L'ablation de la Fibrillation atriale:

Un traitement arrivé à maturité ?

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CARDIORUN 2021

Traitement mature

- Efficace
- Sûr
- Quelle que soit la forme clinique de la FA
- Recommandé en première intention

Efficacy

Ablation vs. AAR drugs

In Second Line Therapy

Source	No. of Patients	End Point	AF Recurrence, %[a]	
			Catheter Ablation	Antiarrhythmic Drugs
Catheter Ablation vs Antiarrhythmic Drugs in Second-Line Therapy				
Jaïs et al,[20] 2008	112	1-y AF recurrence	11	77
Wilber et al,[21] 2010	167	9-mo AF recurrence	34	84
Packer et al,[22] 2013	245	1-y AF recurrence	30.1	92.7
Mont et al,[24] 2014[c]	146	1-y AF recurrence	29.6	56.3

~ 60% relative risk reduction of AF recurrence with ablation vs. AAD

- Better efficacy than AAD
  - Better rhythm control
  - Better QoL & functional improvement

Prystowski E et al., JAMA. 2015;314:278

Efficacy

Ablation vs. AAR drugs

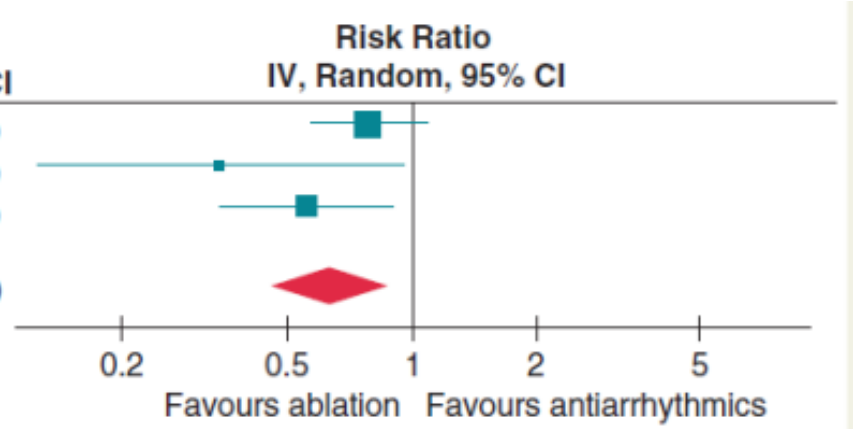
In First Line Therapy with RF energy

- Recurrence of AF

Study or subgroup	log(Risk Ratio)	SE	Weight	Risk Ratio IV, Random, 95% CI
MANTRA-PAF 2012	–0.24	0.16	52.9%	0.79 (0.57, 1.08)
RAAFT-1 2005	–1.07	0.52	11.3%	0.34 (0.12, 0.95)
RAAFT-2 2014	–0.58	0.24	35.8%	0.56 (0.35, 0.90)
Total (95% CI)			**100.0%**	**0.63 (0.44, 0.92)**

Heterogeneity: $\tau^2 = 0.04$; $\chi^2 = 3.22$, df = 2 ($P = 0.20$); $I^2 = 38\%$

Test for overall effect: $Z = 2.42$ ($P = 0.02$)

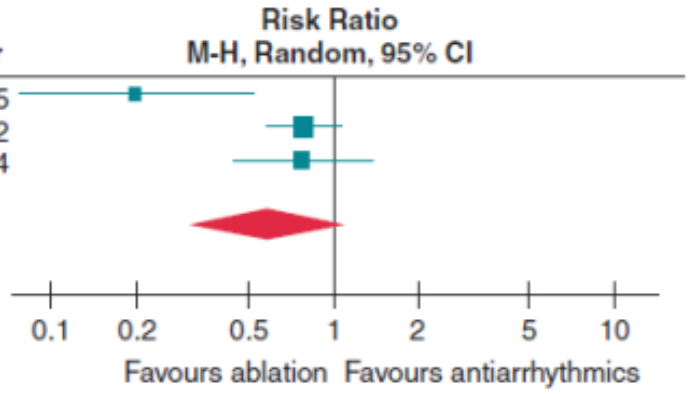


- Recurrence of symptomatic AF

Study or subgroup	Catheter ablation Events	Total	Antiarrhythmic drug Events	Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
RAAFT-1 2005	4	32	22	35	23.1%	0.20 (0.08, 0.51)	2005
MANTRA-PAF 2012	46	140	61	146	42.5%	0.79 (0.58, 1.07)	2012
RAAFT-2 2014	16	66	19	61	34.4%	0.78 (0.44, 1.37)	2014
Total (95% CI)		**238**		**242**	**100.0%**	**0.57 (0.30, 1.08)**	
Total events	66		102				

