STAR AF 2: The End of Lines and CFAE?

International Dea Sea Symposium, Tel Aviv, March 8 2016

Atul Verma, MD FRCPC FHRS
Director, Arrhythmia Services
Southlake Regional Health Centre
Associate Professor, Faculty of Medicine
University of Toronto, McGill University
Affiliate Scientist, Li Ka Shing Knowledge Institute

Disclosures

- Moderate Support (honoraria, speaking bureau, research)
  - St Jude Medical International
  - Medtronic Inc.
  - Biosense Webster
  - Bayer
  - Boehringer Ingelheim
- Advisory Board
  - St Jude Medical International
  - Biosense Webster
  - Bayer
  - Boehringer Ingelheim
  - Pfizer/Bristol Meyers Squibb
  - Acutus Medical
  - Colibri Medical Devices
  - Nicoya Medical Devices

Original STAR AF Study

European Heart Journal (2010) **31**, 1344–1356
doi:10.1093/eurheartj/ehq041

CLINICAL RESEARCH
Arrhythmia/electrophysiology

Substrate and Trigger Ablation for Reduction of Atrial Fibrillation (STAR AF): a randomized, multicentre, international trial†

Atul Verma[1]*, Roberto Mantovan[2], Laurent Macle[3], Guiseppe De Martino[4], Jian Chen[5], Carlos A. Morillo[6], Paul Novak[7], Vittorio Calzolari[2], Peter G. Guerra[3], Girish Nair[6], Esteban G. Torrecilla[8], and Yaariv Khaykin[1]

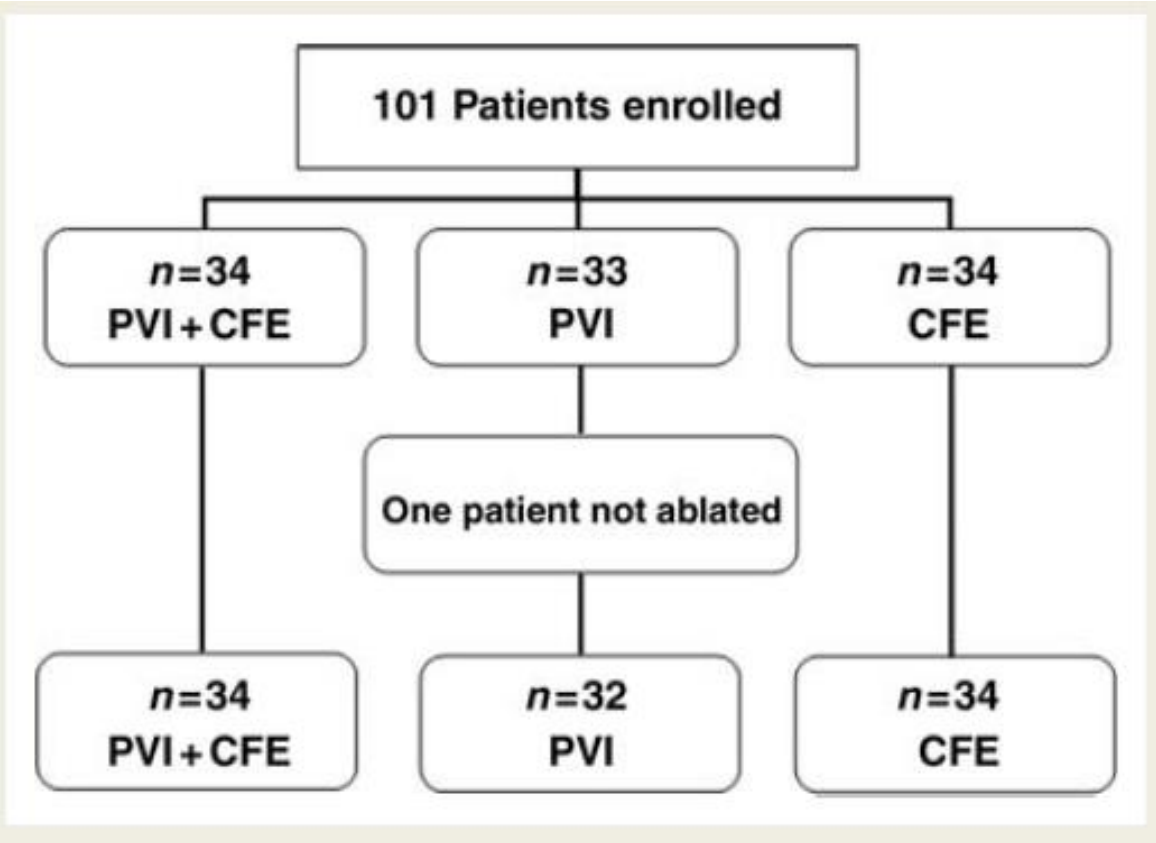
[1]Southlake Heart Rhythm Program, Southlake Regional Health Centre, 105-712 Davis Drive, Newmarket, Ontario, Canada L3Y 8C3; [2]Ospedale Regionale di Treviso, Piazzale Ospedale, Treviso, Italy; [3]Montreal Heart Institute, Montreal, Quebec, Canada; [4]Casa di Cura Santa Maria, Bari, Italy; [5]Haukeland University Hospital, Bergen, Norway; [6]Hamilton Health Sciences Centre, Hamilton, Ontario, Canada; [7]Royal Jubilee Hospital, Victoria, British Columbia, Canada; and [8]Hospital General Universitario Gregorio Marañón, Madrid, Spain

