Ablation de FA
Pour qui et quand ?

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Disclosures

- Consulting and Speaker’s fees from Biotronik, Medtronic, Boston Scientific, Abbott, Microport

ESC European Society of Cardiology

European Heart Journal (2020) **00**, 1–125
doi:10.1093/eurheartj/ehaa612

ESC GUIDELINES

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS)

The Task Force for the diagnosis and 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

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Table 18 Principles of antiarrhythmic drug therapy

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Principles
AAD therapy aims to reduce AF-related symptoms
Efficacy of AADs to maintain sinus rhythm is modest
Clinically successful AAD therapy may reduce rather than eliminate AF recurrences
If one AAD 'fails', a clinically acceptable response may be achieved by another drug
Drug-induced proarrhythmia or extracardiac side-effects are frequent
Safety rather than efficacy considerations should primarily guide the choice of AAD

Recommendations for long-term antiarrhythmic drugs (1)

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Reduces CV hospitalizations & death
Most solid safety data.

Recommendations	Class	Level
Flecainide or propafenone is rec[illegible]d for long-term rhythm control in AF patients with **normal LV fu[illegible]nd without structural heart disease**, including significant LVH and m[illegible]rdial ischaemia.	I	A
Dronedarone is recommended for long-term rhythm control in AF patients with: • **Normal or mildly impaired (but stable) LV function, or** • **HFpEF, ischaemic, or valvular heart disease.**	I	A
Amiodarone is recommended for long-term rhythm control in all AF patients, including those with HFrEF. However, owing to its extracardiac toxicity, other AADs should be considered first whenever possible.	I	A
Sotalol may be considered for long-term rhythm control in patients with normal LV function or with ischaemic heart disease **if close monitoring** of QT interval, serum potassium levels, creatinine clearance, and other proarrhythmia risk factors is provided.	IIb	A

New !

2020 ESC Guideli[illegible]gement of atrial fibrillation
(Europ[illegible].1093/eurheartj/ehaa612)

Recommendations for rhythm control/catheter ablation of AF (1)

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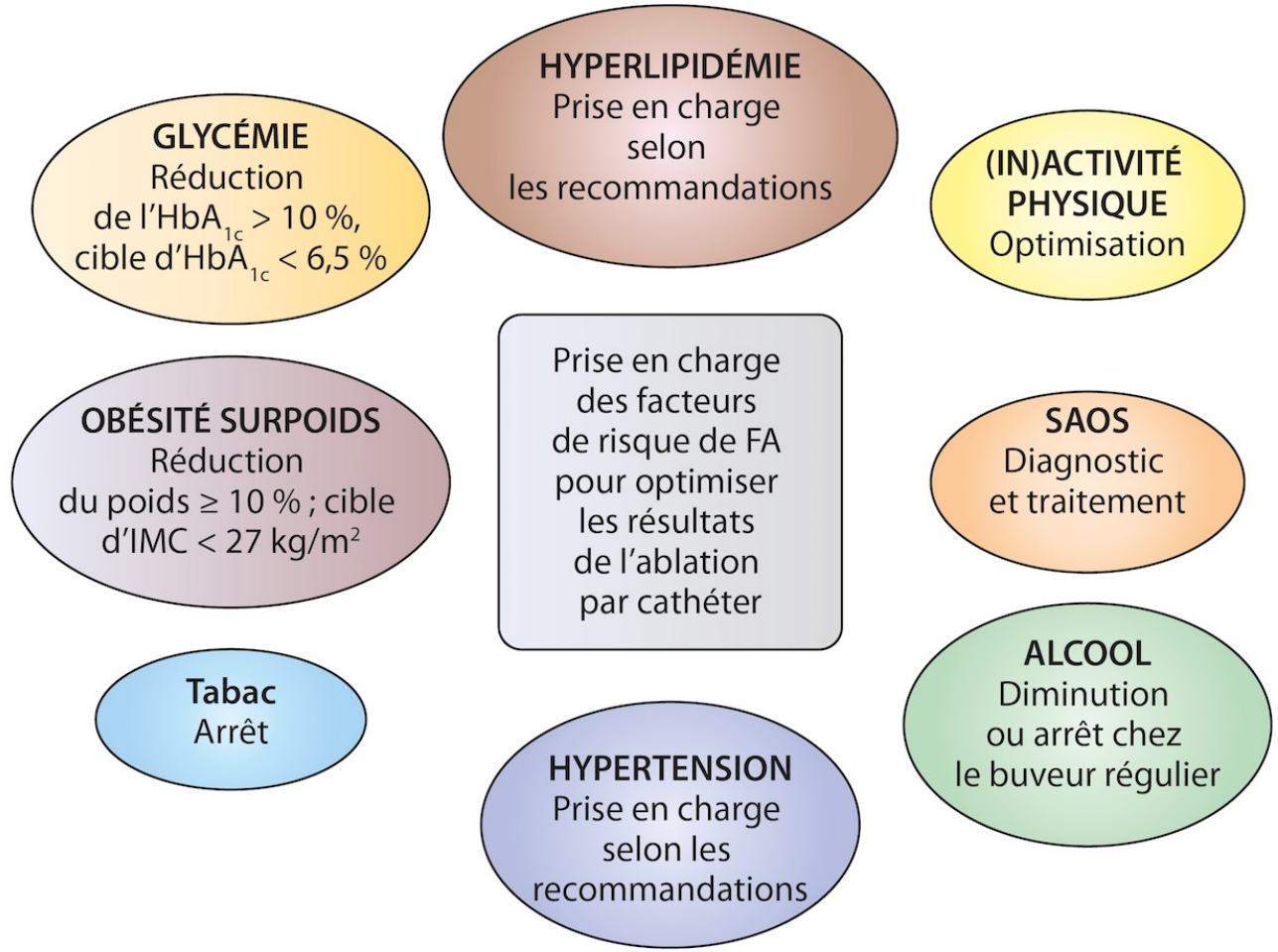
New !

Recommendations	Class	Level
General recommendations		
For the **decision on AF catheter ablation**, it is recommended to take into consideration the procedural risks and the **major risk factors for AF recurrence following the procedure** and discuss them with the patient.	I	B
Repeated PVI procedures should be considered in patients with AF recurrence provided the patient's symptoms were improved after the initial PVI.	IIa	B

New !



Recommandations de style de vie et prise en charge des facteurs de risque et des comorbidités chez les patients avec FA	
La prise en charge optimale du SAOS peut être envisagée pour réduire l'incidence de la FA, sa progression, ses récidives et les symptômes	IIb
Le traitement du SAOS devrait être optimisé pour réduire les et améliorer les résultats du traitement de la FA	IIa

Figure 3. Recommandations 2020 concernant la prise en charge de la FA[8].

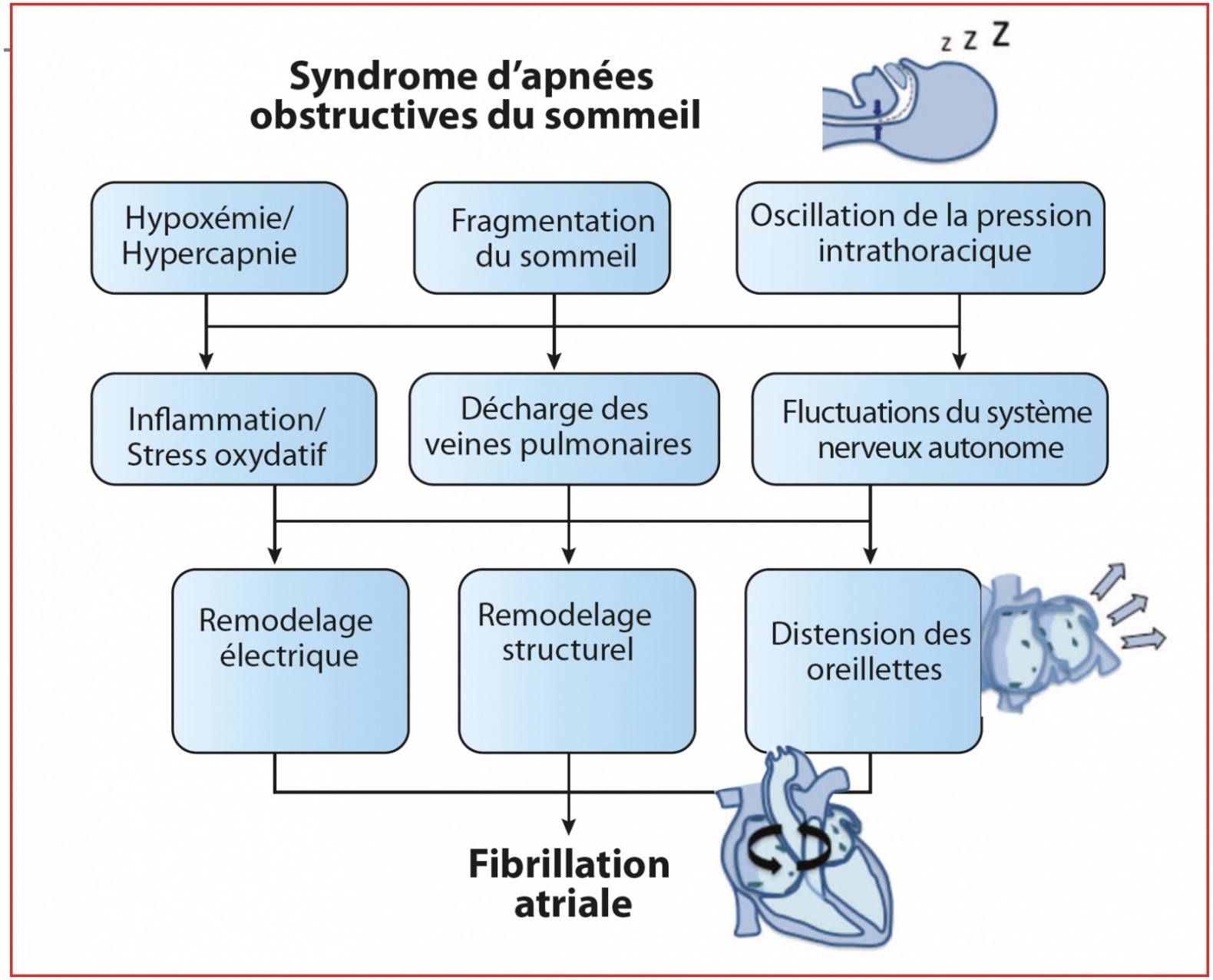


Figure 1. **Mécanismes physiopathologiques du syndrome d'apnées obstructives du sommeil contribuant à la fibrillation atriale.**

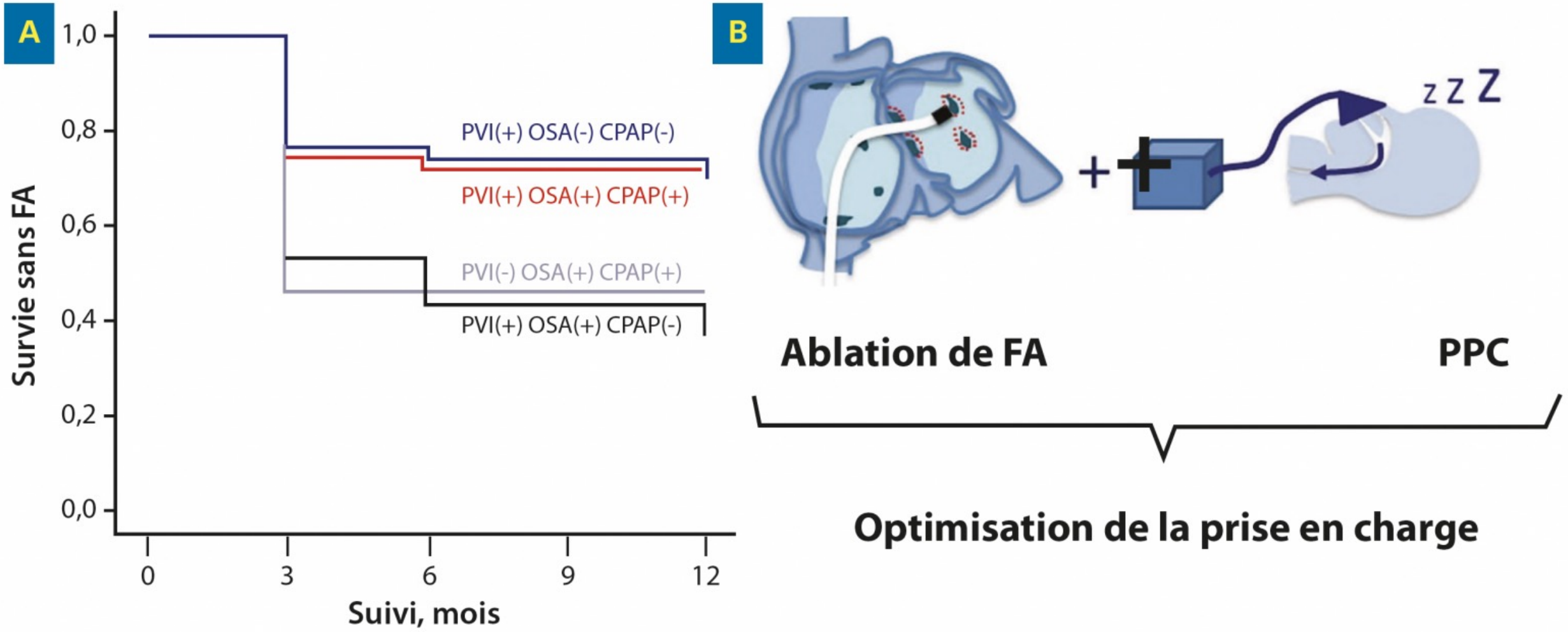
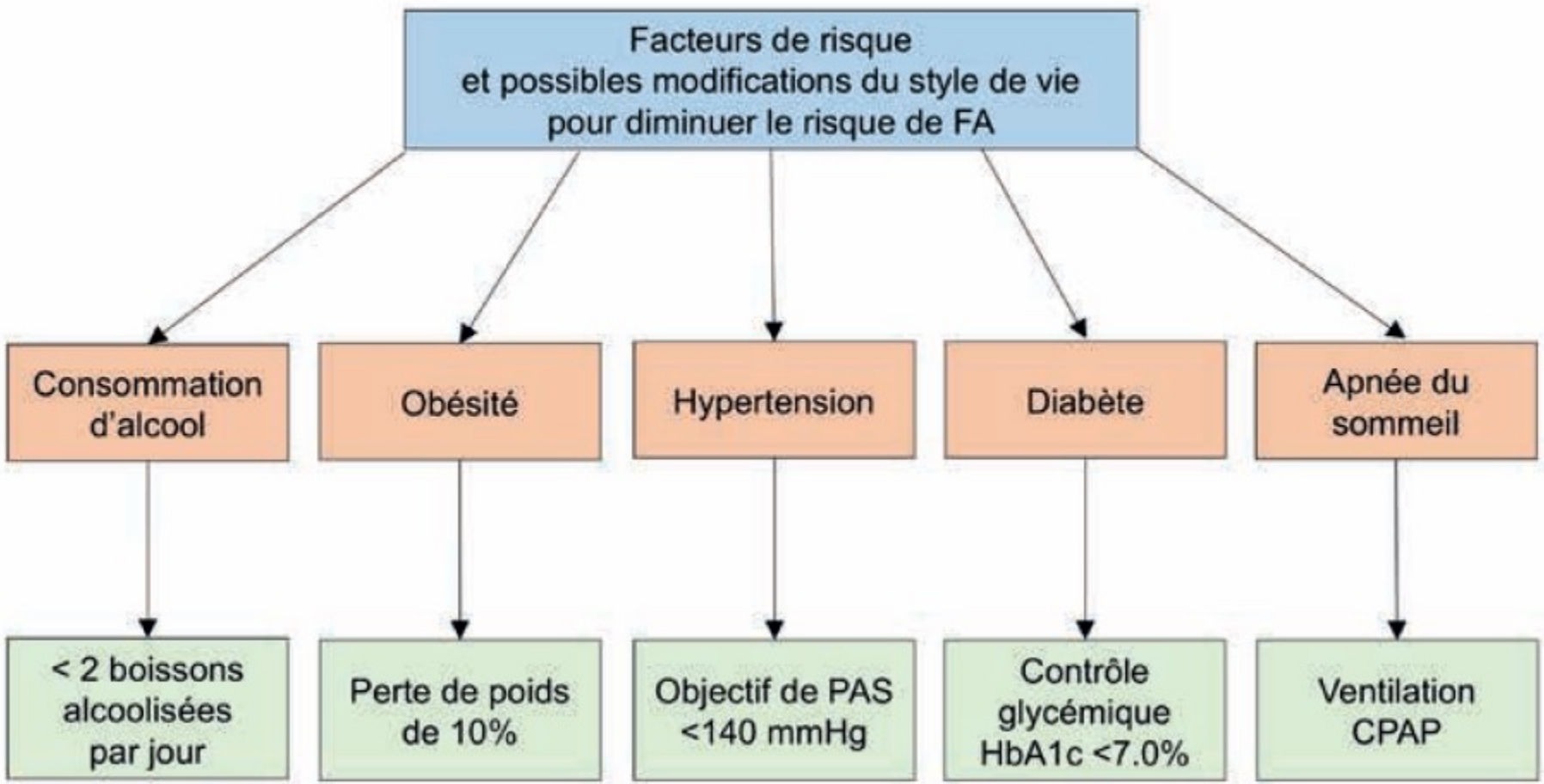


Figure 2. A. Courbe de survie en fonction du type de traitement. D'après Fein *et al.* 2013[7]. **B.** L'ablation de fibrillation atriale associée au traitement du SAOS permet une optimisation de la prise en charge du patient.

Figure 1. Prise en charge des facteurs modifiables du risque de fibrillation atriale (FA).



