



Individualised strategy approach to AF ablation

Dr Tim Betts MD MBChB FRCP

Consultant Cardiologist & Electrophysiologist

Oxford Heart Centre, John Radcliffe Hospital

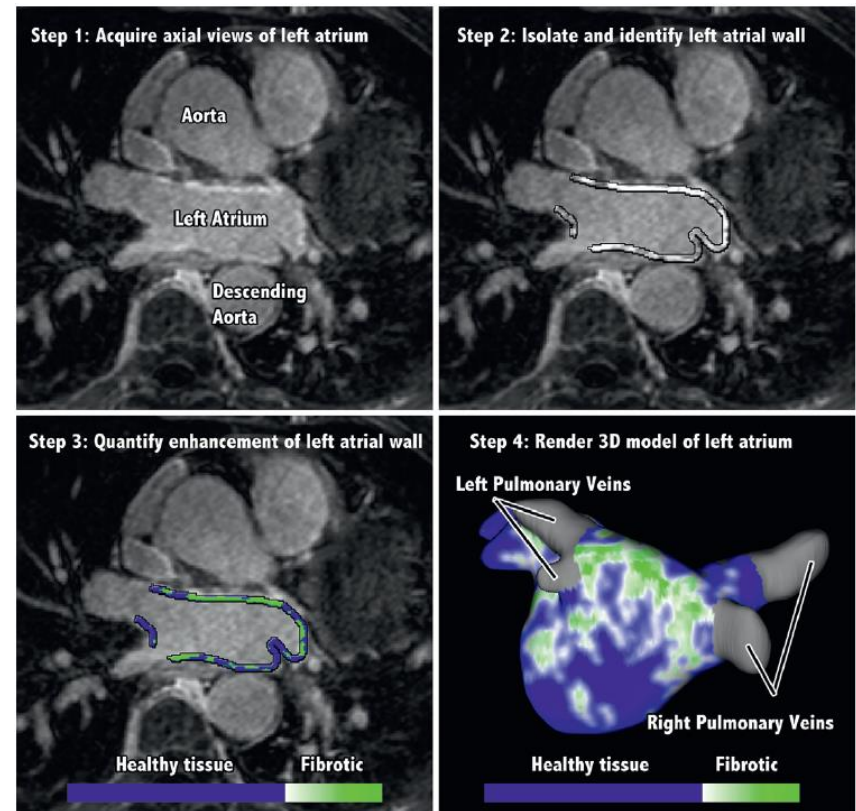
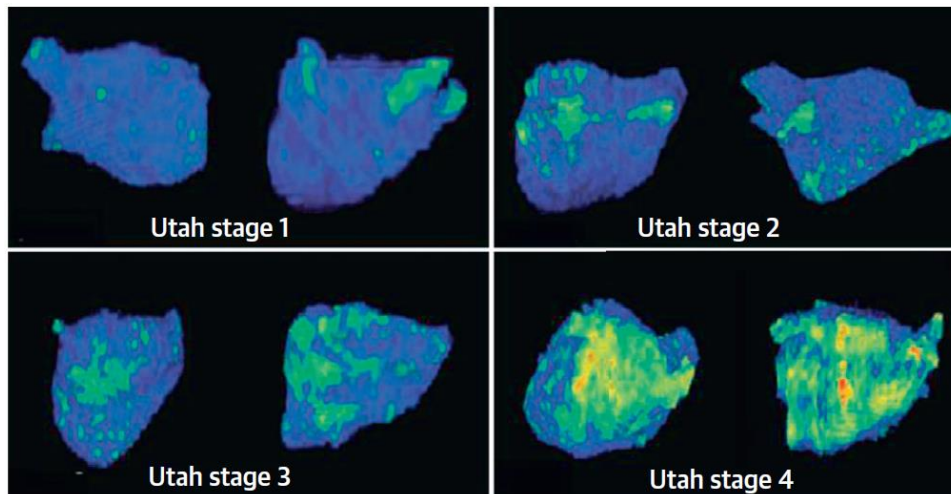
Oxford University Hospitals NHS Foundation Trust

Disclosures

- None related to this talk

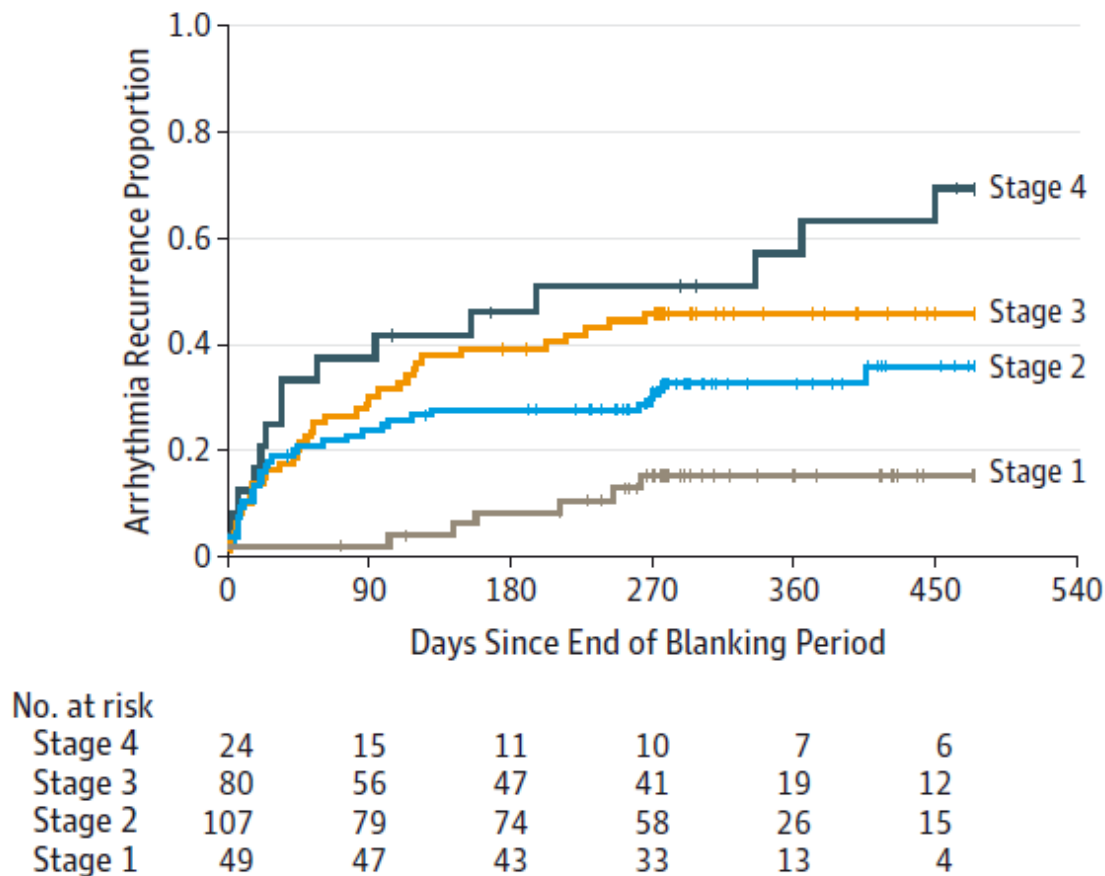
Does pre-procedure imaging help?

- PV anatomy
- LA dimensions/volume
- Fibrosis



DECAAF study: Extent of fibrosis predicts outcome after ablation

Figure 4. Cumulative Incidence of Arrhythmia Recurrence Without Covariate Adjustment Through Day 475 After the Blanking Period

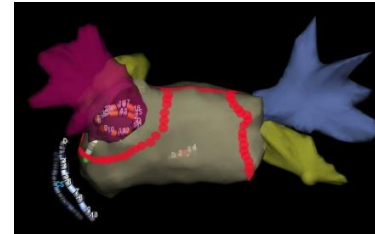
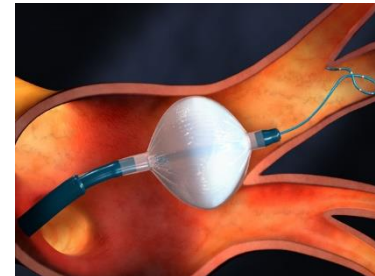
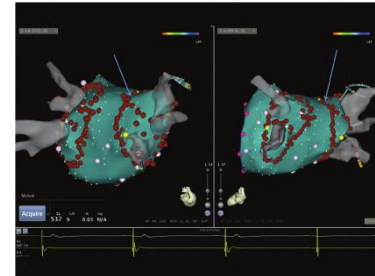


Paroxysmal AF: What is the correct approach?

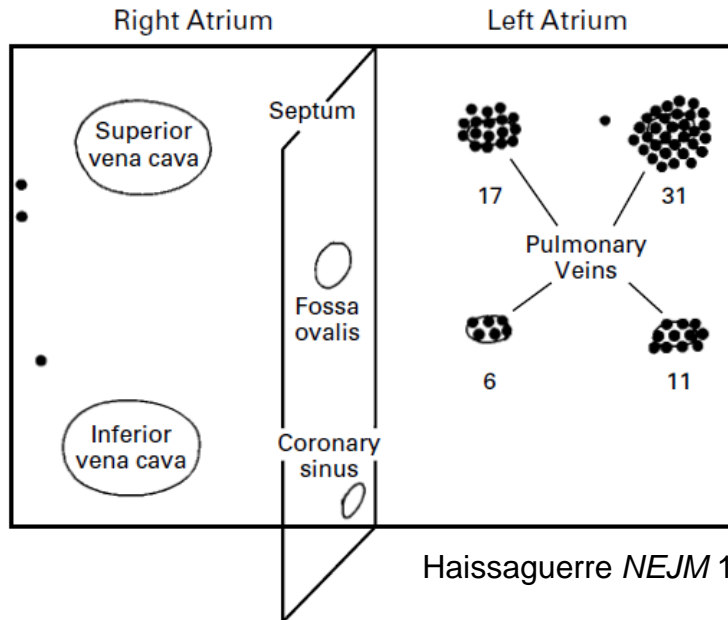
2012 HRS/EHRA/ECAS Expert Consensus Statement on Catheter and Surgical Ablation of Atrial Fibrillation: Recommendations for Patient Selection, Procedural Techniques, Patient Management and Follow-up, Definitions, Endpoints, and Research Trial Design

Table 3 Recommendations regarding ablation technique

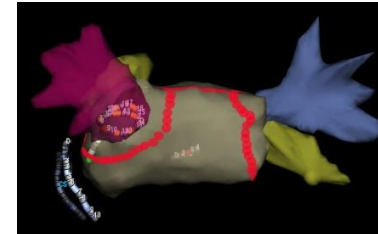
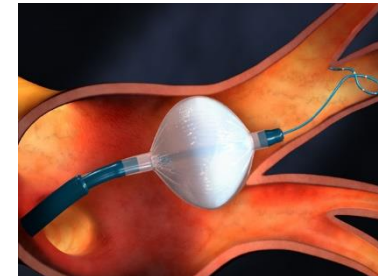
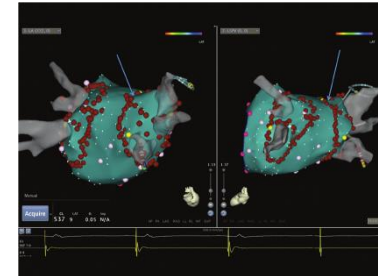
- Ablation strategies that target the PVs and/or PV antrum are the cornerstone for most AF ablation procedures.
- If the PVs are targeted, electrical isolation should be the goal.
- Achievement of electrical isolation requires, at a minimum, assessment and demonstration of entrance block into the PV.
- Monitoring for PV reconnection 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.



Paroxysmal AF: What is the correct approach?



