
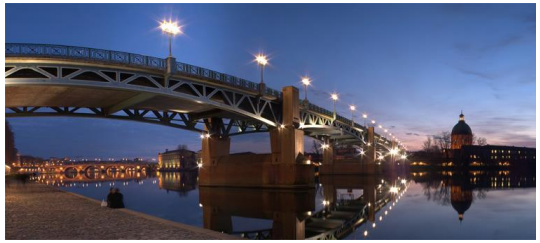

RETAC

# Paroxysmal AF ablation for index and redo procedure:

**Cryo:** *Olivier Thomas*
**RF:** *Stephane Combes*

**Stéphane Combes,** ***scombes@clinique-pasteur.com***

45 avenue de Lombez - BP 27617 - 31076 Toulouse Cedex 3
Tél. : 05 62 21 31 31 - Fax : 05 62 21 31 32
**www.clinique-pasteur.com**

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# No conflict of interest

no valid study comparing the latest technological advances of these two energies….

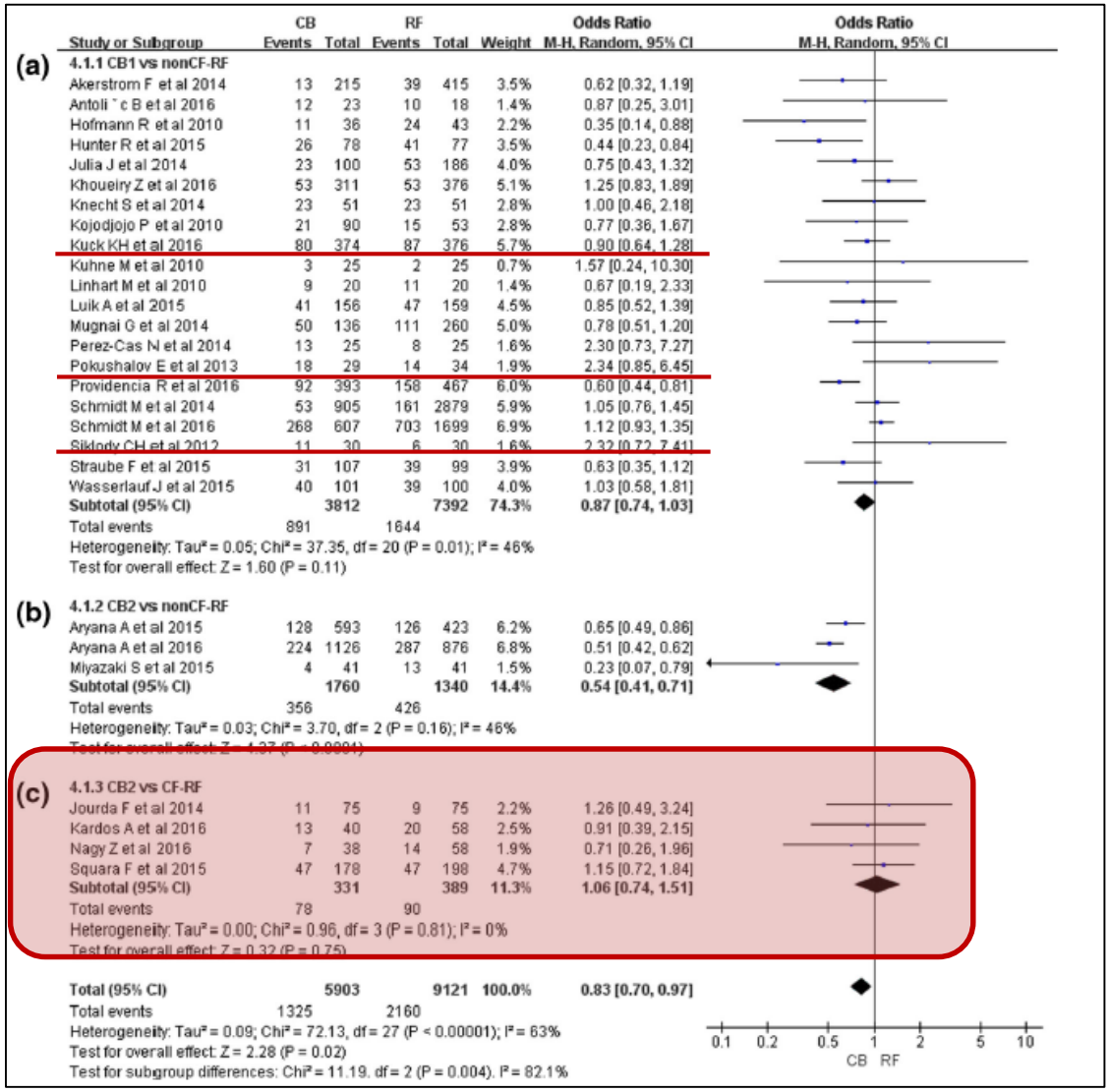
REVIEWS

# Comparison of catheter ablation for paroxysmal atrial fibrillation between cryoballoon and radiofrequency: a meta-analysis

Chao-feng Chen[1] · Xiao-fei Gao[1] · Xu Duan[1] · Bin Chen[1] · Xiao-hua Liu[1] · Yi-zhou Xu[1,2]

## Atrial arythmia recrudescence

***J Interv card Electrophysiol Dec 2016***




*Conclusion* Available overall and subgroup data suggested that both CB1 and CB2 were more beneficial than RF ablation, and the main advantages were reflected in comparing them with non-CF-RF. However, CF-RF and CB2 showed similar clinical benefits.

**Can we conclude on this data particulary with regard to new device ?**

**Cryoballoon versus Radiofrequency Catheter Ablation in Atrial Fibrillation:** A Meta-Analysis

RHANDERSON CARDOSO, M.D., RODRIGO MENDIRICHAGA, M.D., GILSON FERNANDES, M.D., CHRIS HEALY, M.D., LITSA K. LAMBRAKOS, M.D., JUAN F. VILES-GONZALEZ, M.D., JEFFREY J. GOLDBERGER, M.D., and RAUL D. MITRANI, M.D.

From the Division of Cardiology, Department of Medicine, University of Miami, Jackson Memorial Hospital, Miami, Florida, USA

***JCE oct 2016***

**Cryo ablation vs. Radiofrequency ablation for treatment of paroxysmal atrial fibrillation: a systematic review and meta-analysis**

*Chen YH, Lu ZY, Xiang Y, Hou JW, Wang Q, Lin H, Li YG*

***Europace 2017***

**"CONCLUSIONS:**
Compared with RF ablation, cryoablation present a comparable long-term AF/atrial tachycardial-free survival and procedure-related adverse events. Meanwhile, cryoablation markedly shorten the procedure time, nonetheless, with negligible impact on the fluoroscopy time."

