Atrial Fibrillation Ablation: Who and Why ?

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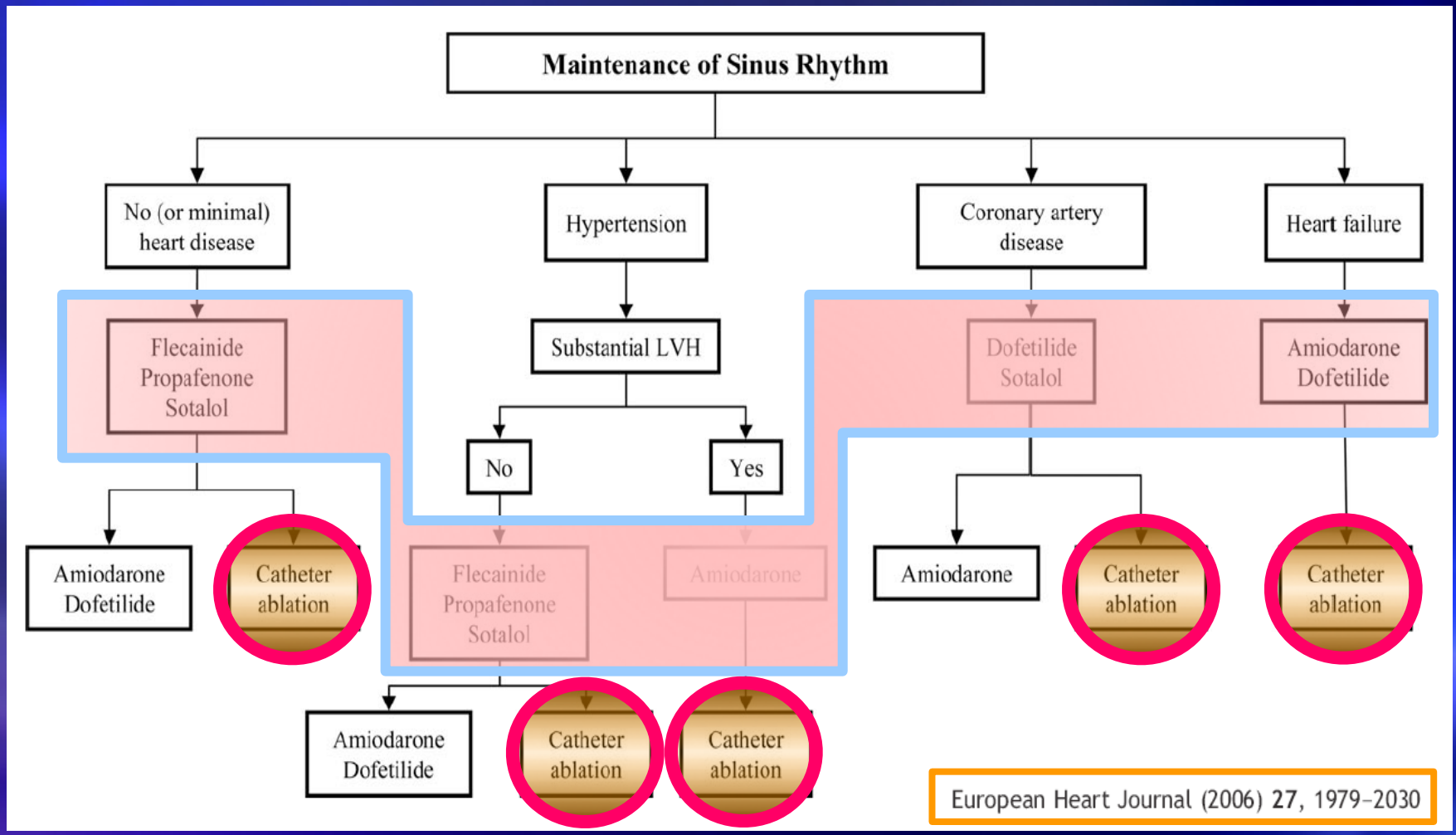
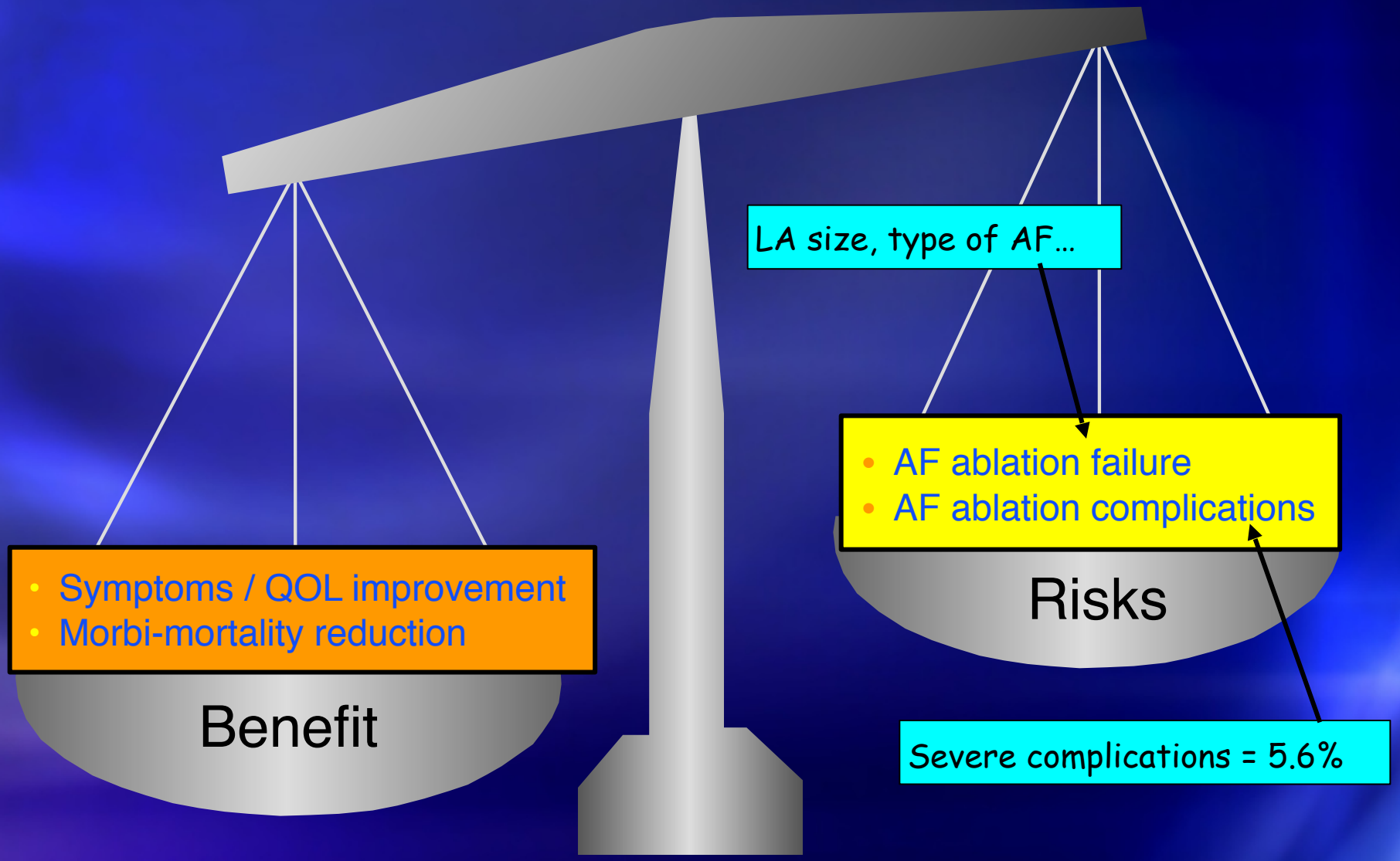
Who ?

ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation—executive summary

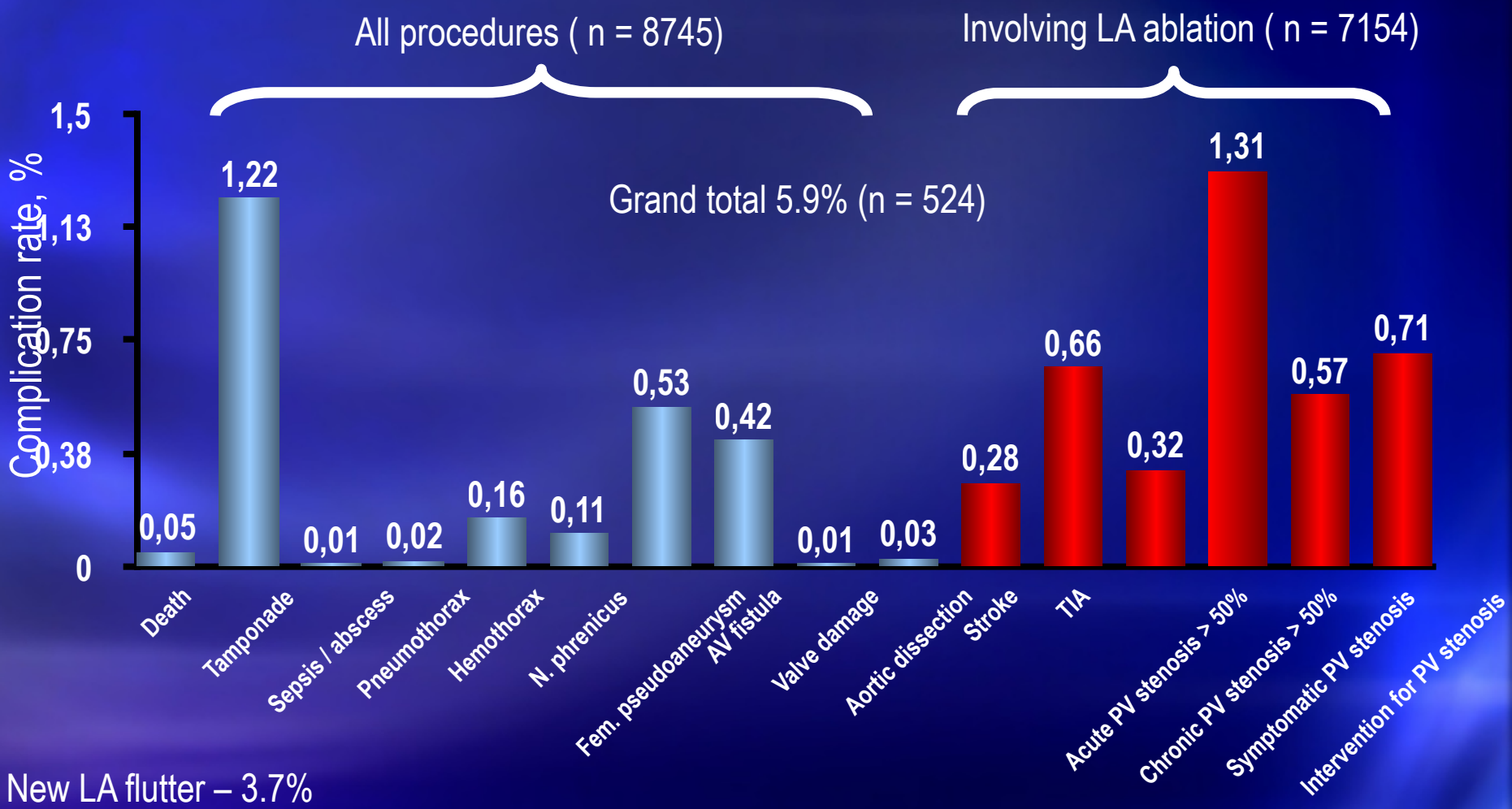


A tailored decision

Based upon the benefice / risk ratio



Worldwide Survey on Catheter Ablation for AF: Complications



New LA flutter – 3.7%

Atrio-esophageal fistula – not reported

The Spectrum of A.fib

Paroxysmal	Persistent	Permanent
Mainly triggers	Triggers present	Triggers present
Minimal substrate	More substrate	Advanced substrate

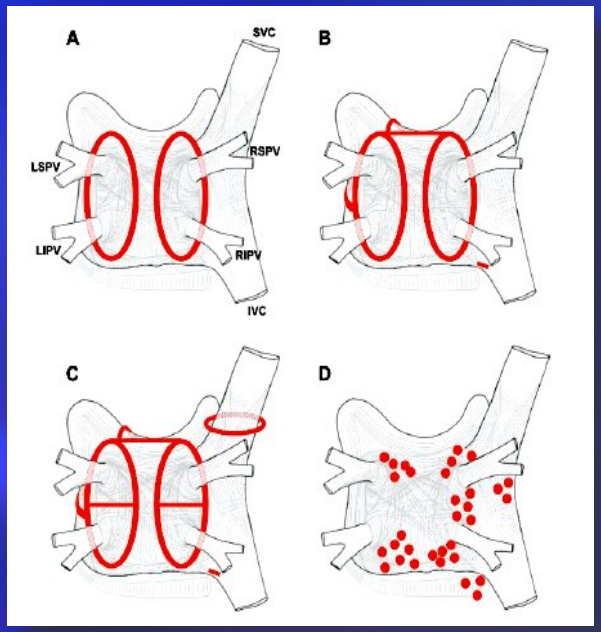
Symptoms of AF increase

Efficacy of ablation increases

Risk of ablation may increase

Randomized trial of AF ablation vs drugs

Trial	AF type	Number of patients	RF ablation patients	Control patients	Follow Up months	AF free RFA (%)	AF free Control (%)	P value
Krittayaphong	Persistent	30	15	15	12	78.6	40	0.018
Wazni	Paroxysmal	70	33	37	12	87	13	<0.001
Stabile	All	137	68	69	13	55.9	8.7	<0.001
Pappone	Paroxysmal	198	99	99	12	93	35	<0.01
Oral	Persistent	146	77	69	12	74	58	0.05
Jais	Paroxysmal	112	53	59	12	75	7	<0.001



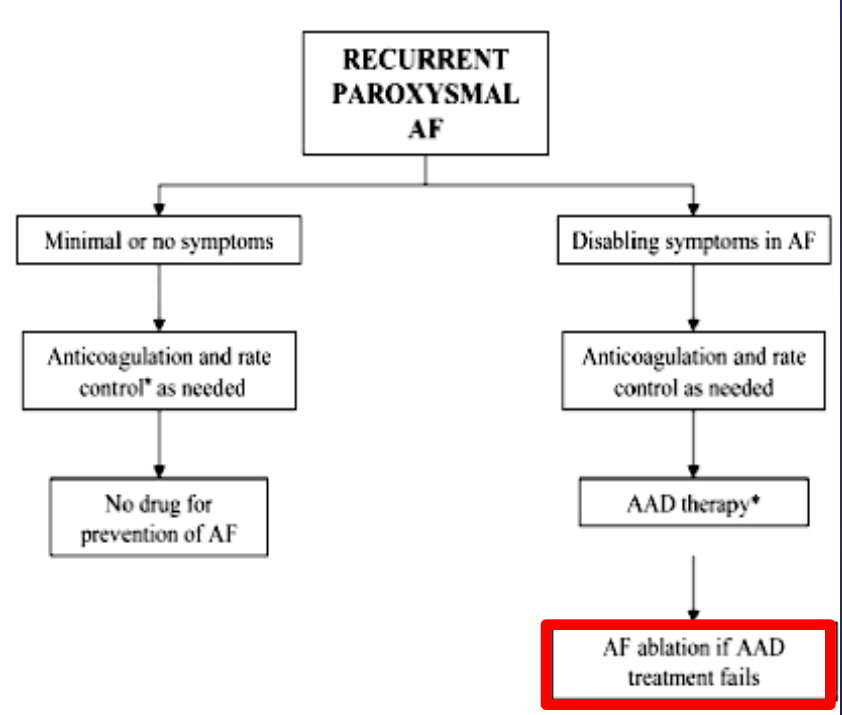
«Catheter ablation is a reasonable alternative to pharmacological therapy to prevent recurrent AF in symptomatic patients with little or no LA enlargement»
(Class 2A, level of evidence C).

Fuster et al. JACC 2006

« The optimal ablation strategy for both paroxysmal and long lasting persistent atrial fibrillation is unknown »

Knecht et al. J Cardiovasc Electrophysiol 2008

ACC/AHA/ESC 2006 Guidelines for the Management of AF



Symptomatic Paroxysmal AF

When first-line AA drugs fail or are not tolerated, ablation may be considered.