Recommendations for rhythm control/catheter ablation of AF (2)

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Recommendations	Class	Level
AF catheter ablation after failure of drug therapy		
AF catheter ablation for PVI is recommended for rhythm control after one failed or intolerant class I or III AAD, to improve symptoms of AF recurrences in patients with	I	A
• **Paroxysmal** AF, or		
• **Persistent** AF without major risk factors for AF recurrence, or		
• **Persistent** AF with major risk factors for AF recurrence		
AF catheter ablation for **PVI should be considered** for rhythm control **after one failed or intolerant to beta-blocker** treatment to improve symptoms of AF recurrences in patients with paroxysmal and persistent AF.	IIa	B

Results from CAPTAF & CABANA trials

Change IIa

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
(European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

JAMA | Original Investigation

Effect of Catheter Ablation vs Antiarrhythmic Medication on Quality of Life in Patients With Atrial Fibrillation
The CAPTAF Randomized Clinical Trial

Carina Blomström-Lundqvist, MD, PhD; Sigfus Gizurarson, MD, PhD; Jonas Schwieler, MD, PhD; Steen M. Jensen, MD, PhD; Lennart Bergfeldt, MD, PhD; Göran Kennebäck, MD, PhD; Agnes Rubulis, MD, PhD; Helena Malmborg, MD, PhD; Pekka Raatikainen, MD, PhD; Stefan Lönnerholm, MD, PhD; Niklas Höglund, MD, PhD; David Mörtsell, MD

INTERVENTION

155 Patients randomized

79 Ablation
Pulmonary vein isolation ablation

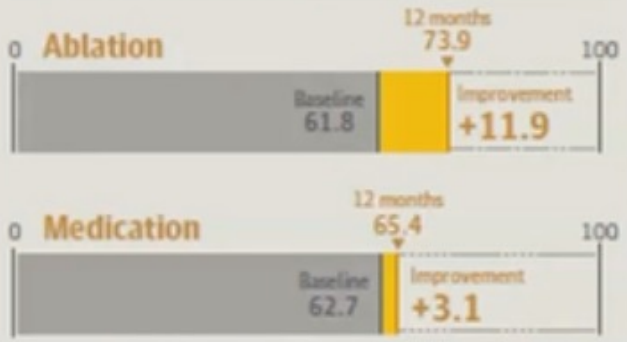
76 Medication
Antiarrhythmic drug (not previously used)

PRIMARY OUTCOME

Quality of life based on SF-36 General Health subscale score (range, 0 [worst] to 100 [best])

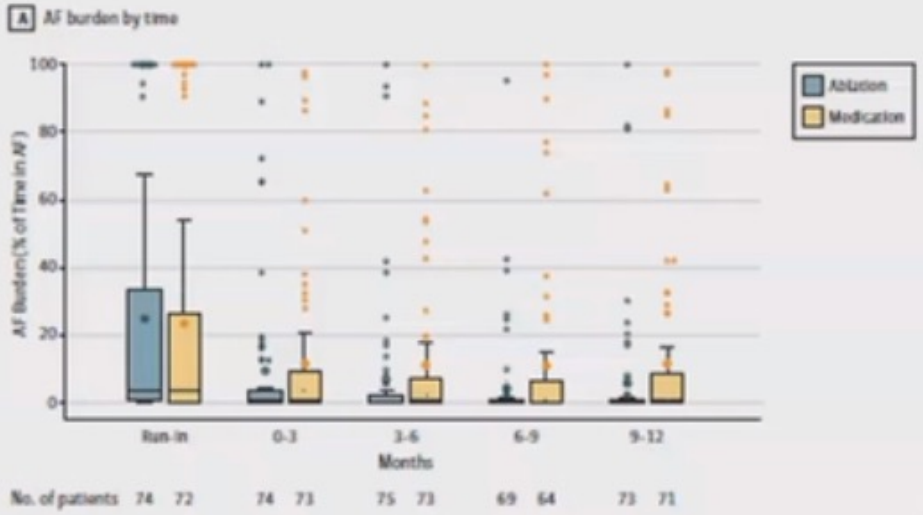
FINDINGS

Change in SF-36 General Health subscale score



Improvement in QoL and reduction in AF burden - significantly greater in AF ablation vs AAD group

Figure 3. Secondary End Point Atrial Fibrillation Burden From the Implantable Cardiac Monitor



Blomstrom-Lundqvist, et al JAMA 2019

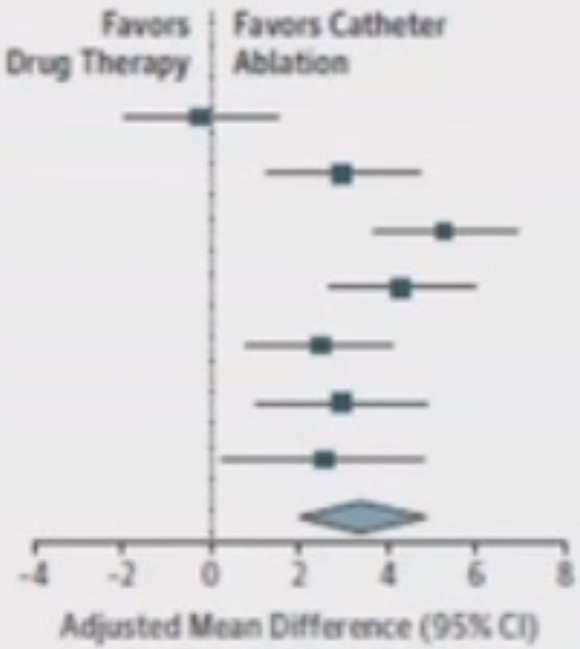
anagement of atrial fibrillation
/10.1093/eurheartj/ehaa612)

JAMA | Original Investigation

Effect of Catheter Ablation vs Medical Therapy on Quality of Life Among Patients With Atrial Fibrillation
The CABANA Randomized Clinical Trial

B Between-group AFEQT summary score difference

Interval, mo	No. of Patients Ablation (n = 1108)	No. of Patients Drug Rx (n = 1096)	Adjusted Mean Difference (95% CI)
Baseline	1084	1078	-0.2 (-1.9 to 1.5)
3	971	983	3.0 (1.3 to 4.7)
12	915	903	5.3 (3.7 to 6.9
24	856	798	4.3 (2.7 to 6.0)
36	645	605	2.5 (0.8 to 4.1)
48	476	473	3.0 (1.1 to 4.9)
60	329	320	2.6 (0.3 to 4.8)
All	4192	4082	3.4 (2.1 to 4.8)

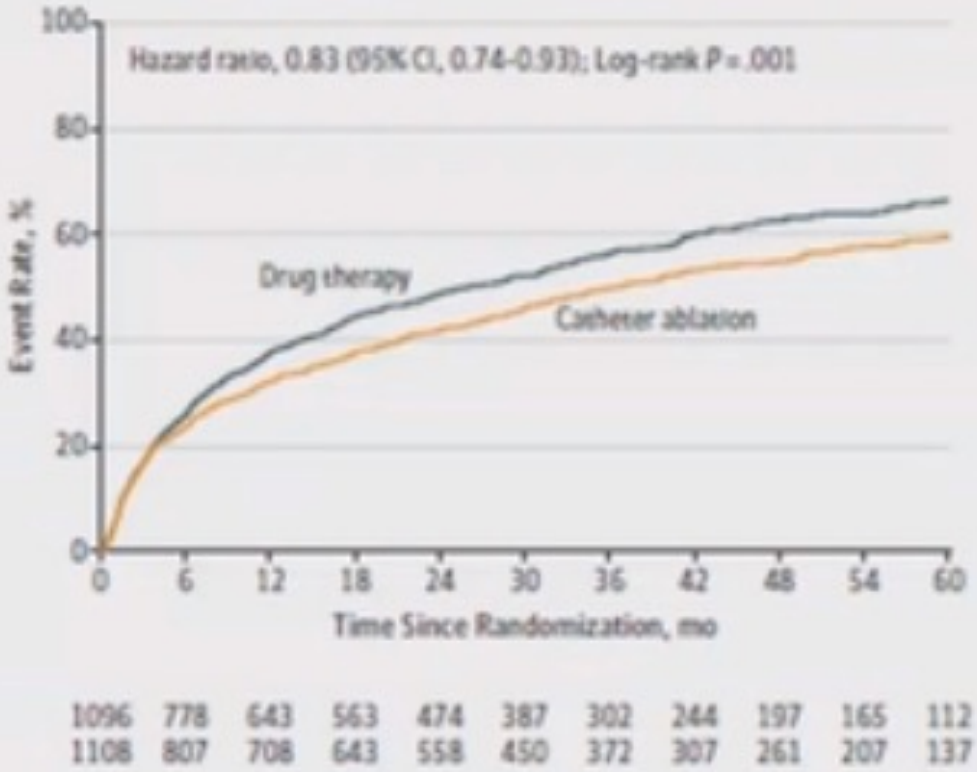


Mark, JAMA 2019

JAMA | Original Investigation

Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation
The CABANA Randomized Clinical Trial

B Mortality or cardiovascular hospitalization



Packer et al, JAMA 2019

Recommendations for rhythm control/catheter ablation of AF (3)

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Recommendations	Class	Level
First-line therapy		
AF catheter ablation for PVI should/may be considered as first-line rhythm control therapy to improve symptoms in selected patients with symptomatic:		
• **Paroxysmal** AF episodes, or	IIa	B
• **Persistent** AF **without major risk factors for AF recurrence**.	IIb	C
as an alternative to AAD class I or III, considering patient choice, be[illegible]fit, and risk.		

New !

Recommendations for rhythm control/catheter ablation of AF (4)

ESC European Society of Cardiology

Recommendations	Class	Level
***First-line therapy** (continued)*		
AF catheter ablation:		
• Is recommended to reverse LV dysfunction in AF patients when tachycardia-induced cardiomyopathy is highly probable, independent of their symptom status.	I	Change IIa
• Should be considered in selected AF patients with **HF with reduced LVEF** to **improve survival and reduce HF hospitalization**.	IIa	B
AF catheter ablation for **PVI** should be considered as a **strategy to avoid pacemaker** implantation in patients with **AF-related bradycardia or symptomatic pre-automaticity pause after AF conversion** considering the clinical situation.	IIa	C

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
(European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Recommendations for rhythm control/catheter ablation of AF (4)

3 RCTs on AF ablation vs AAD in HF

- DiBase, AATAC, Circulation 2016
- Marrouche, CASTLE-AF, NEJM 2018
- Kuck, AMICA, Circ Arrh Electrophys 2019

} Reduction in all-cause mortality and hospitalizations with ablation

No difference in LVEF

1 substudy RCT on AF abl vs AAD

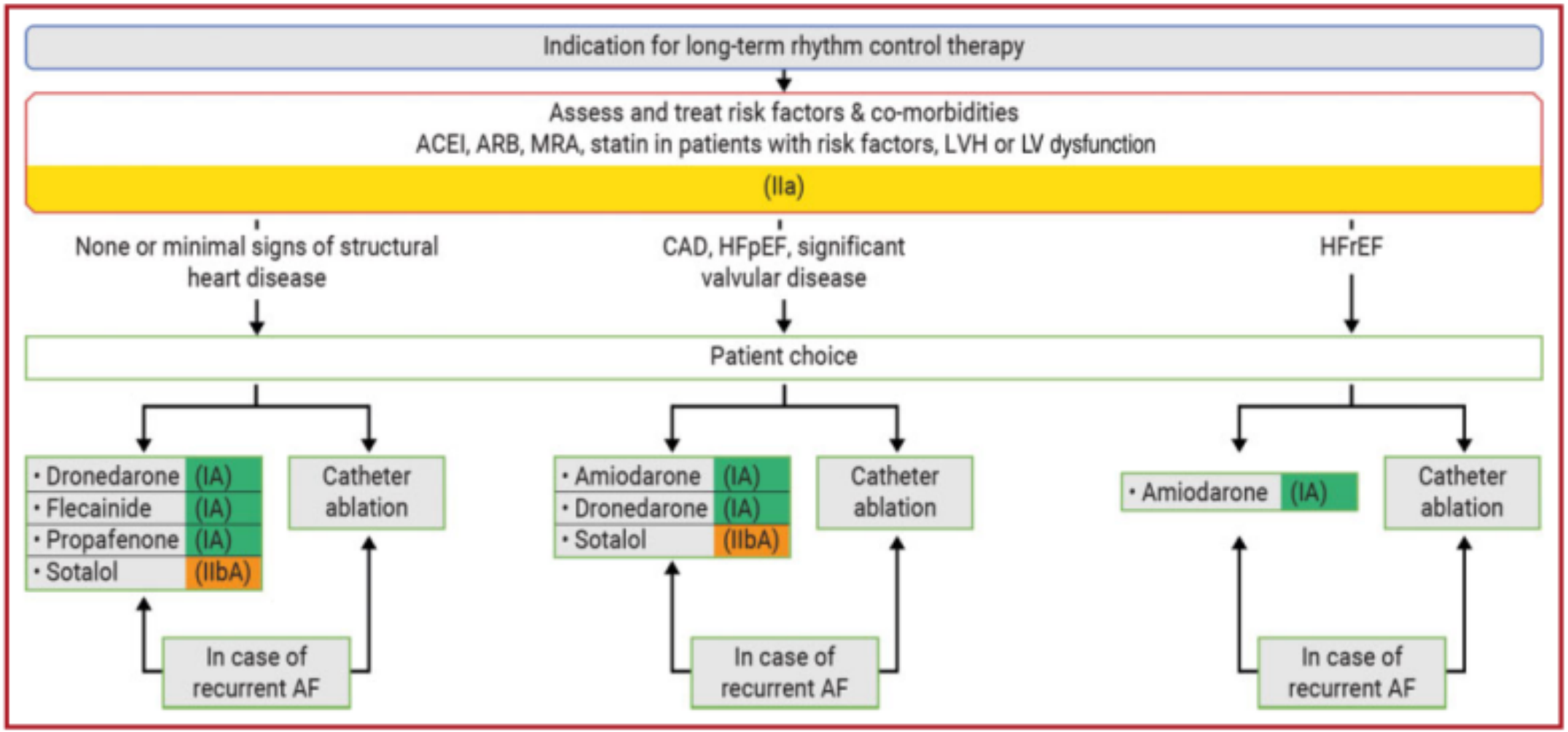
- Packer, CABANA subanalysis, HR 2020

Reduction in "death, stroke, bleeding, CA", and mortality with ablation in HF pats.

Recommenda		
First-line ther		
AF catheter ab		
• Is recommended to reverse LV dysfunction in AF patients when tachycardia-induced cardiomyopathy is highly probable, indep their symptom status.	I	Change IIa
• Should be considered in selected AF patients with **HF with reduced LVEF** to **improve survival and reduce HF hospitalization**.	IIa	Changed indication
AF catheter ablation for **PVI** should be considered as a **strategy to avoid pacemaker** implantation in patients with **AF-related bradycardia or symptomatic pre-automaticity pause after AF conversion** considering the clinical situation.	IIa	C

Recommendations	Class	Level
Women with symptomatic paroxysmal or persistent AF should be offered timely access to rhythm control therapies, including AF catheter ablation, when appropriate for medical reasons.	IIa	B

New !


Indication for long-term rhythm control therapy
Assess and treat risk factors & co-morbidities
ACEI, ARB, MRA, statin in patients with risk factors, LVH or LV dysfunction
(IIa)
None or minimal signs of structural heart disease
CAD, HFpEF, significant valvular disease
HFrEF
Patient choice
• Dronedarone (IA)
• Flecainide (IA)
• Propafenone (IA)
• Sotalol (IIbA)
Catheter ablation
In case of recurrent AF
• Amiodarone (IA)
• Dronedarone (IA)
• Sotalol (IIbA)
Catheter ablation
In case of recurrent AF
• Amiodarone (IA)
Catheter ablation
In case of recurrent AF

Vis ma vie de ....
Rythmologue

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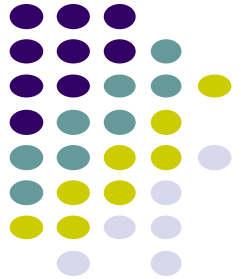
Le jeune patient des urgences



- Homme
- 40 ans
- 75 Kg pour 1m79
- Pas de facteurs de risque
- Palpitations 2 heures (après un repas et 2 bières)
- FA 180 bpm aux urgences
- Réduction spontanée

Que disent les recommandations?

11.2 Long-term antiarrhythmic drug therapy

The aim of antiarrhythmic drug therapy is improvement in AF-related symptoms.[41,580] Hence, the decision to initiate long-term antiarrhythmic drug therapy needs to balance symptom burden, possible adverse drug reactions, and patient preferences. The principles of antiarrhythmic drug therapy outlined in the 2010 ESC AF guidelines[369] are still relevant and should be observed:

(1) Treatment is aimed at reducing AF-related symptoms;
(2) Efficacy of antiarrhythmic drugs to maintain sinus rhythm is modest;
(3) Clinically successful antiarrhythmic drug therapy may reduce rather than eliminate the recurrence of AF;
(4) If one antiarrhythmic drug 'fails', a clinically acceptable response may be achieved with another agent;
(5) Drug-induced pro-arrhythmia or extracardiac side-effects are frequent;
(6) Safety rather than efficacy considerations should primarily guide the choice of antiarrhythmic drug.

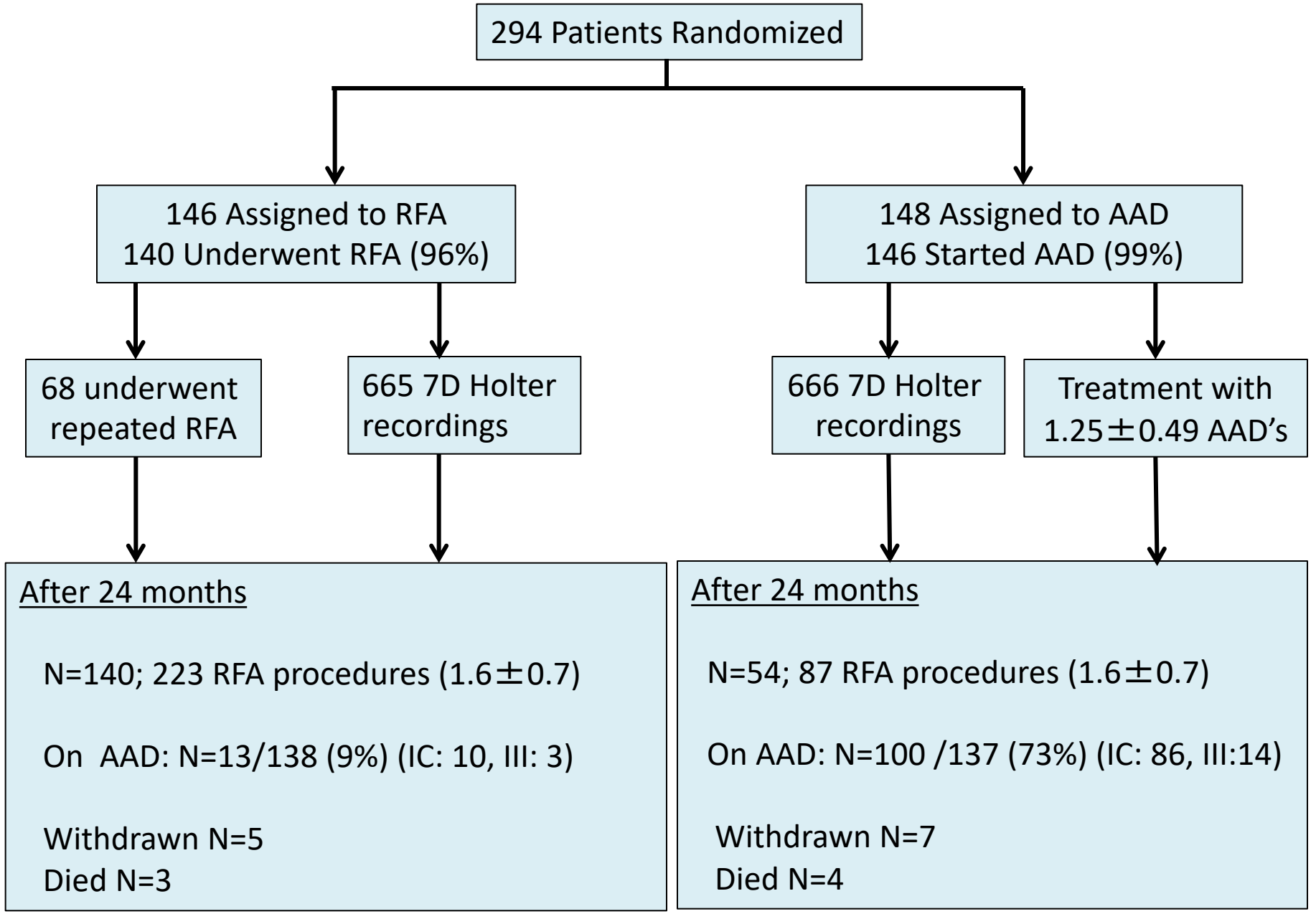
Une première FA

- Hôtesse de l'air
- 40 ans
- 58 kg/1m74
- Pas de FDR
- Adressée en USIC le 2.1.2014 par SAMU pour FA rapide 200 bpm responsable d'un OAP (VNI 1h)
- ETT FE et OG nles
- Régularisation après 2 jours par amiodarone
- Revue en cs sous amiodarone / AOD