Received 3 September 2009; revised 29 November 2009; accepted 8 December 2009; online publish-ahead-of-print 9 March 2010

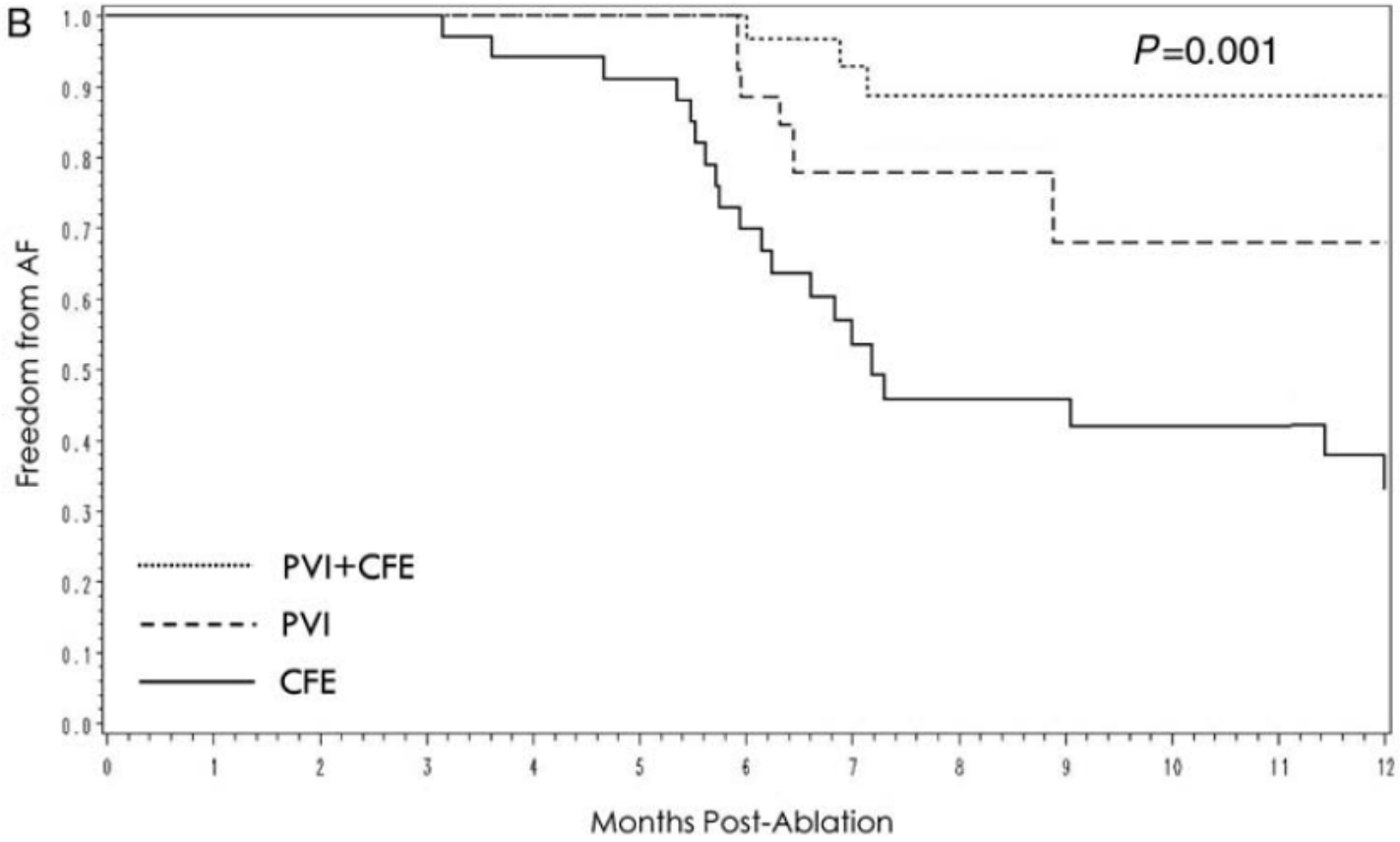
STAR AF I

- Very small pilot study (only 100 patients divided over 3 arms)
- Mixed population of high burden paroxysmal AF and persistent AF
- Provided rationale for STAR AF II