Fuster et al. JACC 2006 (48),4 :e149-246

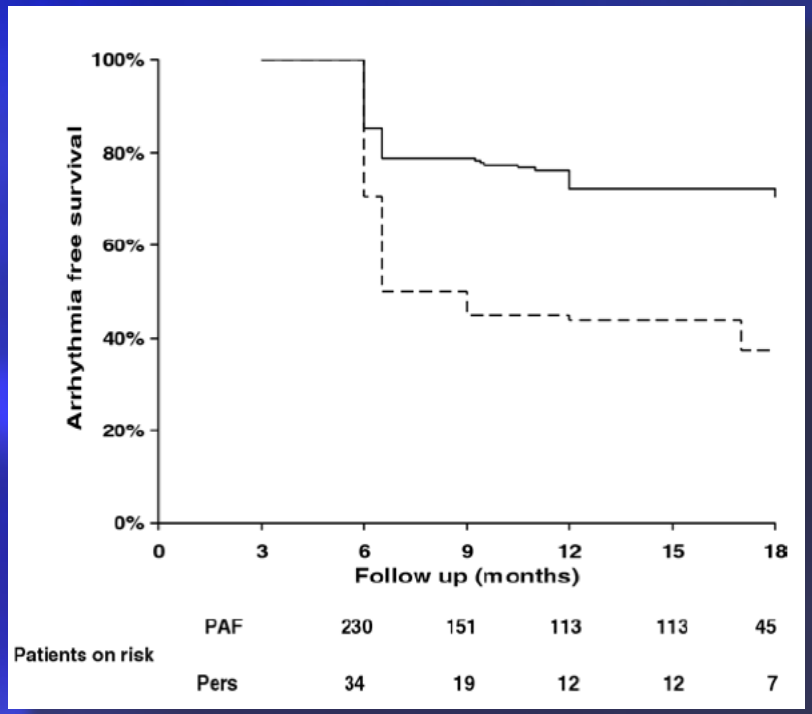
RFCA for Paroxysmal AF

TABLE 1. Success Rates of Most Recent Studies Using Ablation of All PVs Outside the Tubular Segment

Study	Year	Patients	Age, y	Parox, %	SHD, %	Tool(s)	End Point	AF Free (Off Drugs), %	Follow-Up, d
Ouyang et al[37]	2004	41	63±9	100	NA	CARTO	PV Isolat'n	76*	178
Haissaguerre et al[38]	2004	70	53±8	NA	43	Fluoro	PV Isolat'n	79	210
Mansour et al[40]	2004	40	55±10	80	13	CARTO	PV Isolat'n	75	330
Marrouche et al[41]	2003	259	54±11	51	21	ICE	PV Isolat'n	87†	347
Oral et al[39]	2003	40	54±11	100	3	CARTO	EGM Red'n	88	365
Pappone et al[36]	2003	589	65±9	69	6	CARTO	EGM Red'n	79	861
Total		1039						81.0	

Verma A et al. Circulation 2005.

Circumferential PVI With Cryoballoon



- 346 PAF (293) or pers AF (53) pts
- Proc time = 170 (fluo =40 min)
- Nr of applications/PV = 2.8.
- 1,360/1,403 PVIsolated (97%)
- FU=12 mth (7d Holters)
- SR= 74% (PAF) & 42% (pers AF)

Neumann T et al. *JACC 2008*

- 70 (54 males) PAF pts wo SHD aged 40±10
- Proc time = 331 (fluo =88 min); Nr of applications/PV = 5
- FU=33 ±15 mth (Holters)
- Success = 82% (SR or >50% improvement)

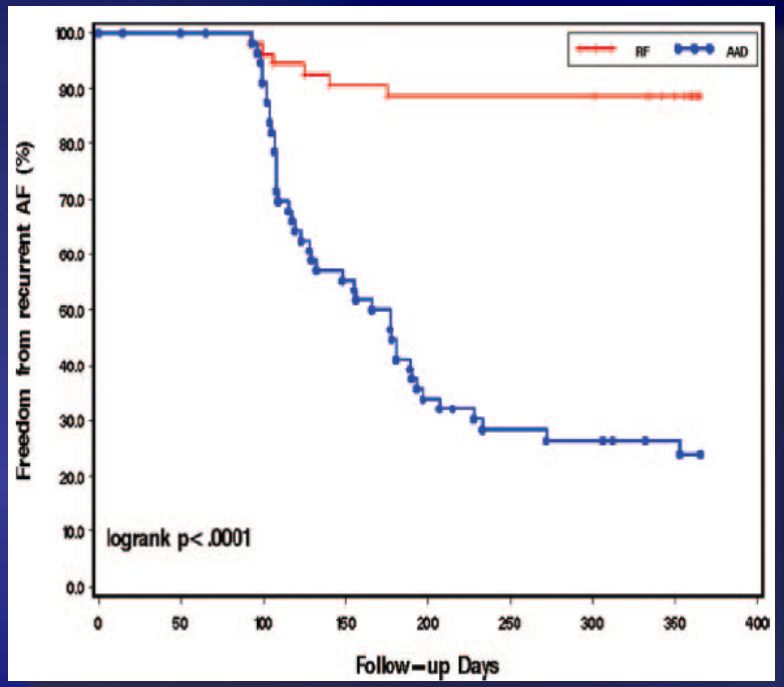
Moreira W et al JACC2008

Catheter Ablation Vs AAD for AF (A4)
A Randomized Multicenter Comparison

- PAF pts resistant to ≥ 1 AA
- N=112 (51.1±11 y)
- LA = 39.8mm)
- RFCA (n=53; 1.8 proc/pt; or "new" AA drugs (n=59)
- ***Predictors of a successful ablation***

  Univariate : shorter AF duration, higher baseline EF, and fewer DC shocks.