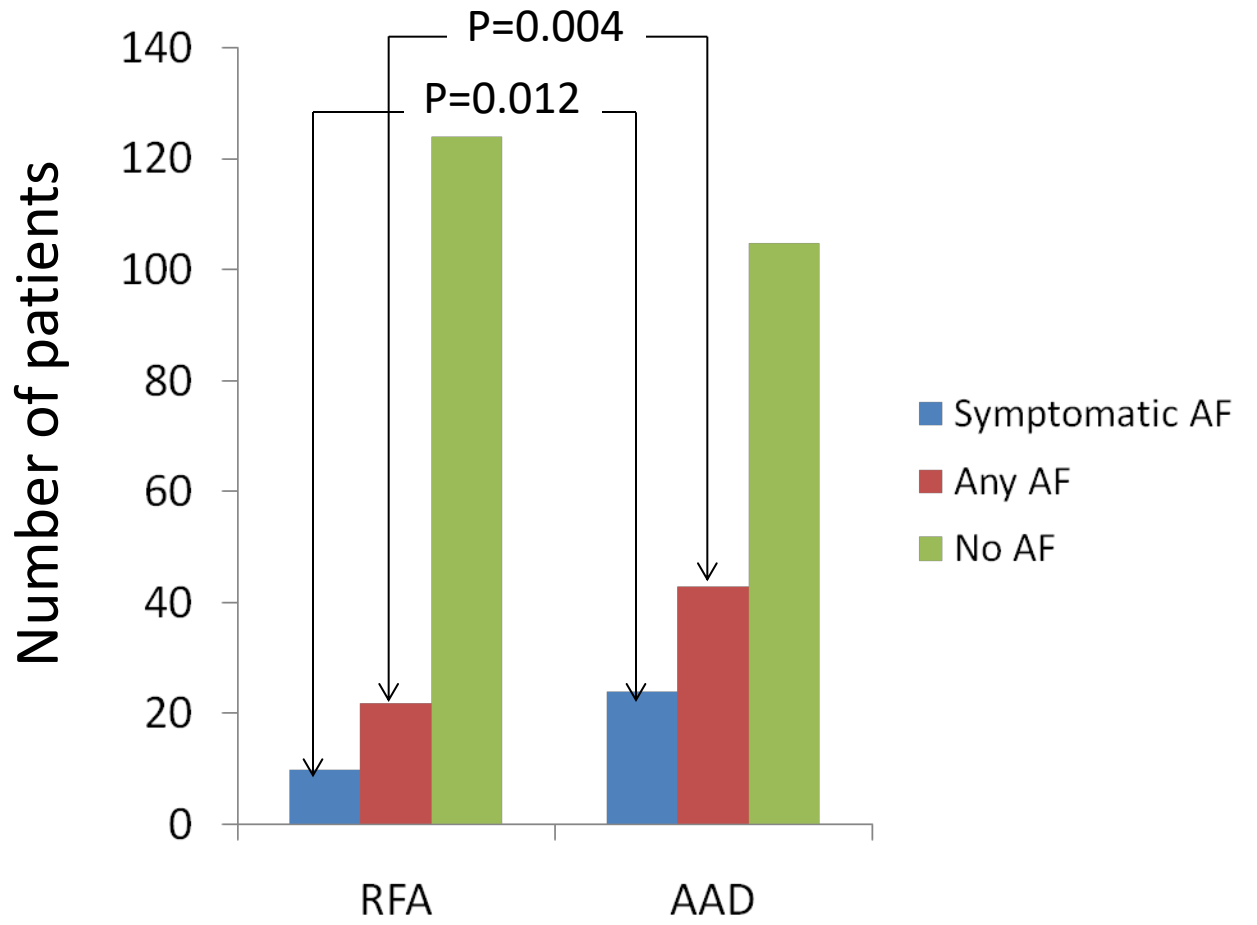
Ablation de FA en première intention : résultats de MANTRA PAF

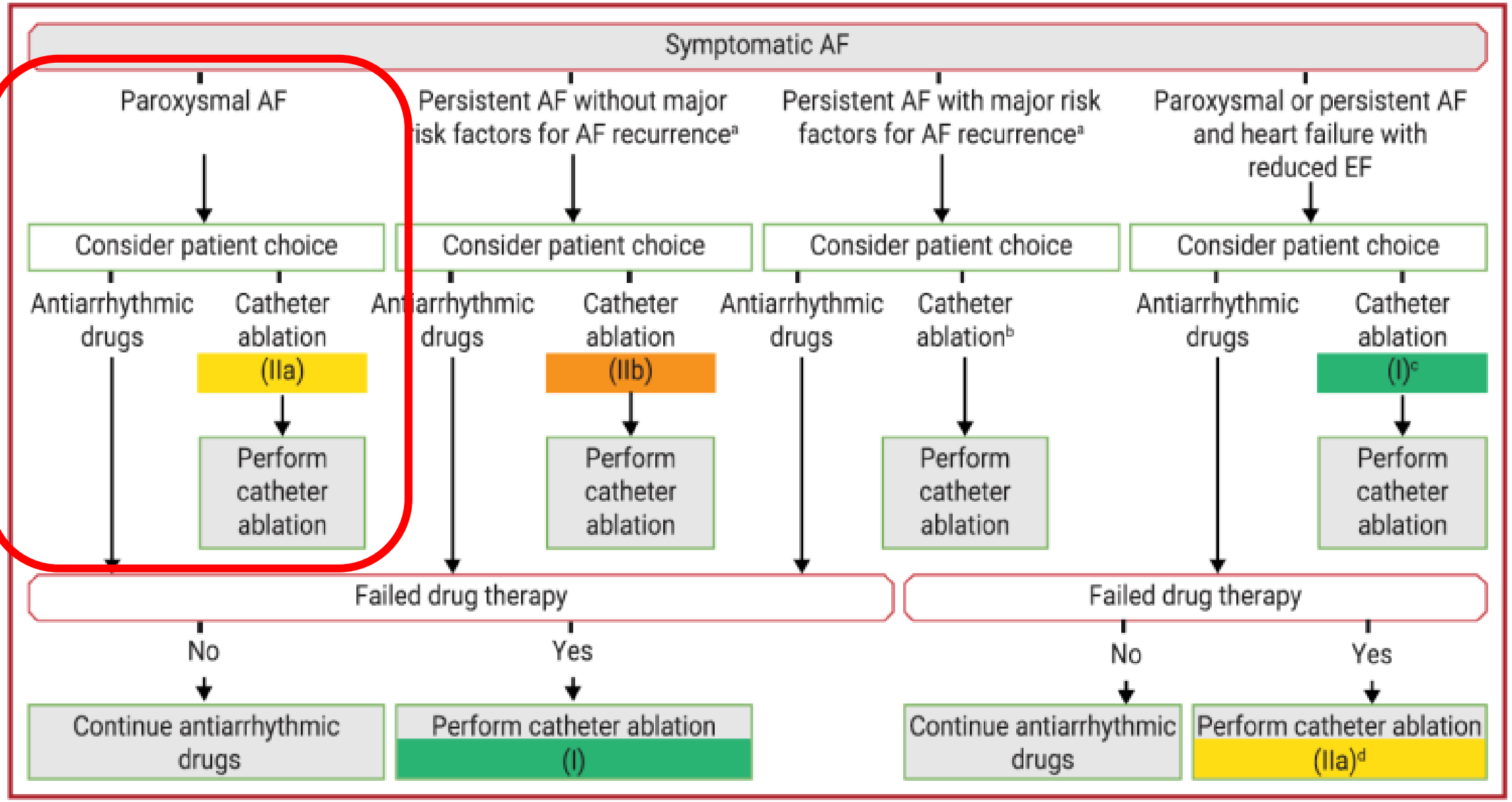
- Randomized controlled multicenter trial
- Antiarrhythmic drug therapy (Class IC or III) (AAD) *versus* pulmonary vein isolation (RFA)
- Primary endpoints:
  - Cumulative burden of AF
  - AF-burden at each 7-day Holter recording
- Secondary endpoints:
  - Freedom from any AF after 24 months
  - Freedom from symptomatic AF after 24 months
  - Burden of symptomatic AF after 3, 6, 12, 18, and 24 months
  - Atrial flutter
  - Quality-of life after 12 and 24 months
  - Serious adverse events

Nielsen JC, Johannessen A, Raatikainen P et al. Radiofrequency ablation as initial therapy in paroxysmal atrial fibrillation. New Engl J Med 2012; 367: 1587-95.


294 Patients Randomized
146 Assigned to RFA
140 Underwent RFA (96%)
148 Assigned to AAD
146 Started AAD (99%)
68 underwent repeated RFA
665 7D Holter recordings
666 7D Holter recordings
Treatment with 1.25±0.49 AAD's
After 24 months
N=140; 223 RFA procedures (1.6±0.7)
On AAD: N=13/138 (9%) (IC: 10, III: 3)
Withdrawn N=5
Died N=3
After 24 months
N=54; 87 RFA procedures (1.6±0.7)
On AAD: N=100 /137 (73%) (IC: 86, III:14)
Withdrawn N=7
Died N=4

AF after 24 Months



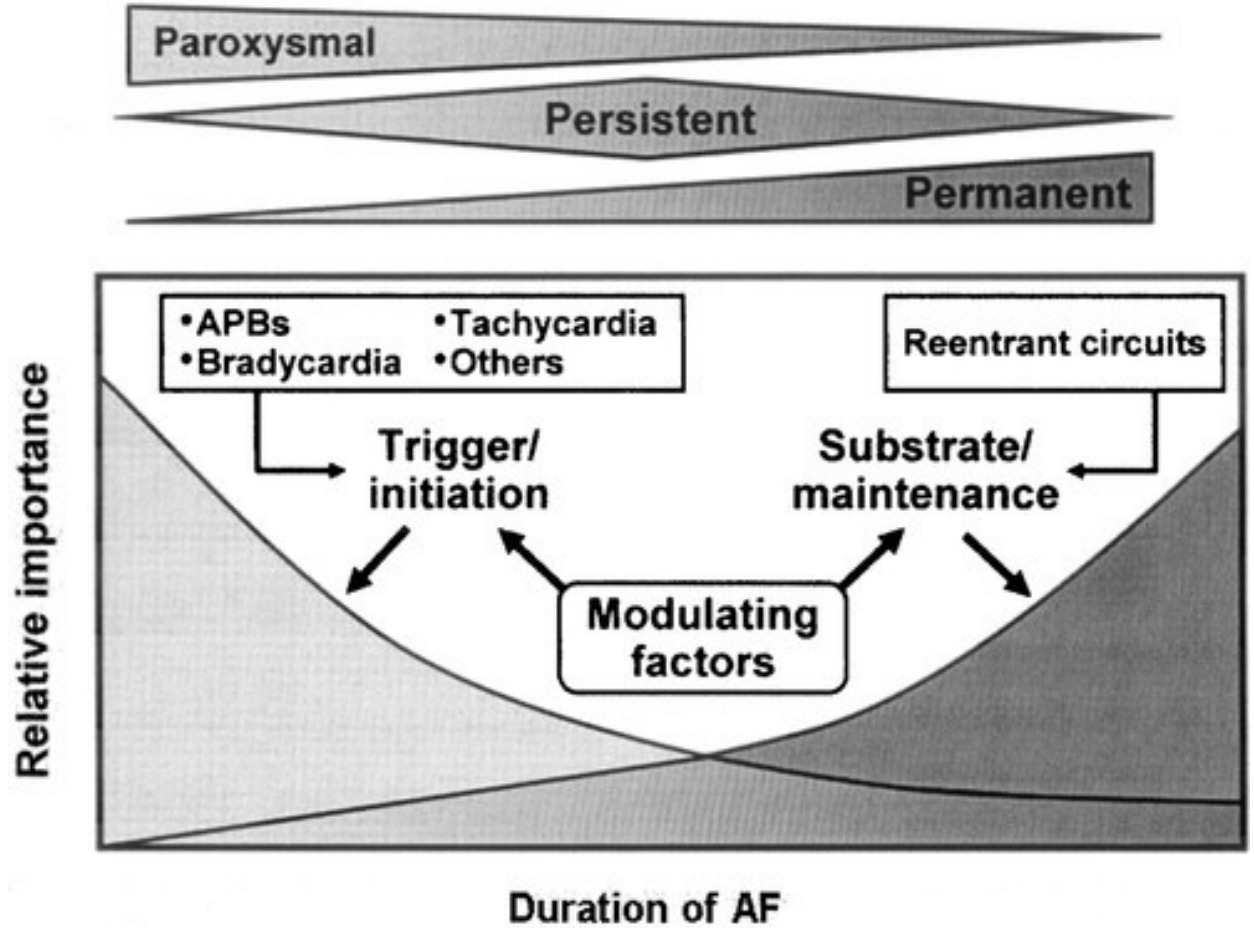

Symptomatic AF
Paroxysmal AF
Persistent AF without major risk factors for AF recurrence[a]
Persistent AF with major risk factors for AF recurrence[a]
Paroxysmal or persistent AF and heart failure with reduced EF
Consider patient choice
Consider patient choice
Consider patient choice
Consider patient choice
Antiarrhythmic drugs
Catheter ablation
(IIa)
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation
(IIb)
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation[b]
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation
(I)[c]
Perform catheter ablation
Failed drug therapy
Failed drug therapy
No
Yes
No
Yes
Continue antiarrhythmic drugs
Perform catheter ablation
(I)
Continue antiarrhythmic drugs
Perform catheter ablation
(IIa)[d]

Catheter ablation of atrial fibrillation and atrial fibrillation surgery (1)

Recommendations	Class	Level
Catheter ablation of symptomatic paroxysmal AF is recommended to improve AF symptoms in patients who have symptomatic recurrences of AF on antiarrhythmic drug therapy (amiodarone, dronedarone, flecainide, propafenone, sotalol) and who prefer further rhythm control therapy, when performed by an electrophysiologist who has received appropriate training and is performing the procedure in an experienced centre.	I	A
Ablation of common atrial flutter should be considered to prevent recurrent flutter as part of an AF ablation procedure if flutter has been documented or occurs during the AF ablation.	IIa	B
Catheter ablation of AF should be considered as first-line therapy to prevent recurrent AF and to improve symptoms in selected patients with symptomatic paroxysmal AF as an alternative to antiarrhythmic drug therapy, considering patient choice, benefit, and risk.	IIa	B
All patients should receive oral anticoagulation for at least 8 weeks after catheter (IIaB) or surgical (IIaC) ablation.	IIa	B C
Anticoagulation for stroke prevention should be continued indefinitely after apparently successful catheter or surgical ablation of AF in patients at high-risk of stroke.	IIa	C
When catheter ablation of AF is planned, continuation of oral anticoagulation with a VKA (IIaB) or NOAC (IIaC) should be considered during the procedure, maintaining effective anticoagulation.	IIb	B C
Catheter ablation should target isolation of the pulmonary veins using radiofrequency ablation or cryothermy balloon catheters.	IIa	B

European Heart Journal - doi:10.1093/eurheartj/ehw210

Maintaining SR and reduction of AF Disease Progression



Wyse DG, Gersh BJ. *Circulation*. 2004;109:3089-3095.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Early Rhythm-Control Therapy in Patients with Atrial Fibrillation

P. Kirchhof, A.J. Camm, A. Goette, A. Brandes, L. Eckardt, A. Elvan, T. Fetsch, I.C. van Gelder, D. Haase, L.M. Haegeli, F. Hamann, H. Heidbüchel, G. Hindricks, J. Kautzner, K.-H. Kuck, L. Mont, G.A. Ng, J. Rekosz, N. Schoen, U. Schotten, A. Suling, J. Taggeselle, S. Themistoclakis, E. Vettorazzi, P. Vardas, K. Wegscheider, S. Willems, H.J.G.M. Crijns, and G. Breithardt, for the EAST-AFNET 4 Trial Investigators*

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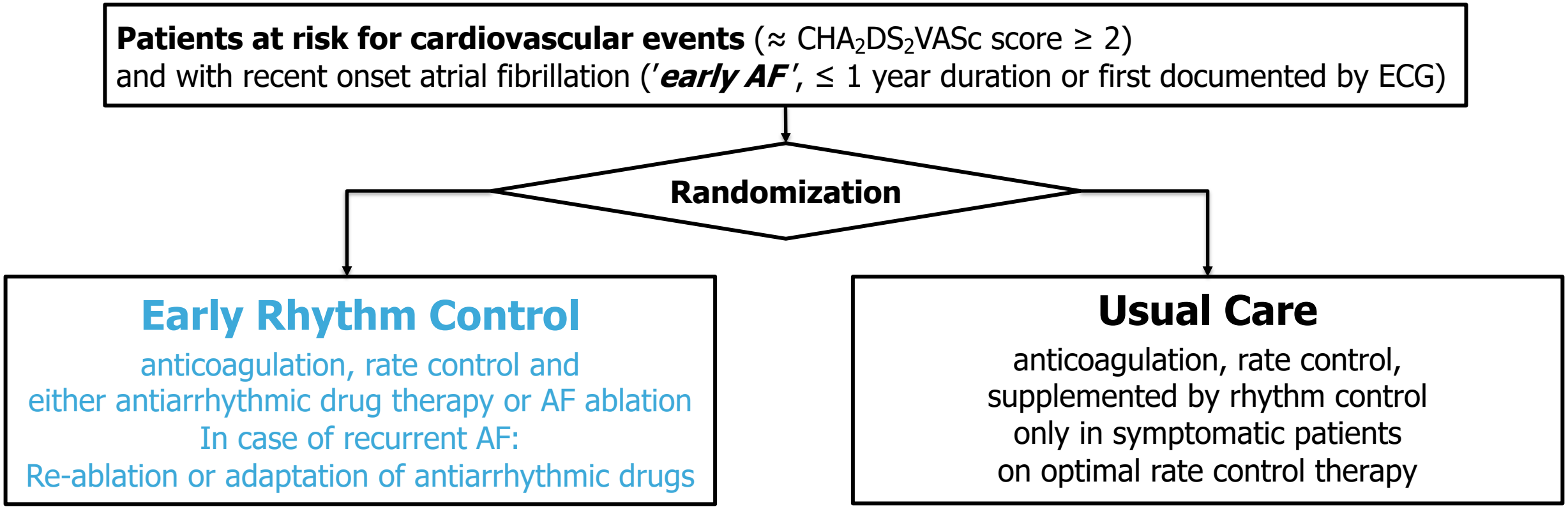
EAST – AFNET 4 Design



therapy of concomitant cardiovascular diseases (both randomized groups)
in-person follow-up at 1 and 2 years
all patients were followed up until the end of the study

www.easttrial.org

Kirchhof P, et al. *Am H J* 166:442-448 (2013)