Freedom from AF/AFL/AT



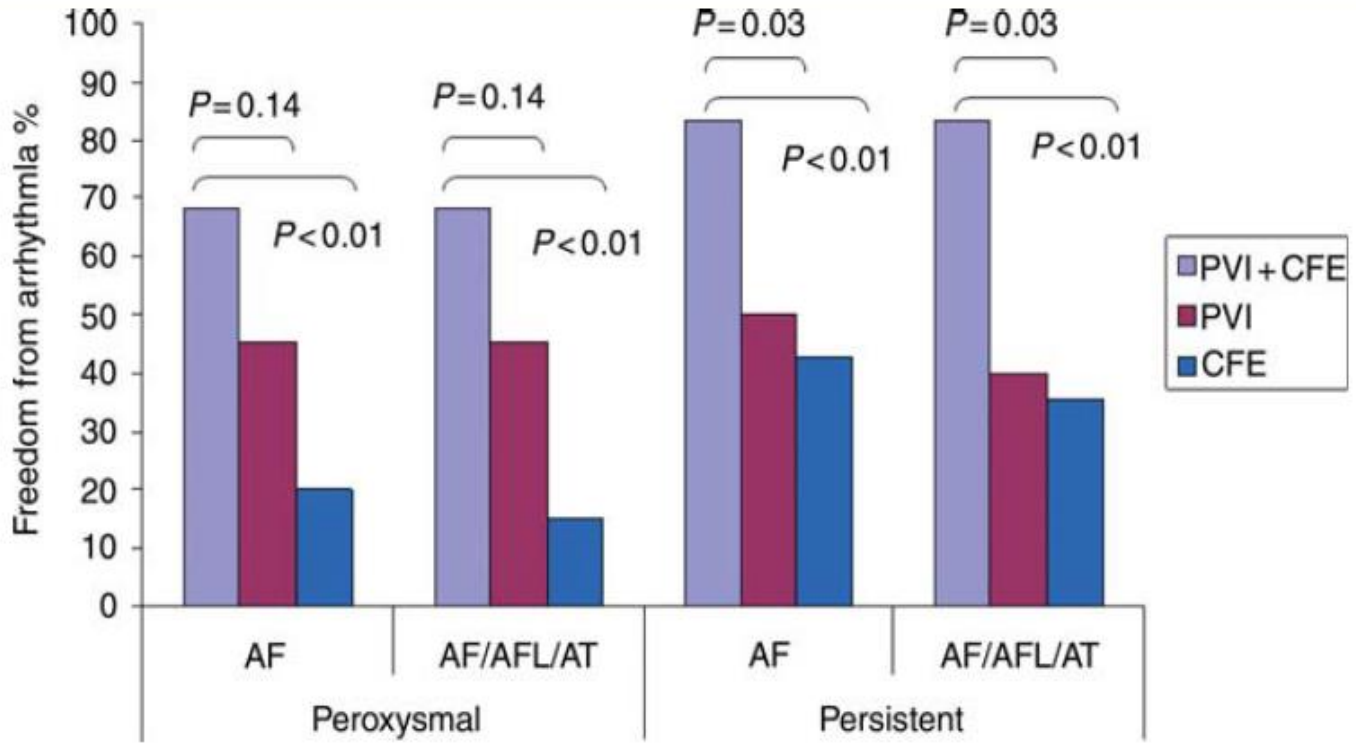
Freedom from AF/AT/AFL



PVI+CFE	34	34	34	30	30
PVI	32	32	29	22	22
CFE	34	34	25	14	11

1 or 2 procedure success rate – mean 1.2 per patient

Sub-Analysis of STAR AF I



***ONLY 36 PATIENTS TOTAL IN PERSISTENT AF GROUP

The NEW ENGLAND JOURNAL of MEDICINE

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 372;19 NEJM.ORG MAY 7, 2015

The NEW ENGLAND JOURNAL of MEDICINE

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 372;19 NEJM.ORG MAY 7, 2015

Differences from STAR AF I

- Exclusively persistent AF (80% in continuous AF > 6 months)
- Much larger study (589 patients in 48 centers)
- More rigorous follow-up (18 months, Holters, at least weekly TTM for entire 18 months)
- Different arms – PVI and PVI+CFE stayed the same, but PVI+LINES added based on these being the most common techniques used (1)

1 Calkins et al, Consensus Guidelines Catheter Ablation, Heart Rhythm 2012

Purpose

- To compare the efficacy of three different AF ablation strategies in patients with persistent AF*:

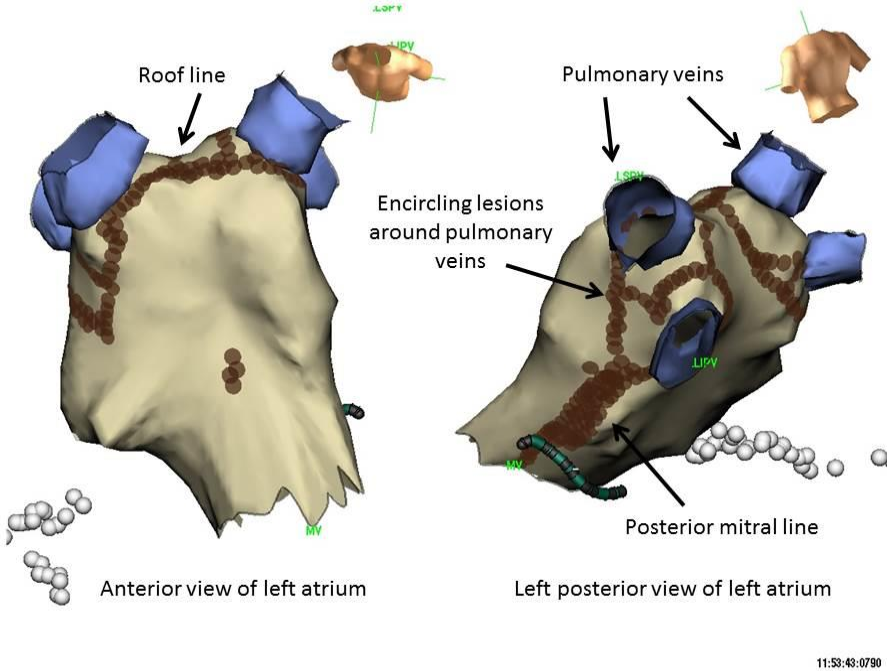
  (1) Pulmonary vein isolation (PVI) alone

  (2) PVI plus complex fractionated electrograms (PVI+CFE)

  (3) PVI plus linear ablation (PVI+Lines).