Haissaguerre *NEJM* 1998 (339):659



Non-PVI triggers initiating AF

- Are very rarely seen
- Are very difficult to locate with 3D mapping systems
- Are impossible to map and ablate with single-shot technologies

Empiric SVC isolation has the potential for phrenic nerve injury and SVC stenosis

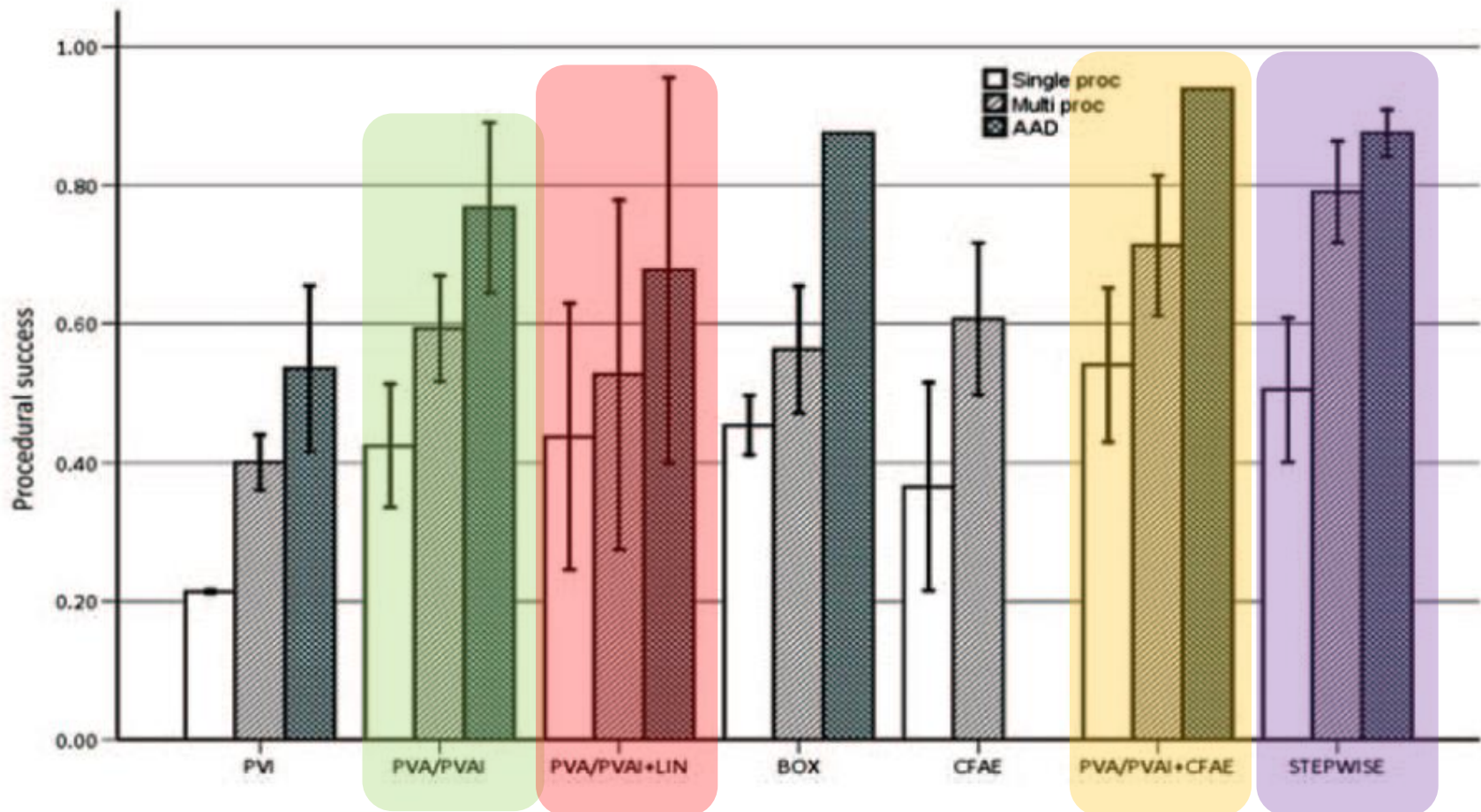
Persistent AF: What is the correct approach?

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

Table 3 Recommendations regarding ablation technique

- If patients with longstanding persistent AF are approached, operators should consider more extensive ablation based on linear lesions or complex fractionated electrograms.

Historical data



Brooks AG, Stiles MK, Laborderie J, Lau DH, Kuklik P, Shipp NJ, Hsu LF, Sanders P. Outcomes of long-standing persistent atrial fibrillation ablation: a systematic review. *Heart Rhythm*. 2010;7:835–846.

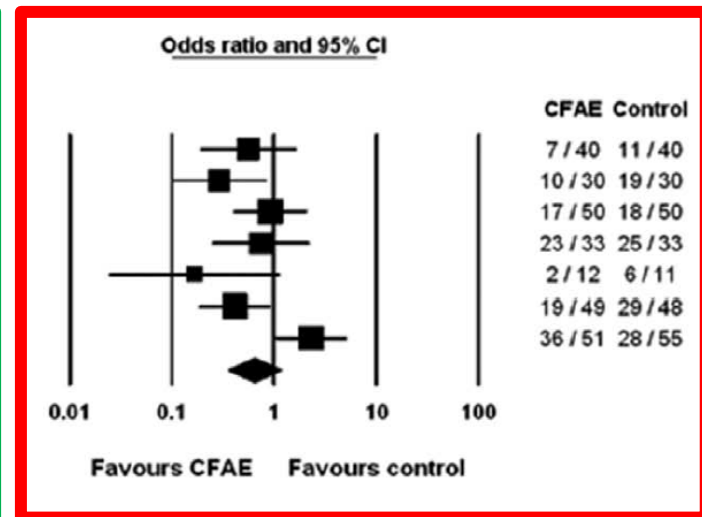
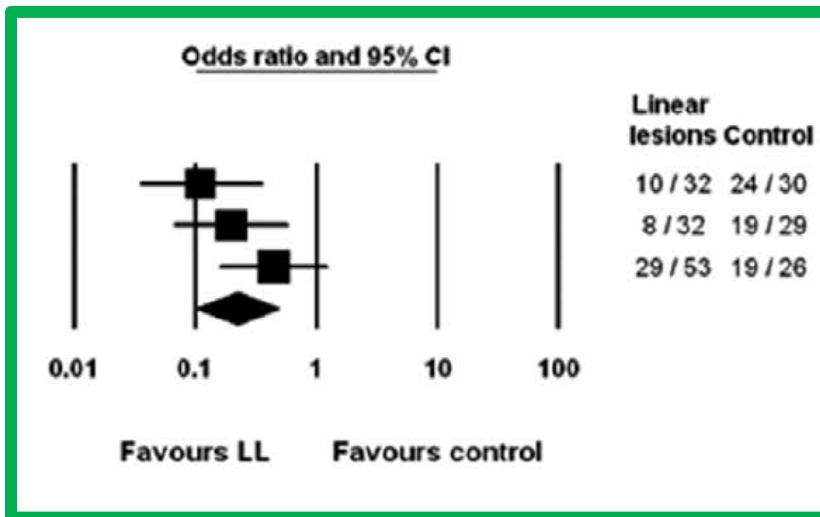
Persistent AF: a meta-analysis?

Efficacy of Catheter Ablation for Persistent Atrial Fibrillation

A Systematic Review and Meta-Analysis of Evidence From Randomized and Nonrandomized Controlled Trials

Gareth J. Wynn, MBChB; Moloy Das, MBBS; Laura J. Bonnett, PhD; Sandeep Panikker, MBBS;
Tom Wong, MD; Dhiraj Gupta, MD

(*Circ Arrhythm Electrophysiol.* 2014;7:841-852.)



Lines may be worth doing CFEs add no benefit

Persistent AF: more recent meta-analysis

The impact of adjunctive complex fractionated atrial electrogram ablation and linear lesions on outcomes in persistent atrial fibrillation: a meta-analysis

Paul A. Scott*, John Silberbauer, and Francis D. Murgatroyd

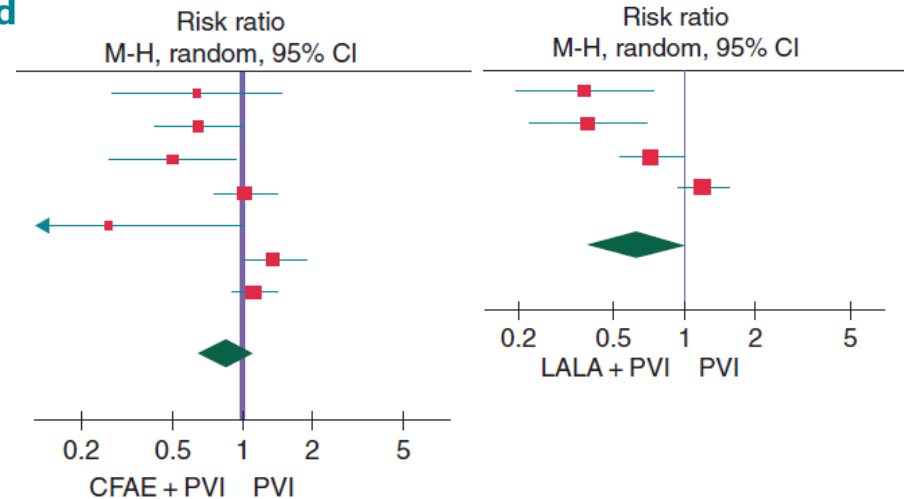
Department of Cardiology, King's College Hospital NHS Foundation Trust, Denmark Hill, London SE5 9RS, UK

Received 14 July 2015; accepted after revision 23 September 2015; online publish-ahead-of-print 10 November 2015

Europace (2016) 18, 359–367

10 studies

6 CFAEs, 3 linear lesions, 1 both



In comparison with PVI alone, the addition of CFAE ablation or left atrial linear lesions offered no significant improvement in arrhythmia-free survival

Adjunctive CFAE ablation was associated with significant increases and linear lesions non-significant increases in procedure and fluoroscopy times

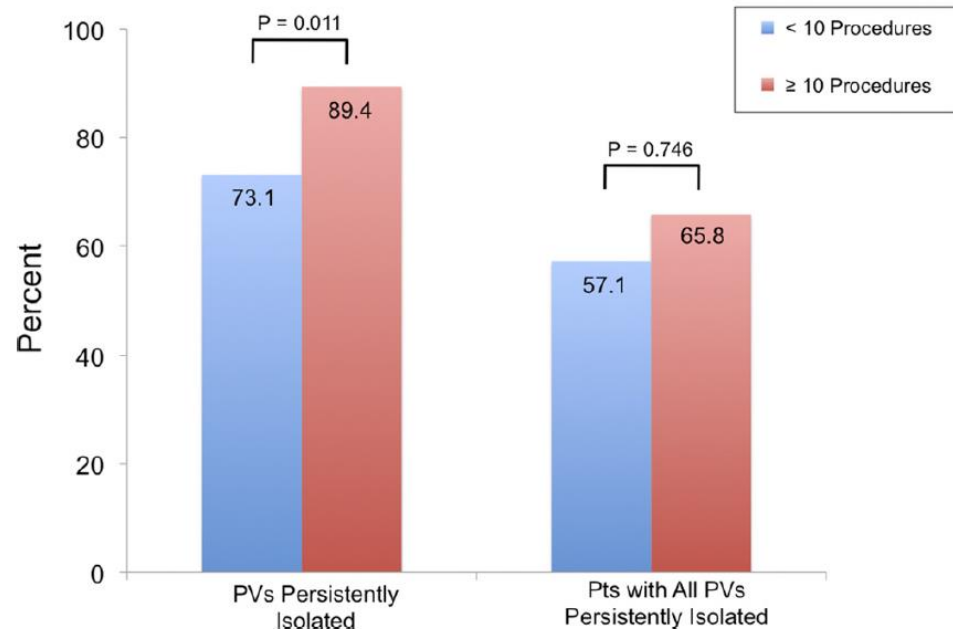
Persistent AF: confounding factors

- How can we reliably assess the impact of adjunctive ablation when there is a high incidence of PV reconnection?
- An ablation technology that has a **90%** chance of permanently isolating each PV will only isolate all 4 PVs $(0.9 \times 0.9 \times 0.9 \times 0.9) = 66\%$ of the time

The durability of pulmonary vein isolation using the visually guided laser balloon catheter: Multicenter results of pulmonary vein remapping studies

Srinivas R. Dukkipati, MD,* Petr Neuzil, MD, PhD,[†] Josef Kautzner, MD, PhD,[‡] Jan Petru, MD,[†] Dan Wichterle, MD,[‡] Jan Skoda, MD,[†] Robert Cihak, MD,[‡] Petr Peichl, MD,[‡] Antonio Dello Russo, MD, PhD,^{§¶} Gemma Pelargonio, MD, PhD,[§] Claudio Tondo, MD, PhD,^{§¶} Andrea Natale, MD, FHRS,^{||} Vivek Y. Reddy, MD*[†]

From the *Helmshley Electrophysiology Center, Mount Sinai School of Medicine, New York, New York; [†]Hololka Hospital, Prague, Czech Republic; [‡]Department of Cardiology, Institute for Clinical and Experimental Medicine, Prague, Czech Republic; [§]Cardiac Arrhythmia and Heart Failure Research Center, San Camillo-Forlanini Hospital, Catholic University of the Sacred Heart, Rome, Italy; [¶]Cardiac Arrhythmia Research Centre, Centro Cardiologico Monzino, Milan, Italy; ^{||}Texas Cardiac Arrhythmia Institute, St. Davis Medical Center, Austin, Texas.