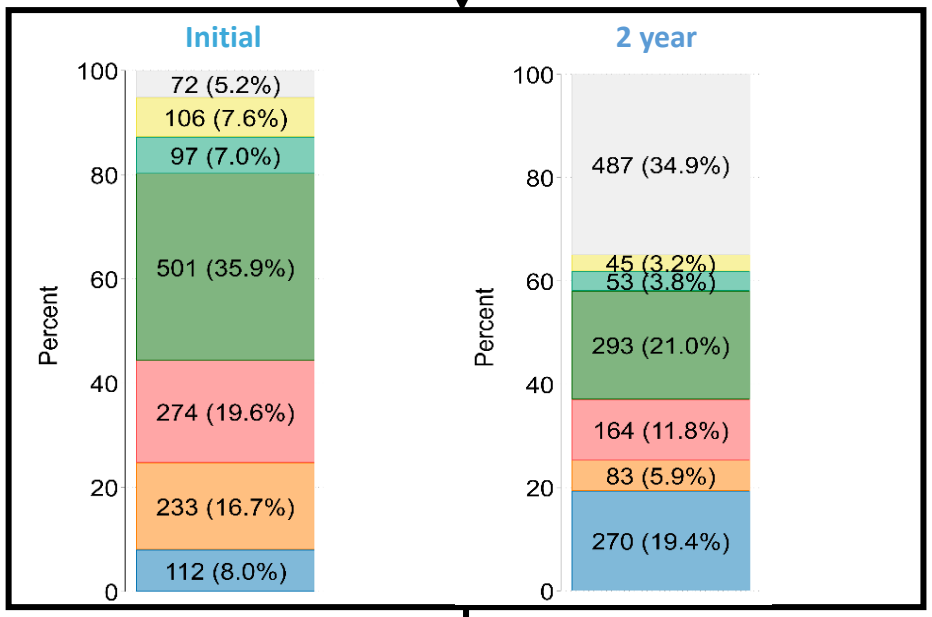
EAST – AFNET 4 CONSORT diagram

2789 patients randomized by 135 sites in 11 countries

Randomization

Early Rhythm Control (n=1,395)

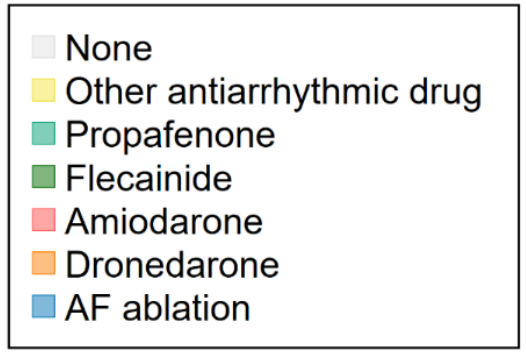
Included in primary analysis n=1,395



Total FU-years lost: 681/7596 (9.0%)

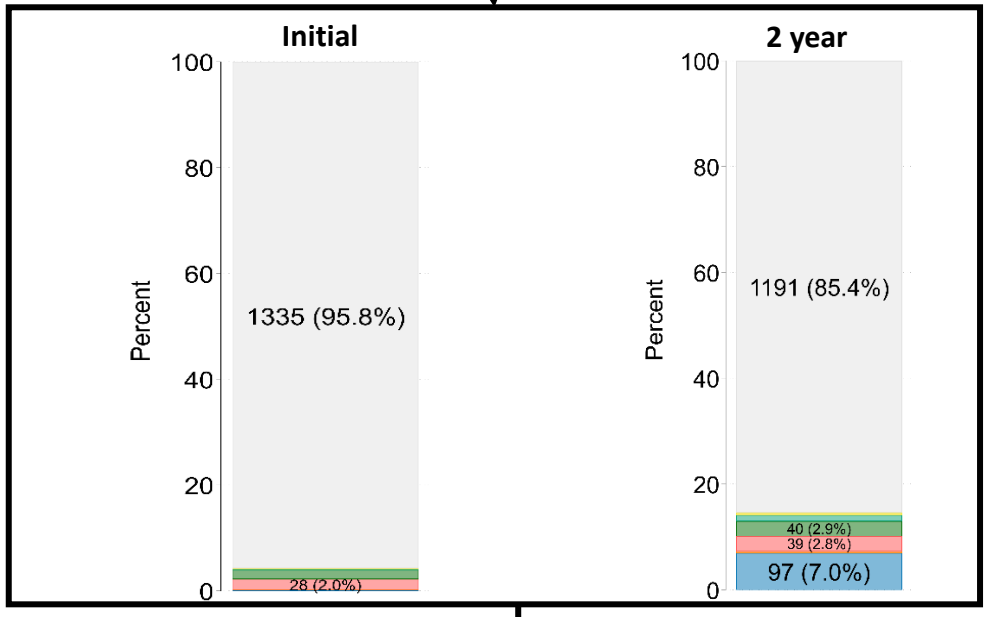
524 (6.9%) FU-years lost because 123 withdrew

157 (2.1%) FU-years lost because 102 were lost to FU



Usual Care (n=1,394)

Included in primary analysis n=1,394

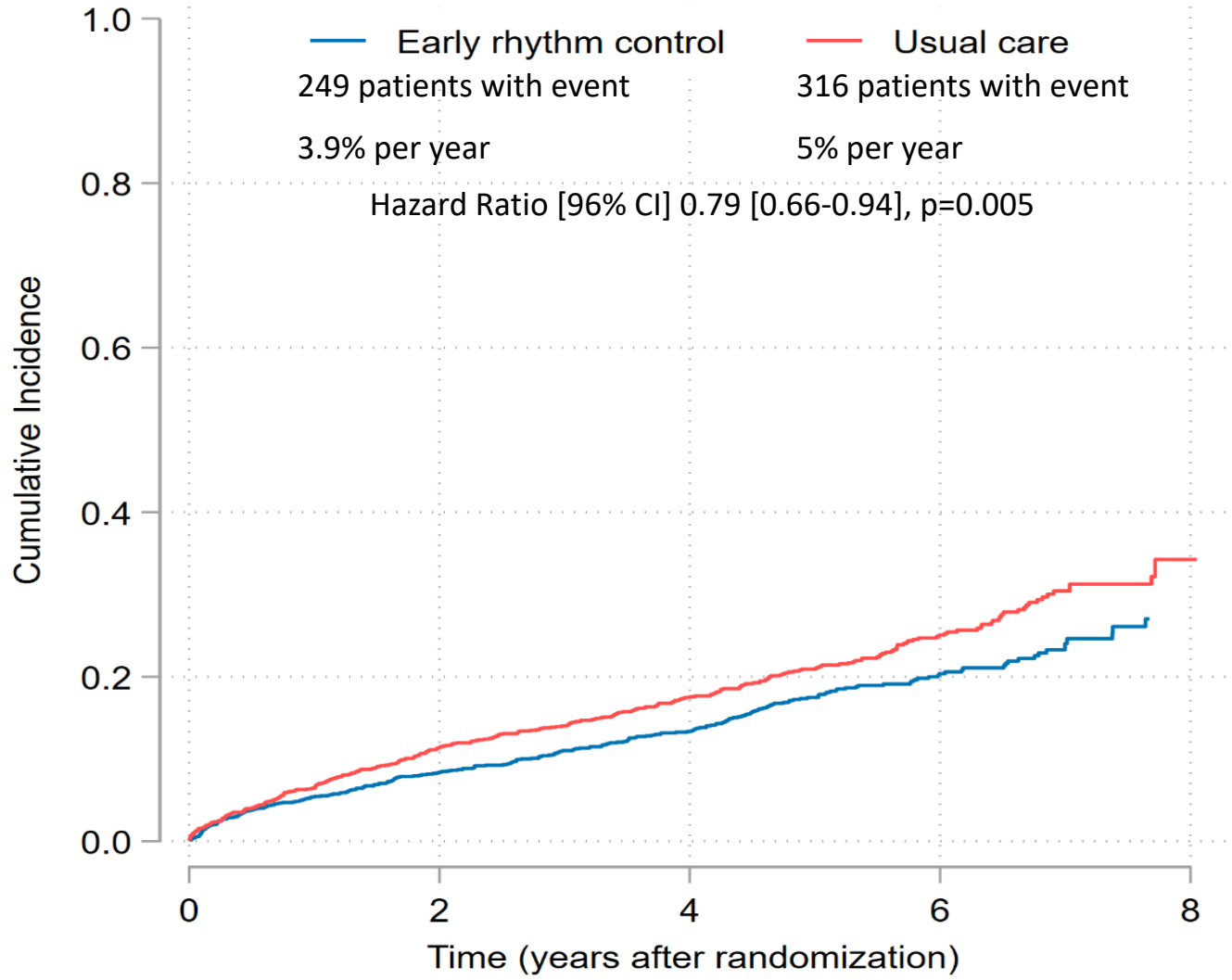


Total FU-years lost: 491/7479 (6.6%)

339 (4.5%) FU-years lost because 83 withdrew

152 (2.0%) FU-years lost because 106 were lost to FU

EAST – AFNET 4 Analysis of first primary outcome



Patients at risk

Early rhythm control	1395	1193	913	404	26
Usual care	1394	1169	888	405	34

	Patients with event in Early Rhythm Control (n=1395)	Patients with event in Usual Care (n=1394)	Uncorrected Hazard Ratio [95% CI]
Cardiovascular death	67	94	0.72 [0.52-0.98]
Stroke	40	62	0.65 [0.44-0.97]
Hospitalization with worsening of heart failure	139 (2.1)	169	0.81 [0.65-1.02]
Hospitalization with acute coronary syndrome	53 (0.8)	65	0.83 [0.58-1.19]

Kirchhof P, *et al. NEJM,* doi: 10.1056/NEJMoa2019422 (published online 29 Aug 2020)

EAST – AFNET 4 Safety outcomes

	Early Rhythm Control (n=1395)	Usual Care (n=1394)
Occurrence of a primary safety outcome	231 (16.6%)	223 (16.0%)
Occurrence of stroke	40 (2.9%)	62 (4.4%)
Occurrence of death	138 (9.9%)	164 (11.8%)
Occurrence of a serious adverse event of special interest related to rhythm control therapy (detailed listing of events given in lines below)	68 (4.9%)	19 (1.4%)
Serious adverse events related to antiarrhythmic drug therapy		
Non-fatal cardiac arrest	1 (0.1%)	1 (0.1%)
Drug toxicity of AF-related drug therapy	10 (0.7%)	3 (0.2%)
Drug-induced bradycardia	14 (1.0%)	5 (0.4%)
AV block	2 (0.1%)	0 (0.0%)
Torsade de Pointes tachycardia	1 (0.1%)	0 (0.0%)
Serious adverse events related to AF ablation		
Pericardial tamponade	3 (0.2%)	0 (0.0%)
Bleeding related to AF ablation, major	6 (0.4%)	0 (0.0%)
Bleeding related to AF ablation, non-major	1 (0.1%)	2 (0.1%)
Other serious adverse events of special interest related to rhythm control therapy		
Blood pressure related (hypotension, hypertension; except syncope)	1 (0.1%)	0 (0.0%)
Hospitalization for AF	11 (0.8%)	3 (0.2%)
Other cardiovascular event	5 (0.4%)	1 (0.1%)
Other event	1 (0.1%)	3 (0.2%)
Syncope	4 (0.3%)	1 (0.1%)
Hospitalization for worsening of heart failure with decompensated heart failure	3 (0.2%)	0 (0.0%)
Implantation of a pacemaker, defibrillator, cardiac resynchronization device, or other device	8 (0.6%)	4 (0.3%)

Kirchhof P, *et al. NEJM,* doi: 10.1056/NEJMoa2019422 (published online 29 Aug 2020)

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UBC

CCI-CIC Centre for Cardiovascular Innovation
Centre d'Innovation Cardiovasculaire

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UNIVERSITY OF OTTAWA HEART INSTITUTE
INSTITUT DE CARDIOLOGIE DE L'UNIVERSITÉ D'OTTAWA

Embargoed for 9:34am CT 11-16-20

Early Intervention for Atrial Fibrillation:

The EARLY-AF Study

Jason G. Andrade, Jean Champagne, Marc W. Deyell, Vidal Essebag, Sandra Lauck, Carlos A. Morillo, John L. Sapp, Allan Skanes, Patricia Theoret-Patrick, George Wells, Atul Verma

EARLY-AF

#AHA20

American Heart Association.
Scientific Sessions

American Heart Association.
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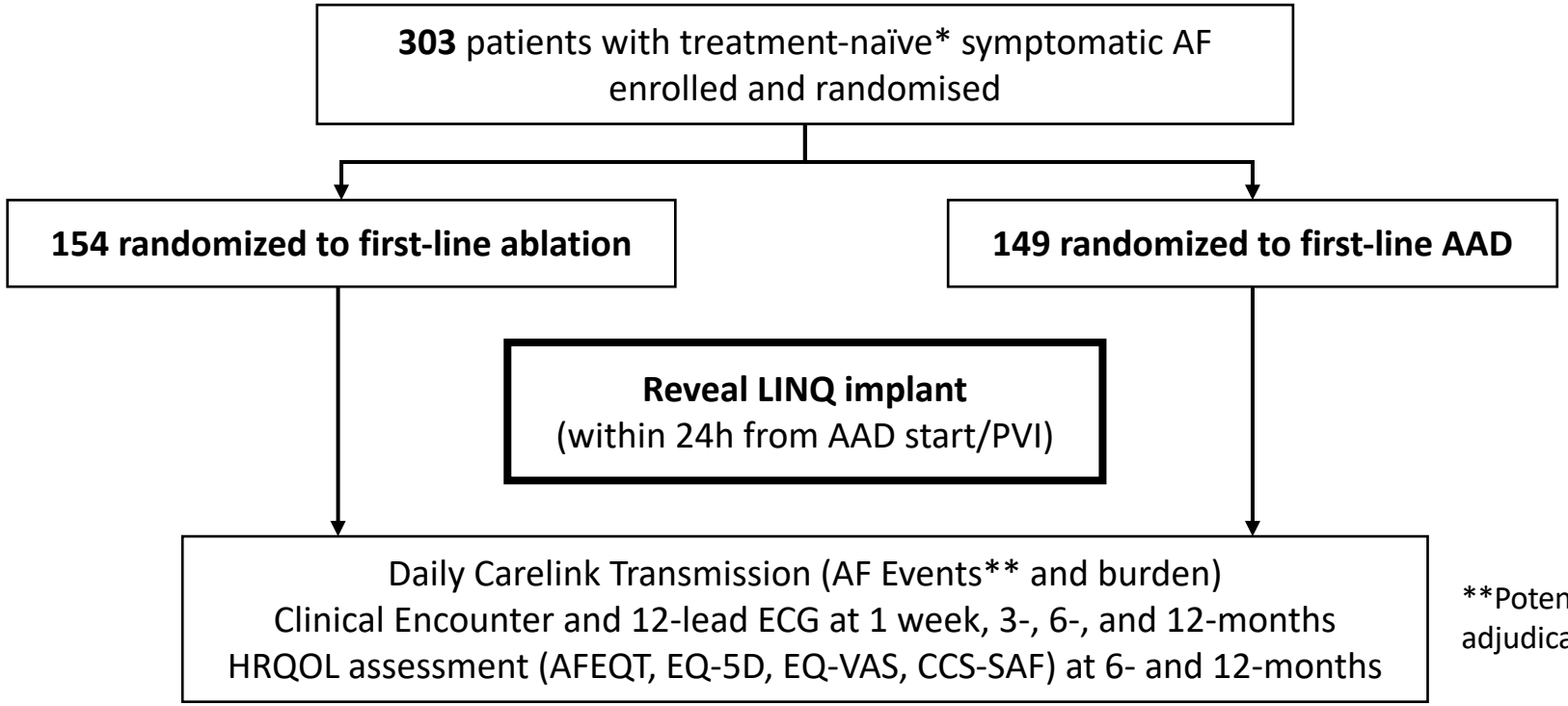
EARLY-AF

Patient flow



*Enrollment Permitted if:

1. AAD Treatment Naive

- Never treated with an AAD

2. Current AAD use

- Treatment < 6m but **below** therapeutic threshold

3. Previous AAD use

- Treatment initiated, discontinued, and washed out >6m

4. Temporary AAD use

- Treatment at therapeutic dose for a period <4 weeks

No adverse drug effects or inefficacy

**Potential arrhythmia events detected by the device were stored for adjudication by an independent, blinded clinical end-point committee.

Treatment Groups

Antiarrhythmic Drug Group

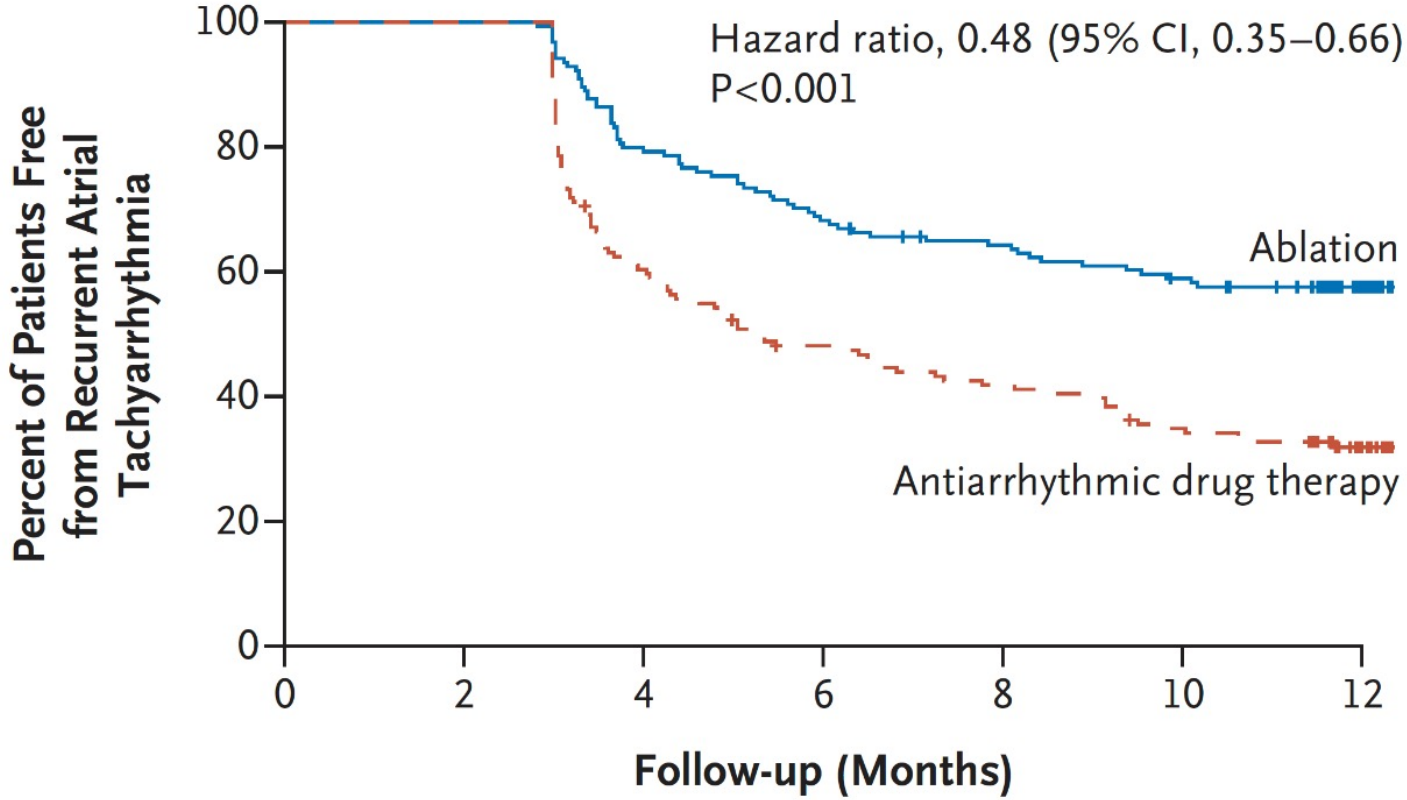
Used	First N (%)	Second N (%)	Third N (%)	Any time N (%)	Median dose in mg/day
Flecainide	114 (76.5%)	10 (6.7%)	0	124 (83.2%)	**200 (125, 250)**
Propafenone	7 (4.7%)	9 (6.0%)	2 (1.3%)	18 (12.1%)	**600 (450, 600)**
Sotalol	23 (15.4%)	17 (11.4%)	2 (1.3%)	42 (28.2%)	**160 (160, 240)**
Dronedarone	5 (3.4%)	7 (4.7%)	0	12 (8.1%)	**800 (800, 800)**
Amiodarone	0	3 (2.0%)	4 (2.7%)	7 (4.7%)	**200 (200, 200)**
Total	**149 (100%)**	**46 (30.9%)**	**8 (5.4%)**		