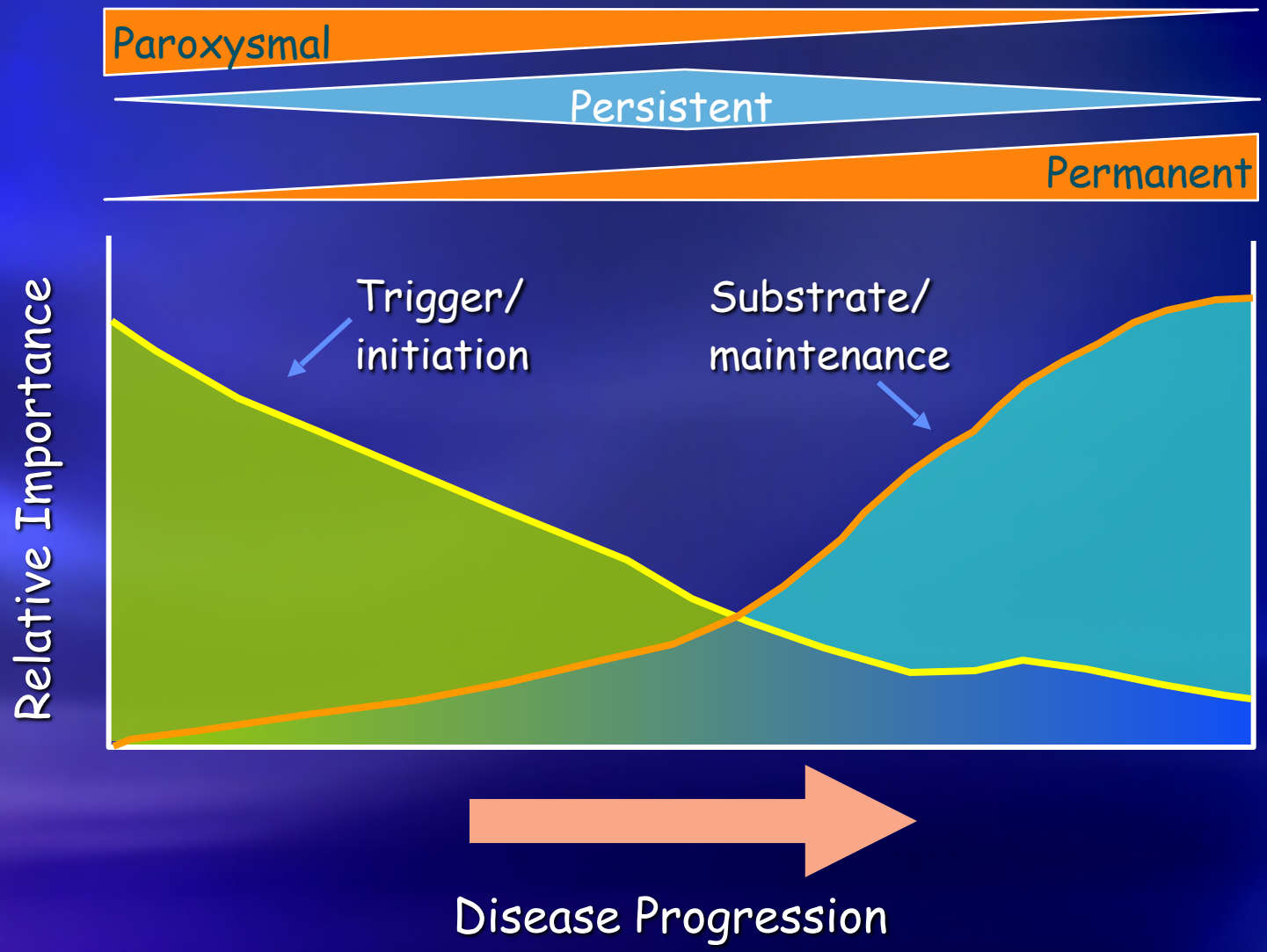
  Multivariate: higher EF



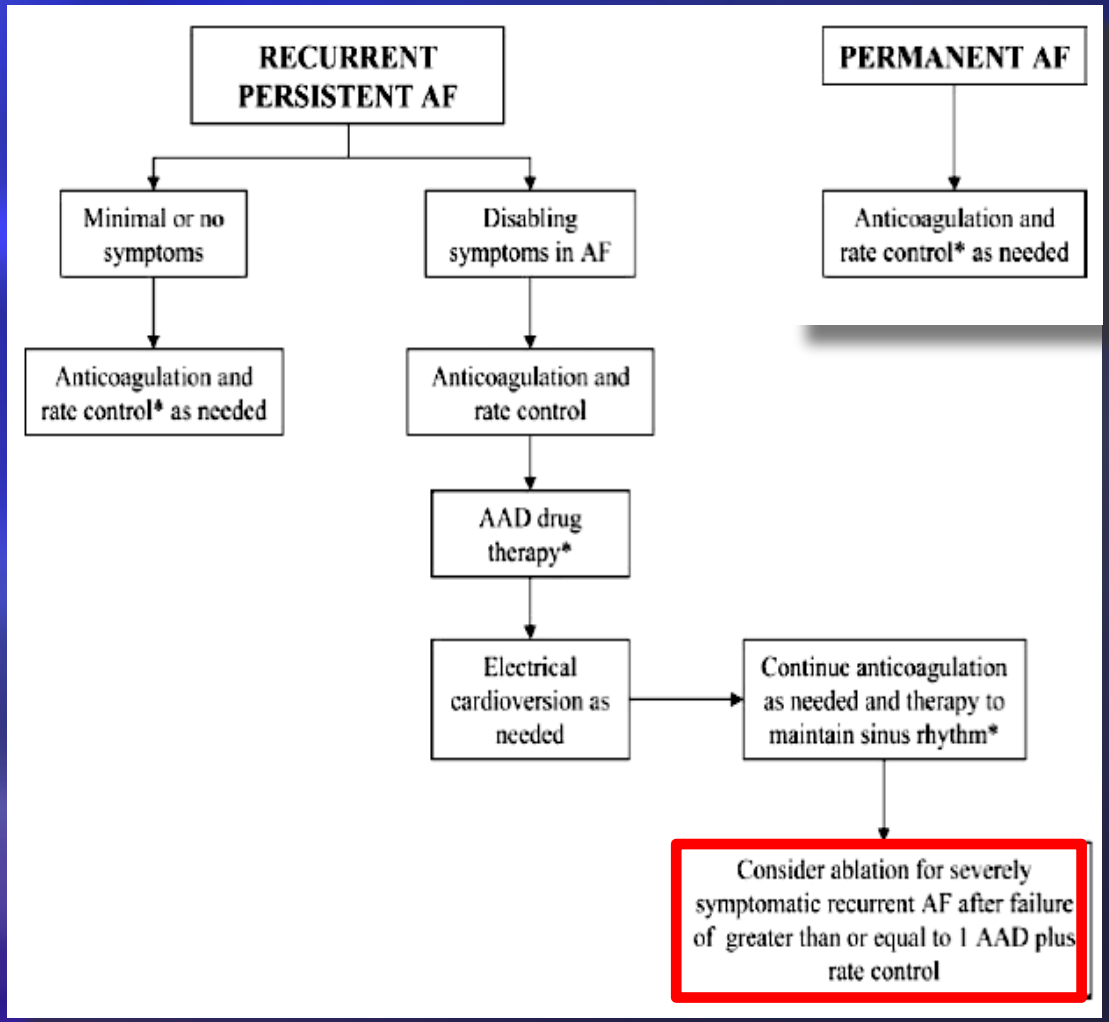
1 y FU: no AF recurrence in 23% (AA) vs. 89% (RFCA) (P<0.0001)

Jais P et al *Circulation. Dec 2008*

Maintaining Sinus Rhythm may slow down AF disease progression



ACC/AHA/ESC 2006 Guidelines for the Management of AF



Persistent / Recurrent

If pts remain severely symptomatic with HR control, and if ≥1AA are either not tolerated or ineffective, ablation may be considered

Permanent

Forget it !

Fuster et al. Circulation. 2006

Emerging key issues:

AF ablation as a first line therapy

AF ablation in HF patients

RFCA vs AA Drugs as First-line Treatment of Symptomatic AF: RAAFT Trial

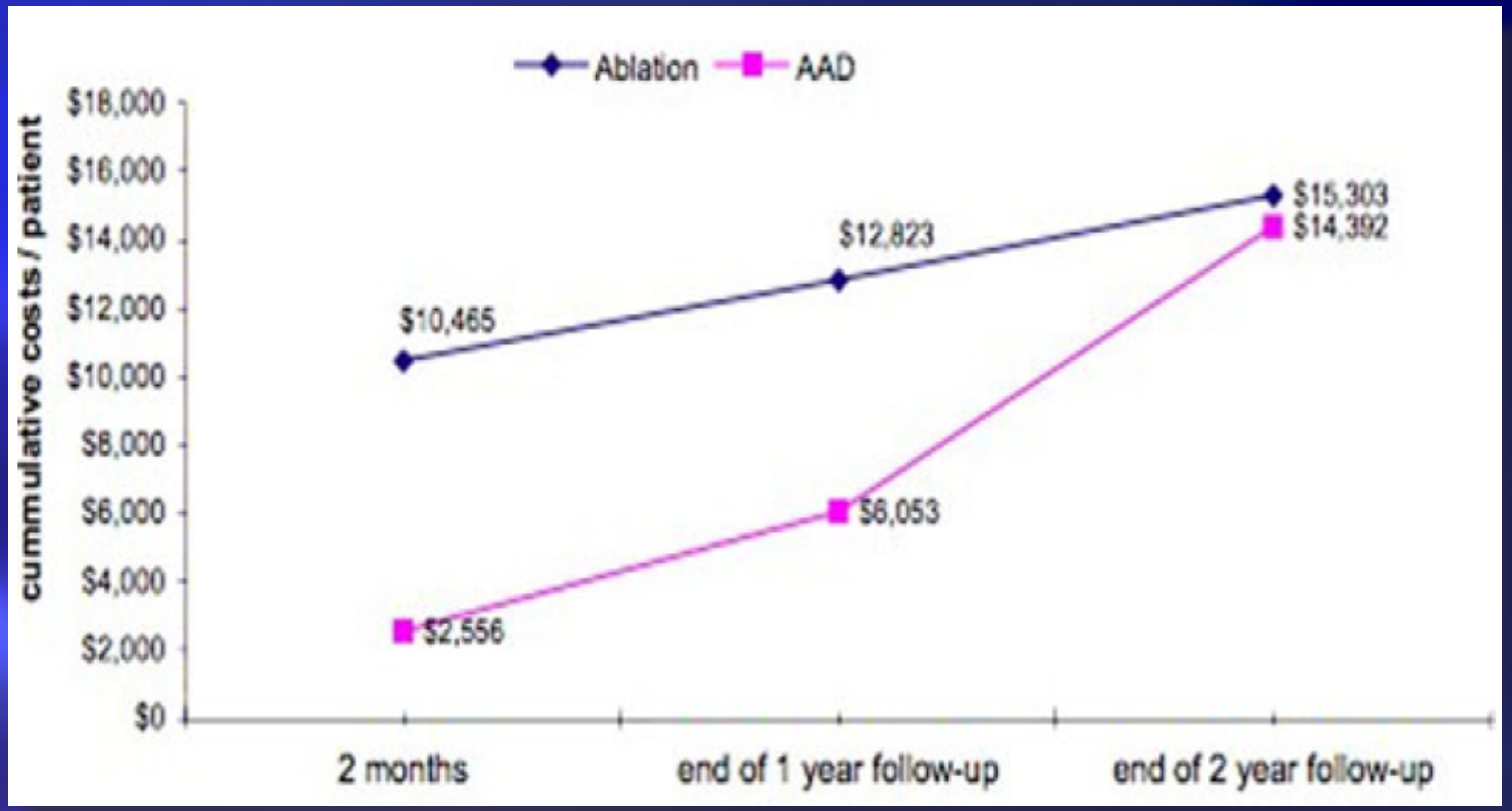
- 37 AF (95% PAF) pts under AA (Flecaïnide, Propafenone or Sotalol) vs 33 PVI
- Holter and loop recorder for one year FU

Table 2. One-Year Follow-up Results by Treatment Group

	No. (%) of Patients		
	Pulmonary Vein Isolation Group (n = 32)	Antiarrhythmic Drug Group (n = 35)	*P* Value
Symptomatic atrial fibrillation recurrence	4 (13)	22 (63)	<.001
Hospitalization	3 (9)	19 (54)	<.001
Thromboembolic events*	0	0	NA
Bleeding	2 (6.3)	1 (2.9)	.60
Bradycardia	0	3 (8.6)	.20
Pulmonary vein stenosis†			
Mild	1 (3)	0	.50
Moderate	1 (3)	0	.50
Severe	0	0	NA