Heterogeneity: $\tau^2 = 0.23$; $\chi^2 = 7.68$, df = 2 ($P = 0.02$); $I^2 = 74\%$

Test for overall effect: $Z = 1.72$ ($P = 0.09$)



Akalahti et al., Europace 2015;17:370

Efficacy

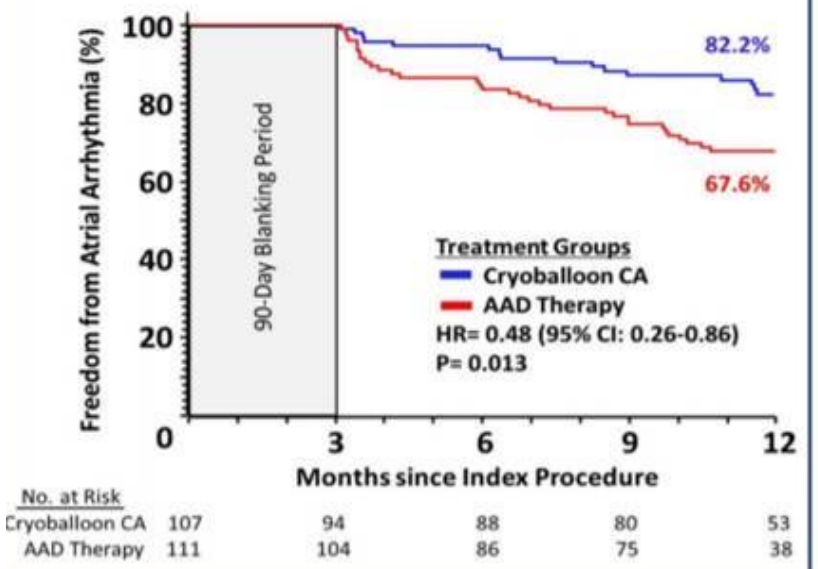
Ablation vs. AAR drugs

In First Line Therapy with Cryo energy

PRIMARY EFFICACY RESULTS

- Differences in the freedom from primary efficacy endpoint failure due in part to
  - Primary endpoint definitions
  - Modality of cardiac monitoring during follow-up

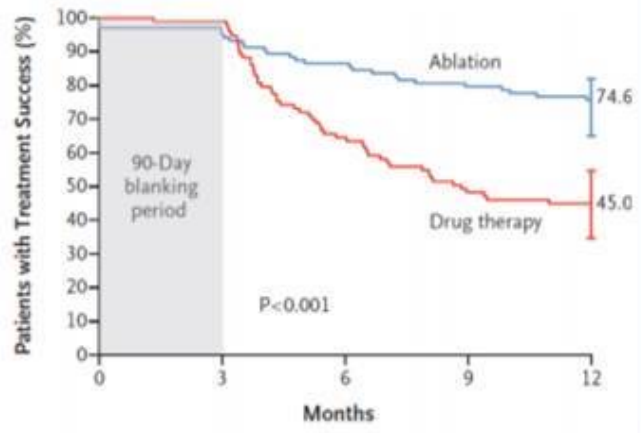
Cryo-FIRST



No. at Risk					
Cryoballoon CA	107	94	88	80	53
AAD Therapy	111	104	86	75	38

7-day Holters every 3 months

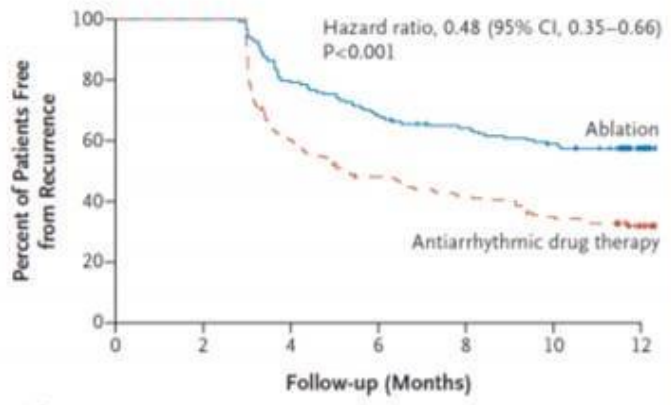
STOP AF First



No. at Risk					
Ablation	104	99	88	81	70
Drug therapy	99	93	60	44	39

TTMs weekly and when symptomatic, 24 hour ambulatory monitoring at 6 and 12 mo

EARLY-AF



No. at Risk							
Ablation	154	154	123	105	96	86	55
Antiarrhythmic drug therapy	149	149	89	69	60	49	27