Cryoballoon Ablation Procedure

Procedural Characteristic	No. of Patients (%) n=152
Procedure Duration, in minutes	106 (89,131)
Fluoroscopy exposure, in minutes	18.9 (12.6,27.0)
Left atrial time, in minutes	73.7 (56.3,94.4)
Ablation duration, in minutes	26.1 (23.1, 30.1)
23-mm Cryoballoon, N (%)	5 (3.2%)
Acute pulmonary reconnection, N (%)	6 (3.9%)

Primary Outcome

Freedom from *any* atrial tachyarrhythmia on continuous cardiac monitoring



Absolute reduction 24.9%
Number needed to treat 4

No. at Risk

Ablation	154	154	123	105	96	86	55
Antiarrhythmic drug therapy	149	149	89	69	60	49	27

Adverse Events

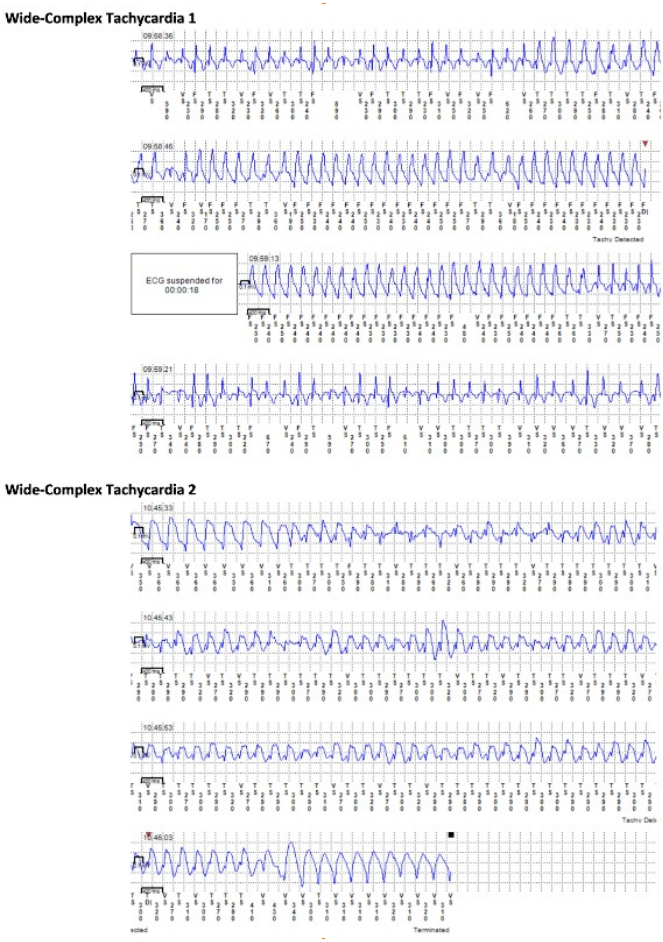
Serious Adverse Events - HR 0.81 (0.25–2.59)

- **Ablation** – 5 (3.2%)
  - 3 phrenic nerve injuries
  - 2 pacemakers for bradycardia
- **Antiarrhythmic drugs** – 6 (4.0%)
  - 2 wide-complex tachycardia
  - 2 pacemakers for bradycardia
  - 1 heart failure
  - 1 syncope

Any Safety Endpoint - HR 0.59 (0.29–1.21)

- **Ablation** – 14 (9.1%)
- **Antiarrhythmics** – 24 (16.1%)

Event	Ablation Group (N=154)	Antiarrhythmic Drug Group (N=149)
Any serious adverse event related to the trial regimen — no. of patients (%)*	5 (3.2)	6 (4.0)
Any safety end point — no.		
Patients	14	24
Events	15	27
Death — no.	0	0
Cardiac event — no.		
Pericardial effusion for which drainage was warranted or tamponade	0	1†
Pericardial effusion for which drainage was not warranted	0	0
Pericarditis	0	0
Exacerbation of heart failure	0	1
Syncope	1	2
Wide-complex tachycardia or proarrhythmic event	0	2
Bradycardia or atrioventricular block for which pacemaker insertion was warranted	2	2
Acute coronary syndrome	0	2
Neurologic event — no.		
Stroke	0	0
Transient ischemic attack	0	1
Vascular event — no.		
Arteriovenous fistula	0	0
Hematoma for which intervention was warranted	0	0
Hematoma for which intervention was not warranted	1	0
Pseudoaneurysm for which intervention was warranted	0	0
Deep-vein thrombosis	1	0
Pulmonary event — no.		
Persistent phrenic-nerve palsy	3‡	0
Pneumonia	1	0
Self-limited hemoptysis	1	1
Gastrointestinal event — no.		
Esophageal injury or perforation	0	0
Gastrointestinal upset such as indigestion or diarrhea	2	1
Adverse drug reaction leading to dose modification or discontinuation — no.		
Prolongation of QT interval	0	1
Presyncope	0	5
Tremor	0	1
Visual disturbance	0	1
Mild cognitive impairment	0	1
Insomnia	0	1
Other event — no.		
Erectile dysfunction	0	1
Rash	0	1
Epistaxis	2	0
Joint pain	0	2
Migraine	1	0



Conclusions

- First-line ablation was associated with significant reductions in arrhythmia outcomes:
  - Time to first recurrence of ***any*** AF/AFL/AT
  - Time to first recurrence of ***any*** AF
  - Time to first recurrence of ***symptomatic*** AF/AFL/AT
  - Time to first recurrence of ***symptomatic*** AF
  - Total AF burden
  - Days with AF

} Continuous cardiac monitoring with implantable loop recorders

- First-line ablation was associated with meaningful improvements in quality of life and symptoms

- Adverse events were similar between contemporary cryoballoon ablation and AAD therapy

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Scientific Sessions

EARLY-AF

Thank you!

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cryoablation or Drug Therapy for Initial Treatment of Atrial Fibrillation

Jason G. Andrade, M.D., George A. Wells, Ph.D., Marc W. Deyell, M.D., Matthew Bennett, M.D., Vidal Essebag, M.D., Ph.D., Jean Champagne, M.D., Jean-Francois Roux, M.D., Derek Yung, M.D., Allan Skanes, M.D., Yaariv Khaykin, M.D., Carlos Morillo, M.D., Umjeet Jolly, M.D., Paul Novak, M.D., Evan Lockwood, M.D., Guy Amit, M.D., Paul Angaran, M.D., John Sapp, M.D., Stephan Wardell, M.D., Sandra Lauck, Ph.D., Laurent Macle, M.D., and Atul Verma, M.D., for the EARLY-AF Study Investigators*

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CANet.

Revue 6 mois après ablation FA

- Asymptomatique
- Pas de traitement
- ECG : RS
- Au sol et pas autorisée à voler…

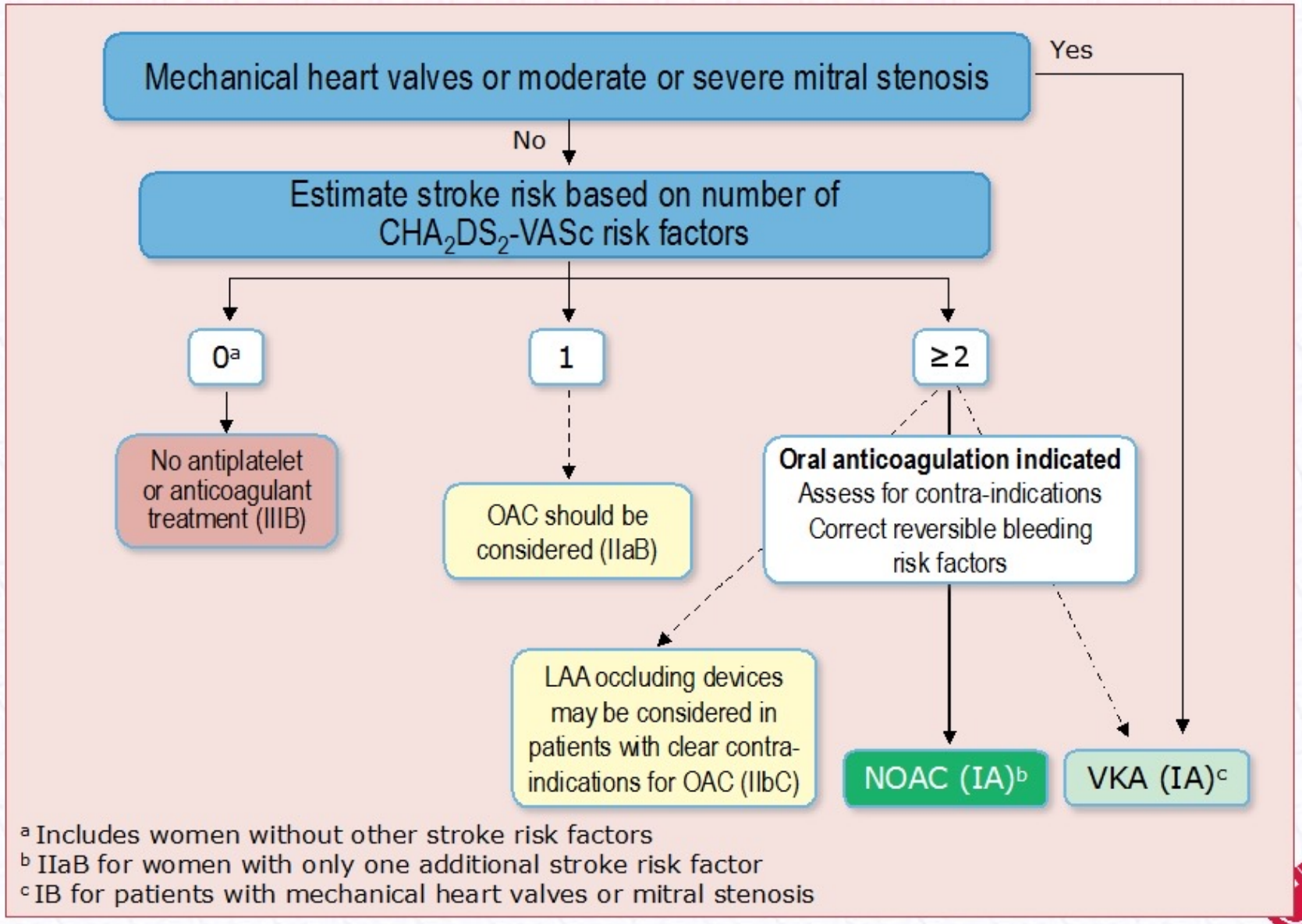
Cas

- Patient de 40 ans
- Diabète de type 2
- Obésité BMI 42 kg/m2
- HTA traitée par ARA2 – amlodipine
- Hospitalisé pour OAP sous VNI
- FA 180 bpm
- FE 25%

Suite

- Coro Nle
- Ralentissement FA
- FE 45% sous traitement

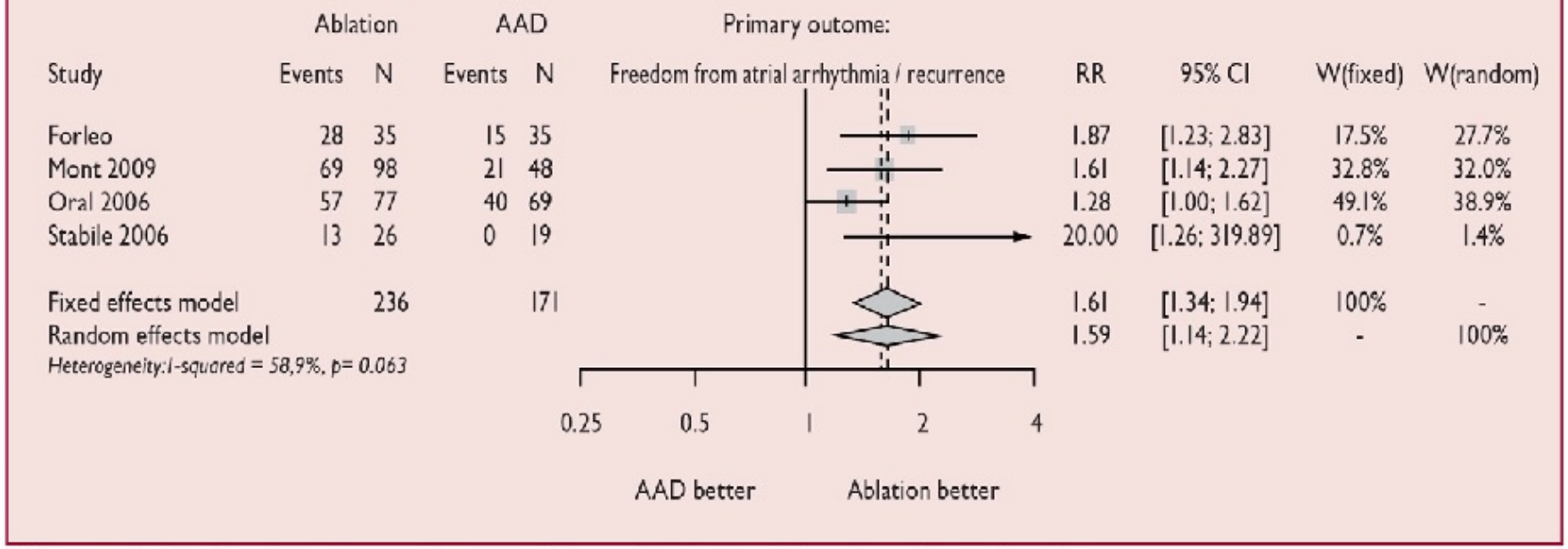
Stroke prevention in atrial fibrillation



European Heart Journal - doi:10.1093/eurheartj/ehw210

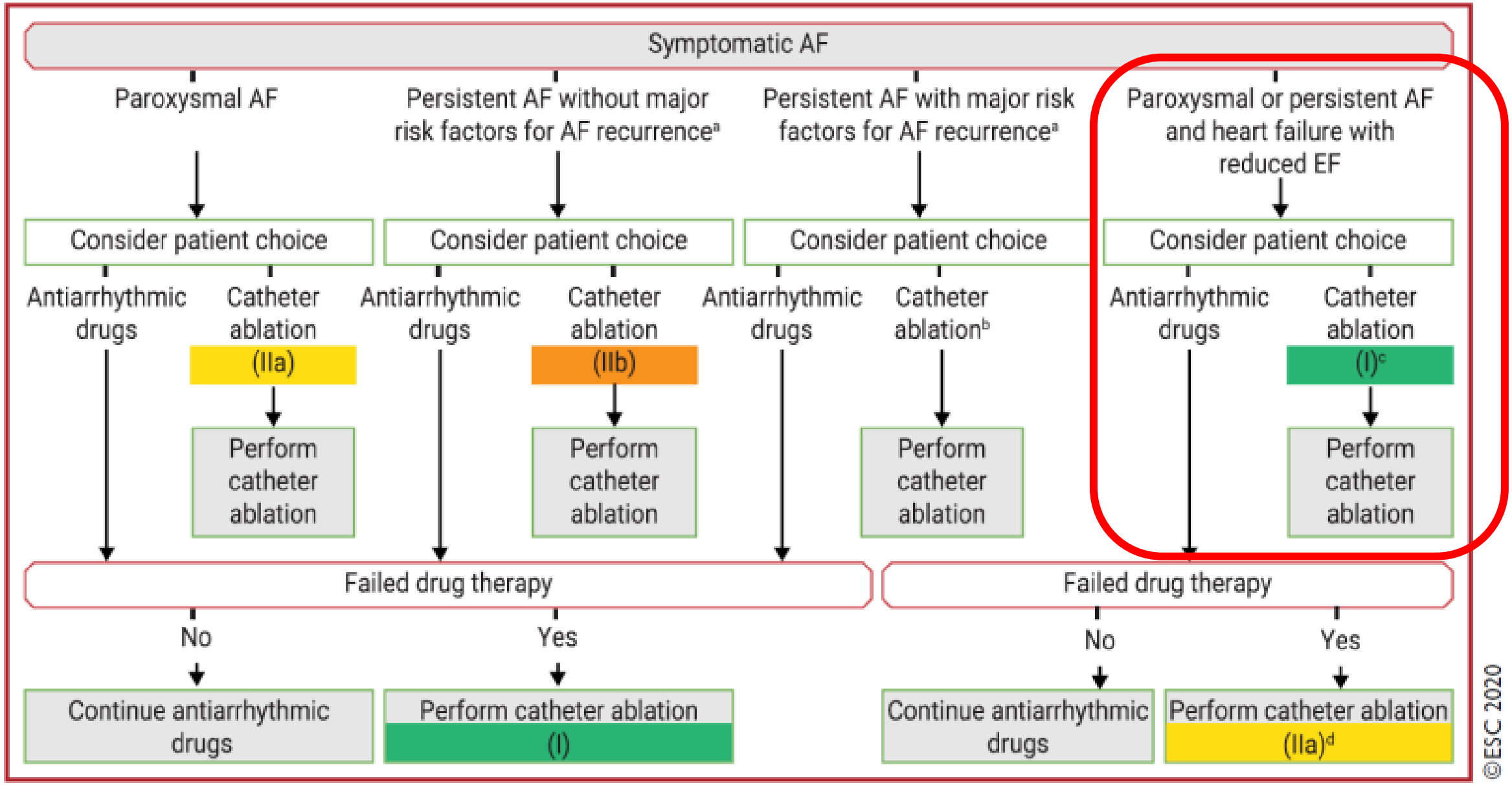
Rhythm outcome after catheter ablation compared to cardioversion and AAD in patients with persistent or long-standing persistent atrial fibrillation

Freedom from recurrence of atrial fibrillation or atrial arrhythmias, comparing catheter ablation with antiarrhythmic drug therapy in patients with persistent or long-standing persistent atrial fibrillation



AAD = antiarrhythmic drug therapy; CI = confidence interval; N = number of patients; RR = risk ratio; W = study weighting.