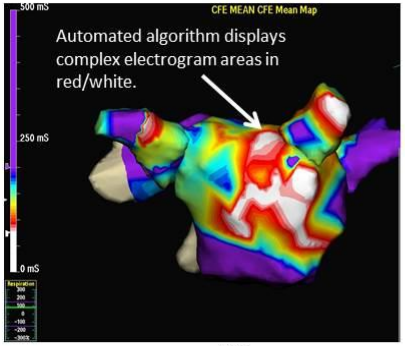
* Defined as AF episode lasting > 7 days but less than 3 years

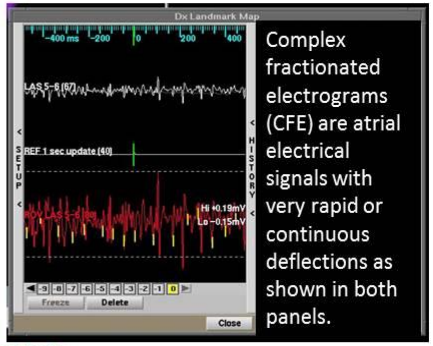
Methods – Ablation Strategy



** Complete elimination of CFE (not defragmentation) until termination or all CFE regions eliminated.

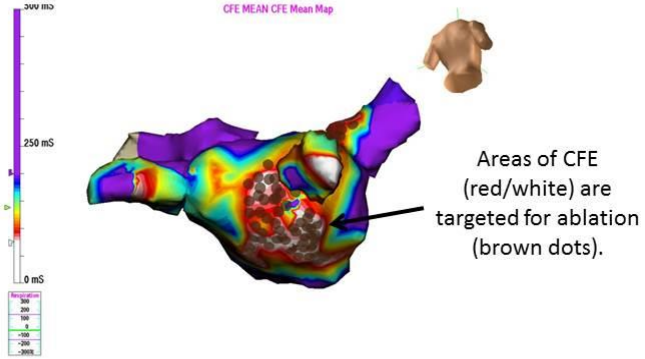
CFE strategy





Linear strategy

** Pre-specified pacing manoeuvres to determine linear block

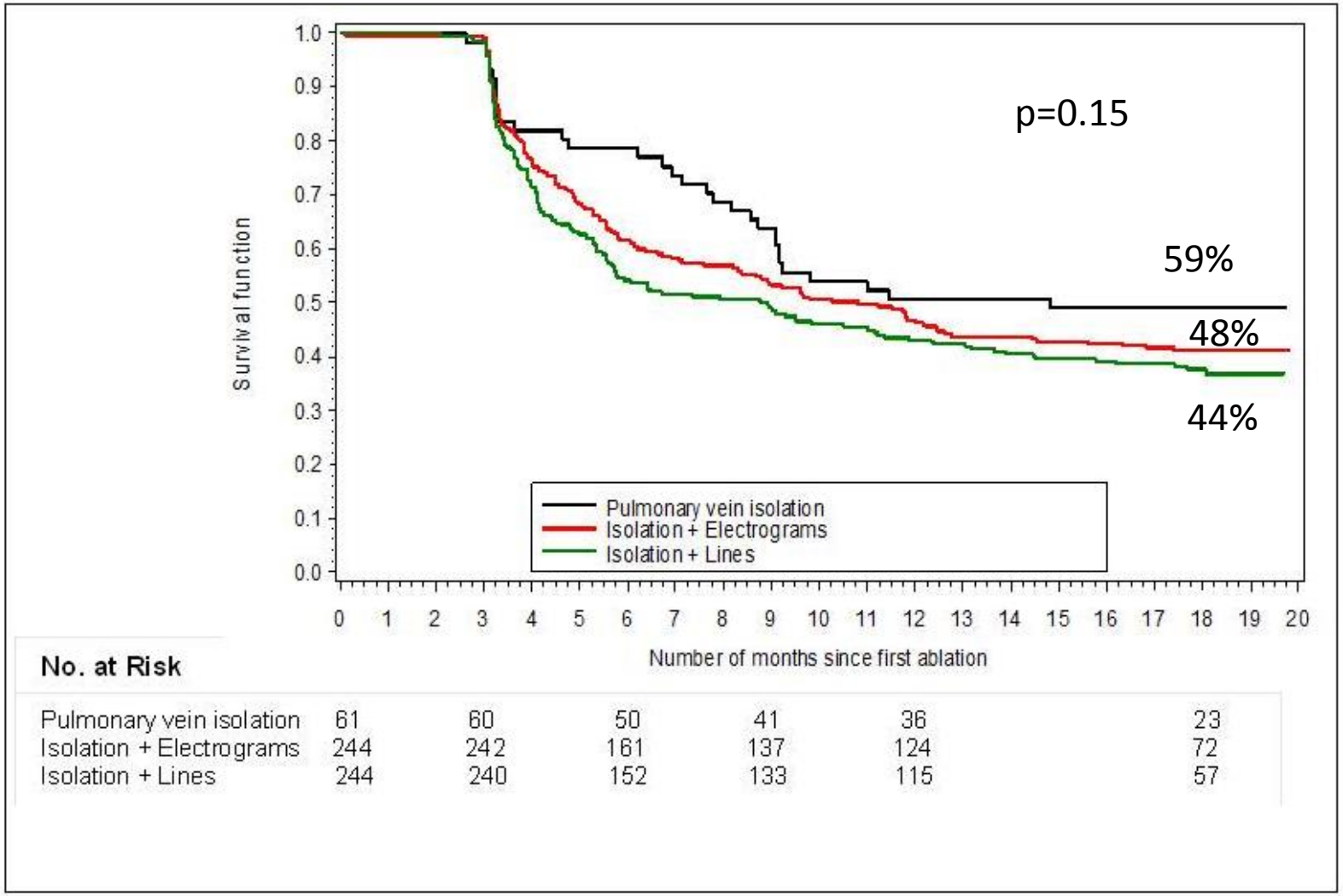


Results - Ablation characteristics