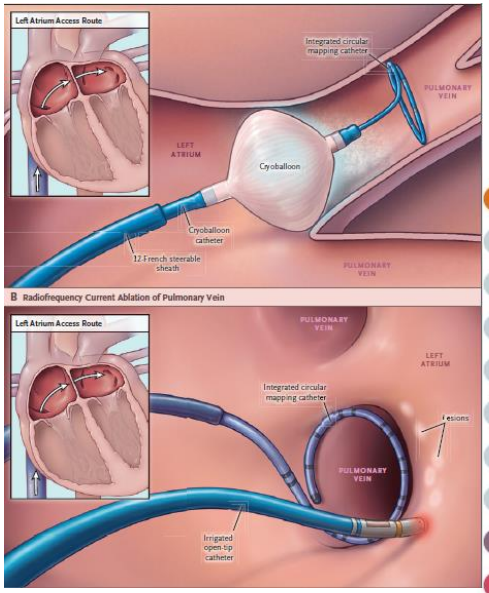
The NEW ENGLAND JOURNAL of MEDICINE

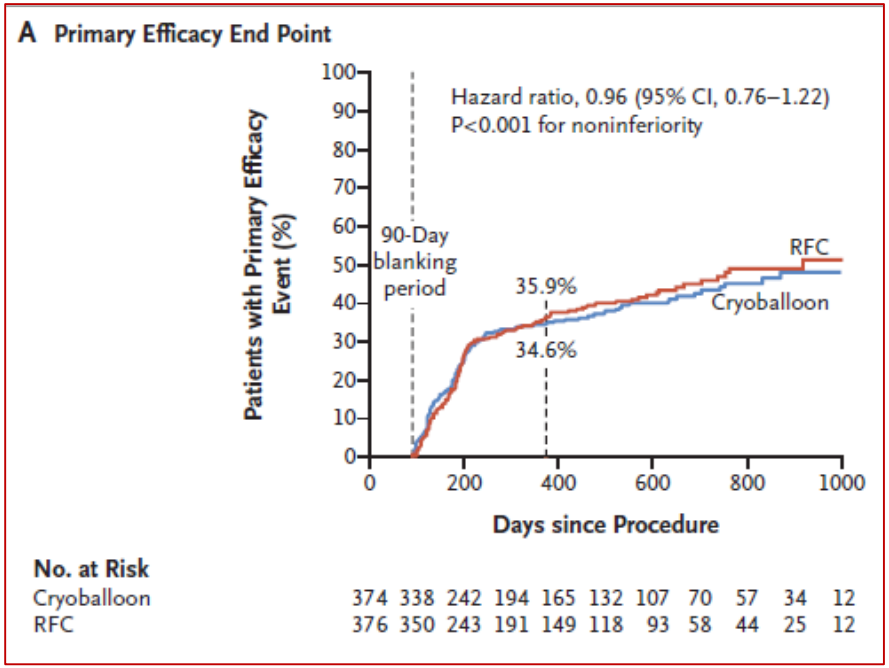
ORIGINAL ARTICLE

# Cryoballoon or Radiofrequency Ablation for Paroxysmal Atrial Fibrillation

Karl-Heinz Kuck, M.D., Josep Brugada, M.D., Alexander Fürnkranz, M.D., Andreas Metzner, M.D., Feifan Ouyang, M.D., K.R. Julian Chun, M.D., Arif Elvan, M.D., Ph.D, Thomas Arentz, M.D., Kurt Bestehorn, M.D., Stuart J. Pocock, Ph.D., Jean-Paul Albenque, M.D., Ph.D., and Claudio Tondo, M.D., Ph.D., for the FIRE AND ICE Investigators*

2016



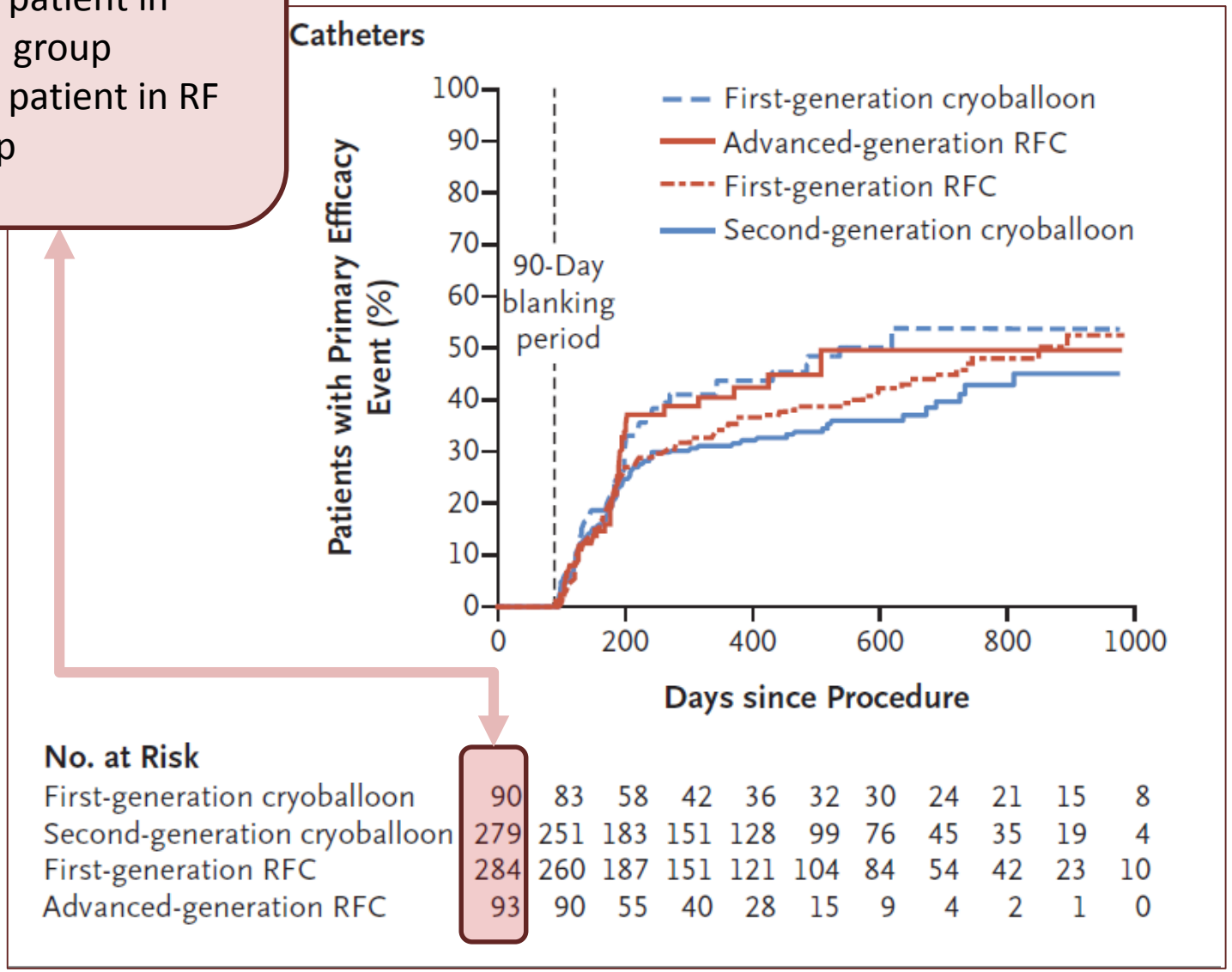
# Multicentric Study ….?