Continuous monitoring with an ICM

Efficacy

Success Rate of Ablation in Relationship with the type of AF

- Worldwide Survey including > 20 000 AF ablation procedures

			Success Without AADs		Success With AADs		Overall Success	
Type of AF	No. of Centers	No. of Patients	No. of Patients	Rate, Median (Interquartile Range)*	No. of Patients	Rate Median (Interquartile Range)*	No. of Patients	Rate Median (Interquartile Range)*
Paroxysmal	85	9590	6580	74.9 (64.9–82.6)	1290	9.1 (0.2–14.7)	7870	84.0 (79.7–88.6)
Persistent	73	4712	2800	64.8 (52.4–72.0)	595	10.0 (0.8–15.2)	3395	74.8 (66.1–80.0)
Long-lasting	40	1853	1108	63.1 (53.3–71.4)	162	7.9 (0.9–15.9)	1270	71.0 (67.4–76.3)

Cappato R et al. Cir AE, 2010;3:32

Efficacy

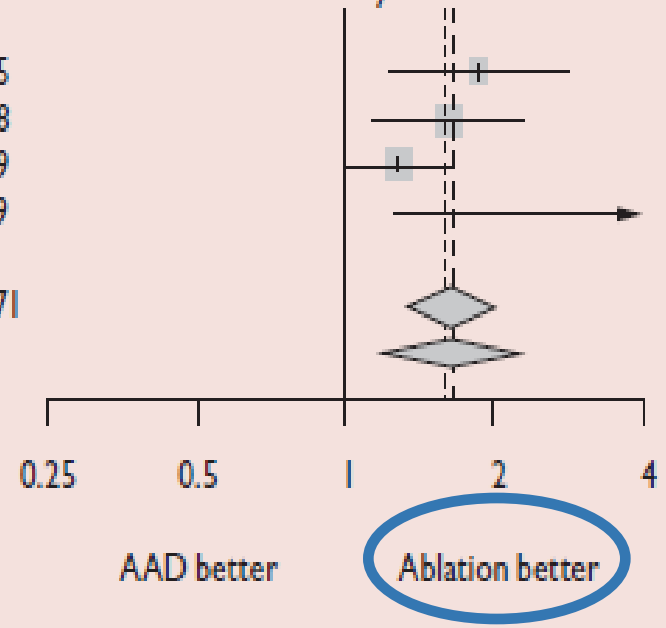
Efficacy of CA vs. AAD in Persistent AF Patients

CHU ROUEN NORMANDIE

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

Study	Ablation Events	Ablation N	AAD Events	AAD N	RR	95% CI	W(fixed)	W(random)
Forleo	28	35	15	35	1.87	[1.23; 2.83]	17.5%	27.7%
Mont 2009	69	98	21	48	1.61	[1.14; 2.27]	32.8%	32.0%
Oral 2006	57	77	40	69	1.28	[1.00; 1.62]	49.1%	38.9%
Stabile 2006	13	26	0	19	20.00	[1.26; 319.89]	0.7%	1.4%
Fixed effects model		236		171	1.61	[1.34; 1.94]	100%	-
Random effects model					1.59	[1.14; 2.22]	-	100%

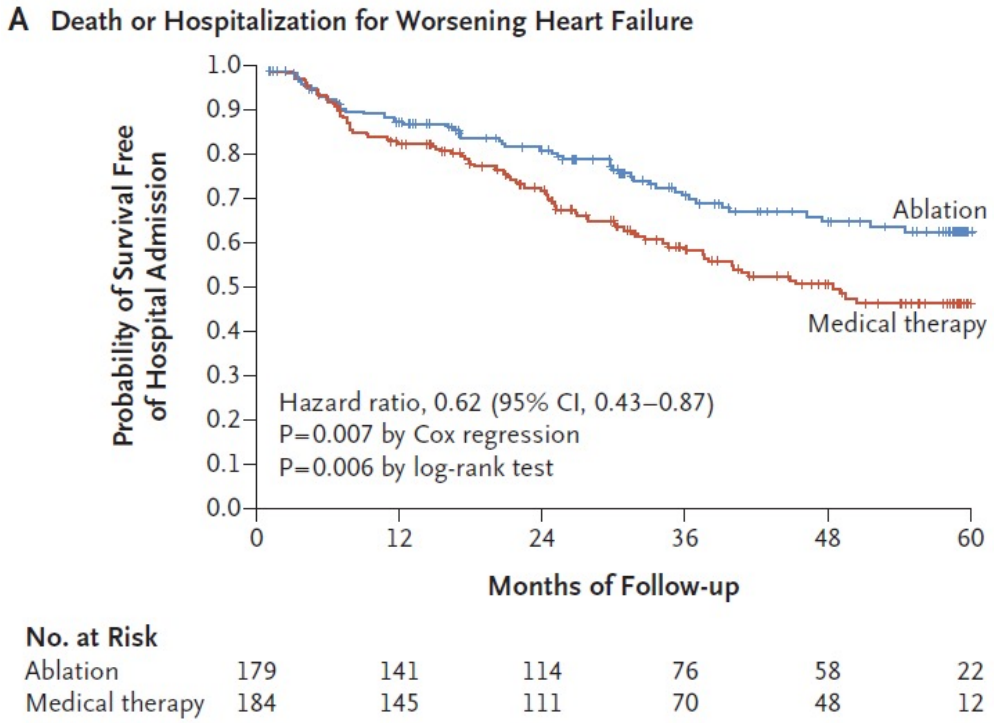
Heterogeneity: I-squared = 58,9%, p= 0.063