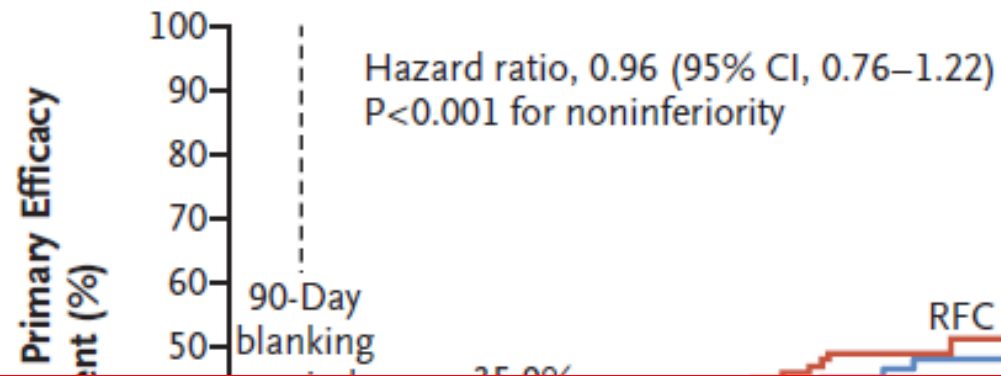


Persistent AF: confounding factors

- Single procedure success rates test the ablation technology as well as the strategy
- Multiple procedure success rates test the strategy

Persistent AF: confounding factors – success?

A Primary Efficacy End Point



End Point	Radiofrequency Group (N = 376)	Cryoballoon Group (N = 374)
Primary efficacy end point — no. of patients (%)‡	143 (35.9)§	138 (34.6)§
Components of the primary efficacy end point — no. of patients		
Recurrent atrial arrhythmia	87	80
Antiarrhythmic drug treatment	49	51
Repeat ablation	7	7

Persistent AF: Is PV isolation enough? Testing the strategy

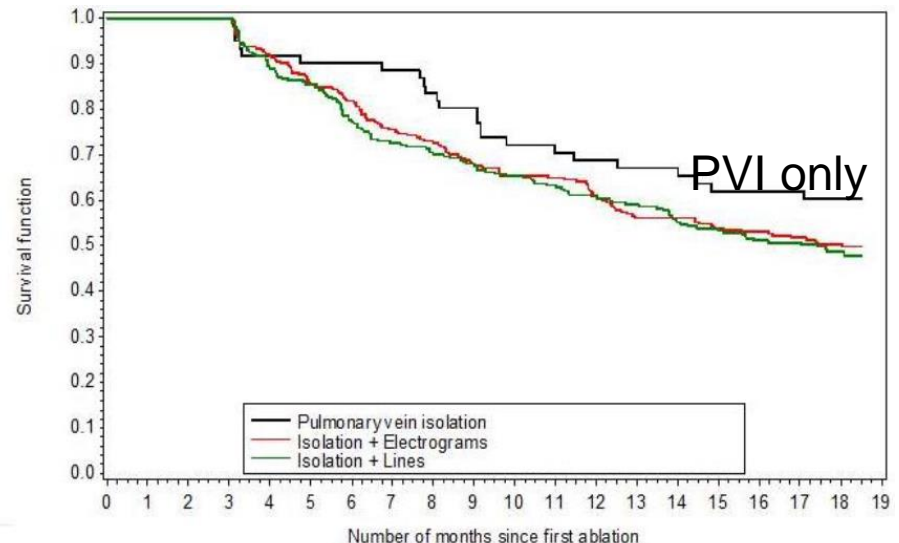
ORIGINAL ARTICLE

Approaches to Catheter Ablation for Persistent Atrial Fibrillation

Atul Verma, M.D., Chen-yang Jiang, M.D., Timothy R. Betts, M.D., M.B., Ch.B., Jian Chen, M.D., Isabel Deisenhofer, M.D., Roberto Mantovan, M.D., Ph.D., Laurent Macle, M.D., Carlos A. Morillo, M.D., Wilhelm Haverkamp, M.D., Ph.D., Rukshen Weerasooriya, M.D., Jean-Paul Albenque, M.D., Stefano Nardi, M.D., Endrj Menardi, M.D., Paul Novak, M.D., and Prashanthan Sanders, M.B., B.S., Ph.D., for the STAR AF II Investigators*

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

Repeat ablation
performed in
21% PVI
26% PVI + CFAE
33% PVI + linear lesions

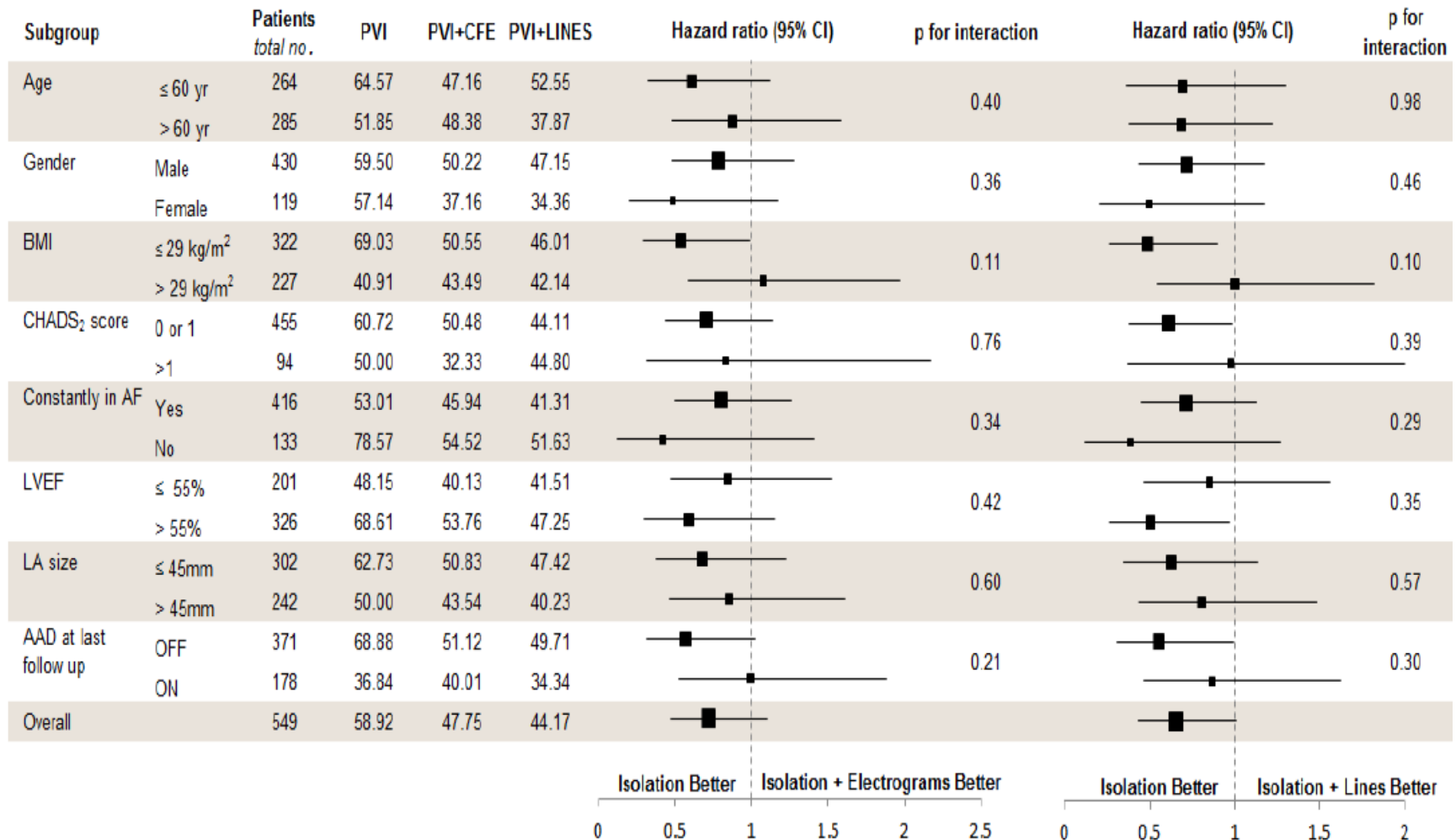


No. at Risk

Pulmonary vein isolation	61	61	55	49	41	23
Isolation + Electrograms	244	244	196	161	143	76
Isolation + Lines	244	244	185	162	142	58

Freedom from **ANY** documented atrial arrhythmia >30s after 2 procedures on or off AADs

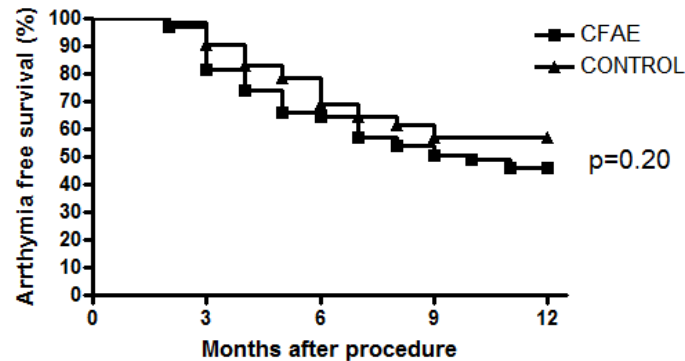
Persistent AF: Is PV isolation enough? Testing the strategy



Should we do even more?: (PVI + linear lesions) vs (PVI + linear lesions + CFEs)

Wong KC, Betts TR, *Circ A&E* 2015

Freedom from AF/AT after first ablation procedure

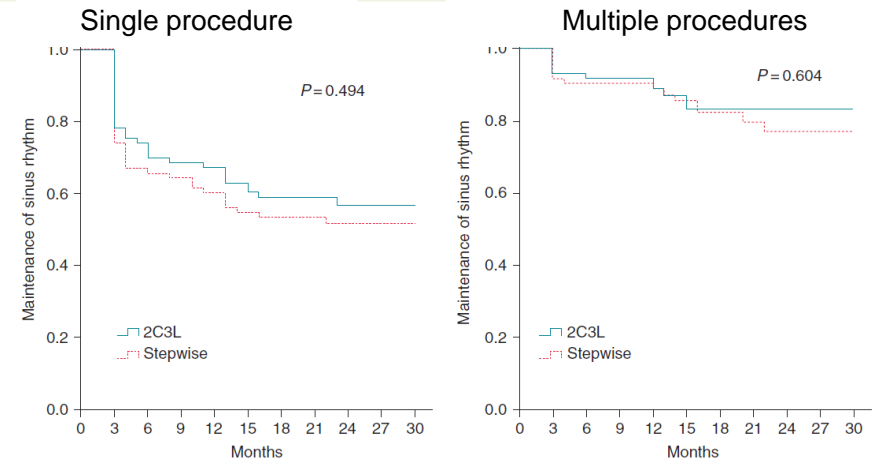


No. at risk					
CFAE	65	53	42	33	30
CONTROL	65	59	45	37	37

After multiple procedures and a mean follow up of 35 ± 5 months (minimum 12 months from final procedure), the success rate in the CFAE + LL arm was no different to the LL arm (80% vs 82% p=0.82)

Prospective randomized comparison between a fixed '2C3L' approach vs. stepwise approach for catheter ablation of persistent atrial fibrillation

Jian-Zeng Dong¹, Cai-Hua Sang¹, Rong-Hui Yu¹, De-Yong Long¹, Ri-Bo Tang¹, Chen-Xi Jiang¹, Man Ning¹, Nian Liu¹, Xing-Peng Liu¹, Xin Du¹, Hung-Fat Tse², and Chang-Sheng Ma^{1*}