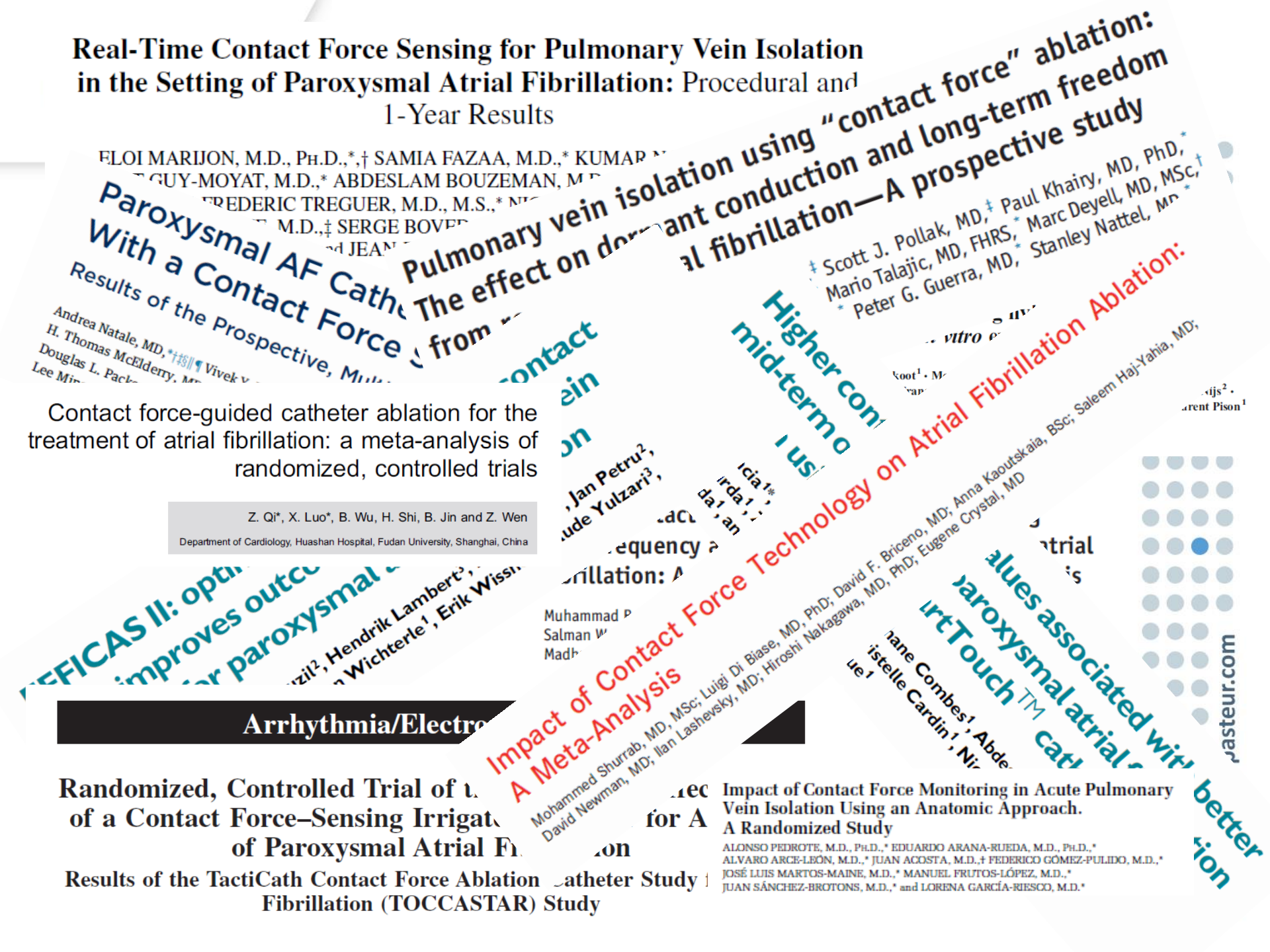
| Investigator | Center | Country | Enrolled Subjects | Treated Subjects |
|---|---|---|---|---|
| Karl-Heinz Kuck<br>Andreas Metzner<br>Feifan Ouyang | Asklepios Klinik St. Georg | Germany | 162 | 157 |
| Julian Chun<br>Alexander Fürnkranz | Cardioangiologisches Centrum Bethanien | Germany | 136 | 131 |
| Arif Elvan | Isala Klinieken Zwolle | The Netherlands | 78 | 74 |
| Thomas Arentz | Herz-Zentrum Bad Krozingen | Germany | 67 | 66 |
| Michael Kühne<br>Christian Sticherling | Universitätsspital Basel | Switzerland | 50 | 50 |
| Laszlo Gellér | Semmelweis Egyetem Budapest | Hungary | 47 | 47 |
| Matthias Busch | Uniklinik Greifswald | Germany | 35 | 33 |
| Josep Brugada<br>Lluis Mont | Hospital Clinic de Barcelona | Spain | 32 | 32 |
| Alberto Barrera | Hospital Clínico Universitario "Virgen de la Victoria" Malaga | Spain | 30 | 30 |
| Thomas Deneke | Klinikum Bad Neustadt | Germany | 27 | 26 |
| Jean-Paul Albenque | Clinique Pasteur Toulouse | France | 26 | 26 |
| Volker Kühlkamp | Herz-Zentrum Bodensee | Germany | 22 | 22 |
| Claudio Tondo | Centro Cardiologico Monzino, University of Milan | Italy | 18 | 18 |
| Ricardo Ruiz-Granell | Hospital Clinico Universitario Valencia | Spain | 17 | 16 |
| Petr Neuzil | NA Homolce Hospital Prague | Czech Republic | 12 | 12 |
| Nicasio Pérez-Castellano | Hospital Clinico San Carlos, Madrid | Spain | 10 | 10 |
| TOTAL | | | 769 | 750 |

40%

***Last generation:***

- 76 % patient in Cryo group
- 25% patient in RF group





Real-Time Contact Force Sensing for Pulmonary Vein Isolation in the Setting of Paroxysmal Atrial Fibrillation: Procedural and 1-Year Results

ELOI MARIJON, M.D., PH.D.,*,† SAMIA FAZAA, M.D.,* KUMAR N
GUY-MOYAT, M.D.,* ABDESLAM BOUZEMAN, M.D.,
FREDERIC TREGUER, M.D., M.S.,* NI
M.D.,‡ SERGE BOVER
d JEAN

Paroxysmal AF Cath
With a Contact Force
Results of the Prospective, Mul

Andrea Natale, MD, *†‡§‖¶ Vivek Y.
H. Thomas McElderry, MD,
Douglas L. Packe
Lee Min

Pulmonary vein isolation using "contact force" ablation:
The effect on dor ant conduction and long-term freedom
from l fibrillation—A prospective study

‡ Scott J. Pollak, MD, ‡ Paul Khairy, MD, PhD,
Mario Talajic, MD, FHRS, * Marc Deyell, MD, MSc,†
* Peter G. Guerra, MD, * Stanley Nattel, MD, *

Higher con
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Contact force-guided catheter ablation for the treatment of atrial fibrillation: a meta-analysis of randomized, controlled trials

Z. Qi*, X. Luo*, B. Wu, H. Shi, B. Jin and Z. Wen

Department of Cardiology, Huashan Hospital, Fudan University, Shanghai, China

EFICAS II: opti
improves outco
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Jan Petru[2],
ude Yulzari[3],
Hendrik Lambert[3],
Wichterle[1], Erik Wissn

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Salman W
Madh

Impact of Contact Force Technology on Atrial Fibrillation Ablation:

Ajijs[2] ·
rent Pison[1]

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alues associated wit
paroxysmal atrial
rtTouch™ cath

Impact of Contact Force Technology on Atrial Fibrillation Ablation: A Meta-Analysis

Mohammed Shurrab, MD, MSc; Luigi Di Biase, MD, PhD; David F. Briceno, MD; Anna Kaoutskaia, BSc; Saleem Haj-Yahia, MD; David Newman, MD; Ilan Lashevsky, MD; Hiroshi Nakagawa, MD, PhD; Eugene Crystal, MD

ane Combes[1], Abde
istelle Cardin[1], Ni
ue[1]

pasteur.com

better
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Arrhythmia/Electro

Randomized, Controlled Trial of t
of a Contact Force–Sensing Irrigat
of Paroxysmal Atrial Fi
Results of the TactiCath Contact Force Ablation atheter Study
Fibrillation (TOCCASTAR) Study

for A
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Impact of Contact Force Monitoring in Acute Pulmonary Vein Isolation Using an Anatomic Approach. A Randomized Study