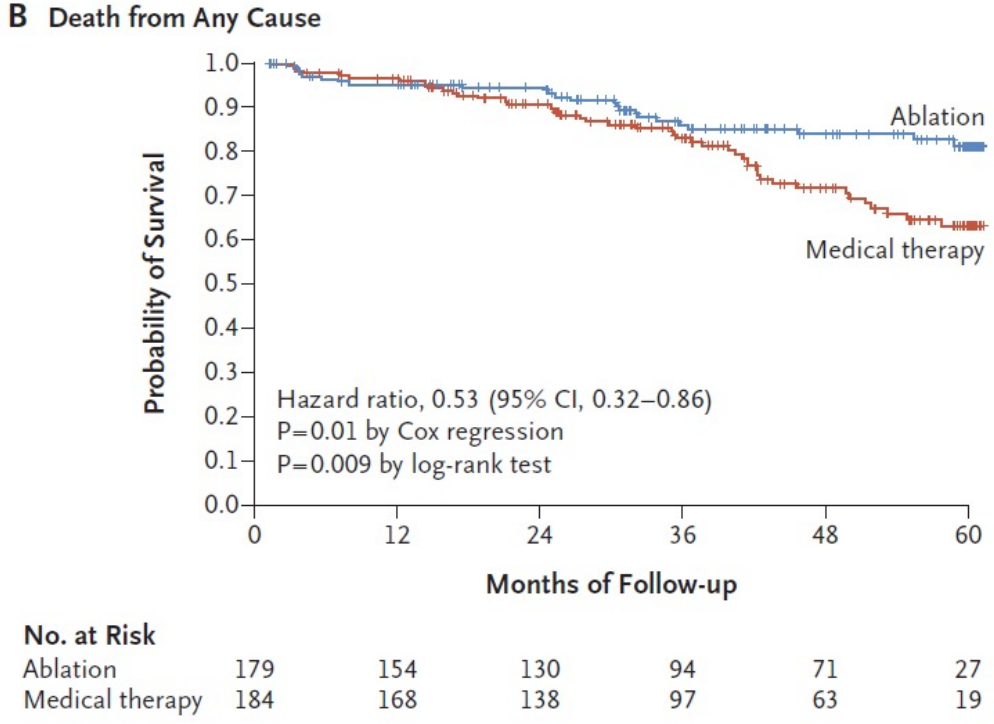


ESC Guidelines 2016. EHJ, 2016 August 27

CASTLE-AF

Catheter Ablation versus Standard Conventional Treatment in Patients with Left Ventricular Dysfunction and Atrial Fibrillation





Persistent AF = 67% (duration >1 year = 29%) – Median LVEF = 32% – Median LA diameter =49mm

Marrouche NF et al. N Eng J Med 2018;378:417-27

QoL

	Overall Cohort (n = 502)
Demographic and echocardiographic features	
Age (yrs)	55.9 ± 10.3
Male	410 (82)
Paroxysmal AF	256 (51)
Persistent AF	175 (35)
Long-standing AF	65 (13)
AF duration (yrs)	6.6 ± 5.9
WACA ablation (vs. PVI)	385 (78)
LV ejection fraction (%)	58.0 ± 9.7
LA size ≥45 mm	175 (35)

Univariate Relationships of QoL Improvement

Characteristic	QoL Change	p Value
AF		
Paroxysmal	−13.4 ± 15.0	0.31
Nonparoxysmal	−15.5 ± 18.8	
LA size, mm		
>45	−14.0 ± 16.1	0.90
≤45	−14.6 ± 17.4	
Post-procedural complication	−17.2 ± 17.4	0.16
No post-procedural complication	−14.0 ± 16.8	
Hypertension	−12.6 ± 16.6	0.06
No hypertension	−15.7 ± 17.1	
Obese	−11.9 ± 18.5	0.05
Nonobese	−16.4 ± 16.2	
AF elimination off AAD	−14.9 ± 16.8	0.62
AF controlled on AAD	−13.9 ± 16.4	
Recurrent AF	−11.8 ± 17.7	
On warfarin at 2 yrs	−9.9 ± 16.5	0.008
Off warfarin at 2 yrs	−16.3 ± 16.8	
On beta-blocker at 2 yrs	−13.2 ± 17.6	0.33
Off beta-blocker at 2 yrs	−14.8 ± 16.4	

