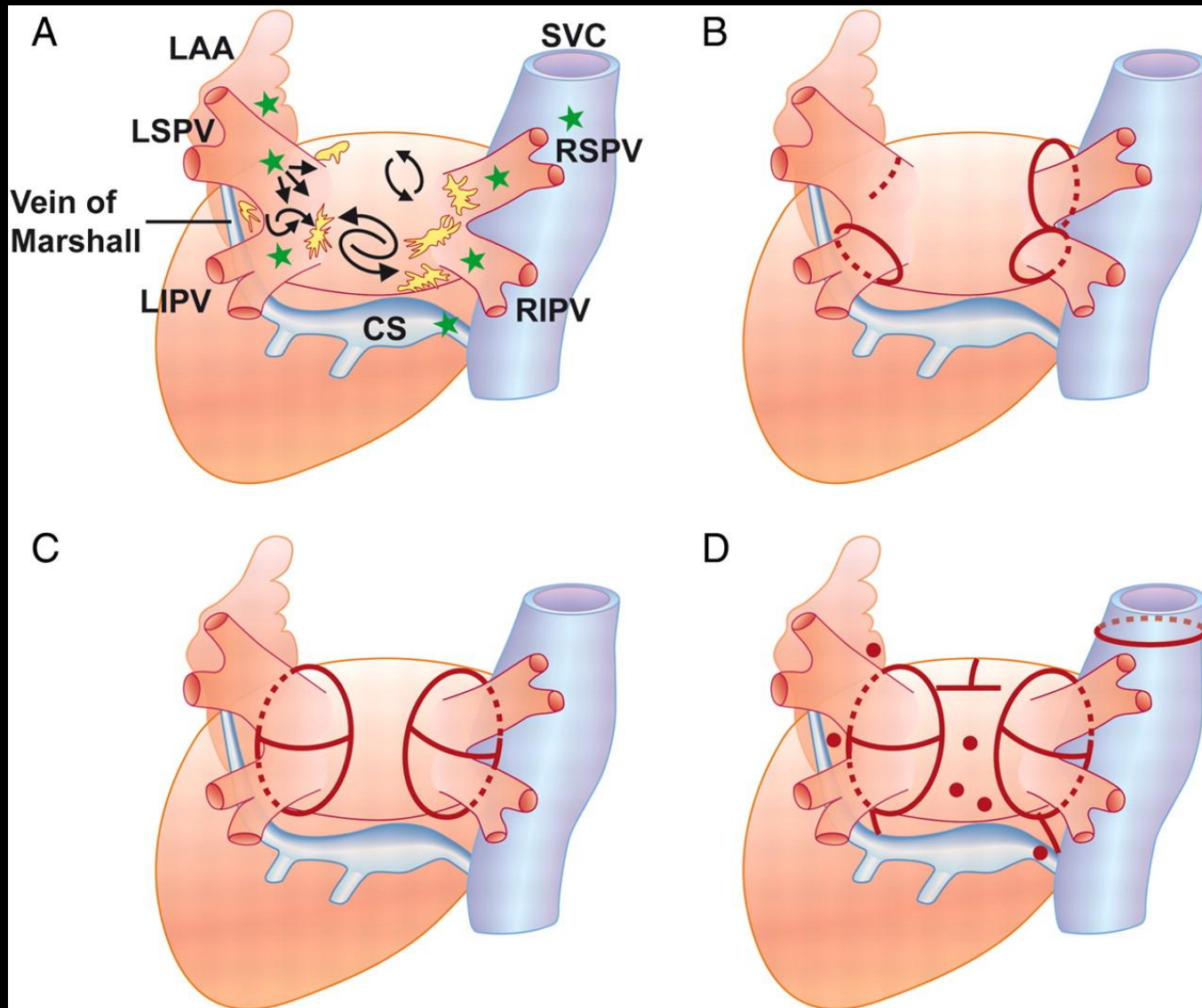


Figure 2





One-year clinical success of a 'no-bonus' freeze protocol using the second-generation 28 mm cryoballoon for pulmonary vein isolation

Erik Wissner^{*†}, Christian-Hendrik Heeger[†], Hanno Grahn, Bruno Reissmann, Peter Wohlmuth, Christine Lemes, Peter Rausch, Shibu Mathew, Andreas Rillig, Sebastian Deiss, Tillman Maurer, Tina Lin, Roland Richard Tiltz, Feifan Ouyang, Karl-Heinz Kuck, and Andreas Metzner

Department of Cardiology, Asklepios Klinik St. Georg, Lohmühlenstraße 5, Hamburg 20099, Germany

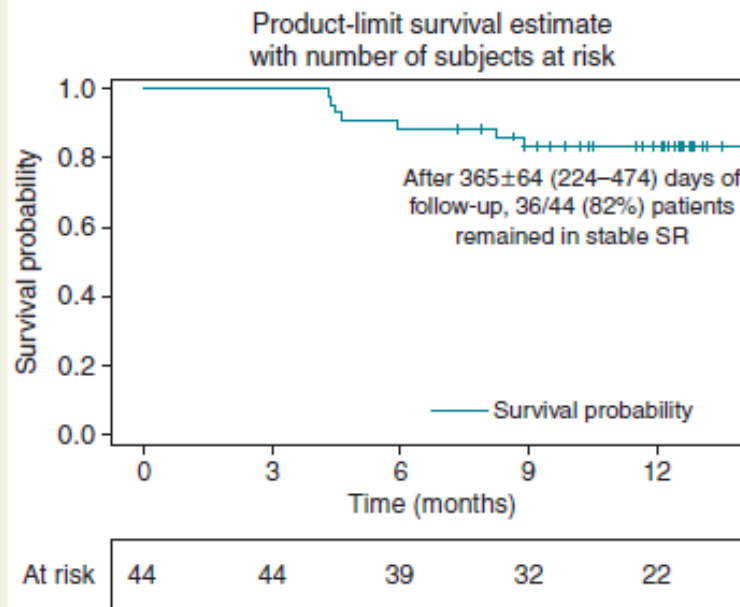


Figure 1 Kaplan–Meier curve. The Kaplan–Meier curve reflects the relative proportion of patients in stable SR following initial pulmonary vein isolation using the second-generation 28 mm cryoballoon during a mean FU period of 392 ± 58 (range 267–522) days including a 3-month blanking period. SR, sinus rhythm.