- 79% of patients presented to EP lab in spontaneous AF
- Successful PV isolation obtained in 97% of all patients (all groups)
- CFE were eliminated in 80% of patients
  - 11% not ablated because AF non-inducible after PVI
  - 9% all CFE could not be eliminated
- Both lines with block achieved in 74% of patients
  - Roof line only 93%
  - Mitral line only 75%

Results - Primary Outcome

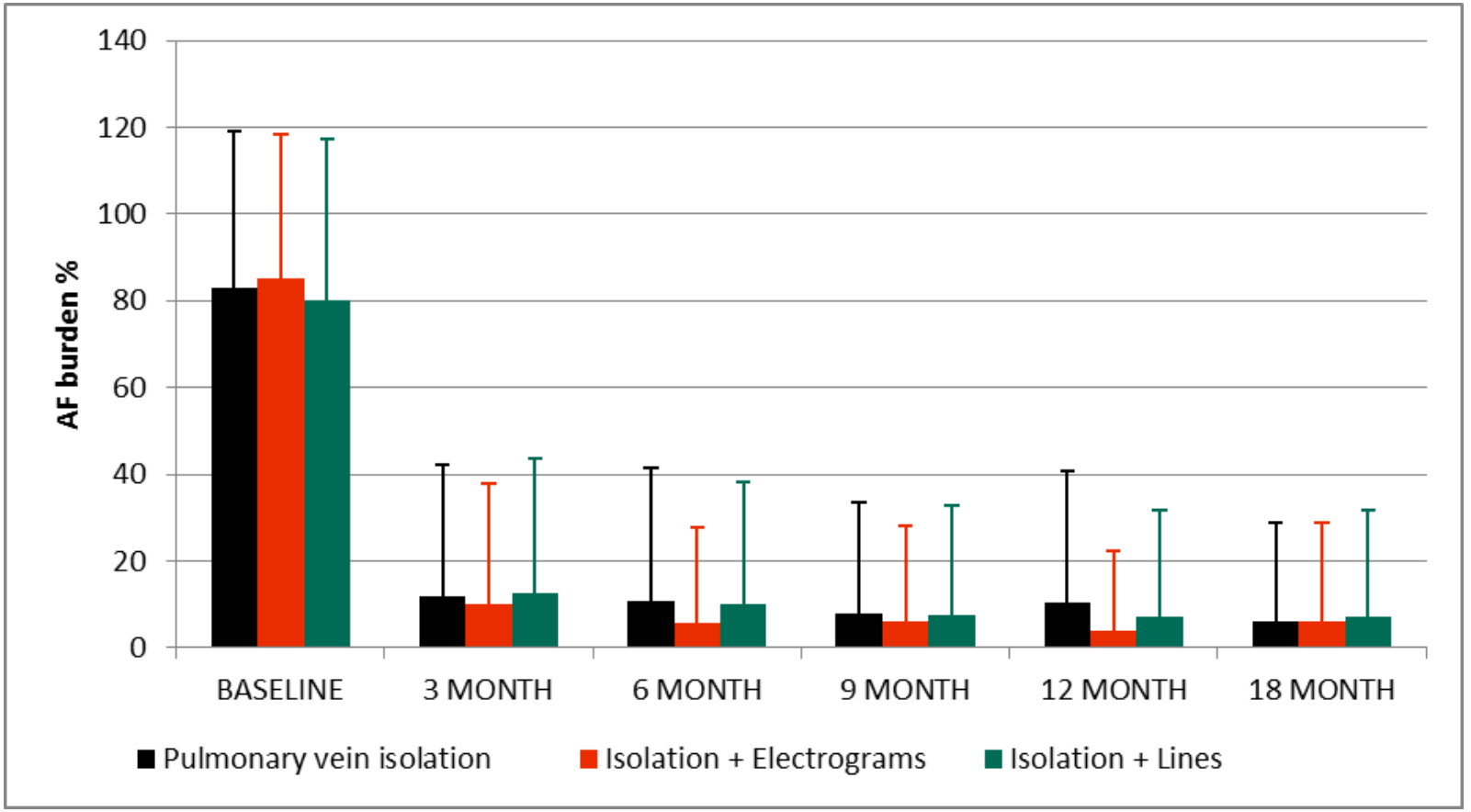
Documented AF > 30 seconds after <u>one</u> procedure with or without AAD