European Heart Journal - doi:10.1093/eurheartj/ehw210


Symptomatic AF
Paroxysmal AF
Persistent AF without major risk factors for AF recurrence[a]
Persistent AF with major risk factors for AF recurrence[a]
Paroxysmal or persistent AF and heart failure with reduced EF
Consider patient choice
Consider patient choice
Consider patient choice
Consider patient choice
Antiarrhythmic drugs
Catheter ablation
(IIa)
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation
(IIb)
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation[b]
Perform catheter ablation
Antiarrhythmic drugs
Catheter ablation
(I)[c]
Perform catheter ablation
Failed drug therapy
Failed drug therapy
No
Yes
No
Yes
Continue antiarrhythmic drugs
Perform catheter ablation
(I)
Continue antiarrhythmic drugs
Perform catheter ablation
(IIa)[d]

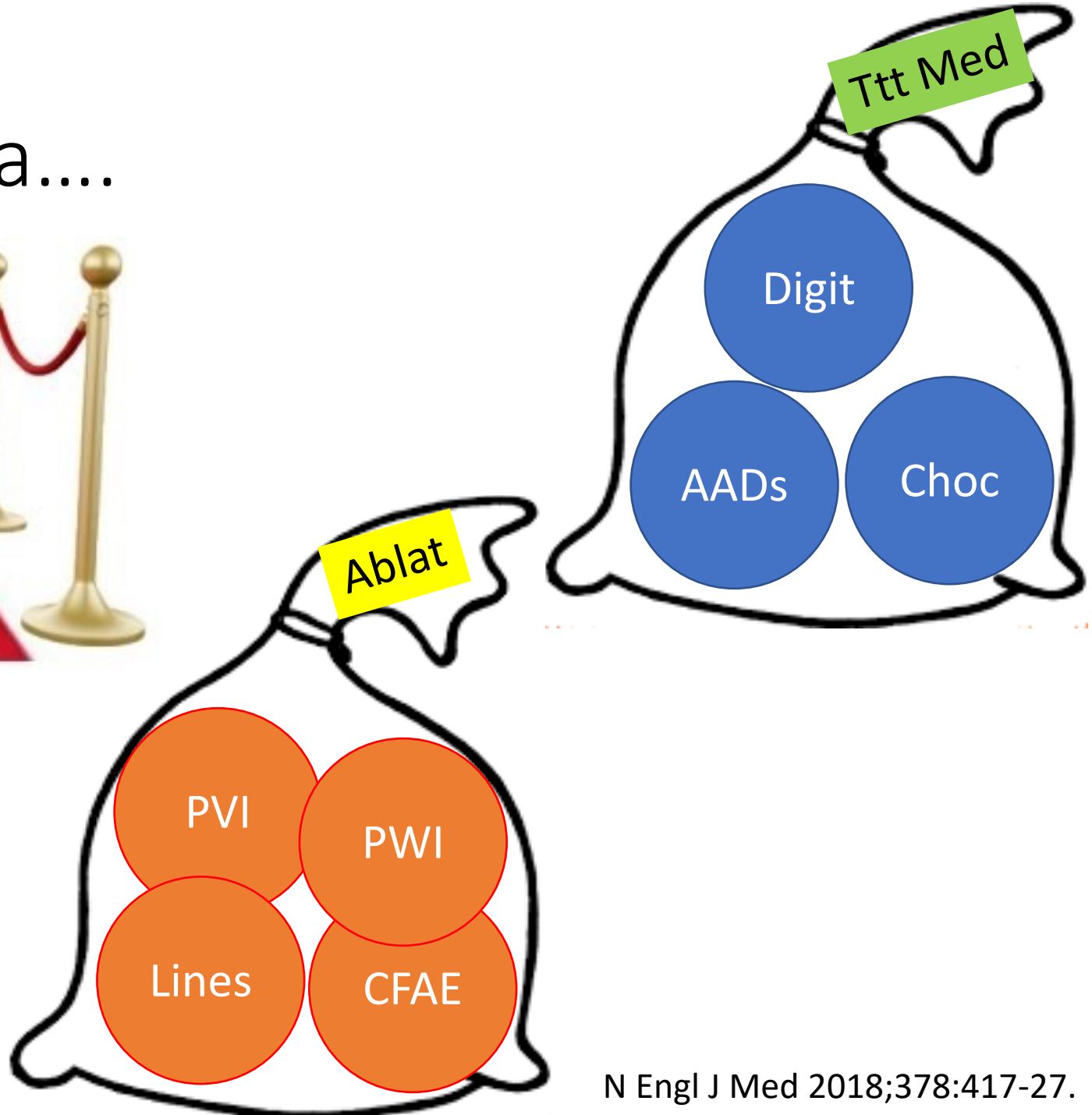
Recommendations for rhythm control/catheter ablation of AF (4)

ESC European Society of Cardiology

Recommendations	Class	Level
First-line therapy (continued)		
AF catheter ablation:		
• Is recommended to reverse LV dysfunction in AF patients when tachycardia-induced cardiomyopathy is highly probable, independent of their symptom status.	I	Change IIa
• Should be considered in selected AF patients with **HF with reduced LVEF** to **improve survival and reduce HF hospitalization**.	IIa	B
AF catheter ablation for **PVI** should be considered as a **strategy to avoid pacemaker** implantation in patients with **AF-related bradycardia or symptomatic pre-automaticity pause after AF conversion** considering the clinical situation.	IIa	C

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
(European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

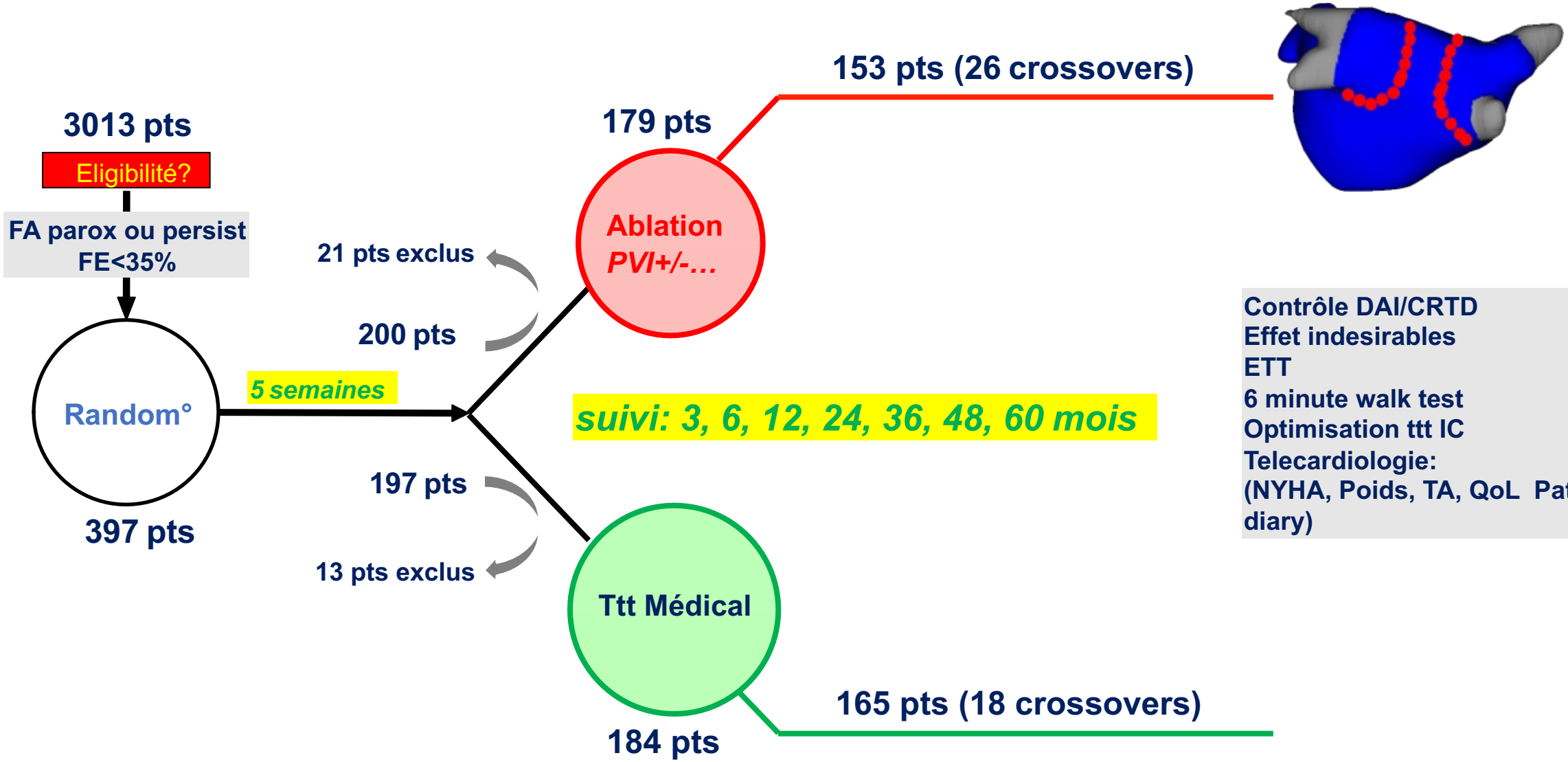
Et CASTLE-AF arriva....



N Engl J Med 2018;378:417-27.

Study Design— CASTLEAF

- **Essai thérapeutique contrôlé randomisé (31 sites, 9 pays),**



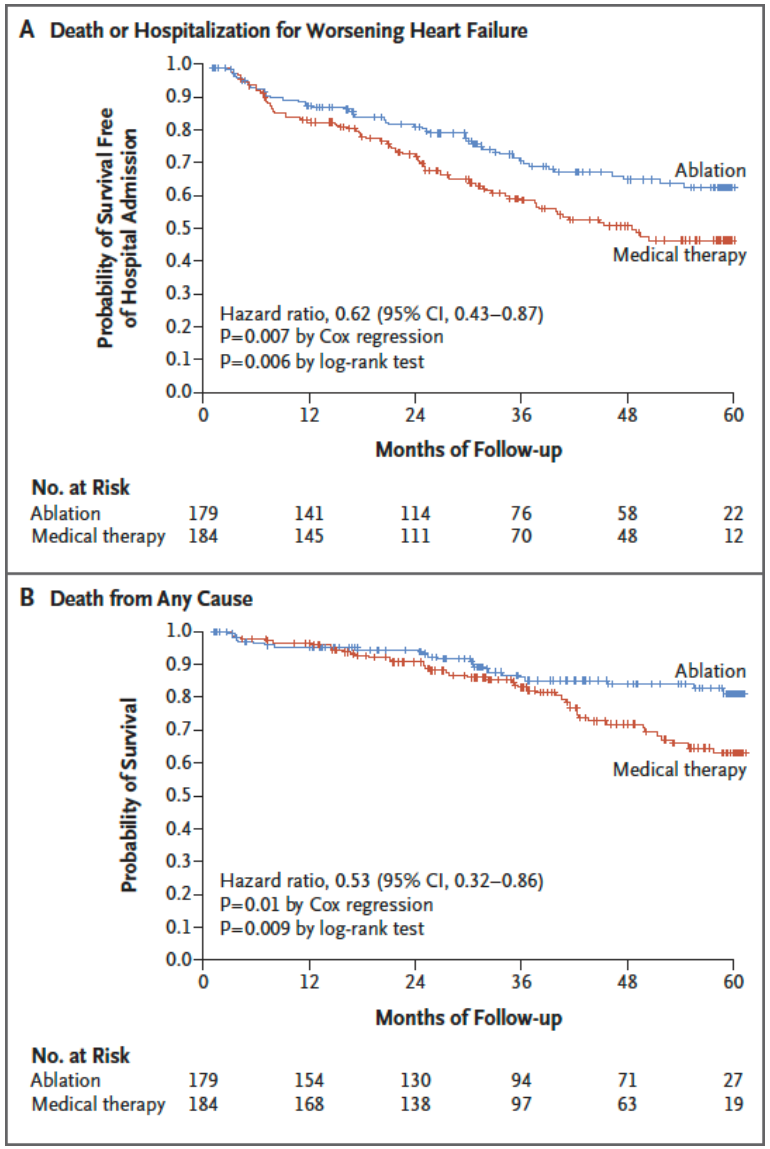
N Engl J Med 2018;378:417-27.

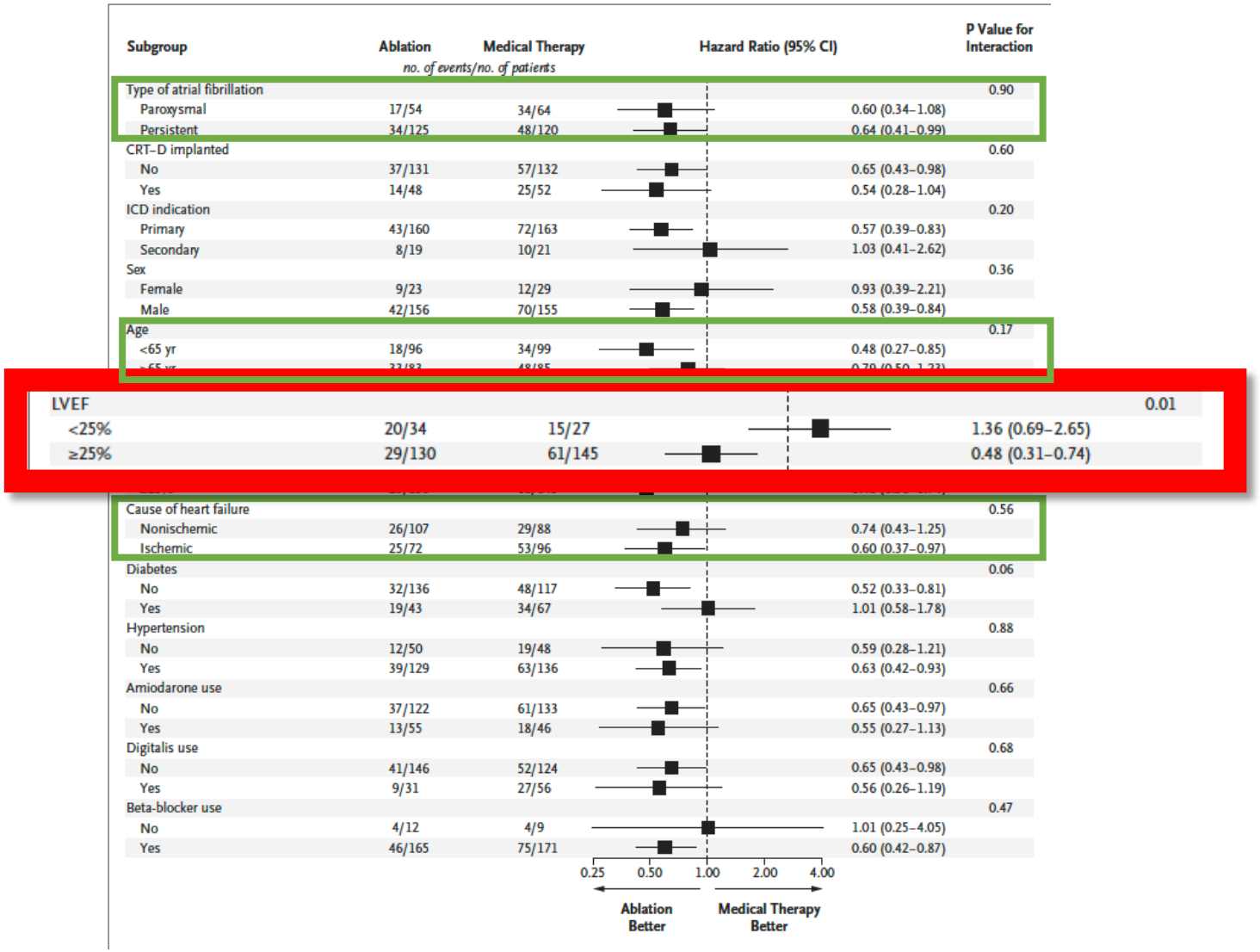
Patients CASTLE AF

	Ablation (179 patients)	Medical (184 patients)
Age – years	64 (5671)	64 (5673.5)
New York Heart Association class		
I (%)	11	11
II (%)	58	61
III (%)	29	27
IV (%)	2	1
Left ventricular ejection fraction – %	32.5 (25.038.0)	31.5 (27.037.0)
Left atrial diameter– mm	48	49.5
Current type of atrial fibrillation		
Paroxysmal (%)	**30**	**35**
Persistent (%)	**70**	**65**
Long standing Persistent (%)	**28**	**29**
CRTD implanted (%)	27	28

N Engl J Med 2018;378:417-27.

Castle AF Résultats





N Engl J Med 2018;378:417-27.

Safety

Table 5. Safety Outcomes for Patients With AF Undergoing Catheter Ablation

circae;2/4/349/TBL5824789T5

Outcomes	t	n/N	%
Mortality			
Death overall	65	42/578	0.7
Procedure-related	64	0/5192	
Vascular access complications			
Arteriovenous fistula	32	1/2885	0.0
Bleeding	33	1/2960	0.0
Hematoma	38	17/3719	0.5
Pneumothorax	34	0/2974	0.0
Femoral artery pseudoaneurysm	34	15/3032	0.5
Periprocedure events			
Stroke, ischemic	62	17/566	0.3
TIA	60	13/5467	
Cardiac tamponade	63	45/572	0.8
PE	60	3/5496	
DVT	56	1/4758	0.0
Other embolism	57	10/5347	0.2
LA-esophageal fistula	60	0/5496	0.0
Other fistula	58	3/5407	0.1
Pericardial effusion	64	36/5719	
PV stenosis*	65	91/583	1.6
AV block	60	1/5496	
CHF exacerbation	60	0/5496	0.0
Need for a pacemaker	46	4/3902	
Total No. of patients with events	28	97/196	4.9

Safety

Table 6. Safety Outcomes for Patients With AF Receiving AAD Therapy

ircae;2/4/349/TBL6824789T6

Safety Outcomes	Overall		
	t	n/N	%
Mortality			
Death overall	33	120/4291	2.8
Sudden death	21	18/2900	0.6
Treatment-related death	22	15/3179	0.5
Not treatment-related death	20	40/3023	1.3
Adverse events			
CV events	10	58/1572	3.7
Bradycardia	19	44/2349	1.9
GI	16	97/1499	6.5
Neuropathy	4	48/969	5.0
Thyroid dysfunction	5	19/576	3.5
Torsades	12	16/2238	0.7
Q-T* prolongation	12	5/2034	0.2
Total No. of patients with events	24	989/3318	29.8
Discontinuations			
Total	32	1035/4347	23.8
Due to AE	32	384/3682	10.4
Due to inefficacy	12	229/1694	13.5
Due to noncompliance	4	19/457	4.2

Table 5. Safety Outcomes for Patients With AF Undergoing Catheter Ablation

ircae;2/4/349/TBL5824789T5

Outcomes	t	n/N	%
Mortality			
Death overall	65	42/5781	0.7
Procedure-related	64	0/5192	0.0
Vascular access complications			
Arteriovenous fistula	32	1/2885	0.0
Bleeding	33	1/2960	0.0
Hematoma	38	17/3719	0.5
Pneumothorax	34	0/2974	0.0
Femoral artery pseudoaneurysm	34	15/3032	0.5
Periprocedure events			
Stroke, ischemic	62	17/5665	0.3
TIA	60	13/5467	0.2
Cardiac tamponade	63	45/5723	0.8
PE	60	3/5496	0.1
DVT	56	1/4758	0.0
Other embolism	57	10/5347	0.2
LA-esophageal fistula	60	0/5496	0.0
Other fistula	58	3/5407	0.1
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PV stenosis*	65	91/5831	1.6
AV block	60	1/5496	0.0
CHF exacerbation	60	0/5496	0.0
Need for a pacemaker	46	4/3902	0.1
Total No. of patients with events	28	97/1964	4.9

Cas

- Patient de 40 ans
- Diabète de type 2
- Obésité BMI 42 kg/m2
- HTA traitée par ARA2 – amlodipine
- Hospitalisé pour OAP sous VNI
- FA 180 bpm
- FE 25%

Après 2 ablations et une chirurgie de l'obésité:

RS

Ce n’est pas qu’une histoire de rythme

In addition to antiarrhythmic drug therapy and catheter ablation (see Chapter 11.3), management of concomitant cardiovascular conditions can reduce symptom burden in AF and facilitate the maintenance of sinus rhythm.[203,204,296,312] This includes weight reduction, blood pressure control, heart failure treatment, increasing cardiorespiratory fitness, and other measures (see Chapter 7).

Cas

- Patient de 40 ans
- Obésité BMI 40 kg/m2
- HTA traitée par ARA2 – amlodipine
- Hospitalisé pour OAP sous VNI
- FA 180 bpm
- FE 30%

Résultat après ablation ??