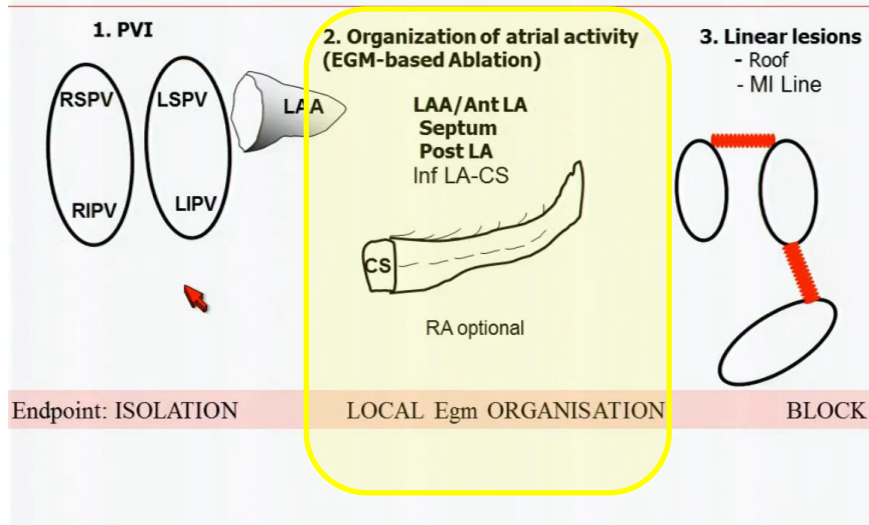


The stepwise approach to ablate to sinus rhythm

The Bordeaux “stepwise” approach: Patients who terminate with rotor ablation have a 76% incidence of further LA tachy requiring roof and MI lines. After a follow-up of more than 2 years, among all the patients ablated for persistent AF, **96% ultimately required a roof line and 86% a mitral line.** *Knecht, Eur Heart J, 2008*

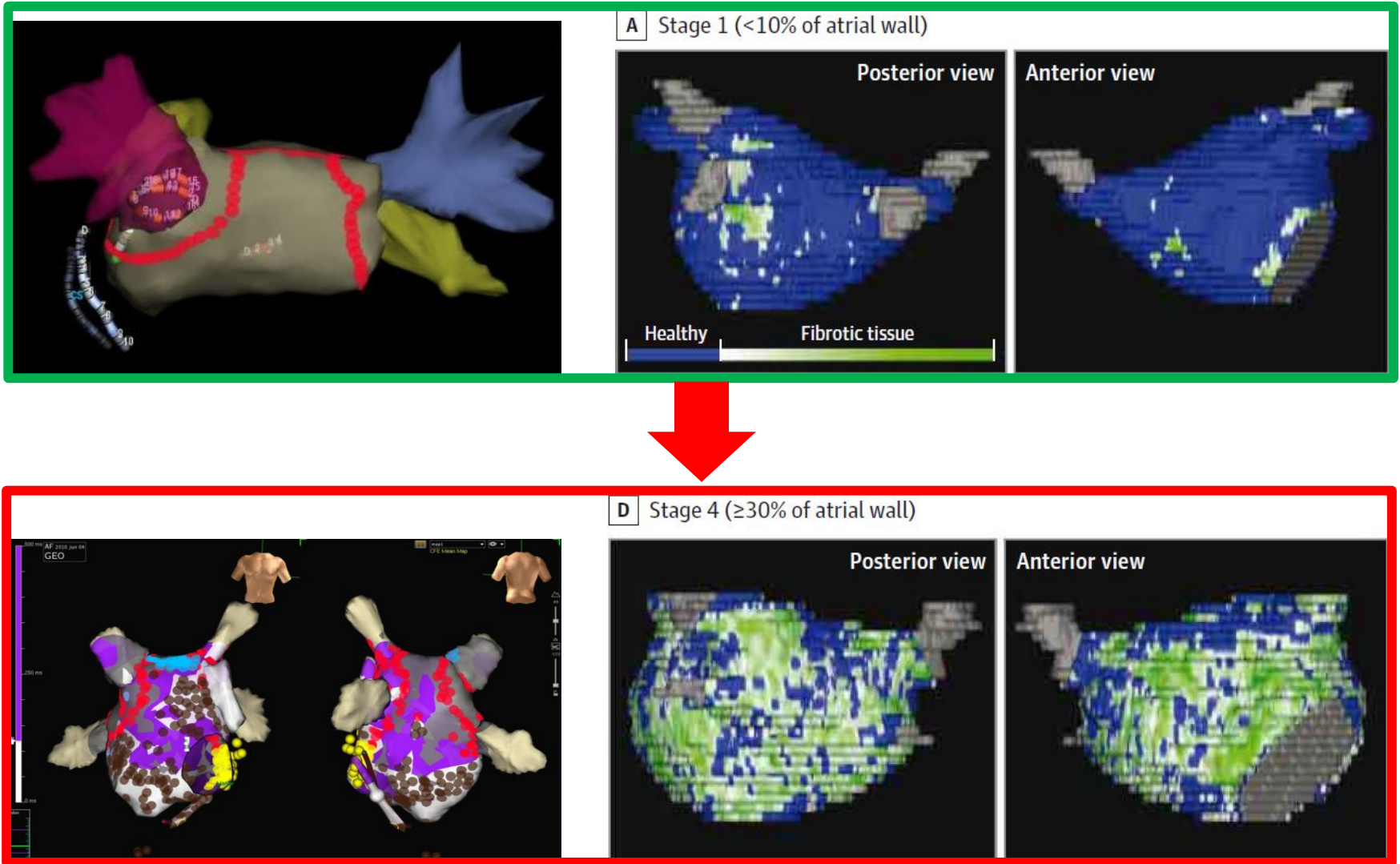
LESSONS FROM THE STEPWISE APPROACH

Widespread/Combined ablation for high success

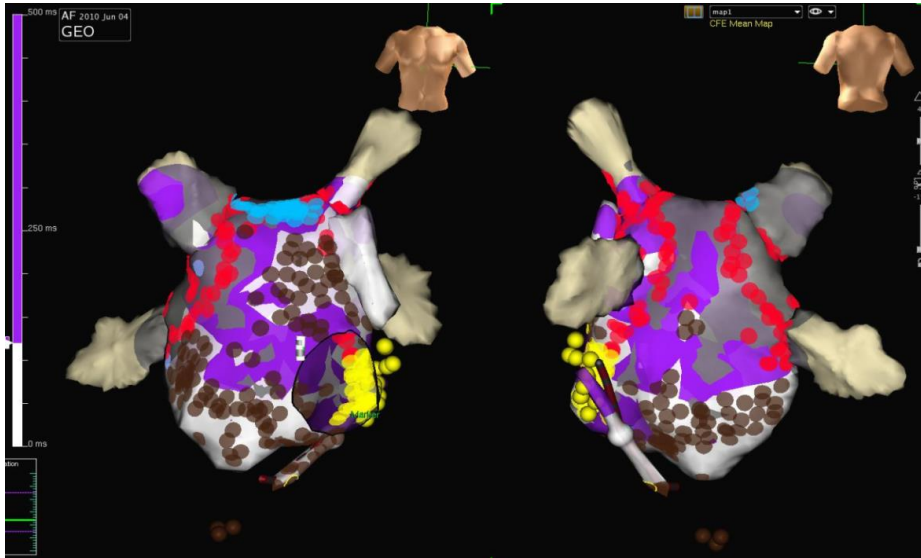


	Roof line	No roof line	Mitral line	No mitral line
Index procedure				
During AF	140	14	69	85
LA macro re-entry	6	8	49	36
Total index procedure	146/154	8/154	118/154	36/154
Redo procedure				
LA macro re-entry	1	7	11	25
TOTAL	147/154 roof lines	7/154 no roof line	129/154 mitral lines	25/154 no mitral line

CFAE ablation



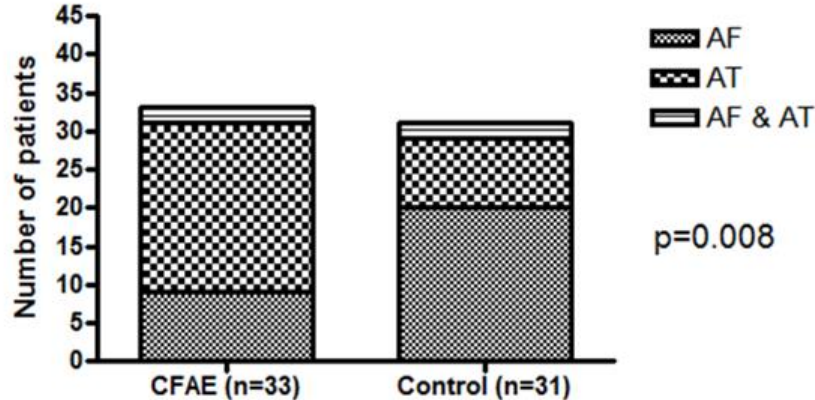
CFAE ablation: creating trouble for the future?



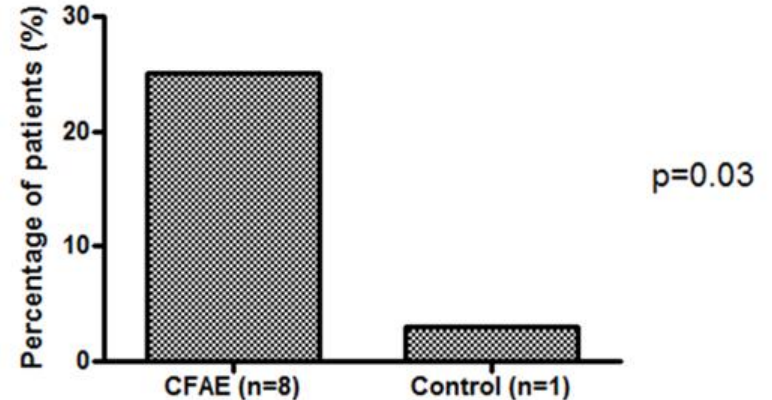
- CFAE ablation results in diffuse scar, providing areas of block that facilitate re-entry
- CFAE ablation creates areas of slow conduction that facilitate re-entry
- Perhaps the linear lesions are only needed because of the CFAE ablation?
- If you don't do CFE ablation you probably won't need linear lesions