Wokhlu A, Packer D. JACC 2010;55:2308

Safety

Complications of CA of AF

Complication severity	Complication type	Complication rate Catheter ablation
Life-threatening complications	Periprocedural death	<0.1%
	Oesophageal perforation/fistula	<0.5%
	Periprocedural thromboembolic event	<1.0%
	Cardiac tamponade	≈1%
Severe complications	Pulmonary vein stenosis	<1.0%
	Persistent phrenic nerve palsy	<1.0%
	Vascular complications	2-4%
	Conversion to sternotomy	N/A
	Pneumothorax	N/A
Moderate or minor complications	Various	1 - 2%
Complications of unknown significance	Asymptomatic cerebral embolism	5 - 15%

ESC Guidelines 2020.

Safety

Safety Outcomes: CA vs. AAD

Catheter Ablation

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
Pericardial effusion	64	36/5719	0.6
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	4/3002	0.1
Total No. of patients with events	28	97/1964	4.9

AAD Treatment

	Overall		
Safety Outcomes	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	3.3
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

Calkins H, et al. Circ. AE 2009. 2:349

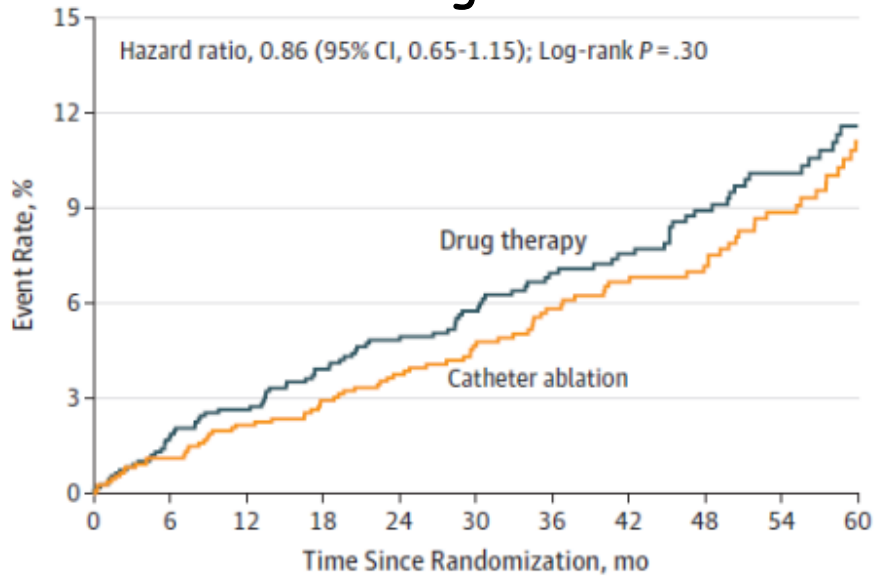
AF ablation on mortality

The CABANA study

>2000 pts, PAF 42 %

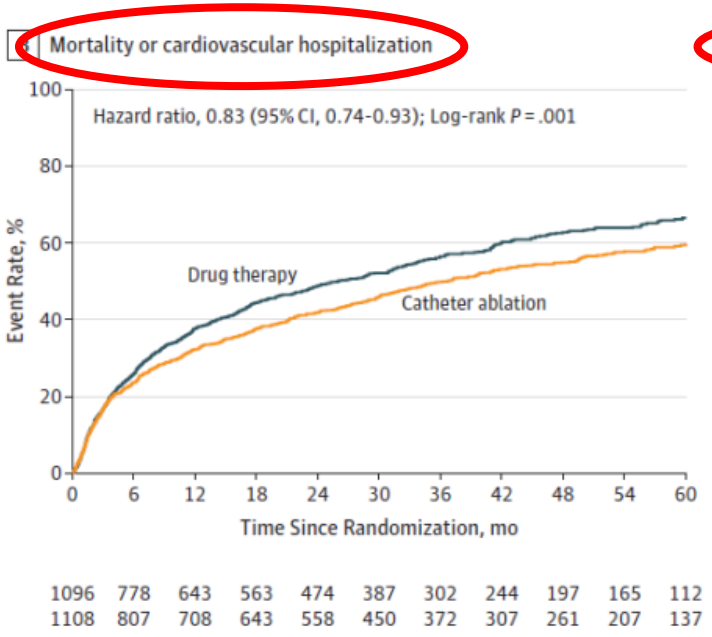
- 4Y.
- Primary end point

DC/bleeding/Stroke

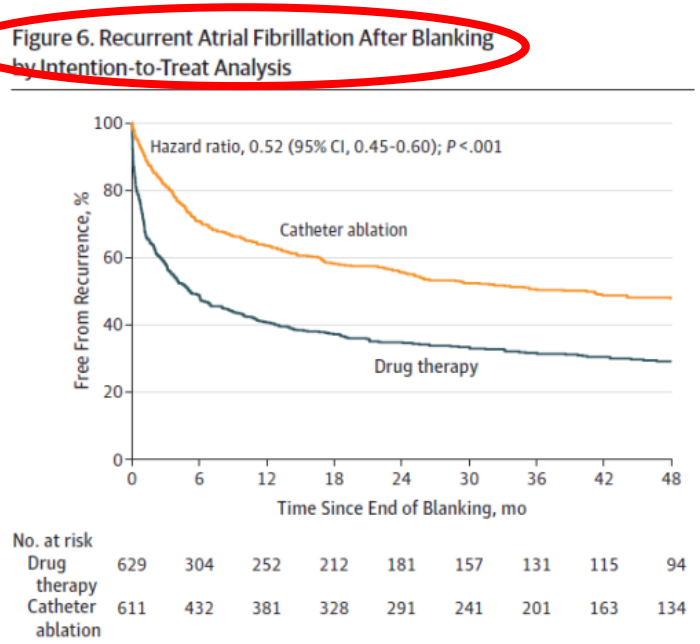


No. at risk											
Drug therapy	1096	1036	1006	970	880	763	652	578	499	418	312
Catheter ablation	1108	1045	1021	996	915	793	700	614	535	432	309

- Secondary end points



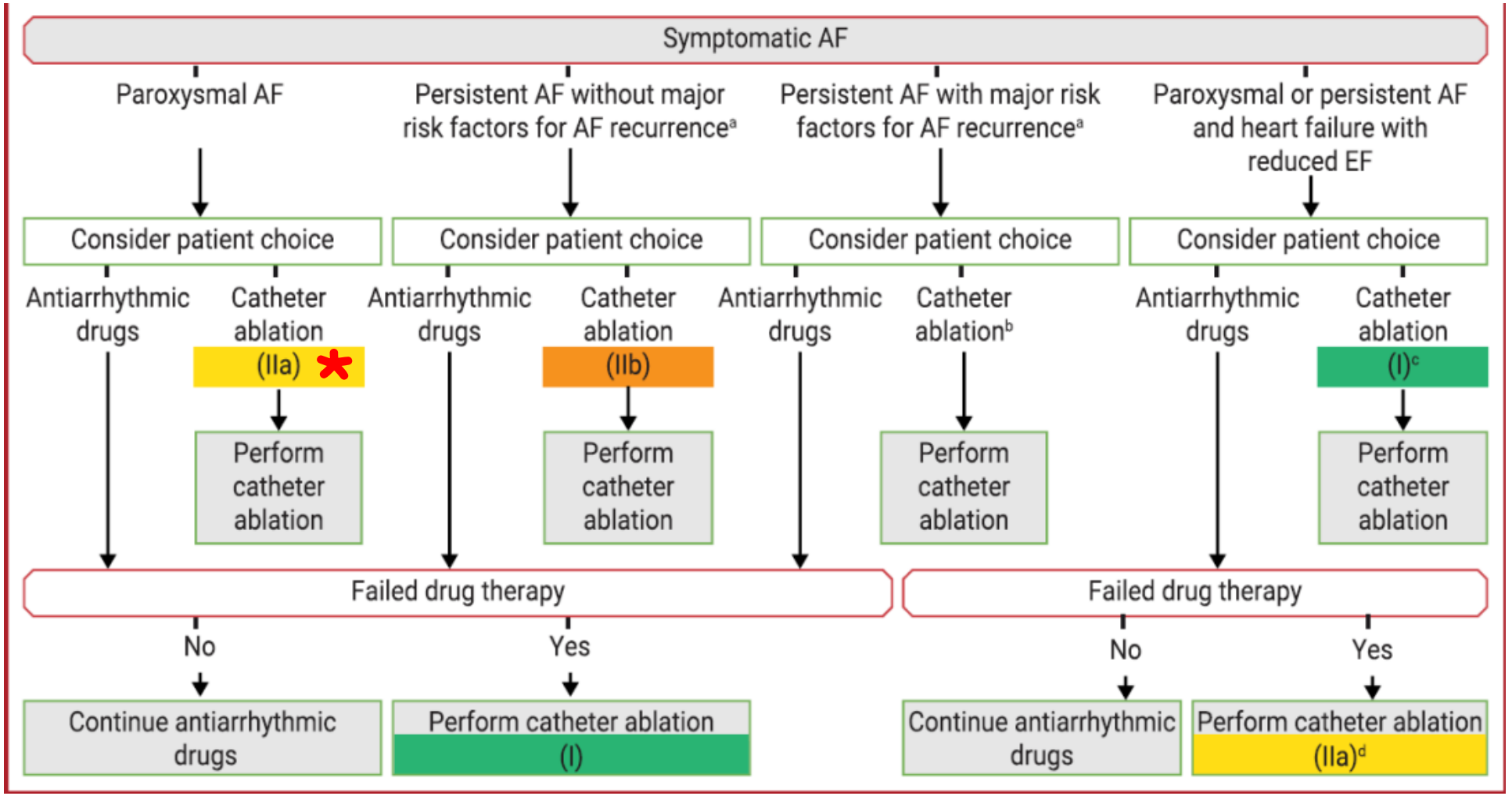
	1096	778	643	563	474	387	302	244	197	165	112
	1108	807	708	643	558	450	372	307	261	207	137