Weight reduction in patients with atrial fibrillation

Recommendations	Class	Level
In obese patients with AF, weight loss together with management of other risk factors should be considered to reduce AF burden and symptoms.	IIa	B

European Heart Journal - doi:10.1093/eurheartj/ehw210

Management of respiratory diseases in patients with atrial fibrillation

Recommendations	Class	Level
Correction of hypoxaemia and acidosis should be considered as initial management for patients who develop AF during an acute pulmonary illness or exacerbation of chronic pulmonary disease.	IIa	C
Interrogation for clinical signs of obstructive sleep apnoea should be considered in all AF patients.	IIa	B
Obstructive sleep apnoea treatment should be optimized to reduce AF recurrences and improve AF treatment results.	IIa	B

European Heart Journal - doi:10.1093/eurheartj/ehw210

A qui proposer l’ablation de FA ?

Quels patients ne pas proposer en ablation ?

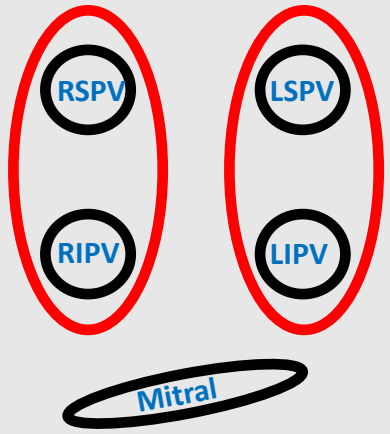
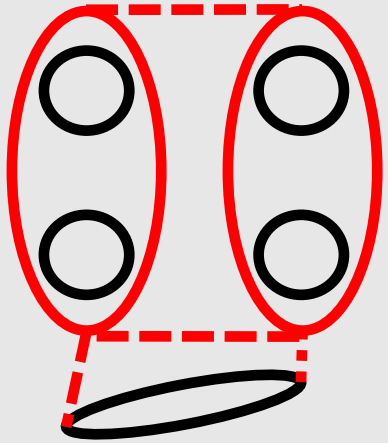
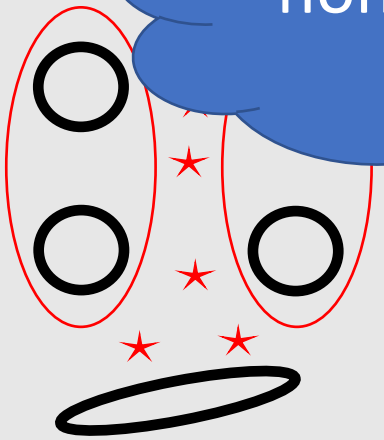
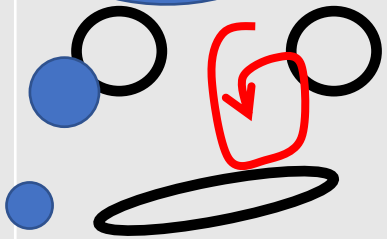
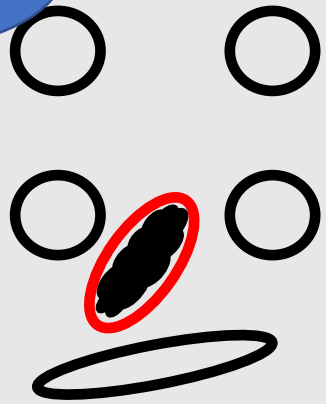
- Asymptomatiques.
- Trop âgés (ou mauvais état général).
- Trop de comorbidités.
- Cardiopathie sous-jacente (Valvulopathie +++)
- OG trop dilatée
- Fibrose OG

- FA persistante « très » prolongée

Ablation de FA
Comment je fais en pratique ?

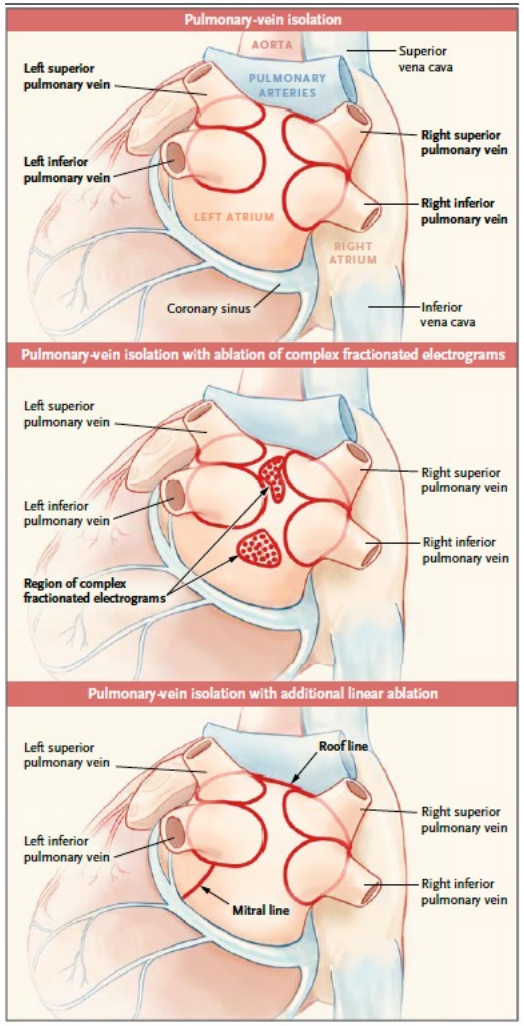
Groupement Hospitalier de Territoire
Grand Paris Nord-Est
Aulnay-sous-Bois - Le Raincy-Montfermeil * Montreuil

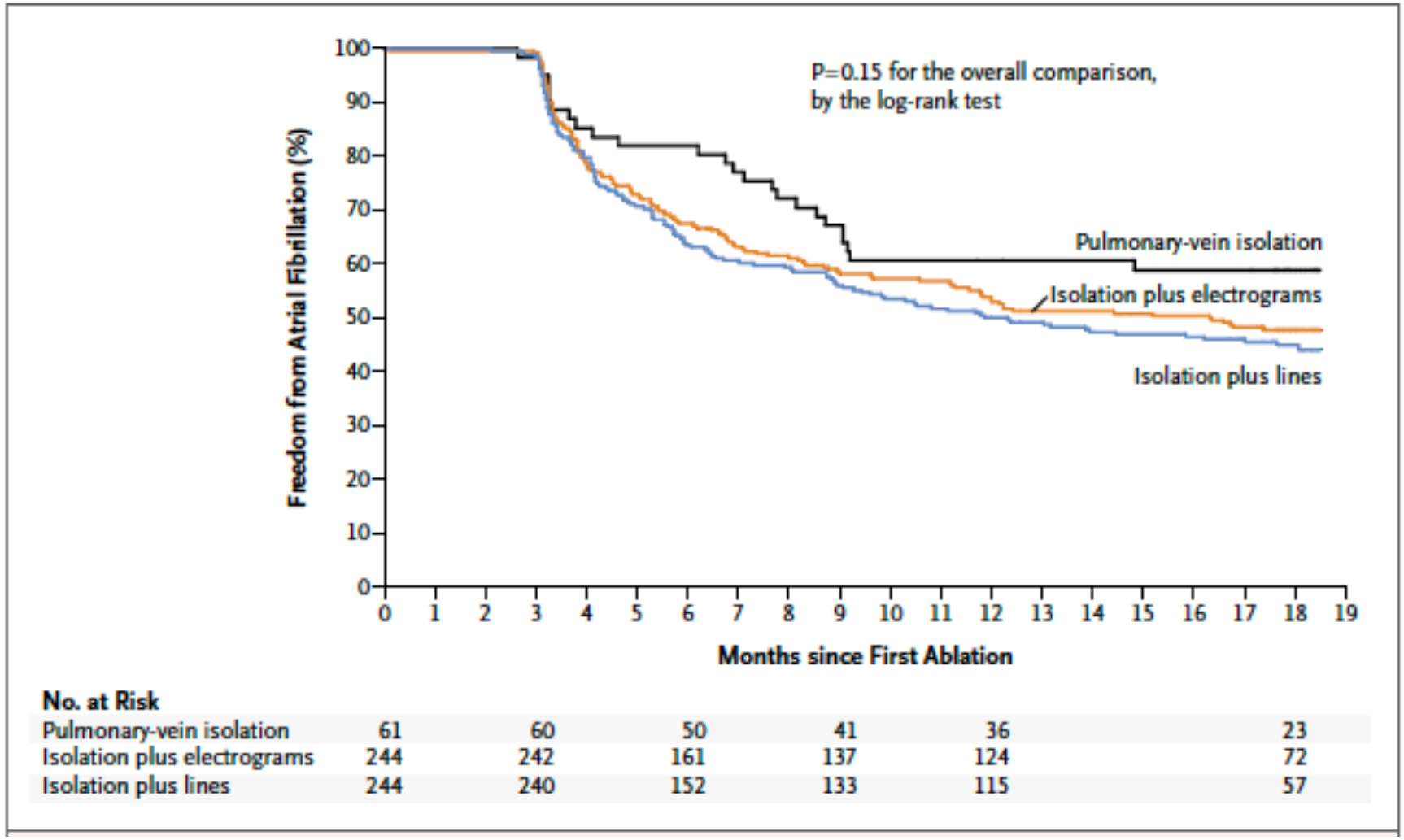
Comment ablater la FA persistante?

PAF	(LS)PsAF			
PVI	Lines	CFA		BIFA
				
AntalPV Block	AF Conversion? SR?			

Interresting but non reproducible

Et si isoler les veines pulmonaires suffisait





N Engl J Med 2015;372:1812-22

Techniques

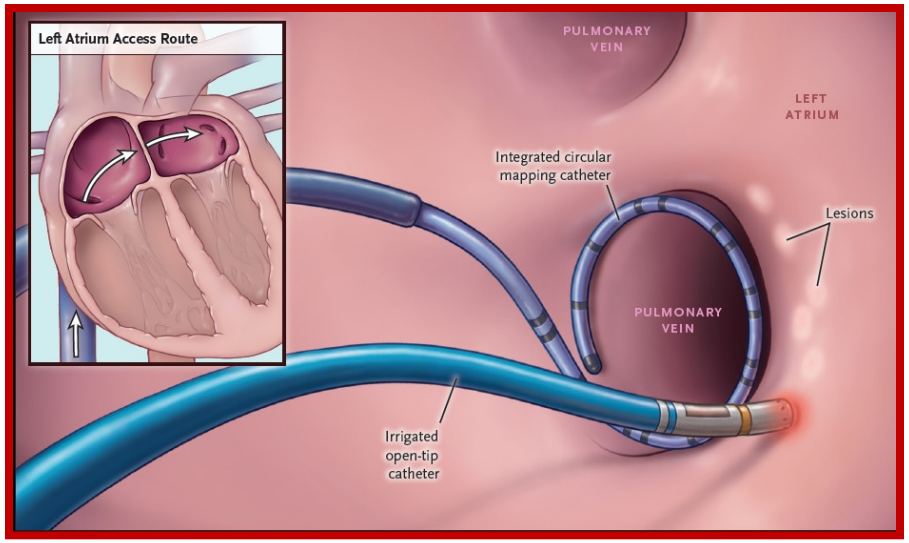
Technique	Class-LOE
Isolation VP	I-A
Lignes	**IIb-C**
Isolation du mur posterieur	**IIb-C**
Domain Frequency Ablation	IIb-C
Ablation BIFA	IIb-B
Ablation CFAEs	IIb-B
Ablation de rotors	IIb-B
Ablation ganglions	IIb-B

Europace (2017) 00, 1–160

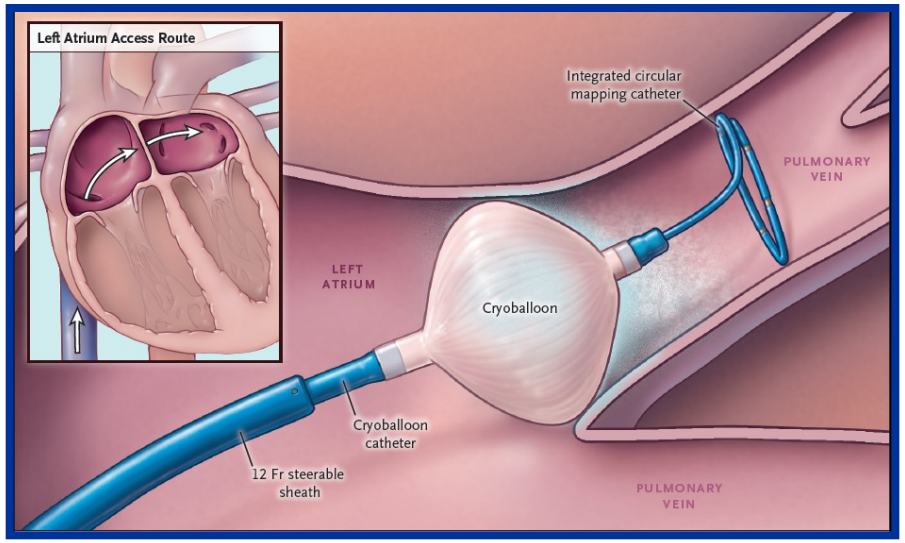
FIRE AND ICE

AF Clinical Trial

- **RFC Ablation (“FIRE”)**
  - Power was not to exceed
    - 40 W at A/I aspect
    - 30 W at P/S aspect
  - 3D electroanatomical mapping

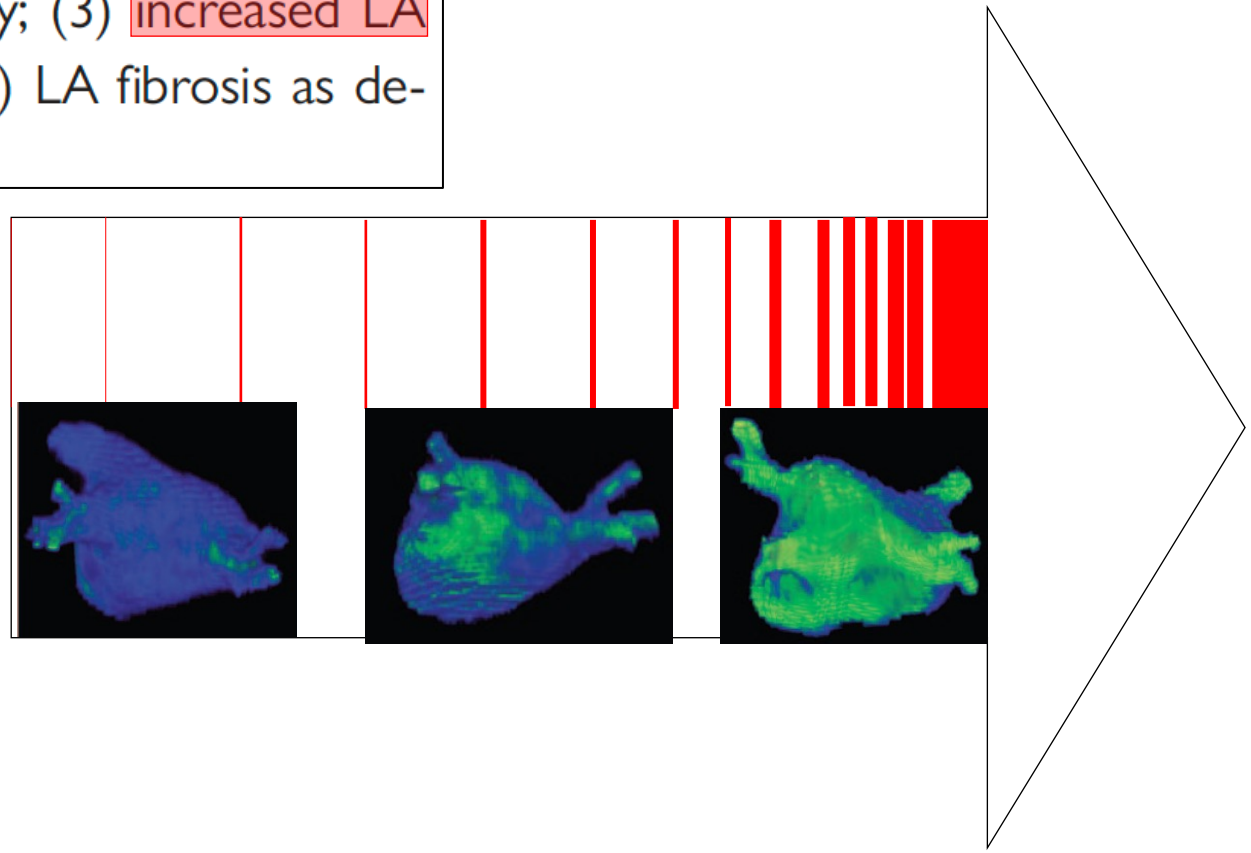


- **Cryoballoon Ablation (“ICE”)**
  - Max. freeze duration of 240s recommended
  - Bonus freeze after isolation recommended
  - Phrenic nerve pacing required



Deuxième regard vers les recommandations….

Factors that have been identified as predictors of a poorer outcome, at least in some studies, include (1) non-PAF and particularly long-term persistent AF; (2) sleep apnea and obesity; (3) increased LA size; (4) increased age; (5) hypertension; and (6) LA fibrosis as detected by cardiac MRI.[365]



Europace (2017) 00, 1–160

SUIVI POST-ABLATION

Table 17 Key issues in follow-up after AF catheter ablation

Key issues
Recognition and management of complications • Patients must be fully informed about the clinical signs and symptoms of rare but potentially dangerous ablation-related complications that may occur after hospital discharge (e.g. atrio-oesophageal fistula, pulmonary vein stenosis).
Follow-up monitoring: Useful to assess procedural success and correlate symptom status with rhythm.[795,796] Recurrences beyond the first month post-ablation are generally predictive of late recurrences,[797,798] but recurrent symptoms may be due to ectopic beats or other non-sustained arrhythmia[644,799,800]; conversely the presence of asymptomatic AF after ablation is well described.[801–803] Monitoring may be performed with intermittent ECG, Holter, Patch recordings, external or implanted loop recorder, or smart phone monitor (although the latter has not been validated for such use). Patients should be first reviewed at a minimum of 3 months and annually thereafter.[1]
Management of antiarrhythmic medication and treatment of AF recurrences a. Continuing AAD treatment for 6 weeks to 3 months may reduce early AF recurrences, rehospitalizations and cardioversions during this period.[797,804] Clinical practice regarding routine AAD treatment after ablation varies and there is no convincing evidence that such treatment is routinely needed. b. Subsequently, AADs may be weaned, ceased, or continued according to symptoms and rhythm status. Recent findings suggest that in AAD-treated patients remaining free of AF at the end of the blanking period, AAD continuation beyond the blanking period reduces arrhythmia recurrences.[805]
Management of anticoagulation therapy a. In general, OAC therapy is continued for 2 months following ablation in all patients.[1,806] Beyond this time, a decision to continue OAC is determined primarily by the presence of CHA_2DS_2-VASc stroke risk factors rather than the rhythm status (*section 10.2.2.6*).