Wazni OM et al. JAMA. 2005

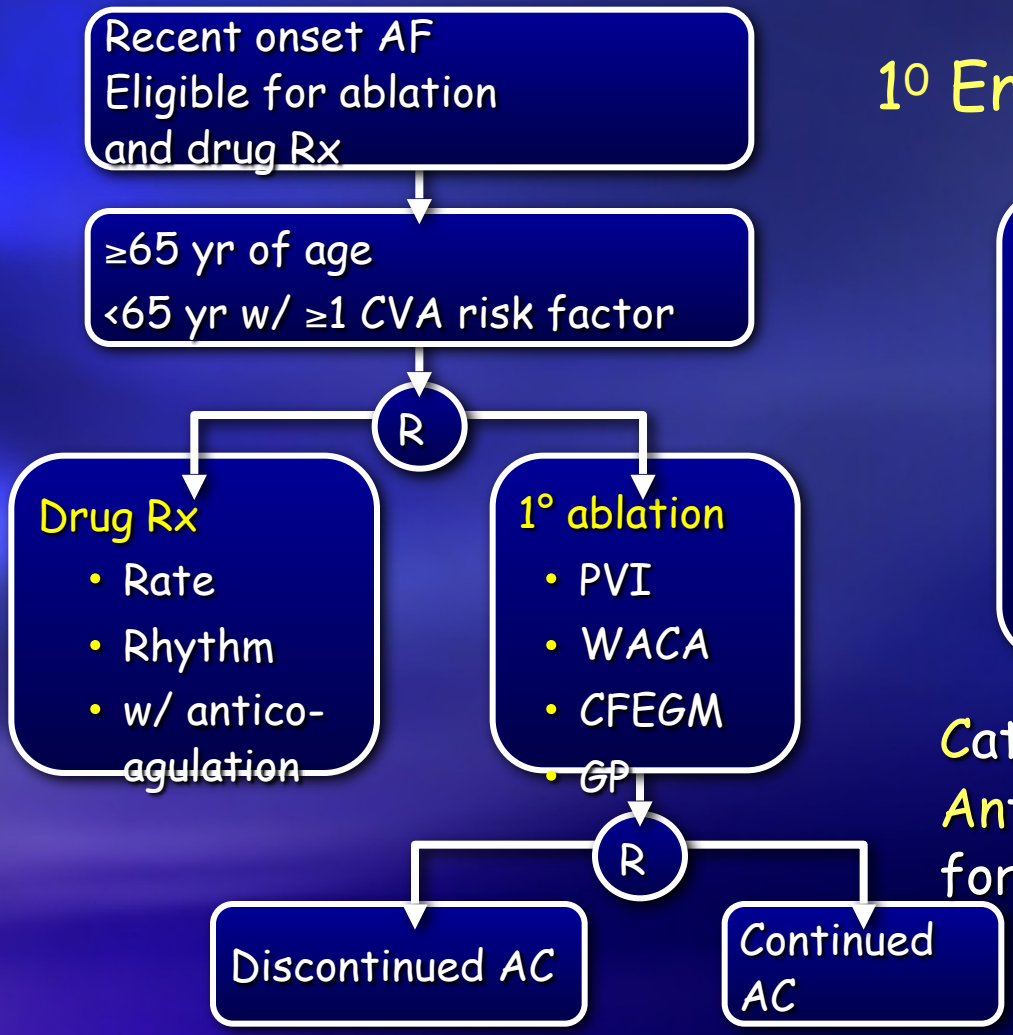
Cost Comparison of RFCA Vs AAd as First-Line Therapy for Atrial Fibrillation: An Economic Evaluation of the RAAFT Pilot Study



- RFA as first-line treatment strategy in pts with PAF was cost neutral 2 years after the initial procedure compared to AAD

Khaykin Y et al. *J Cardiovasc Electrophysiol 2009*

CABANA Trial Design



1º Endpoint: total mortality

Secondary analysis

1) NSR vs AF
2) ± underlying heart disease
3) AF type (parox, pers, perw)
4) D/C anticoagulation

Catheter Ablation vs Antiarrhythmic Drug Therapy for Atrial Fibrillation

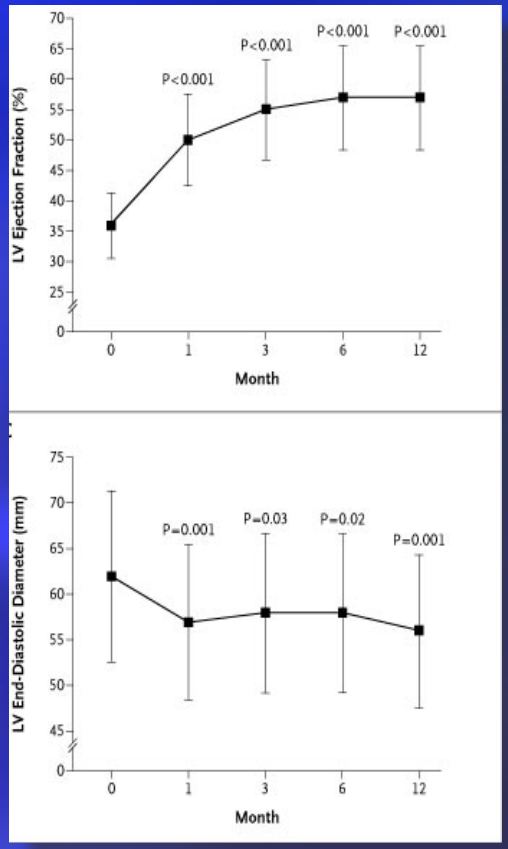
After Douglas Packer

Emerging key issues:

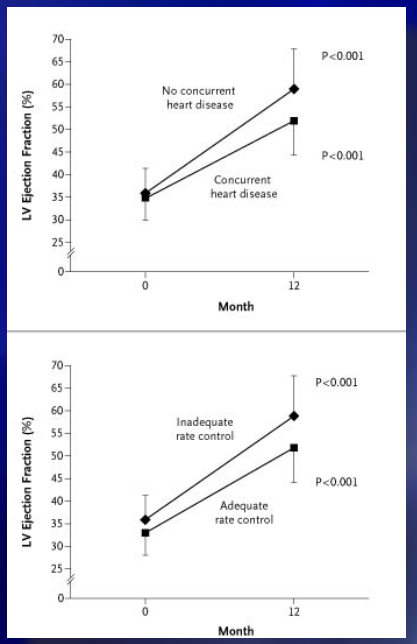
AF ablation as a first line therapy

AF ablation in HF patients

RFCA in CHF



- 58 CHF pts (91% persistent, EF< 45 %) vs 58 controls
- PV isolation + LA lines; FU=12±7 mths
- SR = 78 % in CHF pts and 84 % in controls
- CHF pts had improvement in EF (P<0.001), LV dimensions, exerc. capacity,symptoms,and QOL

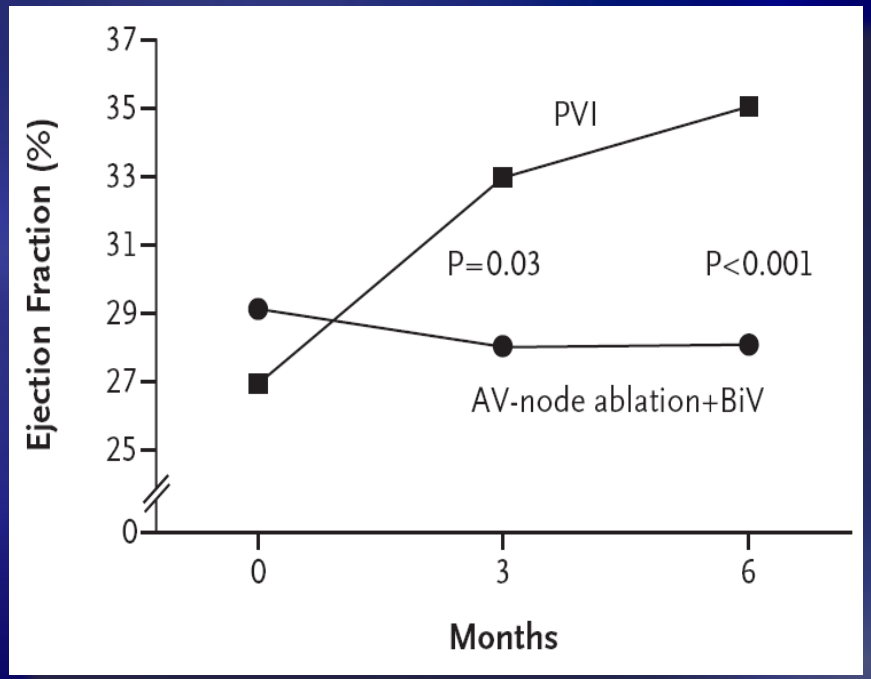


- EF improved in pts without SHD (24±10 %, p<0.001) and with SHD (16 ± 14 %, P<0.001)
- EF improved if inadequate rate control before RFCA (23±10 %, P<0.001) but also if preexisting adequate rate control (17±15 %, P<0.00

Hsu LF. N Eng J Med 2004.