No. at Risk

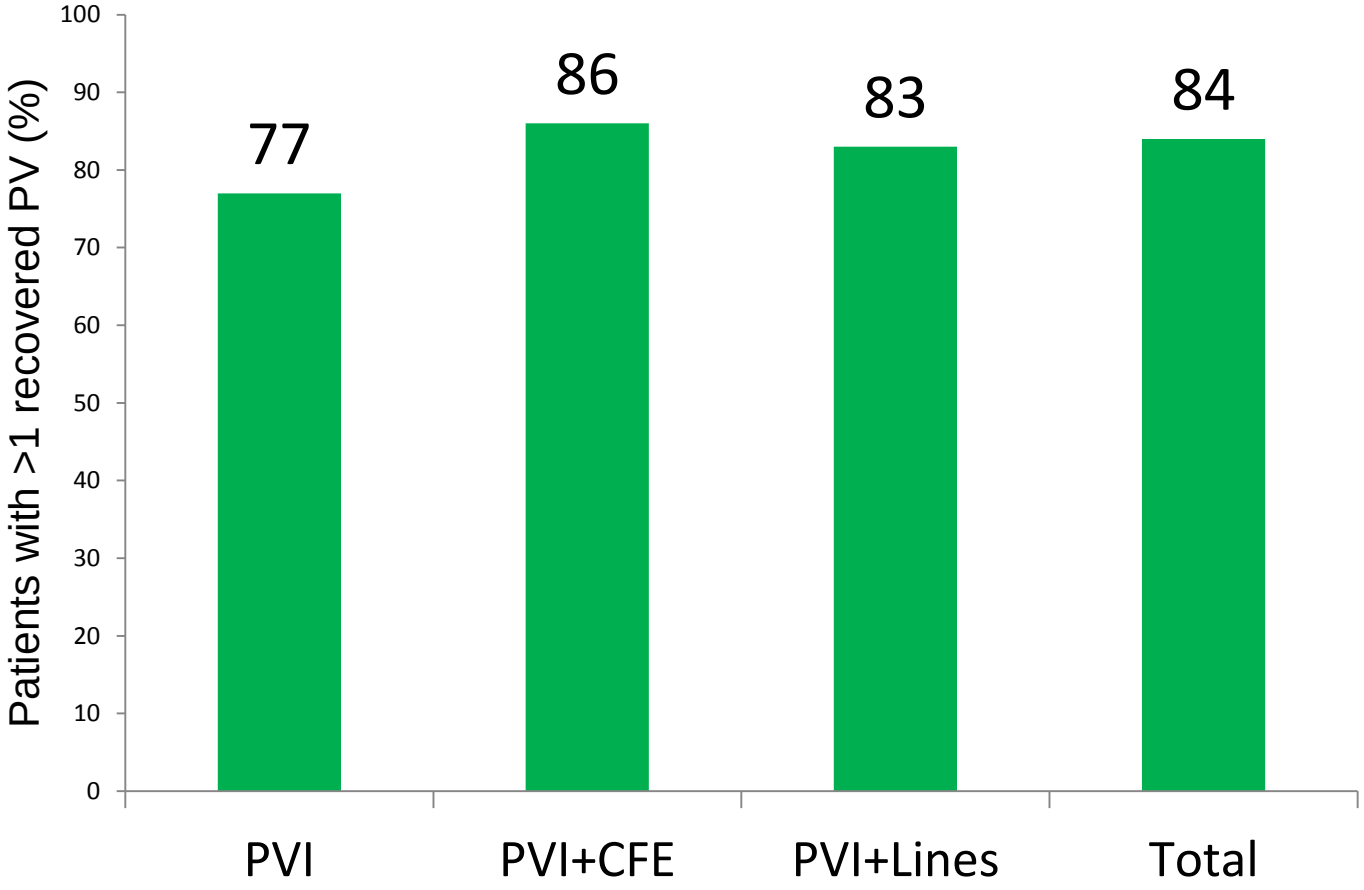
Pulmonary vein isolation	61	60	50	41	36	23
Isolation + Electrograms	244	242	161	137	124	72
Isolation + Lines	244	240	152	133	115	57