ALONSO PEDROTE, M.D., PH.D.,* EDUARDO ARANA-RUEDA, M.D., PH.D.,*
ALVARO ARCE-LEÓN, M.D.,* JUAN ACOSTA, M.D.,† FEDERICO GÓMEZ-PULIDO, M.D.,*
JOSÉ LUIS MARTOS-MAINE, M.D.,* MANUEL FRUTOS-LÓPEZ, M.D.,*
JUAN SÁNCHEZ-BROTONS, M.D.,* and LORENA GARCÍA-RIESCO, M.D.*

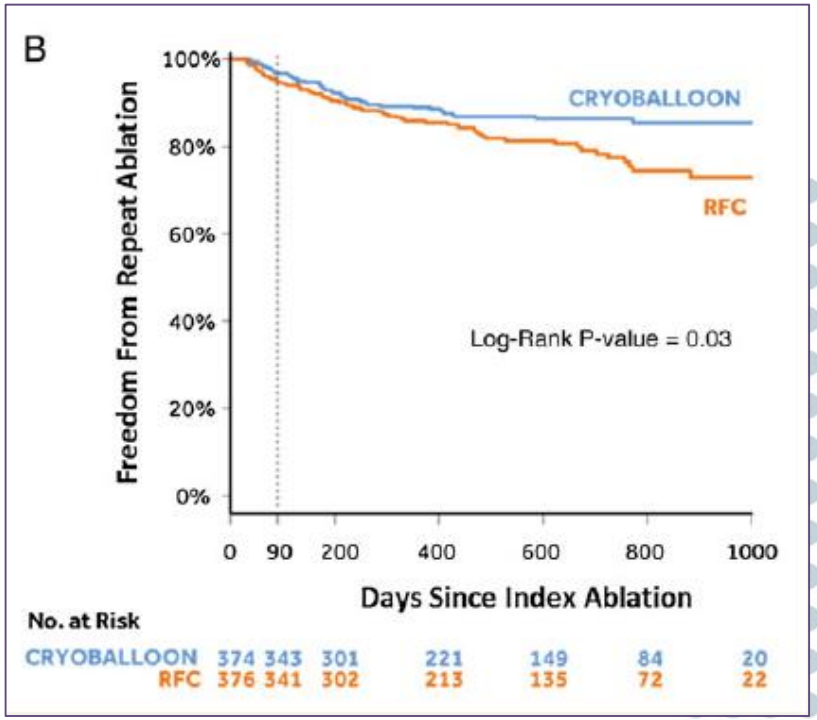
European Heart Journal
doi:10.1093/eurheartj/ehw285

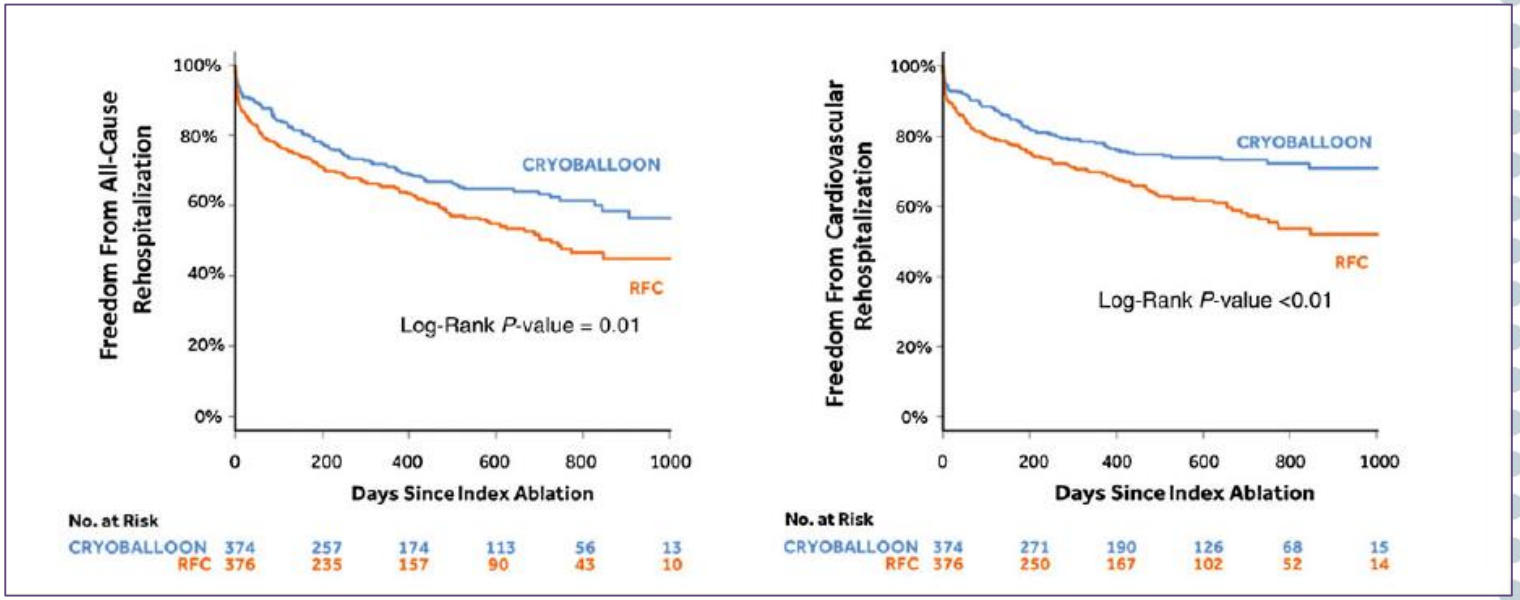


# Cryoballoon or radiofrequency ablation for symptomatic paroxysmal atrial fibrillation: reintervention, rehospitalization, and quality-of-life outcomes in the FIRE AND ICE trial

**Karl-Heinz Kuck[1]*, Alexander Fürnkranz[2], K.R. Julian Chun[2], Andreas Metzner[1], Feifan Ouyang[1], Michael Schlüter[1], Arif Elvan[3], Hae W. Lim[4], Fred J. Kueffer[4], Thomas Arentz[5], Jean-Paul Albenque[6], Claudio Tondo[7], Michael Kühne[8], Christian Sticherling[8], and Josep Brugada[9], on behalf of the FIRE AND ICE Investigators**