The impact of extensive ablation on arrhythmia mechanisms

(A) Patients with AT/AF recurrence at first redo-procedure



(D) Patients with gap-related macroreentrant flutter



CFAE = PVI, lines + CFAEs. Control = PVI + lines

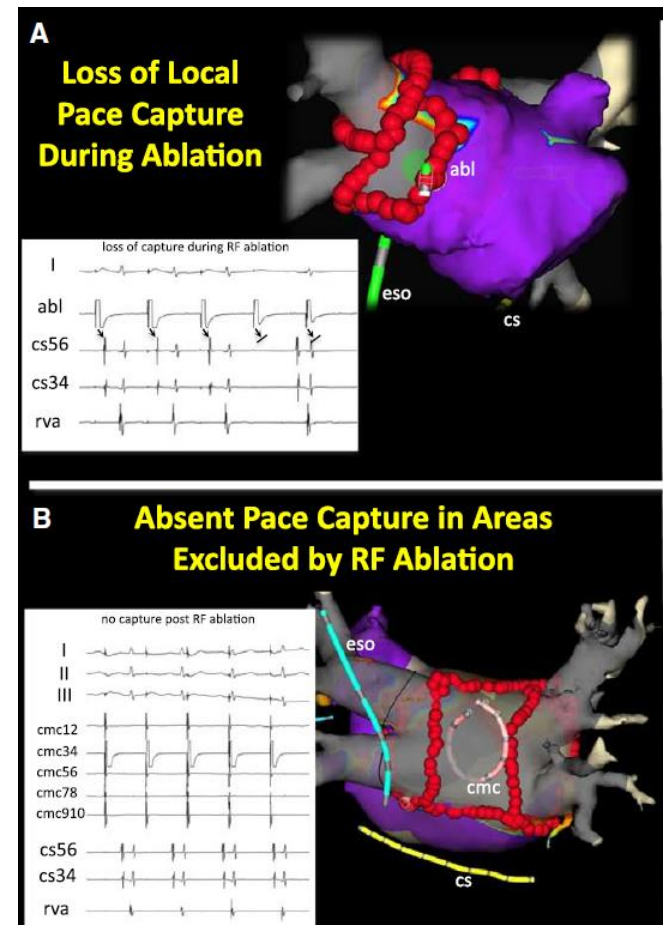
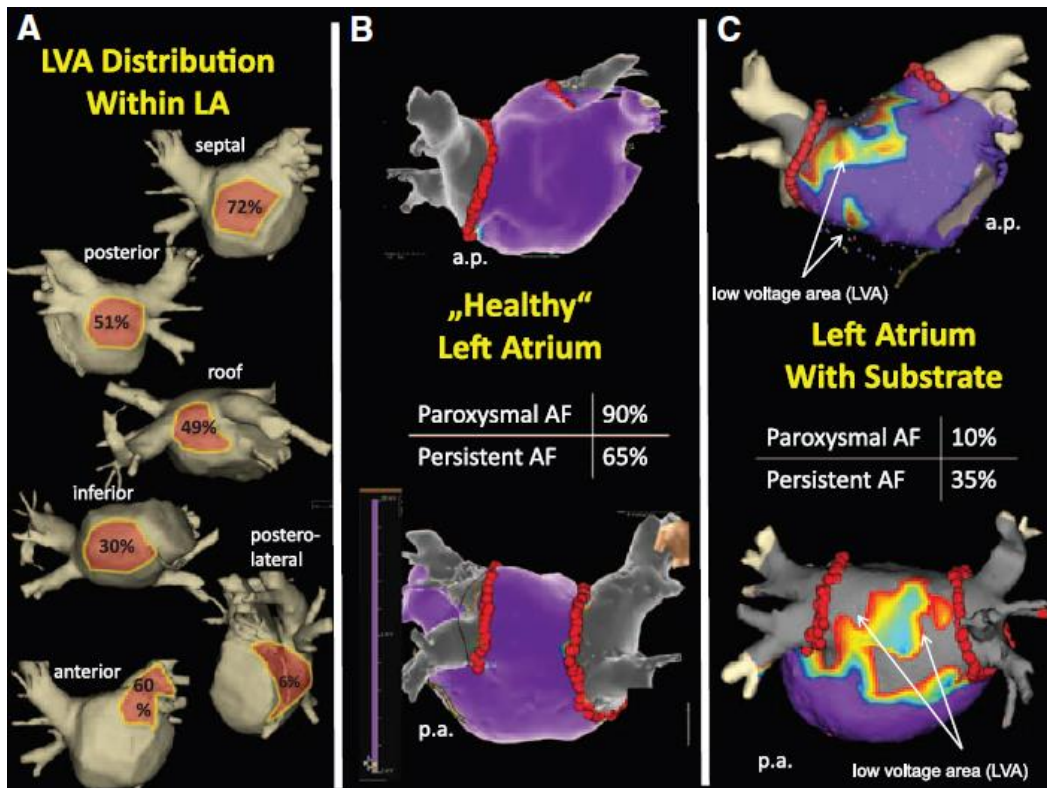
Wong KC, Betts TR, *Circ A&E* 2015

CFAE ablation leads to a greater incidence of organised AT and promotes gap-related mitral isthmus and LA roof flutter

A more tailored approach: Low Voltage Areas

Tailored Atrial Substrate Modification Based on Low-Voltage Areas in Catheter Ablation of Atrial Fibrillation

Sascha Rolf, MD; Simon Kircher, MD; Arash Arya, MD; Charlotte Eitel, MD;
 Philipp Sommer, MD; Sergio Richter, MD; Thomas Gaspar, MD; Andreas Bollmann, MD;
 David Altmann, MD; Carlos Piedra, MD; Gerhard Hindricks, MD; Christopher Piorkowski, MD
Circ Arrhythm Electrophysiol. 2014;7:825-833

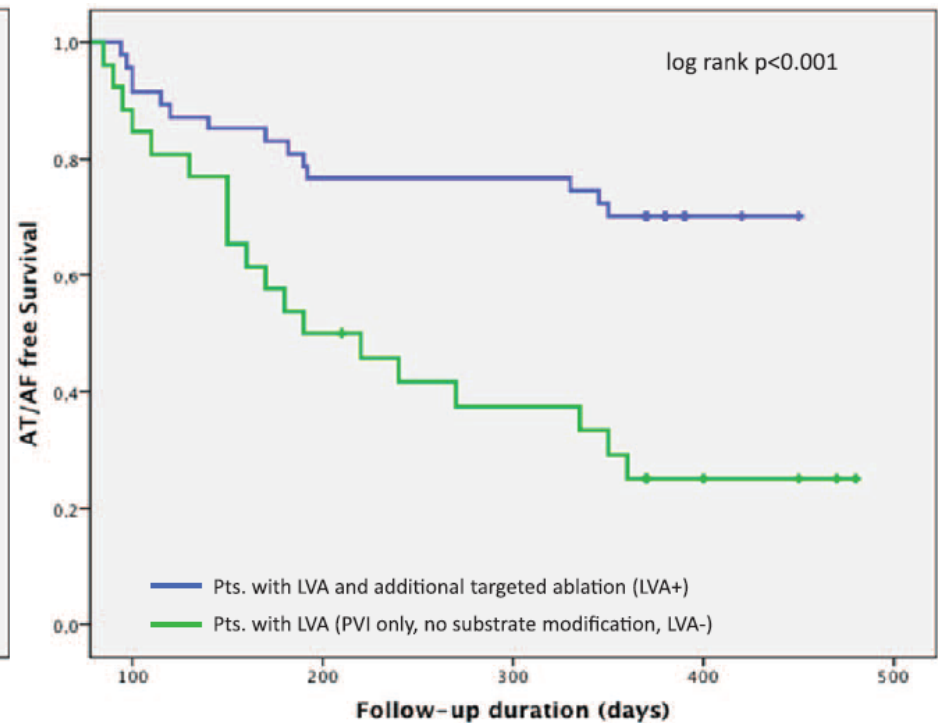
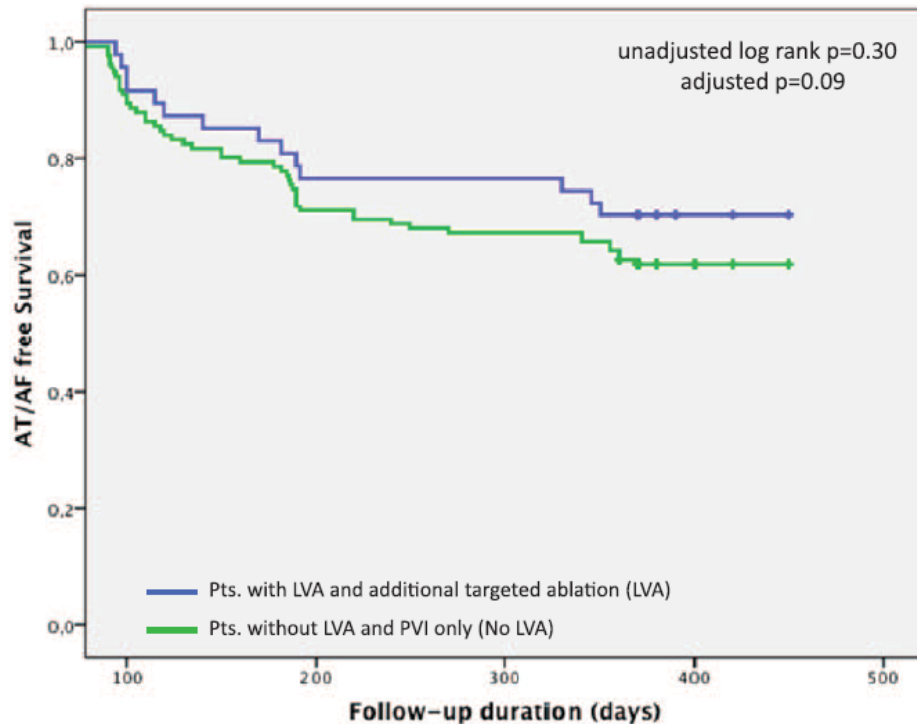


A more tailored approach: Low Voltage Areas

Tailored Atrial Substrate Modification Based on Low-Voltage Areas in Catheter Ablation of Atrial Fibrillation

Sascha Rolf, MD; Simon Kircher, MD; Arash Arya, MD; Charlotte Eitel, MD;
Philipp Sommer, MD; Sergio Richter, MD; Thomas Gaspar, MD; Andreas Bollmann, MD;
David Altmann, MD; Carlos Piedra, MD; Gerhard Hindricks, MD; Christopher Piorkowski, MD

Circ Arrhythm Electrophysiol. 2014;7:825-833



Other strategies: BIFA

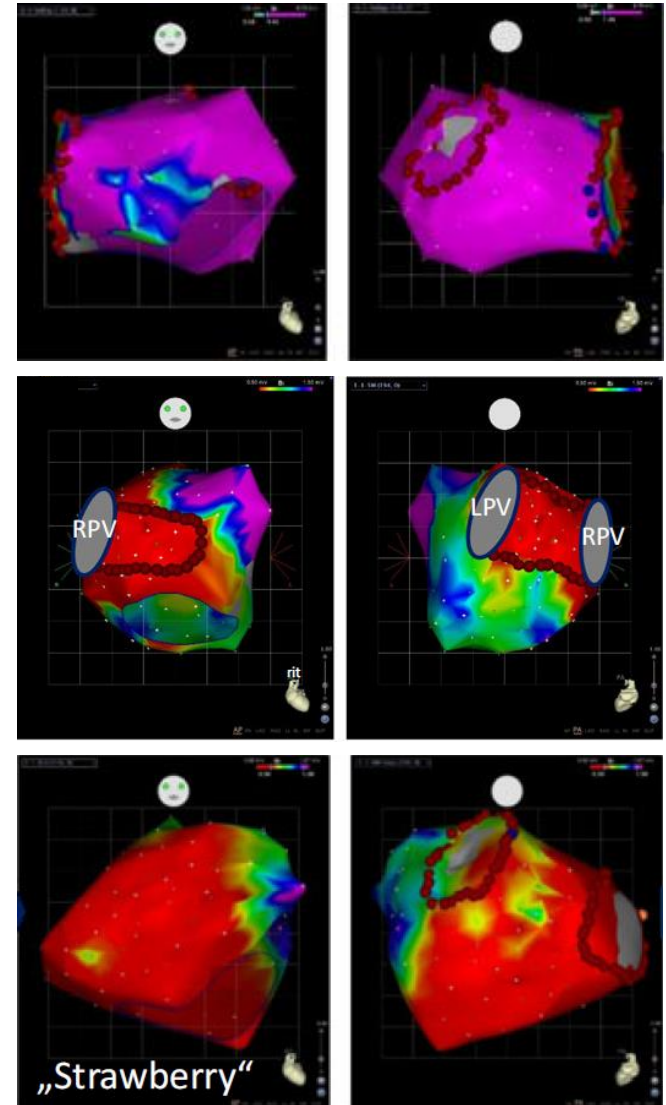
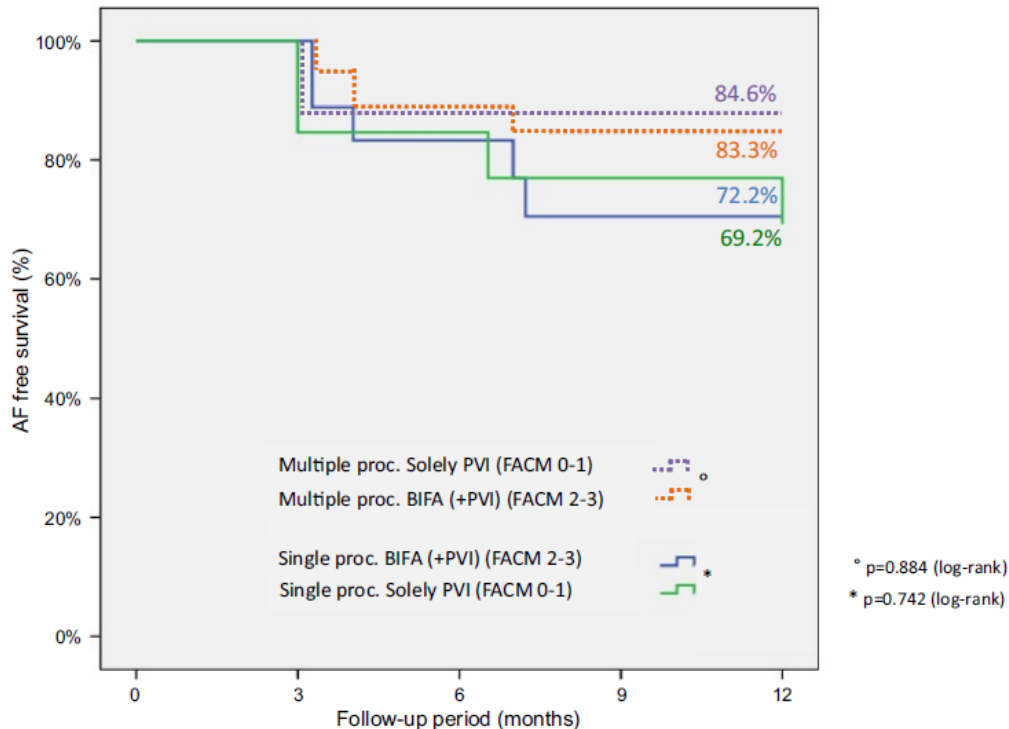
Box Isolation of Fibrotic Areas (BIFA): A Patient-Tailored Substrate Modification Approach for Ablation of Atrial Fibrillation