PVI is better than AVN Abl + CRT

	PVI	AVN+BiV
PM		
	41	40
Age	60±8	61±8
PAF	49	54
Persist or long Standing pers.	51	46
AF Duration	4 ± 2.4	3.0 ± 2.8
EF 27 ± 8	29 ± 7	
LA diameter	4.9 ± .5	4.7 ± .6



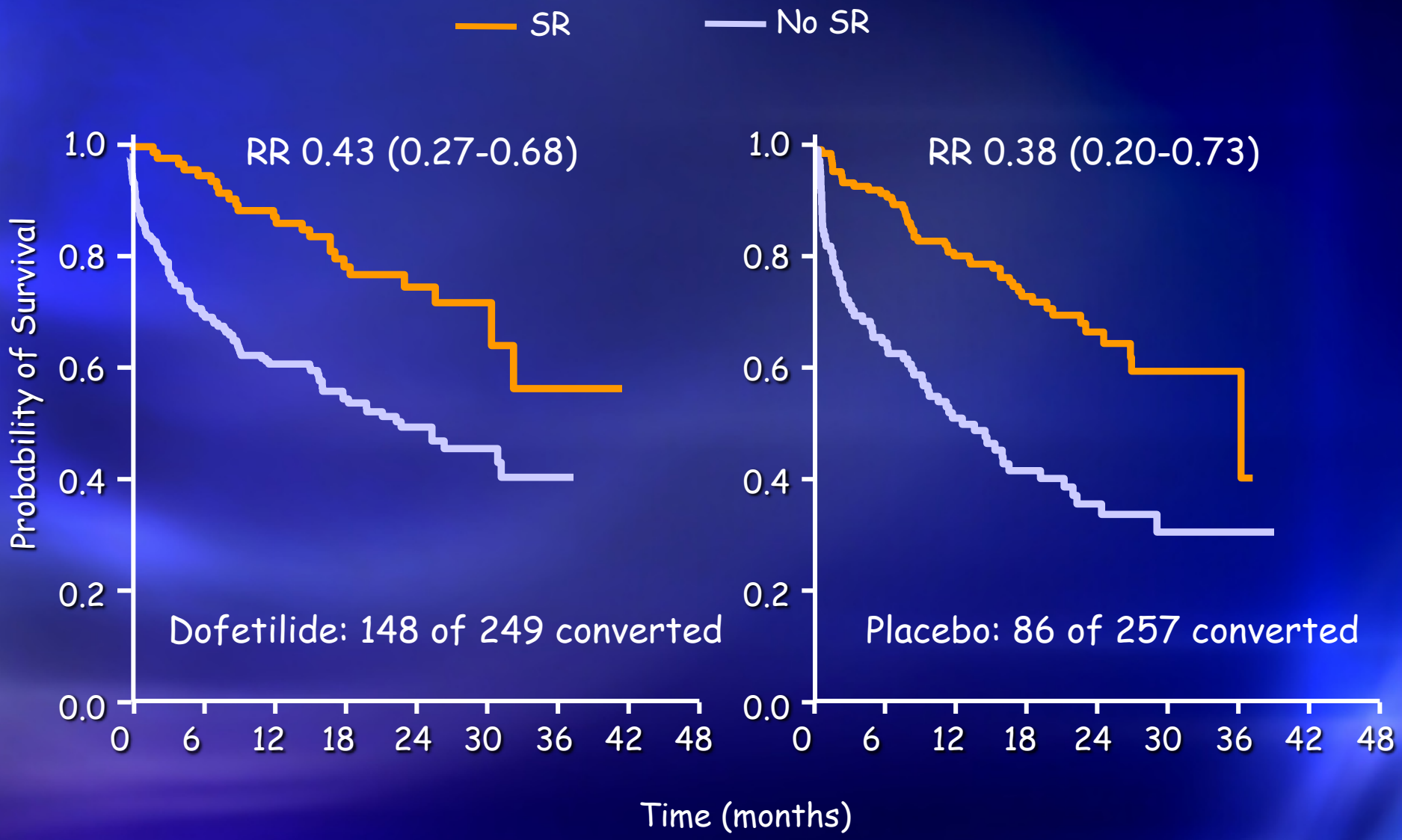
Khan MN et al. *N Engl J Med 2008*

Why ?

Natural history of AF

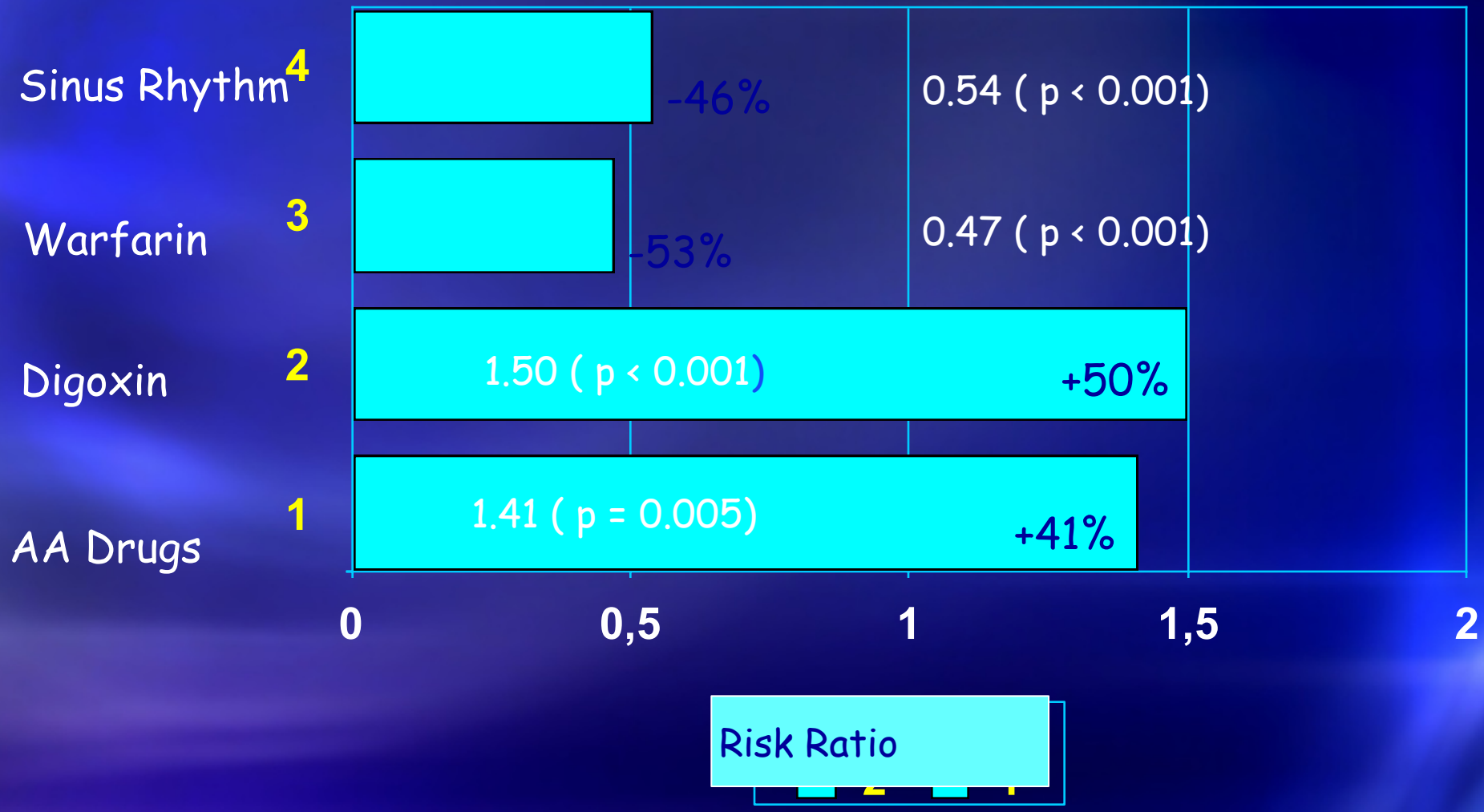
Benjamin EJ et al. Circulation 1998;98:946-52.