AF Burden Reduction



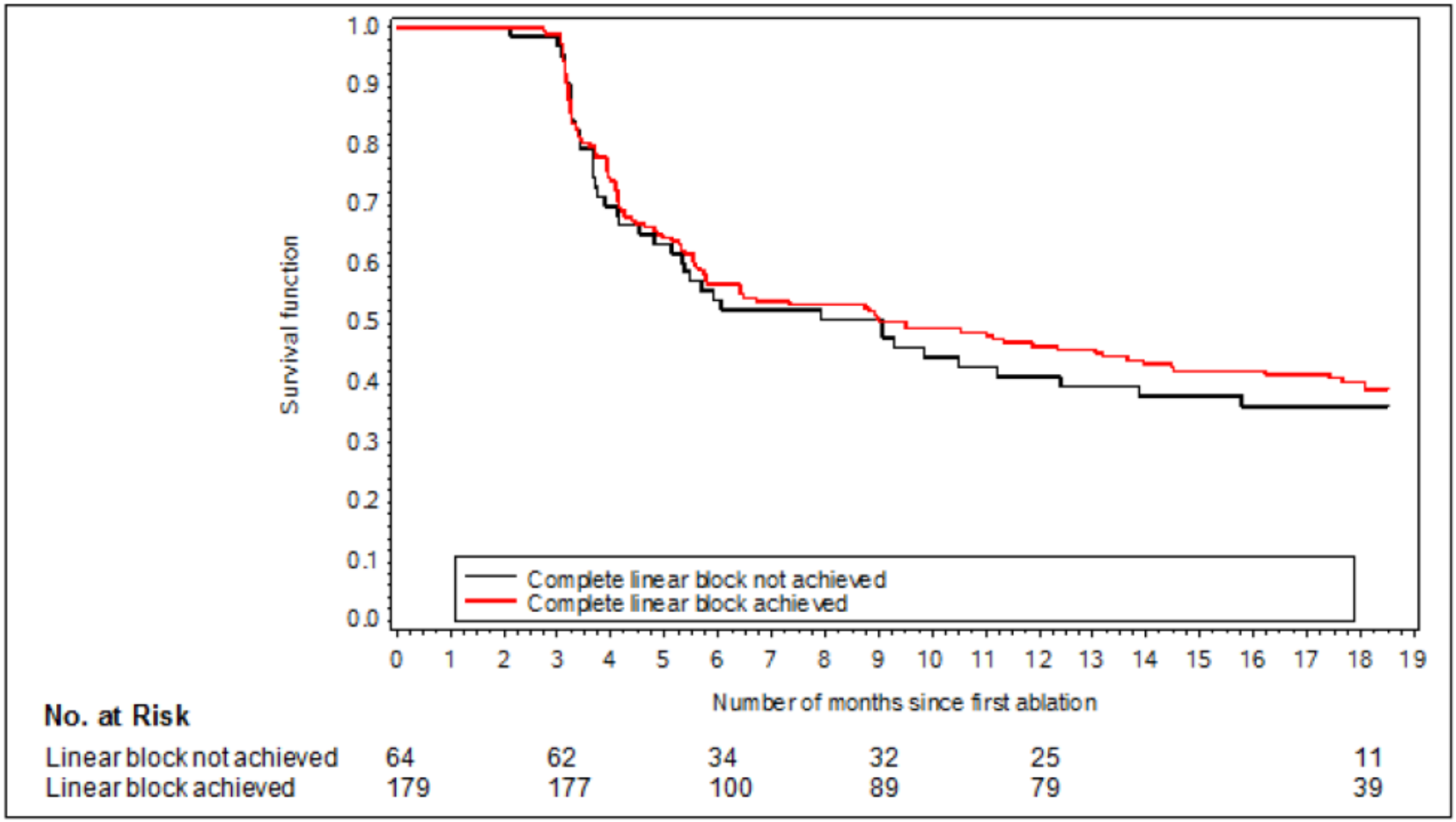
Burden calculation based on maximum of burden calculated from all follow-up Holters or # of weeks with at least one TTM of AF or number of days in AF from CRF

Percentage of Patients with PV Recovery at Repeat Procedure



* 80% of PVI+Lines pts also had gap in one or more lines, 63% of PVI+CFE had more CFE to ablate

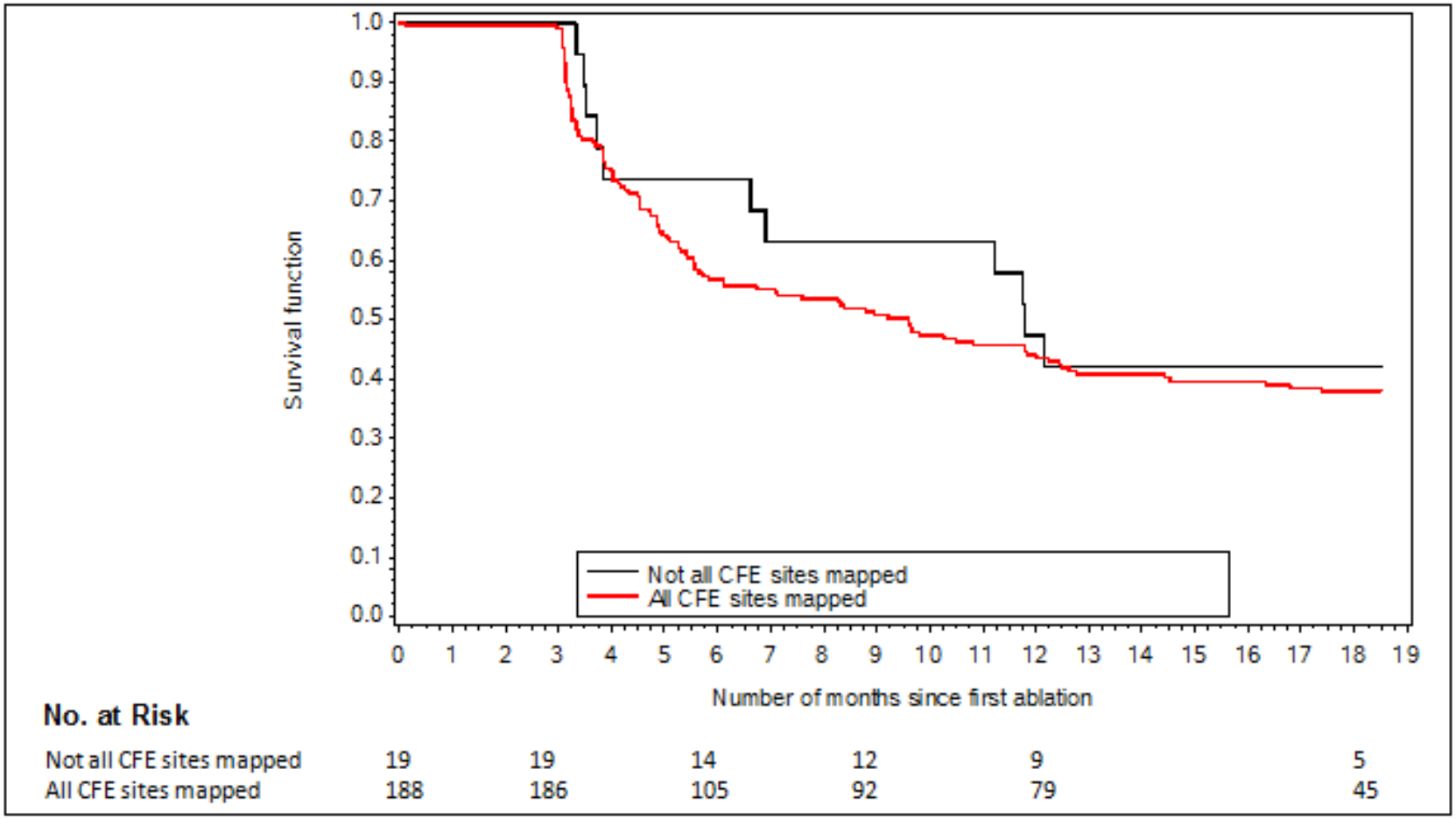
Freedom from AF/AT after 1 procedure based on linear block achieved