JAMA | Original Investigation

Effect of Catheter Ablation With Vein of Marshall Ethanol Infusion vs Catheter Ablation Alone on Persistent Atrial Fibrillation
The VENUS Randomized Clinical Trial

Miguel Valderrábano, MD; Leif E. Peterson, PhD; Vijay Swarup, MD; Paul A. Schurmann, MD; Akash Makkar, MD; Rahul N. Doshi, MD; David DeLurgio, MD; Charles A. Athill, MD; Kenneth A. Ellenbogen, MD; Andrea Natale, MD; Jayanthi Koneru, MD; Amish S. Dave, MD, PhD; Irakli Giorgberidze, MD; Hamid Afshar, MD; Michelle L. Guthrie, RN; Raquel Bunge, RN; Carlos A. Morillo, MD; Neal S. Kleiman, MD

Figure 1. Clinical Trial Conduct

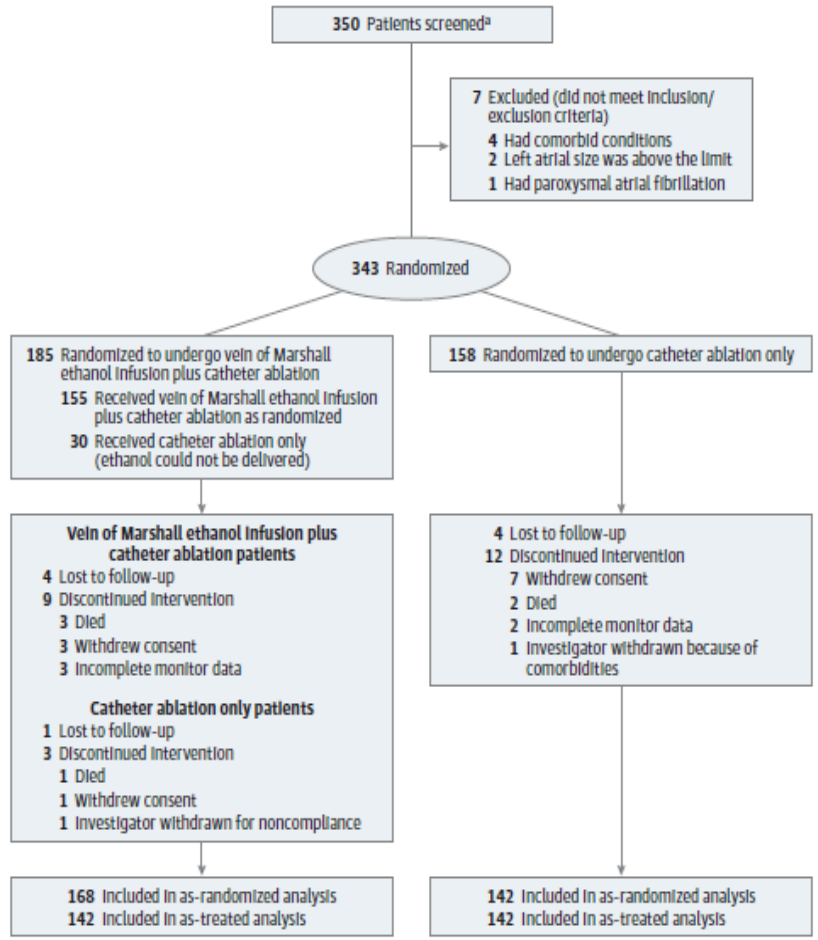
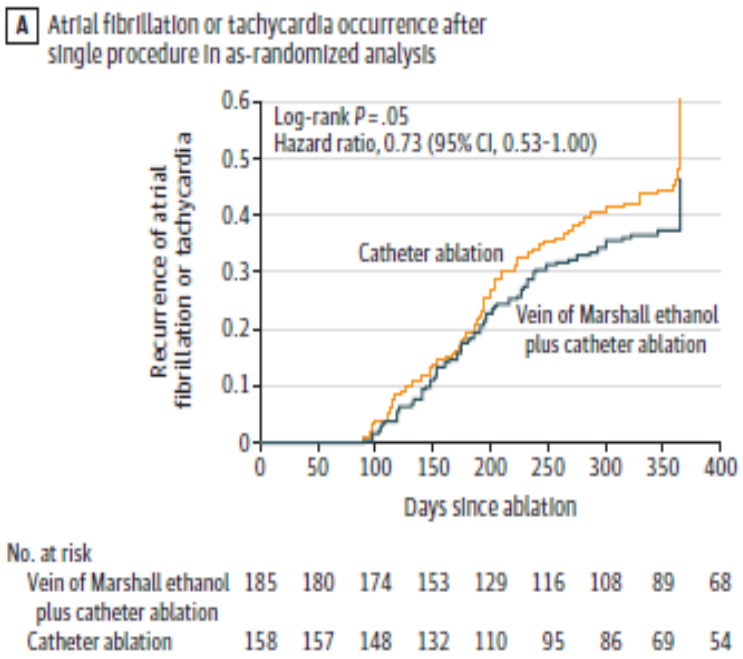
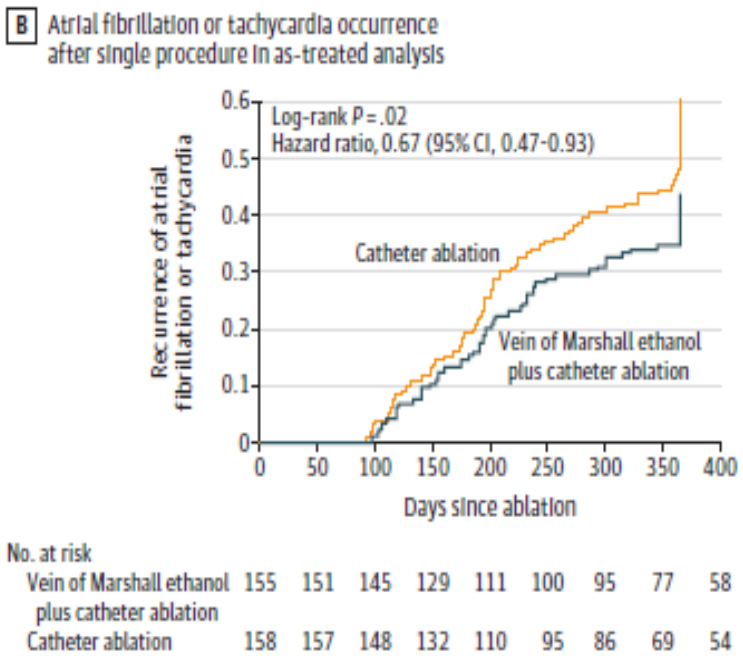


Table 1. Patient Demographic Characteristics

	No. (%)	
	Vein of Marshall–catheter ablation (n = 185)	Catheter ablation (n = 158)
Demographics		
Age, mean (SD), y	66.6 (9.6)	66.4 (9.9)
Sex, No. (%)		
Male	137 (74)	124 (78)
Female	48 (26)	34 (22)
Race and ethnicity		
White	169 (91)	150 (95)
Black	5 (3)	2 (1)
Hispanic	3 (2)	1 (1)
Asian	1 (1)	2 (1)
Not stated	7 (4)	3 (2)
Medical history and risk factors		
Hypertension	144 (77)	104 (66)
Diabetes	52 (28)	31 (20)
Coronary disease	52 (28)	41 (26)
Stroke-TIA	19 (10)	19 (12)
Heart failure	48 (26)	42 (27)
Body mass index[a]	31.2 (6.6)	31.9 (6.5)
CHA_2DS_2-VASC score[b]	2.9 (1.6)	2.6 (1.6)
Cardiac parameters		
Ejection fraction, %	52.1 (10.1)	53.4 (9.4)
Left atrial diameter, mm	44.8.1 (7.9)	47.0 (7.5)
Left atrial volume, mL	110.9 (46.8)	113.9 (46.3)
Time from first AF diagnosis		
<6 mo	15 (8)	10 (6)
6 mo to 2 y	76 (41)	65 (41)
>2 y	94 (51)	83 (52)
Longstanding persistent AF, No. (%)[c]	99 (54)	82 (52)





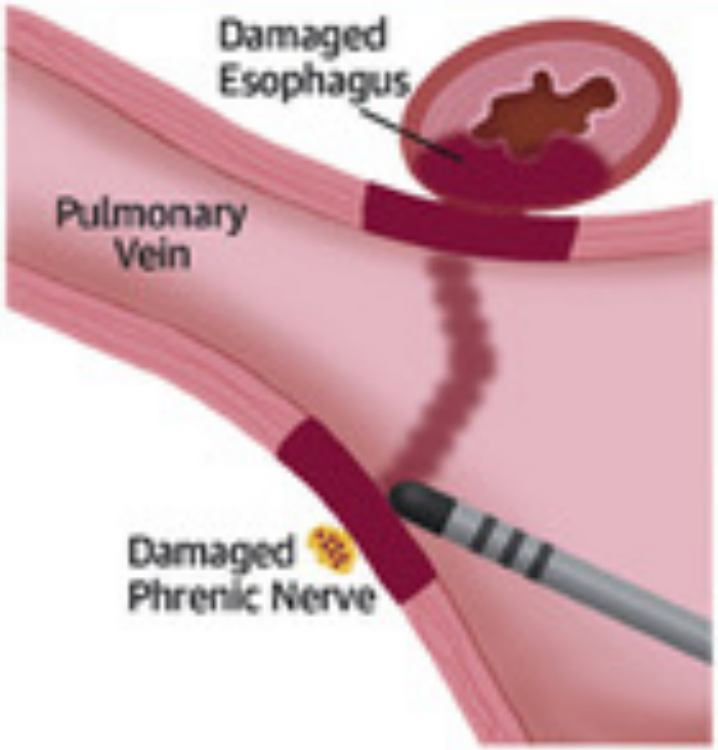
-ETUDE DANS 11 CENTRES US

-DANS 16% DES CAS L'ALCOOLISATION N'A PAS PU ETRE EFFECTUEE

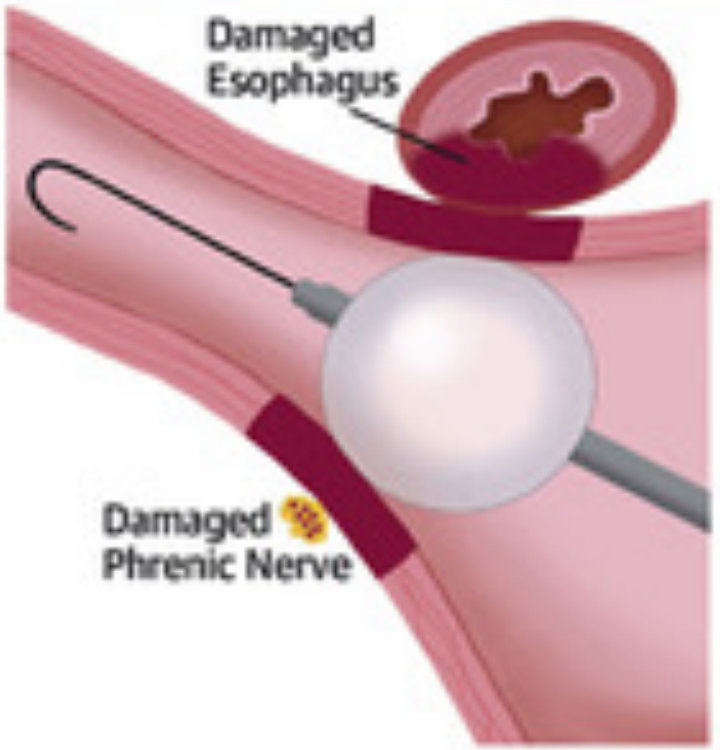
-Critère primaire de jugement : : récidive de FA/ flutter d'au moins 30 secondes après 3 mois après l'ablation = critère classique avec 1 mois d'ECG continu à 6 et 12 mois.

-TAUX DE SUCCES A 1 AN 38% PVI vs 51% dans PVI+LOM

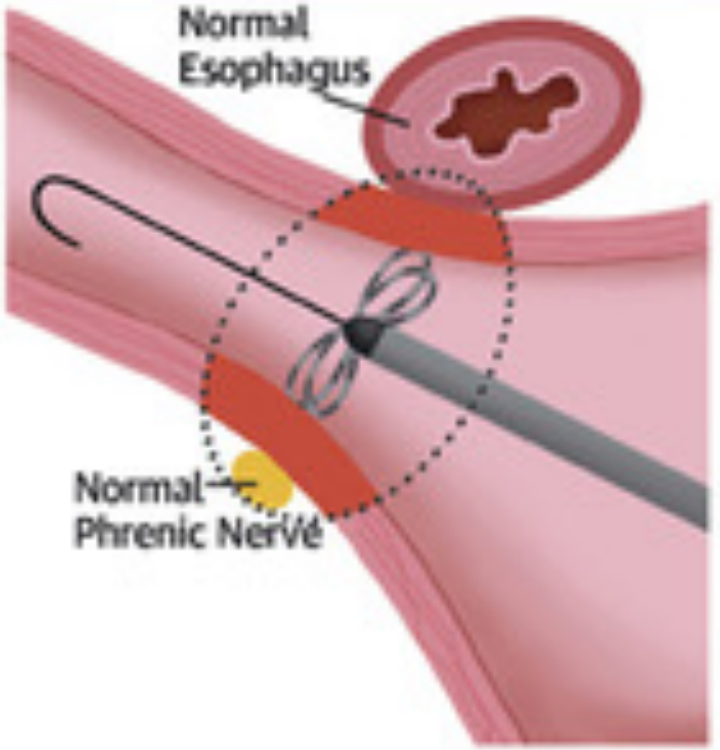
Radiofrequency Ablation



Cryoballoon Ablation



Pulsed Field Ablation



Frequency of Patients With ALL PVs Durably Isolated

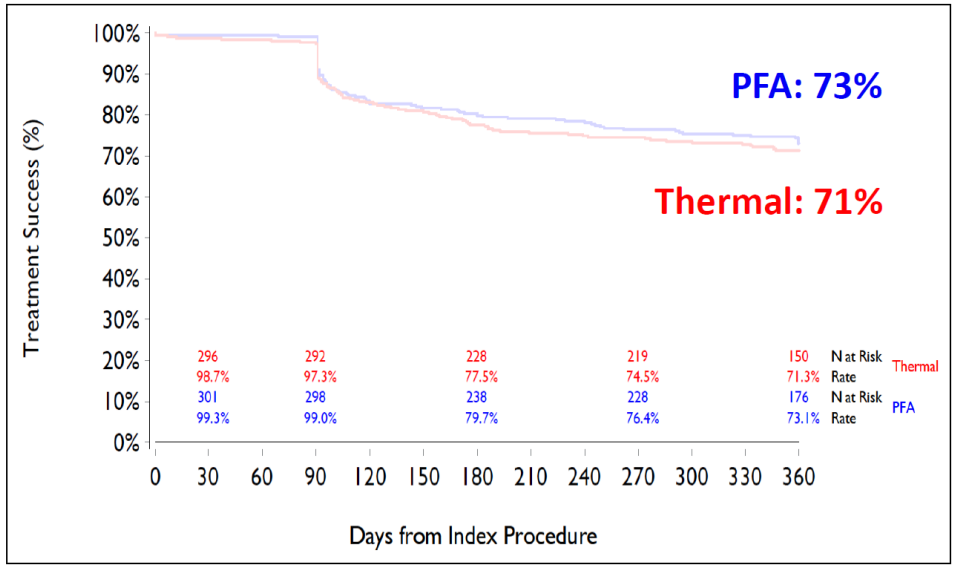
Randomized Controlled Trial for Pulsed Field Ablation versus Standard of Care Thermal Ablation for Paroxysmal Atrial Fibrillation

Primary Results of the *ADVENT* Trial

Vivek Y. Reddy MD,[1] Edward P. Gerstenfeld MD,[2] Andrea Natale MD,[3] William Whang MD,[1] Frank A. Cuoco MD,[4] Chinmay Patel MD,[5] Stavros E. Mountantonakis

Primary Effectiveness Endpoint

(Acute Success + 1-Yr Freedom from Atrial Arrhythmias / Re-Ablation / Cardioversion / AAD Use)



Single-procedure, off-drug treatment success between PFA and thermal ablation met the criterion for **non-inferiority**

Primary Safety Endpoint

	Serious Composite Safety Events	
	Pulsed Field Group, N = 305 n (%)	Thermal Group, N = 302 n (%)
Any Composite Safety Event	**6 (2.0) †**	**4 (1.3)**
Death	1 (0.3)	0
Myocardial infarction	0	0
Persistent phrenic nerve palsy	0	0
Stroke	0	1 (0.3)
Transient ischemic attack	1 (0.3)	0
Systemic thromboembolism	0	0
Cardiac tamponade or perforation	2 (0.7)	0
Pericarditis	1 (0.3)	0
Pulmonary edema	1 (0.3)	1 (0.3)
Vascular access complication	1 (0.3)	2 (0.7)
Heart block	0	0
Gastric motility/ pyloric spasm	0	0
Pulmonary vein stenosis	0	0
Atrio-esophageal fistula	0	0

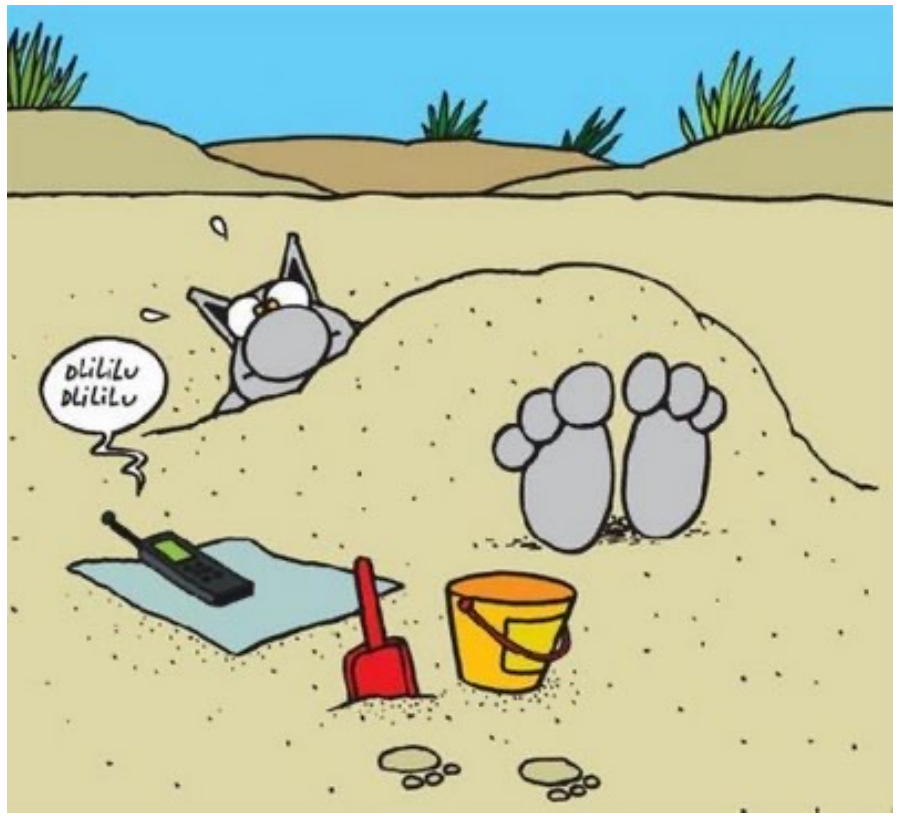
† One patient who sustained a cardiac tamponade subsequently died; accordingly, the individual components add to more than the composite total.

Is this death spurious or specific to PFA?

- The pentaspline PFA catheter received CE-Mark Approval in March 2021
- Registry of all sites performing PFA
  - **24 EU centers / 77 operators**
  - **1,568 patients**
- Mortality:
  - **1 in 1,568 → 0.06%**

M.Turagam, P.Neuzil, B.Schmidt…VY.Reddy, *Circulation* 148:35–46 (2023)


LE PIZZA-FAX, ÇA MARCHE AUSSI AVEC LES CRÊPES ET LE JAMBON EN TRANCHES
POUR TOUT LE RESTE, IL FAUT UN MODEM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Conclusion

- CASTLE AF, CABANA = Premières données quant à un effet sur la morbimortalité de l'ablation de la FA
- Effet notamment dans l'insuffisance cardiaque
- Importance de la sélection des patients, de l'information et de l'expérience du centre et de l'opérateur.
- Simplification des procédures pourrait contribuer à de meilleurs résultats procéduraux