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

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

(*J Cardiovasc Electrophysiol*, Vol. 27, pp. 22-30, January 2016)

42% of persistent AF patients had no LVA



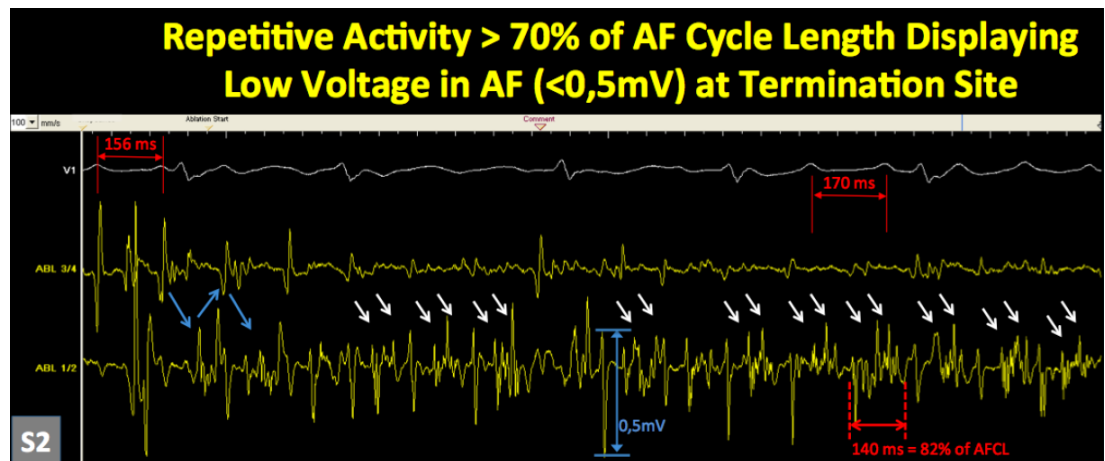
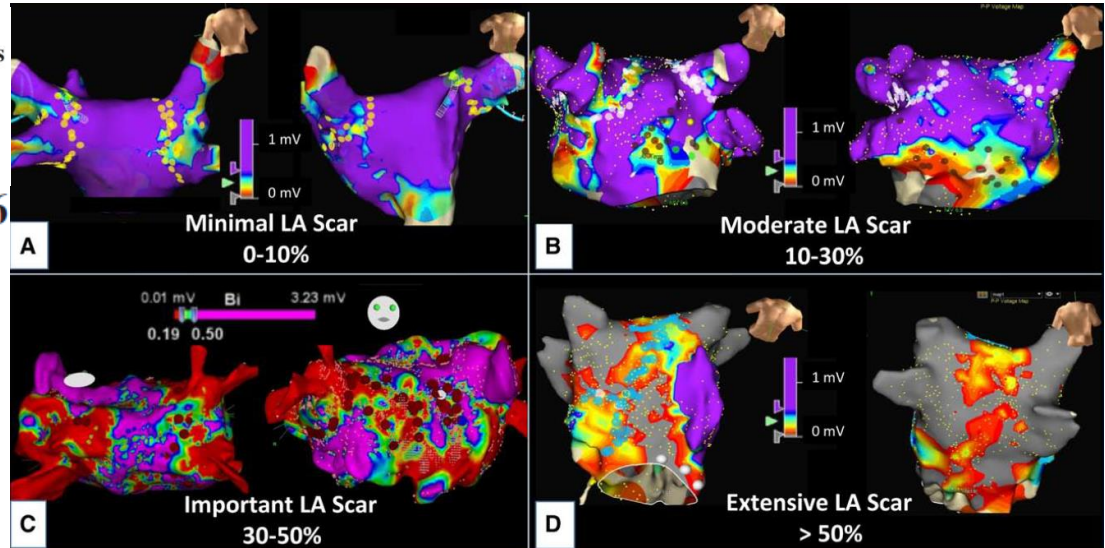
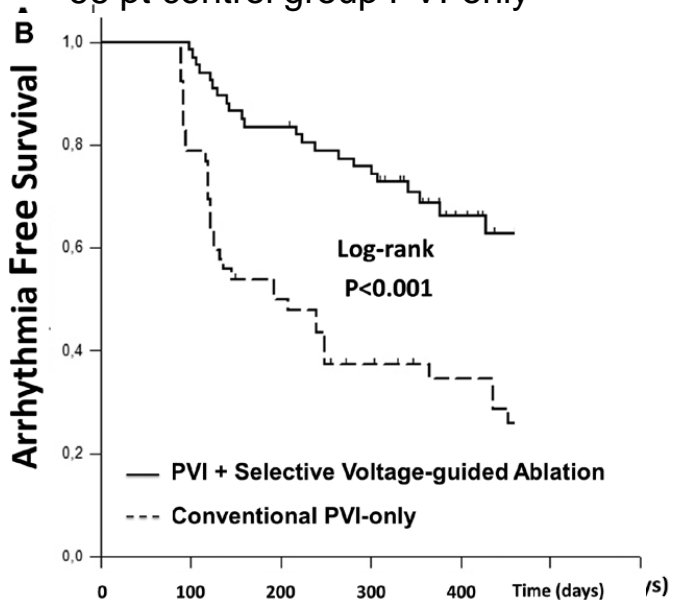
Ablation of LVAs associated with electrograms >70% CL

Ablation of Persistent Atrial Fibrillation Targeting Low-Voltage Areas With Selective Activation Characteristics

Amir S. Jadidi, MD; Heiko Lehrmann, MD; Cornelius Keyl, MD; Jérémie Sorrel, MD; Viktor Markstein, BSc; Jan Minners, MD; Chan-Il Park, MD; Arnaud Denis, MD; Pierre Jais, MD; Méléze Hocini, MD; Clemens Potocnik, MD; Juergen Allgeier, MD; Willibald Hochholzer, MD; Claudia Herrera-Siklody, MD; Steve Kim, MSEE; Youssef El Omri, MD; Franz-Josef Neumann, MD; Reinhold Weber, MD; Michel Haissaguerre, MD; Thomas Arentz, MD

Circ Arrhythm Electrophysiol. 2016

85 patients with persistent AF
All underwent DCCV 10/52 before
67 still in AF
62 in AF after PVI who underwent
mapping and ablation of LVAs
66 pt control group PVI-only



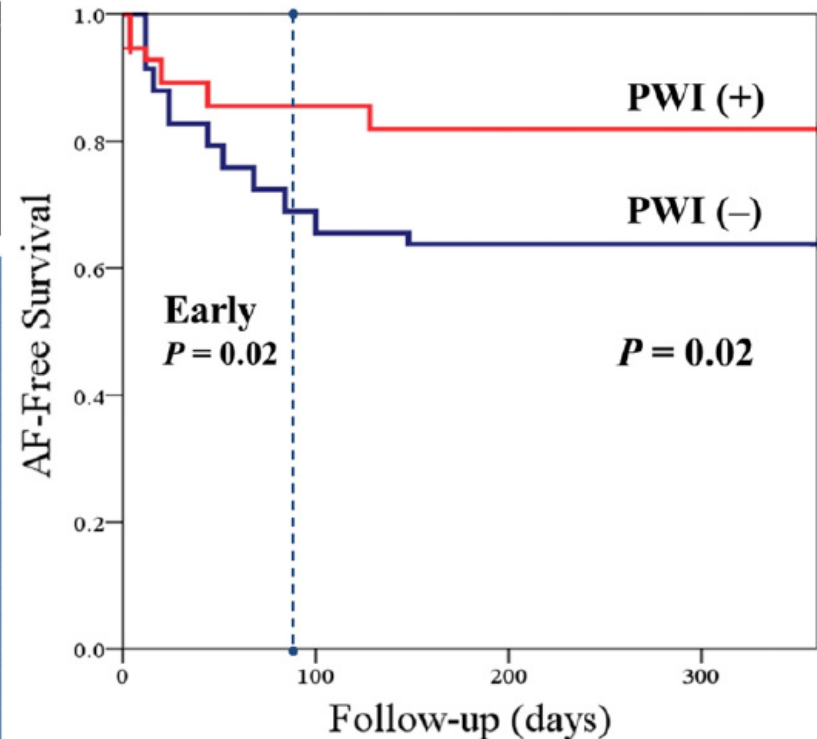
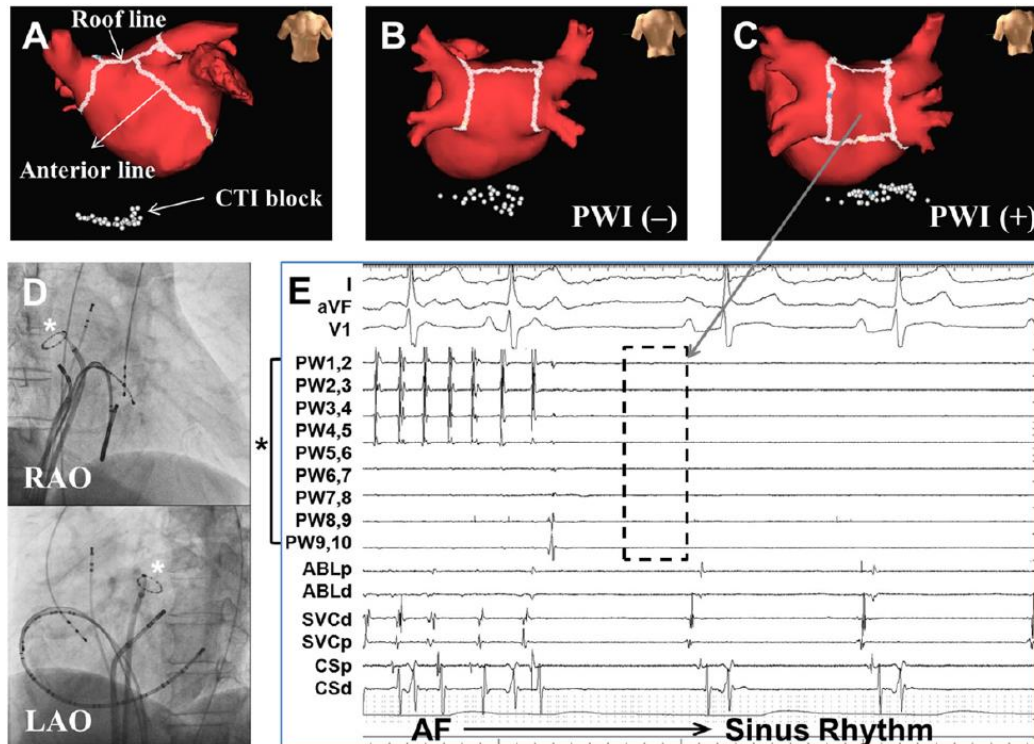
Other strategies: Box isolation of the posterior wall

Does isolation of the left atrial posterior wall improve clinical outcomes after radiofrequency catheter ablation for persistent atrial fibrillation?