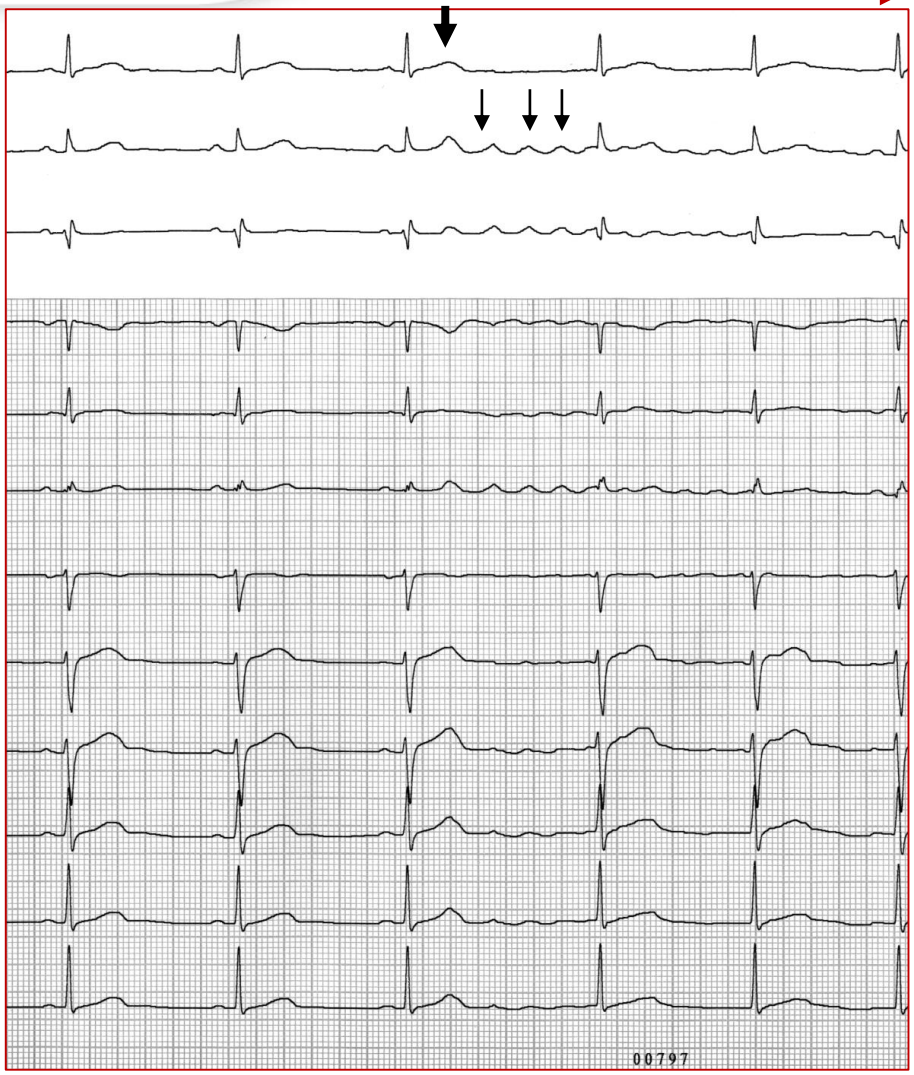
2016



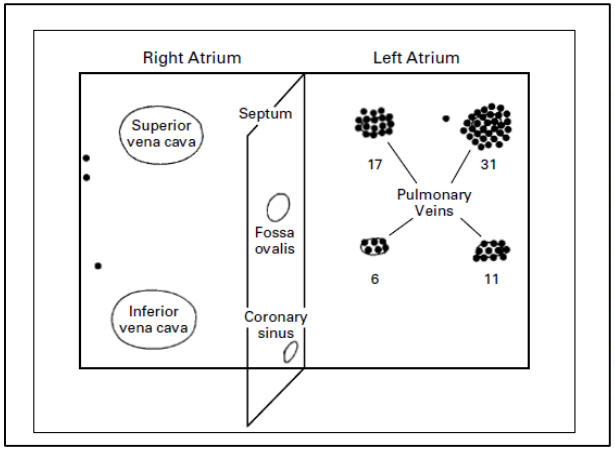
# Is there only one type of paroxysmal AF ?

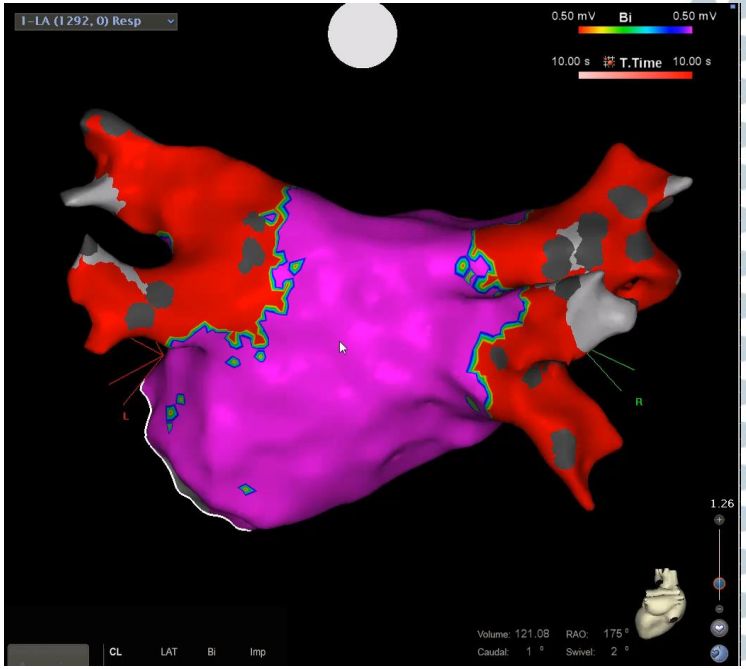
AF




SPONTANEOUS INITIATION OF ATRIAL FIBRILLATION BY ECTOPIC BEATS ORIGINATING IN THE PULMONARY VEINS

MICHEL HAÏSSAGUERRE, M.D., PIERRE JAÏS, M.D., DIPEN C. SHAH, M.D., ATSUSHI TAKAHASHI, M.D., MÉLÈZE HOCINI, M.D., GILLES QUINIOU, M.D., STÉPHANE GARRIGUE, M.D., ALAIN LE MOUROUX, M.D., PHILIPPE LE MÉTAYER, M.D., AND JACQUES CLÉMENTY, M.D.



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European Heart Journal
doi:10.1093/eurheartj/ehw210

ESC GUIDELINES

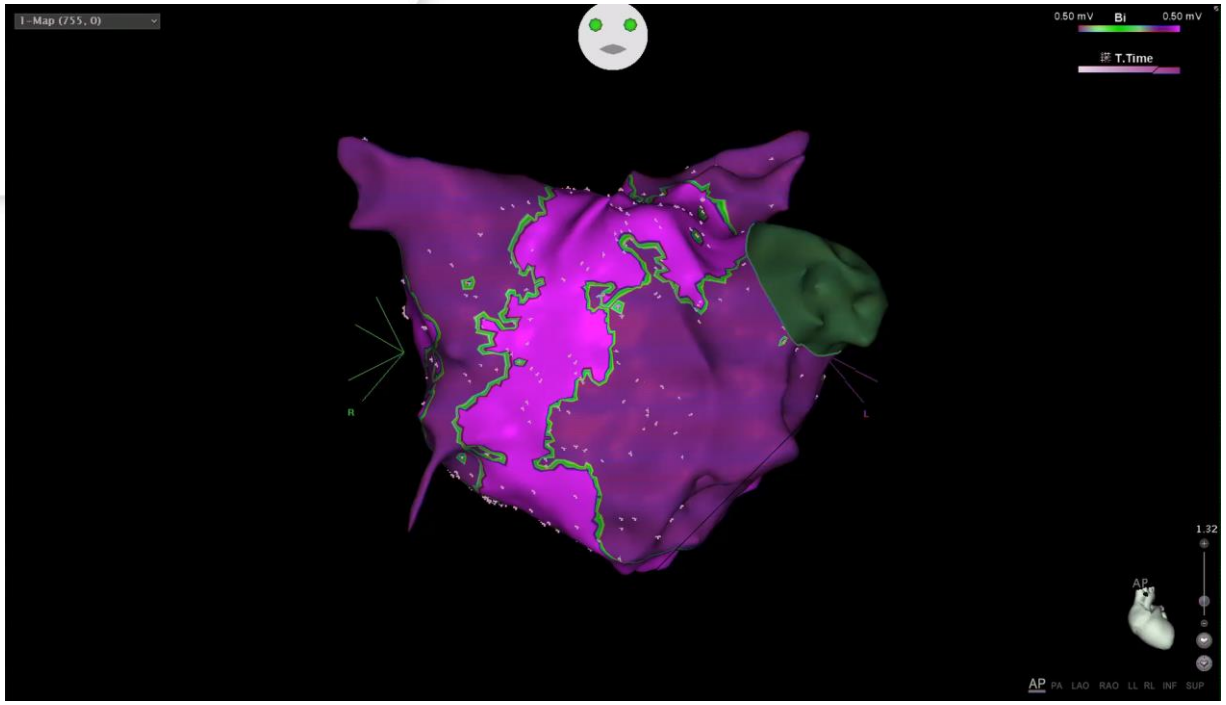
# What is the definition of paroxysmal AF