No. at Risk

Linear block not achieved	64	62	34	32	25	11
Linear block achieved	179	177	100	89	79	39

Freedom from AF/AT after 1 procedure based on all CFE ablated



Does this prove that PVI is enough for persistent AF?

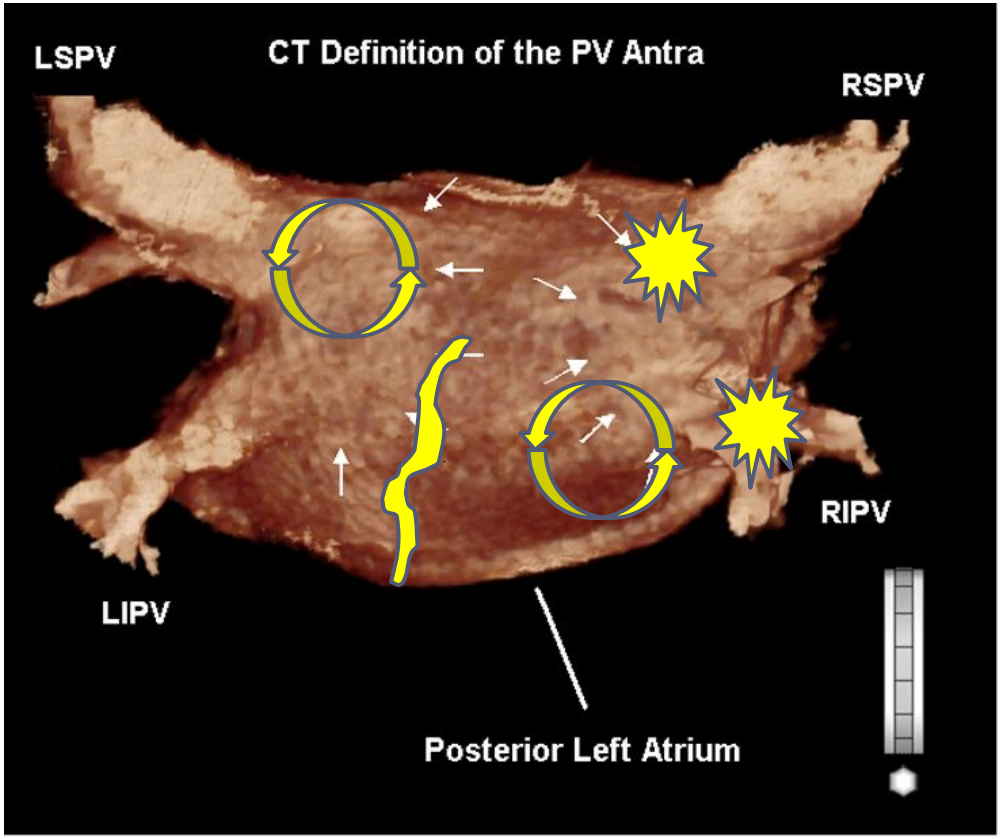
- NO.
- STAR AF II pushes the “reset” button on best strategy for persistent AF ablation
  - Emphasizes the need for a good, wide antral PV isolation as the cornerstone of persistent AF ablation
- Can leave certain strategies in the past…empiric lines, CFE
- But look forward to an exciting field of novel target identification to see if we can improve outcomes
  - CUSTOM ABLATION FOR THE PATIENT’s INDIVIDUAL SUBSTRATE

The “Individualized” Ablation

- Customizing the ablation according to the patient’s unique electrical and/or anatomical substrate
- Avoidance of empirical lesions
- The new “paradigms”
  - Rotor ablation
  - Scar based ablation
  - Non-PV triggers

Do we need to be agnostic?

Remember....atrial fibrillation is complicated.....



Multiple mechanisms may be at play simultaneously.

Based on Repetitive atrial patterns, Hummel et al, AHA 2014

Conclusions

- We know where we have been – CFE and empiric linear ablation do not seem to be the answers
- New techniques are being studied, each with their pros and cons
- Be wary of the “miracle cure” – watch for data
- Ultimately, we need large-scale clinical trials to evaluate outcomes – proof is in the pudding
- Remember, AF is complicated – be agnostic