Effect of Achieved SR on Survival



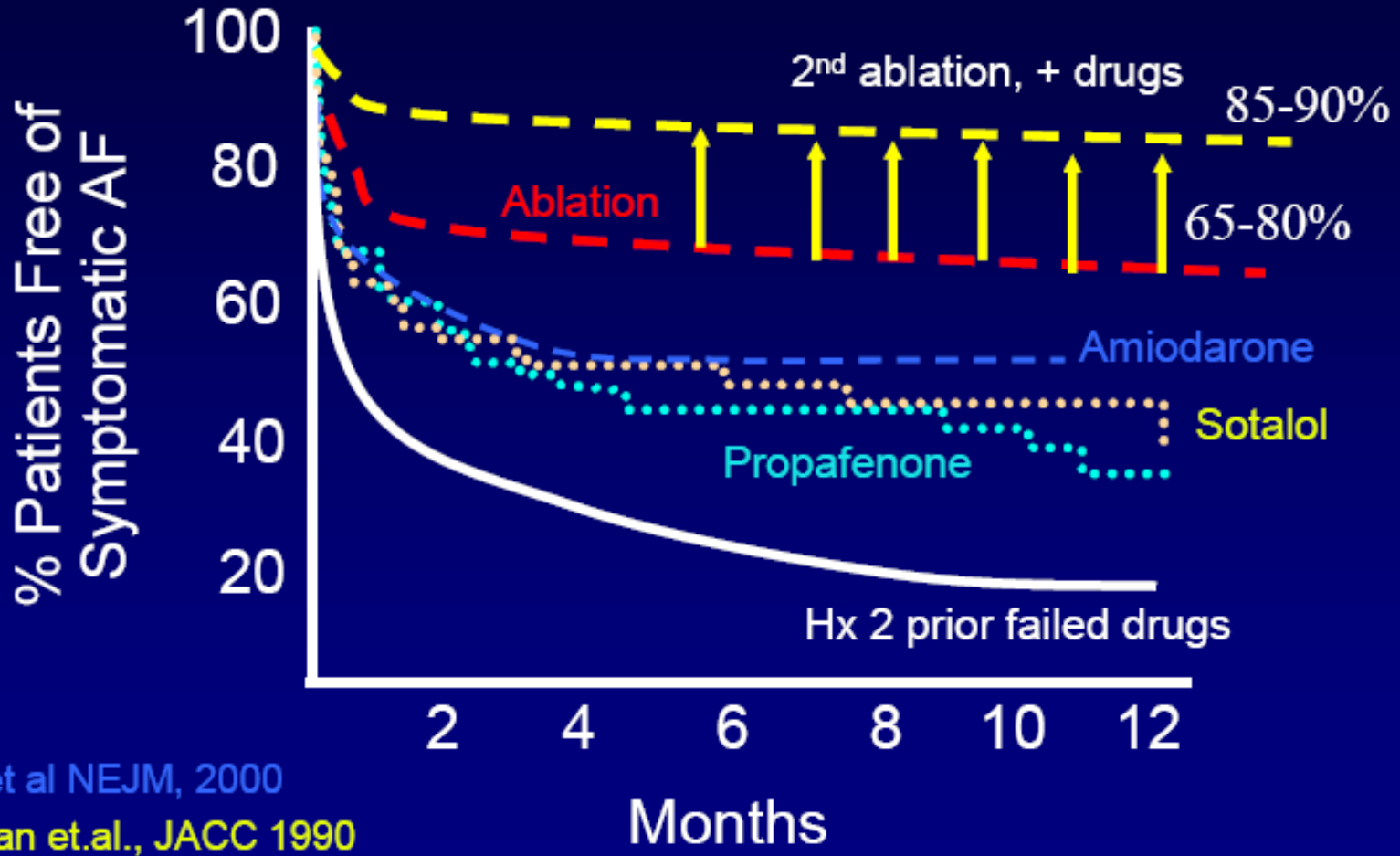
Pedersen. Circulation. 2001;104:292-296.

AFFIRM
"On Treatment-Type" Analysis*



• Other significant factors in model: Age, CAD, CHF, Smoking, Stroke/TIA, Normal LVEF, MR

Ablation vs. Antiarrhythmic Drugs - Efficacy



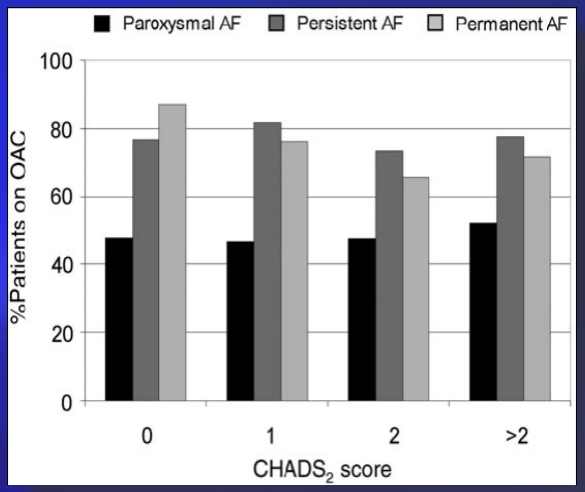
Roy et al NEJM, 2000

Antman et.al., JACC 1990

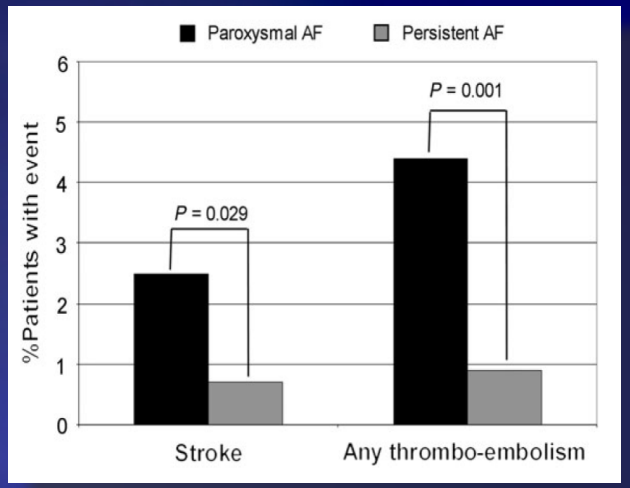
Crijns et. al., AJC 1991

General Considerations Influencing Indications of RFCA

Comorbidities are more Important than Clinical Subtypes of AF: The Euro Heart Survey



Anticoagulation prescription per AF subtype and CHADS2 stroke risk score.



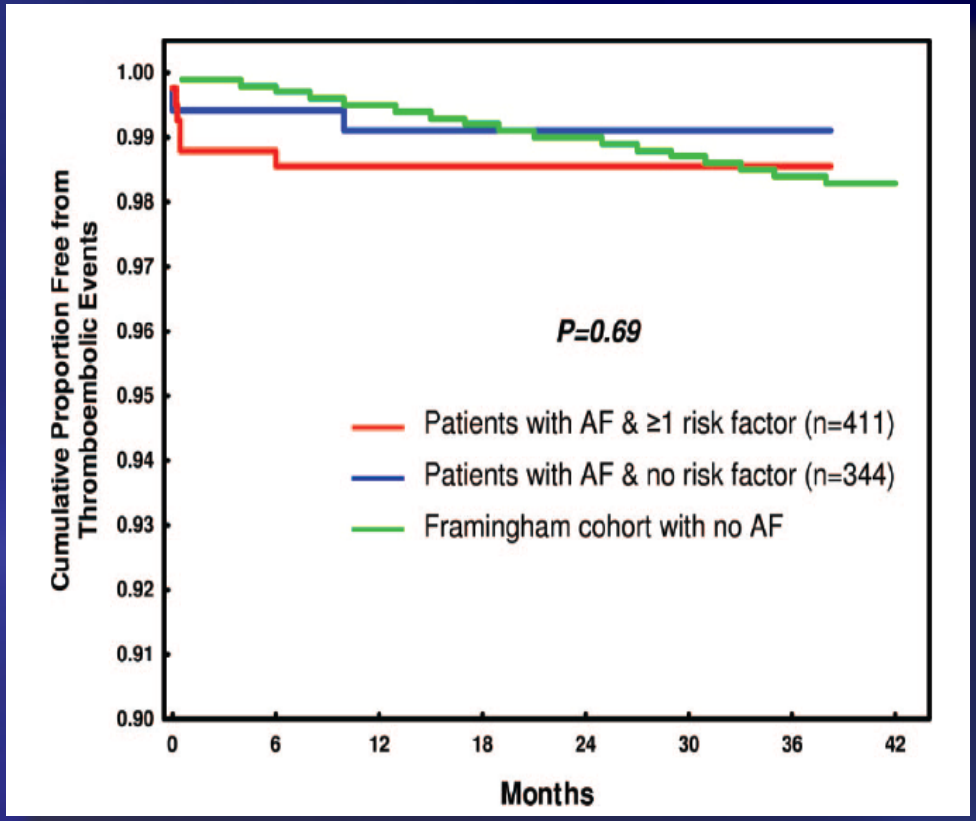
TE Complications 1 Year after Baseline Cardioversion

PAF has a comparable risk for thrombo-embolic events as persistent and permanent AF

Nieuwlaat R et al. Euro Heart Survey Eur Heart J 2008

AF Abl for Med Rx Withdrawal

- Risk of Thromboembolic Events After RFCA
- 755 PAF (n=490) or chronic AF (n=265)
- 411 pts (56%) had 1 RF for stroke.
- All warfarin for 3 mths after Abl
- TE in 7 pts (0.9%) within 2 weeks of RFCA
- Late TE M6 &M10 in 2 pts (0.2%), 1 of whom still had AF, despite therapeutic anticoagulation in both