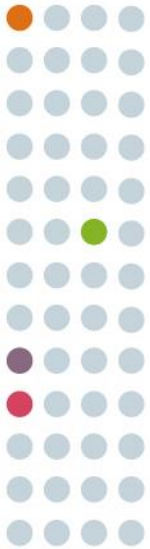
## 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

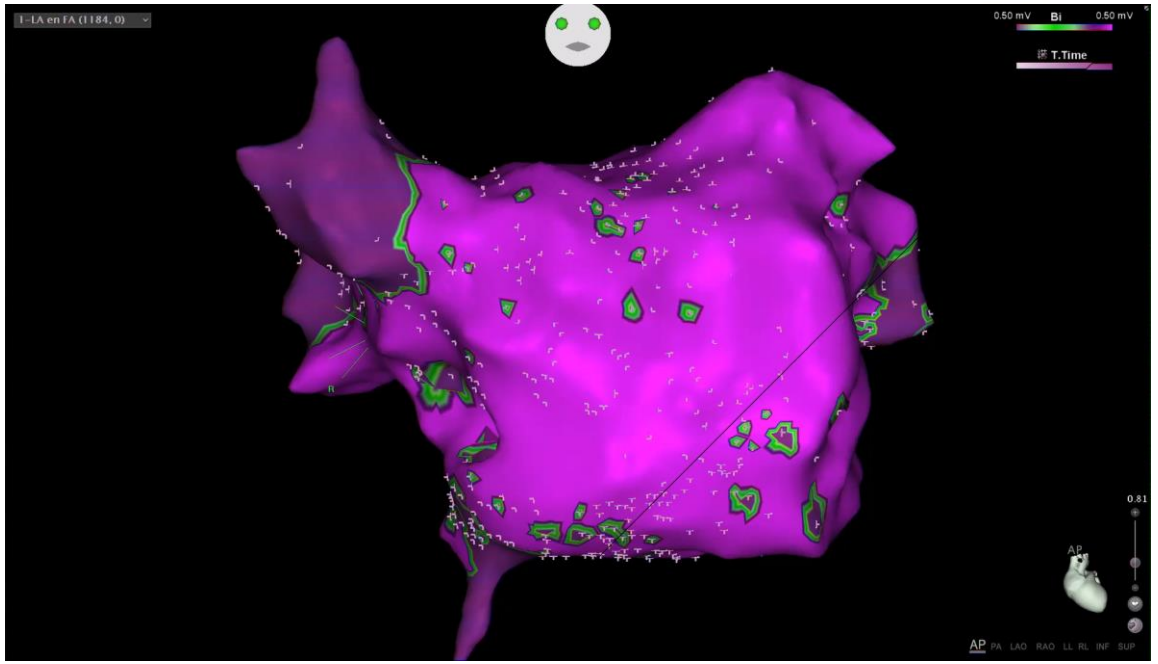
**The Task Force for the management of atrial fibrillation of the European Society of Cardiology (ESC)**

**Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC**

| AF pattern | Definition |
|---|---|
| First diagnosed AF | AF that has not been diagnosed before, irrespective of the duration of the arrhythmia or the presence and severity of AF-related symptoms. |
| Paroxysmal AF | Self-terminating, in most cases within 48 hours. Some AF paroxysms may continue for up to 7 days.[a] AF episodes that are cardioverted within 7 days should be considered paroxysmal.[a] |
| Persistent AF | AF that lasts longer than 7 days, including episodes that are terminated by cardioversion, either with drugs or by direct current cardioversion, after 7 days or more. |
| Long-standing persistent AF | Continuous AF lasting for ≥1 year when it is decided to adopt a rhythm control strategy. |
| Permanent AF | AF that is accepted by the patient (and physician). Hence, rhythm control interventions are, by definition, not pursued in patients with permanent AF. Should a rhythm control strategy be adopted, the arrhythmia would be re-classified as 'long-standing persistent AF'. |