A prospective randomized clinical trial

Jin-Seok Kim^{a,1}, Seung Yong Shin^{b,1}, Jin Oh Na^a, Cheol Ung Choi^a, Seong Hwan Kim^a, Jin Won Kim^a, Eung Ju Kim^a, Seung-Woon Rha^a, Chang Gyu Park^a, Hong Seog Seo^a, Dong Joo Oh^a, Chun Hwang^c, Hong Euy Lim^{a,*2}

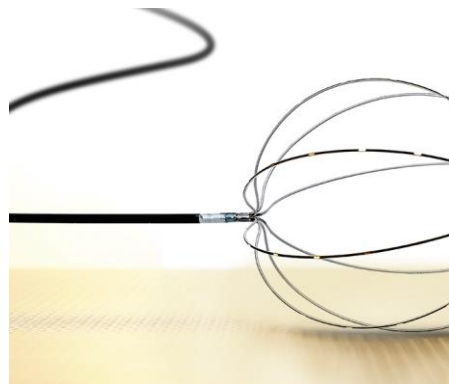
International Journal of Cardiology 181 (2015) 277–283



Mapping AFib



Emerging tools to map AFib



JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
© 2016 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER

VOL. 68, NO. 3, 2016
ISSN 0735-1097/\$36.00
<http://dx.doi.org/10.1016/j.jacc.2016.04.055>

Impact of Rotor Ablation in Nonparoxysmal Atrial Fibrillation Patients Results From the Randomized OASIS Trial

Sanghamitra Mohanty, MD,^a Carlo Gianni, MD,^b Prasant Mohanty, MBBS, MPH,^a Philipp Halbfass, MD,^b Tamara Metz, BSN, RN,^a Chintan Trivedi, MD, MPH,^a Thomas Deneke, MD,^b Gery Tormasson, MD,^a Rong Bai, MD,^{a,d} Amin Al-Ahmad, MD,^a Shane Bailey, MD,^a John David Burkhardt, MD,^a G. Joseph V. Di Biase, MD,^a Rodney Horton, MD,^a Patrick M. Hranitzky, MD,^a Javier E. Sanchez, MD,^a Luigi Di Biase, MD, PhD,^{a,b} Andrea Natale, MD^{a,c,d,e,f,g,h,i}

ABSTRACT

BACKGROUND Nonrandomized studies have reported focal impulse and rotor modulation (FIRM)-guided ablation to be superior to pulmonary vein antrum isolation (PVAI) for persistent atrial fibrillation and long-standing persistent atrial fibrillation.

OBJECTIVES This study sought to compare efficacy of FIRM ablation with or without PVAI versus PVAI plus non-PV trigger ablation in randomized persistent atrial fibrillation and long-standing persistent atrial fibrillation patients.

METHODS Nonparoxysmal atrial fibrillation (AF) patients undergoing first ablation were randomized to FIRM only (group 1), FIRM + PVAI (group 2) or PVAI + posterior wall + non-PV trigger ablation (group 3). Primary endpoint was freedom from atrial tachycardia/AF. The secondary endpoint was acute procedural success, defined as AF termination, ≥10% slowing, or organization into 1:1 tachycardia.

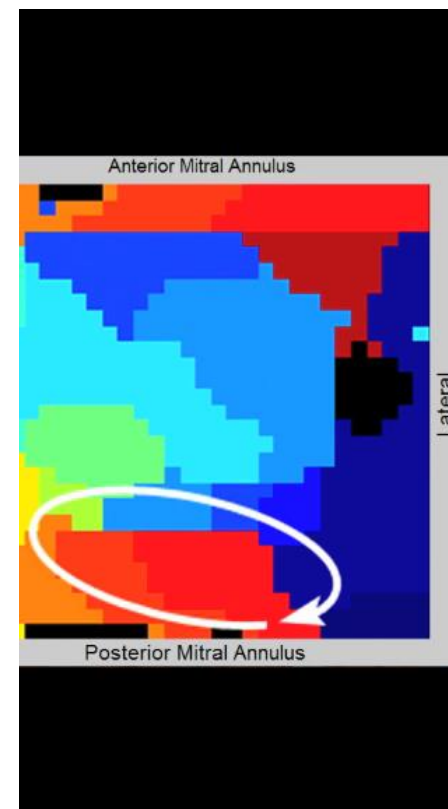
RESULTS A total of 113 patients were enrolled at 3 centers; 29 in group 1 and 42 each in groups 2 and 3. Group 1 enrollment was terminated early for futility. Focal drivers or rotors were detected in all group 1 and 2 patients. Procedure time was significantly shorter in group 3 versus groups 1 and 2 ($p < 0.001$). In groups 1 and 2, acute success after rotor-only ablation was achieved in 12 patients (41%) and 11 (26%), respectively. After 12 ± 7 months' follow-up, 4 patients (14%), 22 (52.4%), and 32 (76%) in groups 1, 2, and 3, respectively, were AF/atrial tachycardia-free while off antiarrhythmic drugs (log-rank $p < 0.0001$). Group 3 patients experienced higher success compared with groups 1 ($p < 0.001$) and 2 ($p = 0.02$).

CONCLUSIONS Outcomes were poor with rotor-only ablation. PVAI + rotor ablation had significantly longer procedure time and lower efficacy than PVAI + posterior wall + non-PV trigger ablation. (Outcome of Different Ablation Strategies in Persistent and Long-Standing Persistent Atrial Fibrillation [OASIS]; NCT02333843) (J Am Coll Cardiol. 2016;68:274-83) © 2016 by the American College of Cardiology Foundation.

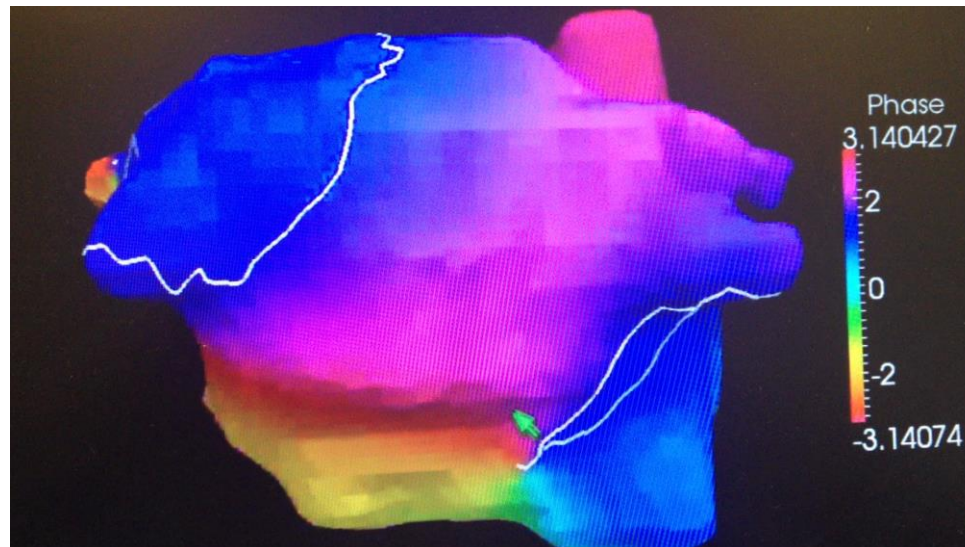
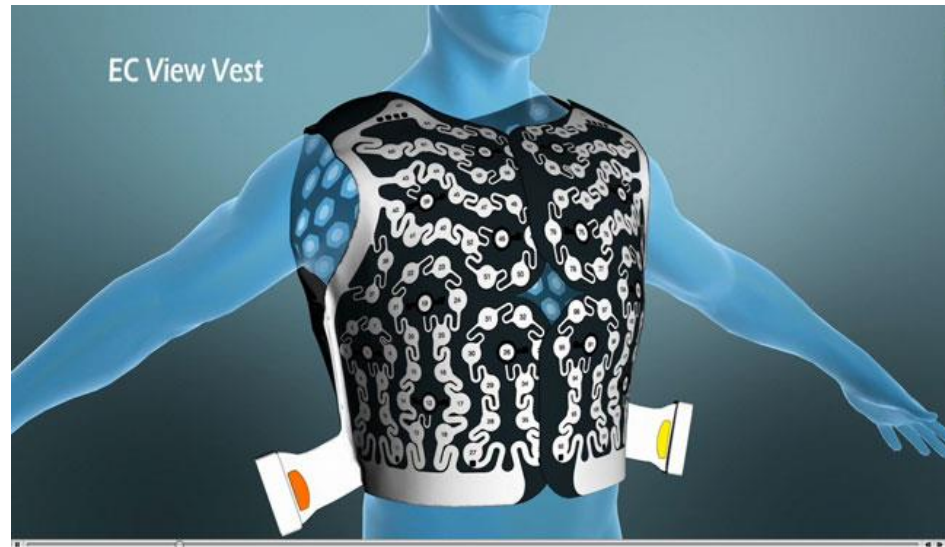
From the Department of Electrophysiology, Texas Cardiac Arrhythmia Institute, St. David's Medical Center, Austin, Texas; Department of Cardiology, Cardiovascular Center, Bad Neuenahr, Germany; Department of Cardiology, Lexington Cardiology at Capital Baptist, Lexington, Kentucky; Department of Electrophysiology, Beijing Anshen Hospital, Capital Medical University, Beijing, China; Department of Electrophysiology and Arrhythmia Services, California Pacific Medical Center, San Francisco, California; Department of Cardiology, Scripps Clinic, La Jolla, California; National Medical Center, Walter Reed Medical Center, Washington; Western University School of Medicine, Cleveland, Ohio; Division of Cardiology, Stanford University, Stanford, California; and the Department of Internal Medicine, Dell Medical School, University of Texas, Austin, Texas. Dr. Thomas has received speaking and consulting fees from Tropic. Dr. Burkhardt consults for Biosense Webster and St. Jude Medical. Dr. Sanchez has received speaking fees from Biosense Webster and St. Jude Medical. Dr. Di Biase is a consultant for Biosense Webster, Boston Scientific, St. Jude Medical, and Medtronic, and consults for Biosense Webster, St. Jude Medical, Biosense, and Lifewatch. All other authors have no reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received April 5, 2016; revised manuscript received April 27, 2016; accepted April 28, 2016.

Listen to this manuscript
audio summary by
JACC Editor-in-Chief
Dr. Valentin Fuster.



Emerging tools to map AFib



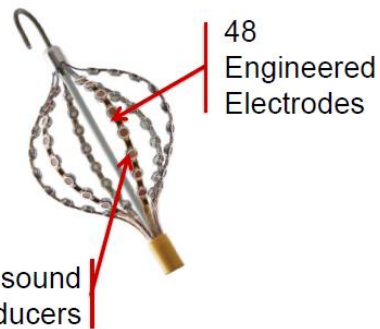
Emerging tools to map AFib

AcQMap System



Console and Workstation

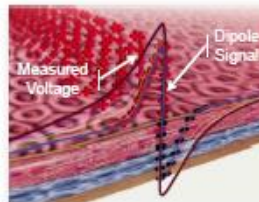
AcQMap Catheter



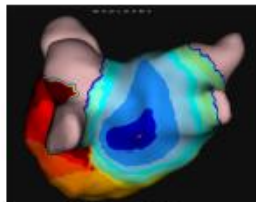
Ultrasound pings the chamber wall



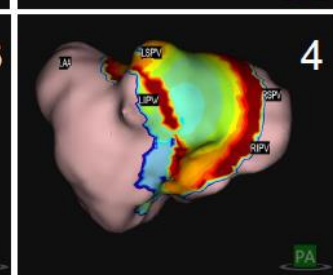
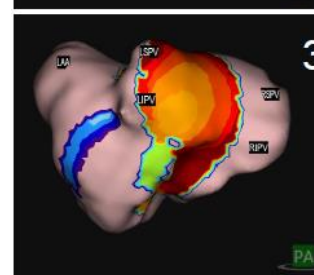
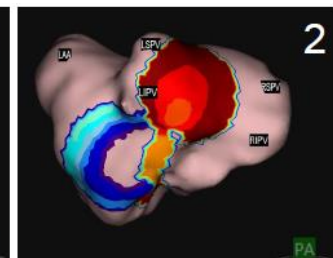
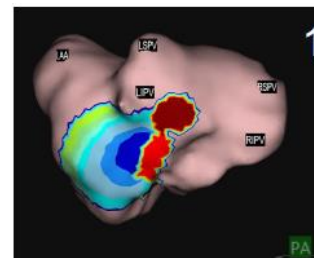
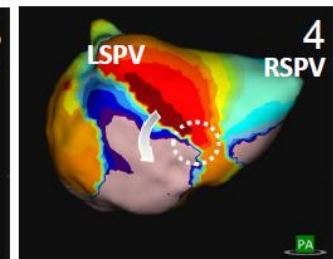
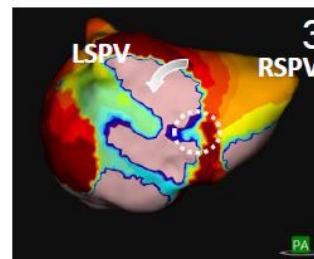
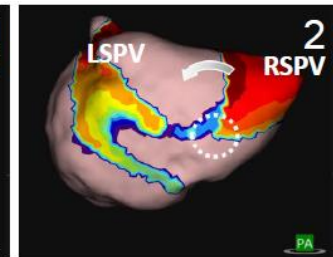
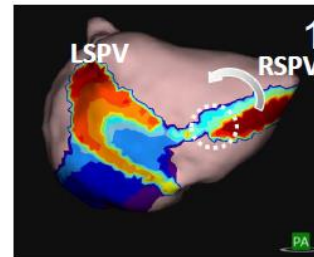
Processed surface anatomy