No. at risk										
Drug therapy	629	304	252	212	181	157	131	115	94	
Catheter ablation	611	432	381	328	291	241	201	163	134	

Packer D, et al. JAMA 2019

ESC Guidelines 2020



* Established before publication of studies on cryoablation as first line therapy

AF risk factors

- Durée de la FA persistante
- Taille de l'OG
- Fibrose atriale ?
- Voltage et cycle atriaux sur ECG ?

Conclusion

- L'ablation peut être considérée comme traitement à maturité dans la prise en charge de la FA car:
  - Efficacité supérieure sur la prévention des récidive / ttt AAR en seconde et première intention (cryo)
  - Avec un taux de complications faible et similaire aux AAR
- Niveau de recommandation élevé pour les patients avec IC
- Mais en constante évolution:
  - Des énergies d'ablation sont toujours en développement (PFA)
  - Les modalités d'ablation en dehors de l'isolation des VPs sont encore à valider
- Pas encore de preuves probantes concernant la mortalité

Ablation as first line therapy in pers. AF patients

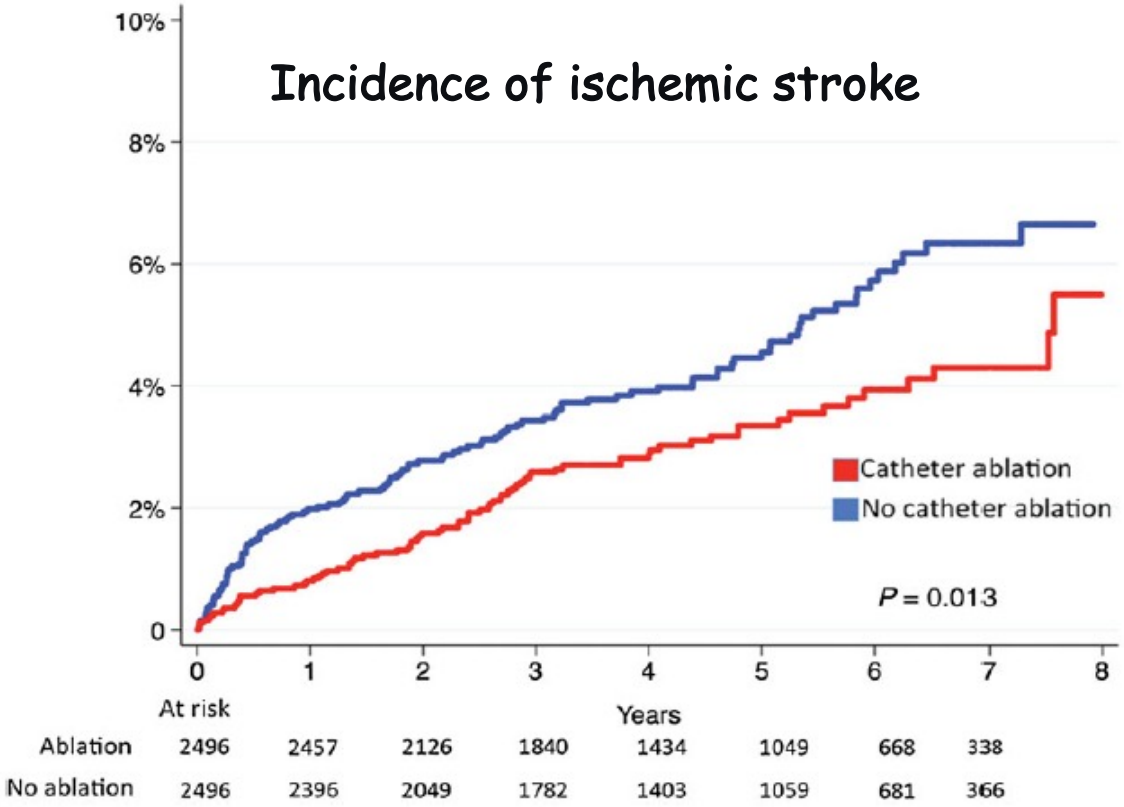
- less data
- no standardized ablation procedure
- evaluate risk/benefit ratio
- experienced centers ++
- consider factors of bad prognosis:

  - Physiologic age (> 75 years old)
  - Comorbidities (hemodialysis…)
  - Sleep apnea syndrome

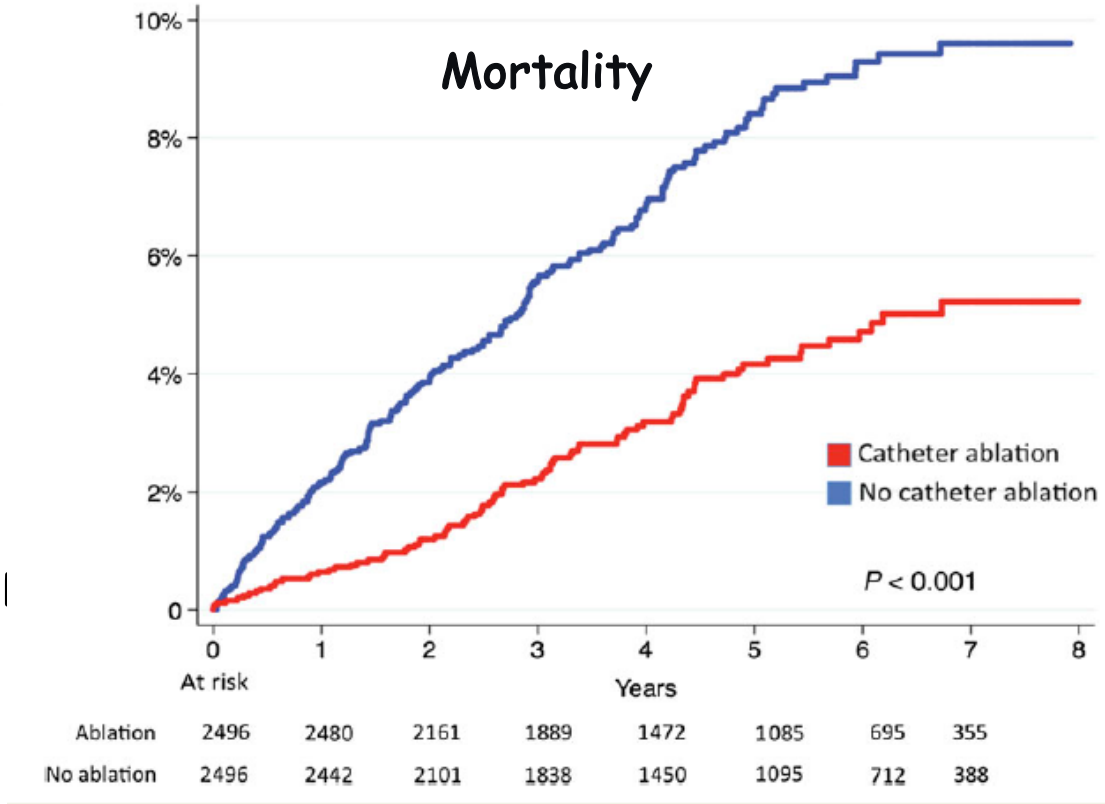
  - Advanced cardiomyopathy (mitral valvular heart disease ++)
  - LA size > 50 mm (or > 30 cm2)

  - AF duration > 2 years
  - AF cycle length on ECG (< 142 ms)

Unanswered Questions regarding AF Ablation



f stroke ?



- Data from Swedish health regist

Friberg L, et al. EHJ. 2016;37:2478

Ablation as first line therapy
in PAF patients

- Reasonable if

- Young	*less risks*
- Sinus node dysfunction	*correction*
- Tachycardiomyopathy	*reversion*
- Avoid AAR drugs side effects	
- Active, wo comorbitidies	
- Willing to be treated by ablation	
- Experienced centers	*minimizing risks*

Who is candidate for AF Ablation as first line therapy?

- Paroxysmal AF patients
- Persistent AF patients