1-Map (755, 0)
0.50 mV
Bi
0.50 mV
T.Time
R
L
1.32
AP
AP PA LAO RAO LL RL INF SUP

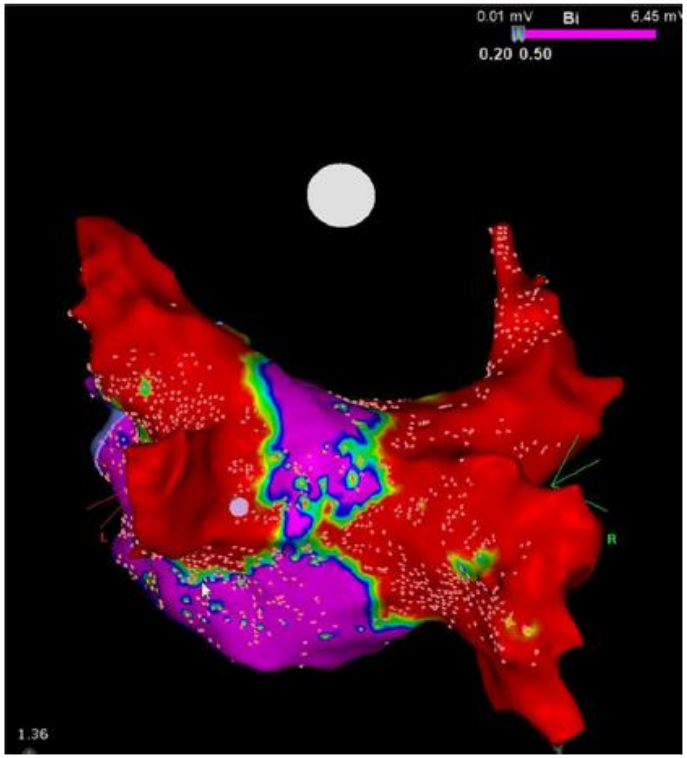


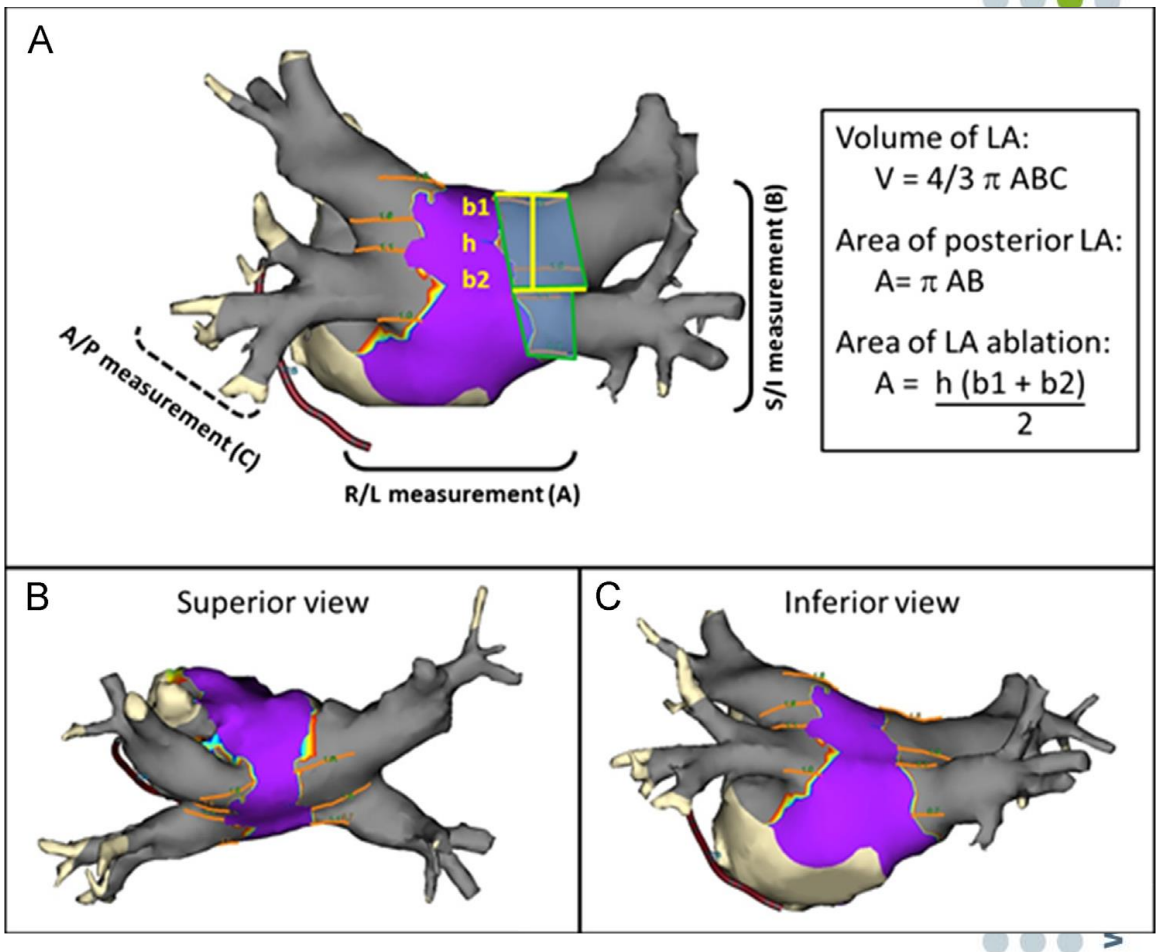

1-LA en fA (1184, 0)
0.50 mV
Bi
0.50 mV
T.Time
0.81
AP
AP PA LAO RAO LL RL INF SUP

# Quantification of the cryoablation zone demarcated by pre- and postprocedural electroanatomic mapping in patients with atrial fibrillation using the 28-mm second-generation cryoballoon

David N. Kenigsberg, MD, FHRS,[*] Natalia Martin, BS,[1†] Hae W. Lim, PhD,[‡] Marcin Kowalski, MD, FHRS,[§] Kenneth A. Ellenbogen, MD, FHRS[‖]

***Heart Rhythm 2015***



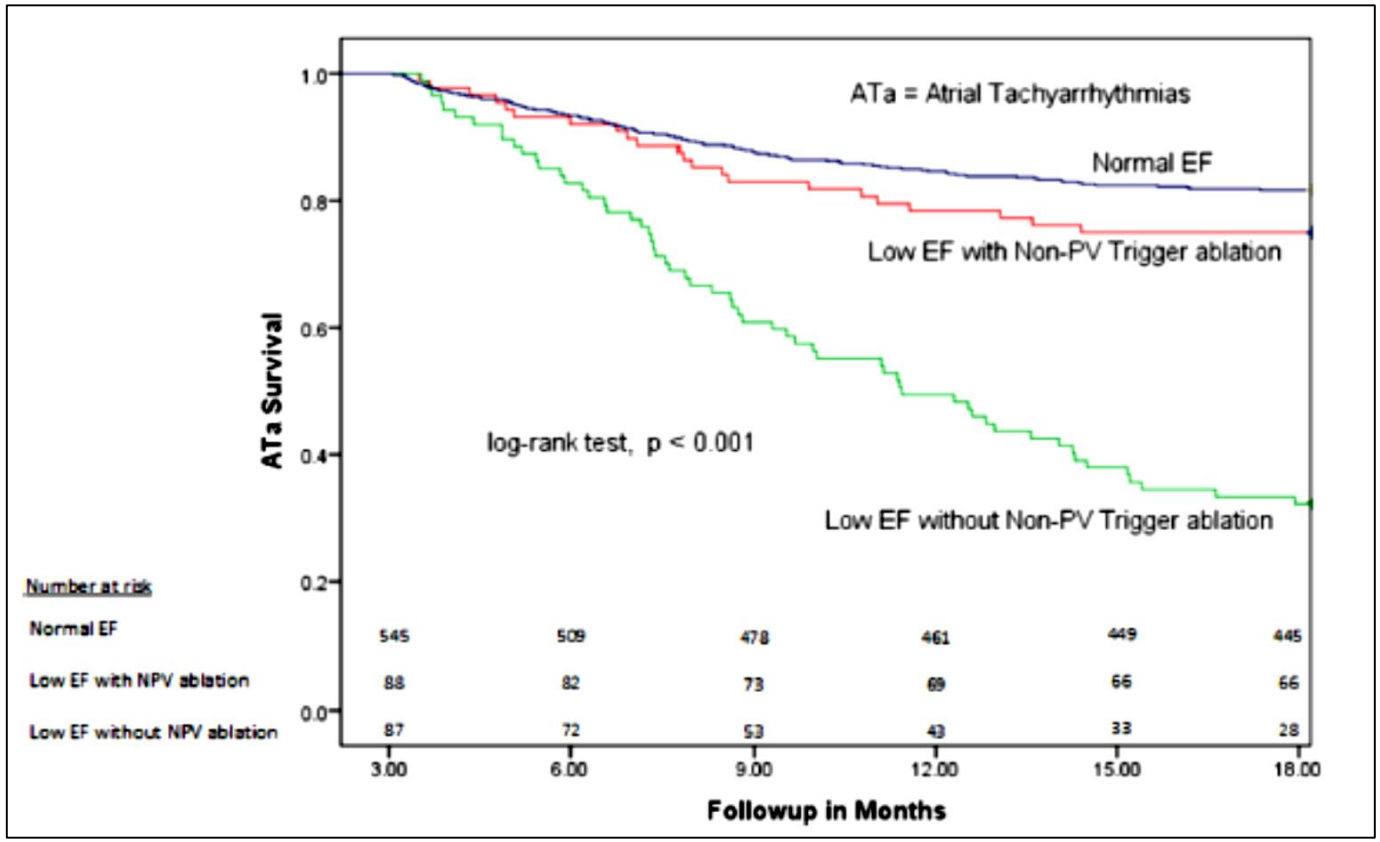




Only 27% of posterior wall was not ablated

# Importance of non-pulmonary vein triggers

**Importance of non–pulmonary vein triggers ablation to achieve long-term freedom from paroxysmal atrial fibrillation in patients with low ejection fraction**