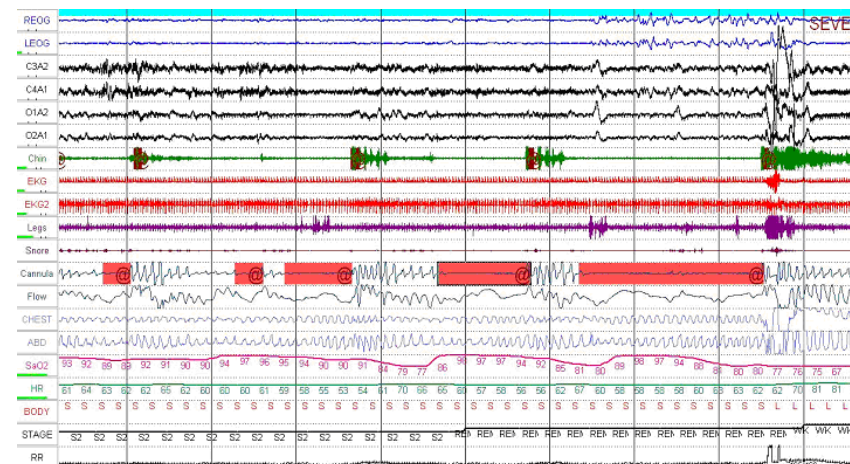
An inverse solution is used to calculate Dipole Density from the Voltages measured on the basket



Dipole Density (or Voltage) is overlaid on the surface anatomy



Emerging tools available to all



Atrial fibrillation and obesity

Long-Term Effect of Goal-Directed Weight Management in an Atrial Fibrillation Cohort

A Long-Term Follow-Up Study (LEGACY)

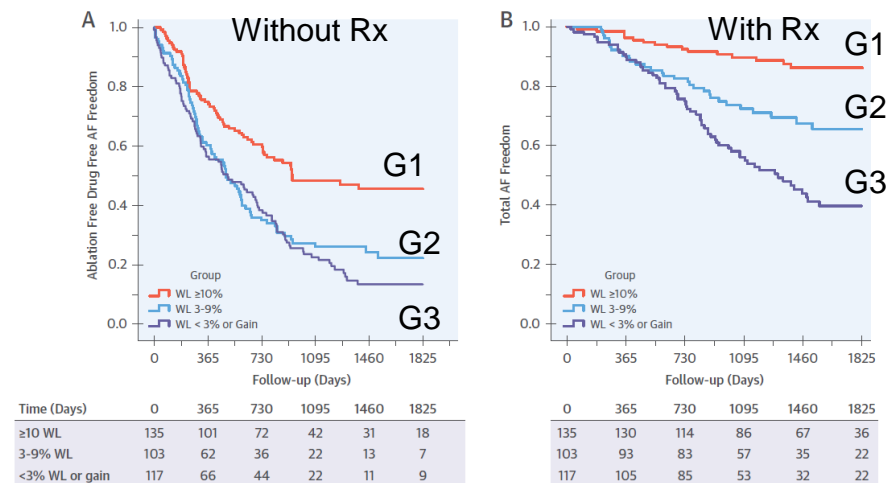
Rajeev K. Pathak, MBBS,* Melissa E. Middeldorp,* Megan Meredith,* Abhinav B. Mehta, MACrSr,†
Rajiv Mahajan, MD, PhD,* Christopher X. Wong, MBBS, PhD,*‡ Daragh Twomey, MBBS,* Adrian D. Elliott, PhD,*§
Jonathan M. Kalman, MBBS, PhD,*¶ Walter P. Abhayaratna, MBBS, PhD,*# Dennis H. Lau, MBBS, PhD,*
Prashanthan Sanders, MBBS, PhD*

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
© 2015 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER INC.

VOL. 65, NO. 20, 2015
ISSN 0735-1097/\$36.00
<http://dx.doi.org/10.1016/j.jacc.2015.03.002>

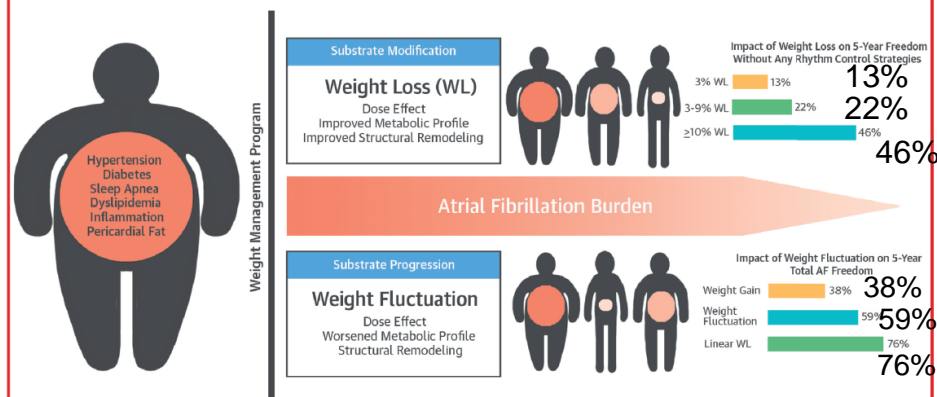
- 355 patients with Pa or Ps AFib and BMI > 27
- Weight loss programme, target BMI of <25
- Group 1 (135 pts) managed >10% , Group 2 (103 pts) 3-9% , Group 3 (117 pts) <3%
- Additional BP, IGT and sleep apnoea treatment
- Independent rate and rhythm control with drugs and/or ablation
- Primary outcome = AF burden using AF Severity Scale
- Average of 4 year FU

FIGURE 2 Atrial Fibrillation Freedom Outcome According to Group



(A) Kaplan-Meier curve for AF-free survival without the use of rhythm control strategies. (B) Kaplan-Meier curve for AF-free survival for total AF-free survival (multiple ablation procedures with and without drugs). Abbreviations as in Figure 1.

CENTRAL ILLUSTRATION Weight Management and Atrial Fibrillation



Pathak, R.K. et al. J Am Coll Cardiol. 2015; 65(20):2159-69.

(Left) Obesity is associated with a variety of associated comorbidities. These are all associated with progression of the atrial substrate and the development of atrial fibrillation (AF). (Top) A dedicated weight management program with weight loss (WL) is associated with reverse remodeling of the atrial substrate and a dose-dependent reduction in the AF burden, which is sustained in the long term. (Bottom) The consequence of weight fluctuation, which somewhat curtails the beneficial effects of WL.

AFib ablation, obesity and risk factor modification

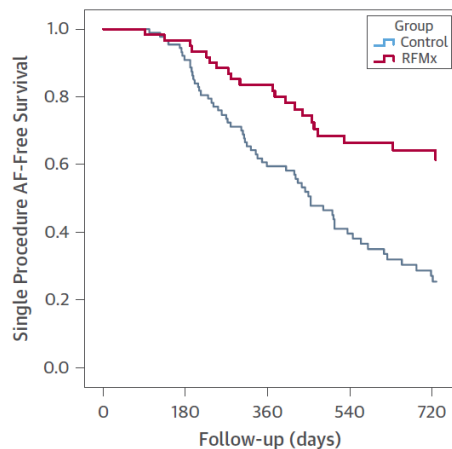
Aggressive Risk Factor Reduction Study for Atrial Fibrillation and Implications for the Outcome of Ablation

The ARREST-AF Cohort Study

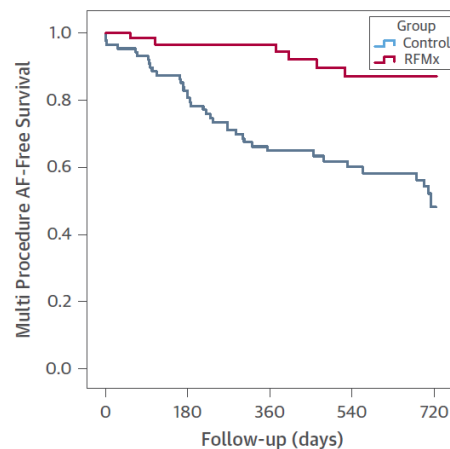
Rajeev K. Pathak, MBBS,* Melissa E. Middeldorp,* Dennis H. Lau, MBBS, PhD,* Abhinav B. Mehta, MAcrSr,†
Rajiv Mahajan, MD,* Darragh Twomey, MBBS,* Muayad Alasady, MBBS,*† Lorraine Hanley, BSc,*
Nicholas A. Antic, MBBS, PhD,† R. Doug McEvoy, MBBS, MD,† Jonathan M. Kalman, MBBS, PhD,§
Walter P. Abhayaratna, MBBS, PhD,|| Prashanthan Sanders, MBBS, PhD*

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
© 2014 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER INC.

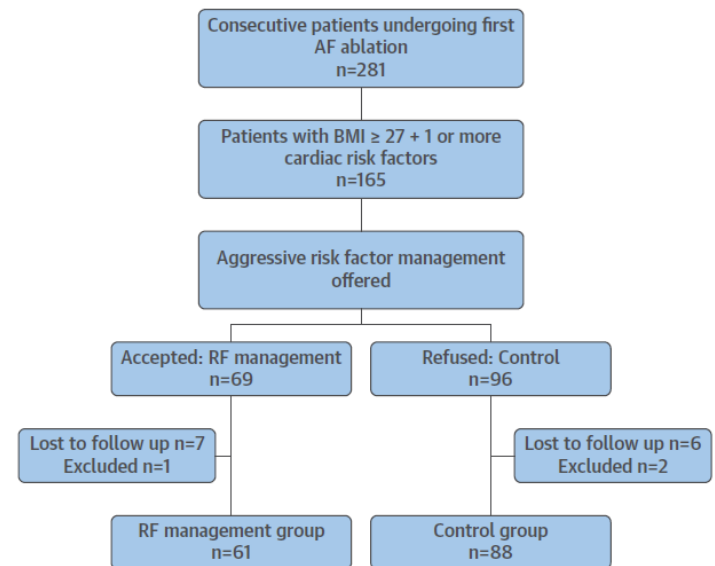
VOL. 64, NO. 21, 2014
ISSN 0735-1097/\$36.00
<http://dx.doi.org/10.1016/j.jacc.2014.09.028>



Time (days)	0	180	360	540	730
RFM	61	59	48	33	27
Control	88	79	51	28	16



Time (days)	0	180	360	540	730
RFM	61	55	46	32	25
Control	88	72	51	36	23



Weight Management and Exercise

Initial Target :
>10% WL

Final Target : To
achieve
BMI<27kg/m²

Avoid weight
fluctuation

Exercise: 30
minutes 3-4
times weekly up
to 250 Min/
week

Hyperlipidemia

Lifestyle
measures

At 3 months LDL
> 2.6 mmol/L -
start statin

Add Fibrate if TG
> 2.6 mmol/L
Start Fibrate if
TG > 5.6 mmol/L

Glucose Tolerance

Glucose
tolerance test

Lifestyle
measures

HbA1c> 6.5 at 3
months – start
Metformin
Referred to a
diabetes clinic

Hypertension

Check BP 2-3
times daily, No
added salt diet +
ACEI/ARB
Aim of
<130/80mmHg
at rest and <
200/100mmHg
at peak exercise

Sleep Apnea

Formal overnight
sleep study
AHI≥30/hour –
CPAP
Use Log in diary

After multiple procedures RFM 87% AF-free, control 18%

Summary: A suggested tailored, step-wise approach

- After a 'PVI alone' procedure, only 21% will need to have a repeat ablation in the next 18 months STAR AF-2
- Patients with persistent AF can legitimately be treated with balloon technologies, at least for their first procedure. For many this will be the only treatment they require
- There is no additional benefit from performing adjunctive CFAE or linear lesion ablation to PVI, at least during the first procedure
- A substrate-based approach, tailored to voltage +/- electrogram mapping, may potentially improve outcomes in those in whom PVI isn't enough We await the larger trials
- Don't just burn the atria. Modify the substrate using lifestyle changes and risk factor modification
- *Primum non nocere*. Doing more doesn't mean doing better

Summary: A suggested tailored, step-wise approach