***Zhao Y et al, Heart Rhythm 2016***




720 patients
Prospective study
2 groups
LVEF≤ 35%
LVEF≥ 50%

# AF Ablation Guided by Spatiotemporal Electrogram Dispersion Without Pulmonary Vein Isolation

## A Wholly Patient-Tailored Approach

Julien Seitz, MD,[a] Clément Bars, MD,[a,b] Guillaume Théodore, MD,[c] Sylvain Beurtheret, MD,[a] Nicolas Lellouche, MD, PhD,[d] Michel Bremondy, MD,[a] Ange Ferracci, MD,[a] Jacques Faure, MD,[a] Guillaume Penaranda,[e] Masatoshi Yamazaki, MD, PhD,[f] Uma Mahesh R. Avula, MD,[f] Laurence Curel, MS,[a] Sabrina Siame,[a] Omer Berenfeld, PhD,[f] André Pisapia, MD,[a] Jérôme Kalifa, MD, PhD[f]

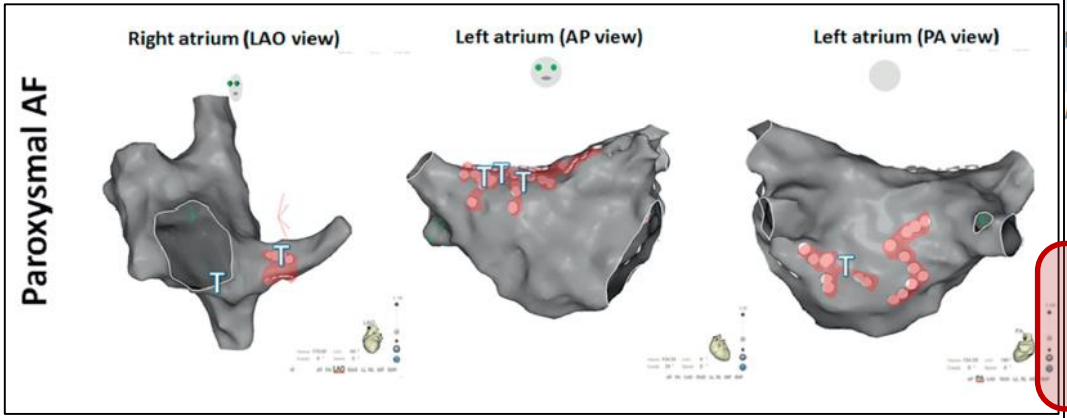
**JACC 2017**

22, 8 % of paroxysmal AFIb

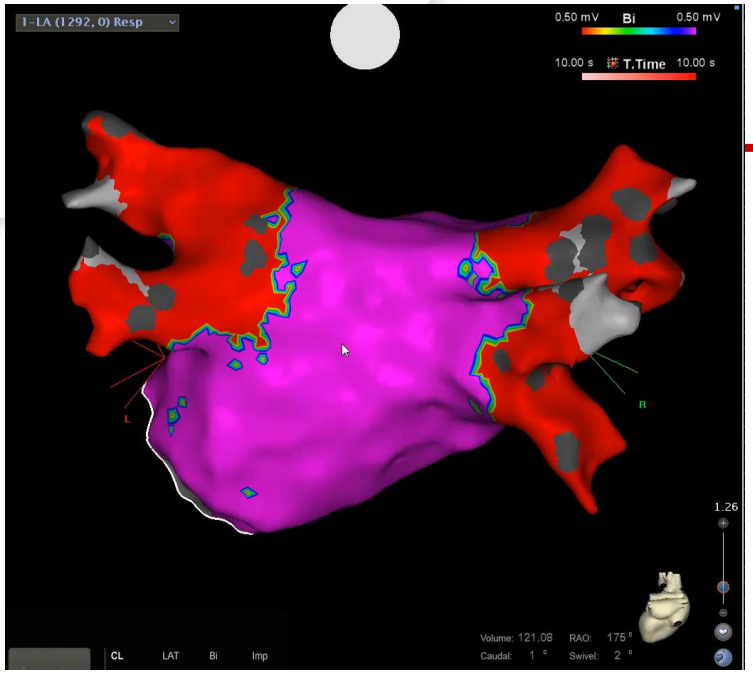
Ablation at dispersion areas terminated AF in 95% of the 105 patients

on average 1,4 +/- à 0,5 procedures
18 months of follow up

The atrial arrhythmia recurrence rate was 15%




| | All Patients (N = 43) | Paroxysmal (n = 15) |
|---|---|---|
| Dispersion areas | | |
| Total dispersion area surface, cm² | | |
| Mean ± SD | 22.5 ± 13.5 | 18 ± 10 |
| Median (IQR) | 19 (12.5-33) | 17 (13-22) |
| Mean dispersion area surface, cm² | | |
| Mean ± SD | 5 ± 2 | 5 ± 2 |
| Median (IQR) | 4.5 (3-6) | 4.5 (3.4-6.0) |
| Number of dispersion areas | | |
| Mean ± SD | 5 ± 1.5 | 4 ± 1.7 |
| Median (IQR) | 5 (4-6) | 4 (3-5) |
| Ablation in the RA | | |
| RA ablated surface, cm² | | |
| Mean ± SD | 6 ± 5 | 4 ± 5 |
| Median (IQR) | 4.5 (2-7) | 3 (0-4) |
| RA total surface, cm² | | |
| Mean ± SD | 154 ± 58 | 138.3 ± 71.0 |
| Median (IQR) | 150 (122-184) | 129 (121-186) |
| Percent of RA ablated surface | | |
| Mean ± SD | 4 ± 2.5 | 3.8 ± 3 |
| Ablation in the LA | | |
| LA ablated surface, cm² | | |
| Mean ± SD | 25.5 ± 15.7 | 20.5 ± 10.5 |
| Median (IQR) | 20.6 (15-35.5) | 19 (14-27) |
| LA total surface, cm² | | |
| Mean ± SD | 157 ± 47 | 139 ± 44 |
| Median (IQR) | 156 (135-171) | 153 (114-164) |
| Percent of LA ablated surface | | |
| Mean ± SD | 17 ± 10 | 15.8 ± 8.8 |
| Ablation in both atria | | |
| Biatrial total surface, cm² | | |
| Mean ± SD | 302 ± 85 | 266 ± 97.5 |
| Median (IQR) | 312 (257-350) | 288 (207-331) |
| Bi-atrial total ablated surface, cm² | | |
| Mean ± SD | 31 ± 19 | 25 ± 12 |
| Median (IQR) | 24.5 (18-39.5) | 21 (17-39) |
| Percent of biatrial ablated surface, cm² | | |
| Mean ± SD | 10 ± 5 | 10 ± 4 |




# For the REDO procedure

*Currently with new technologies*

Only 10-20% of reconnected PV in REDO procedure

*What do we offer to these patients?*

The radiofrequency proves to be of great importance in this management

# Cost effectiveness

ORIGINAL ARTICLE

## Cost comparison of radiofrequency catheter ablation versus cryoablation for atrial fibrillation in hospitals using both technologies

Tina D. Hunter[a], Swetha R. Palli[a] and John A. Rizzo[b]

*Jounal of Medical Economics 2016*

**Conclusion:** AF ablation using RF results in significantly lower costs compared with Cryo, despite an RF population with more cardiovascular disease. This saving cannot be attributed to a difference in complication rates.

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# Take Home Message

**For trained teams**, Ablation with the last technology of RF or cryo **<u>are equally effective for the deconnection of PV</u>**

**No difference in terms of complication or RX exposure**

**Longer learning** curve, but **less expensive procedure**

Interest of RF energy in **tailored and individualized management of "all paroxysmal AF"**

Interest of RF over the Cryo **in REDO procedures**

# Thank you for your attention