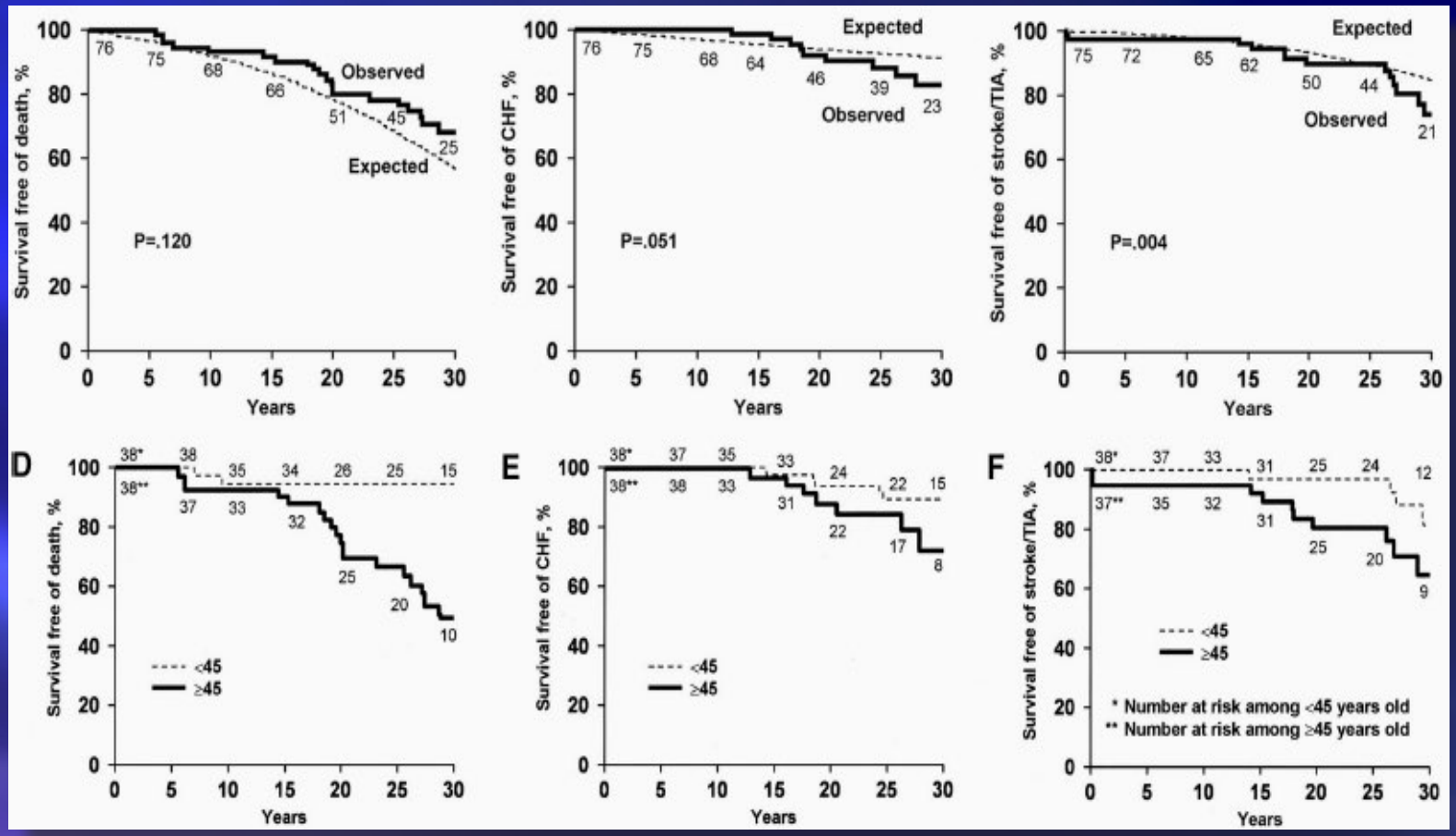


Safety data are as yet unsufficient to support discontinuation of Acoag in pts > 65 years or with a history of stroke.

Oral H et al. Circulation. 2006

Outcomes With Aging in Lone AF Pts
A 30-Year Follow-Up Study

- 3623 residents of Olmsted County with AF; FU = 25.2 ± 9.5 y

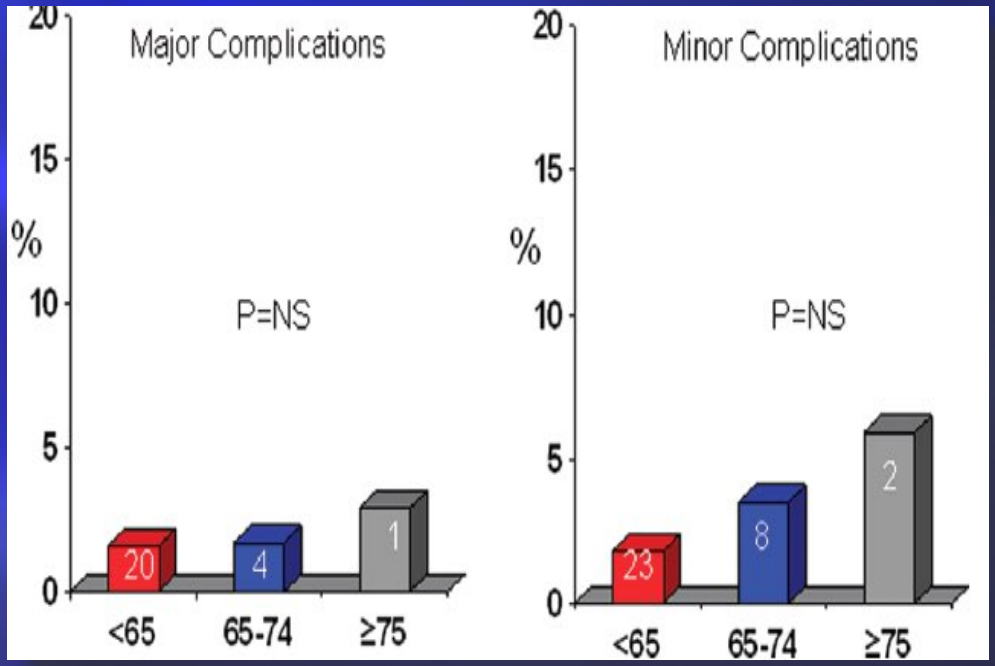


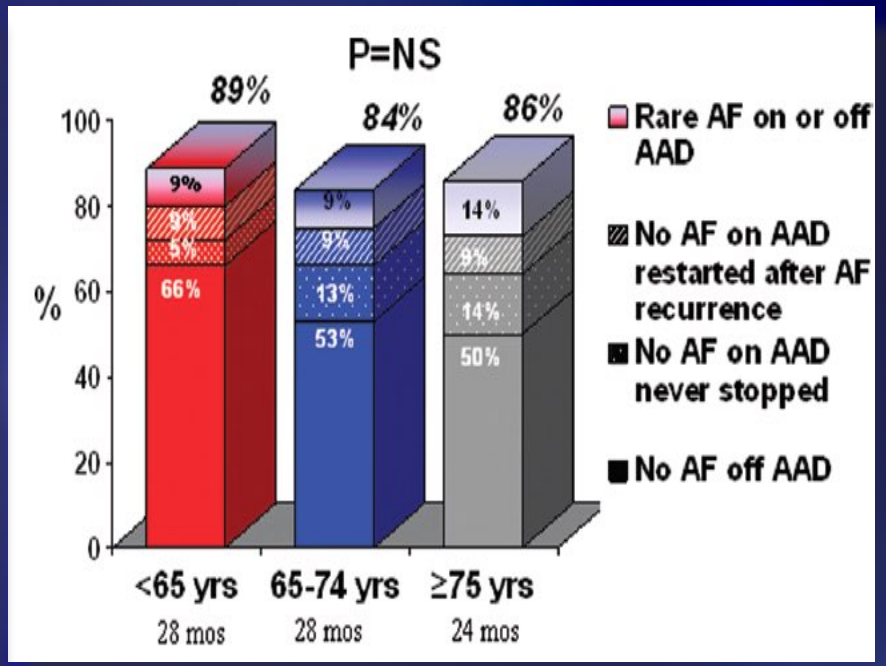
Multivariable:only risk factor is age at diagnosis

Jahangir et al. *Circulation. 2007*

AF Ablation and Age

- 1506 AF ablation in 1165 pts
- Proximal ostial PV isolation and ablation of non-PV triggers)





- Higher proportion of women and incidence of HBP/SHD
- Similar level of AF control wo increased risk
- Patients more likely to remain on AA drugs

Zado E et al J Cardiovasc Electrophysiol 2008;

Prevalence and Correlates of Silent Brain Infarcts in the Framingham Offspring Study

- 2040 sbjts (53% F; 62+/-9 y; Brain MRI (1999-2005); free of clinical stroke
- Multivariable regression : ≥1 SBI in 10.7% of subjects
- SBI associated with AF (OR=2.16)

Das RR et Al. Stroke. 2008

SBI and Risk of Dementia and Cognitive Decline

- 1015 sbjts (Rotterdam) 60-90 ys free of dementia and stroke
- Baseline brain MRI (95-96) and 99-2000
- FU = 3.6 years; Dementia in 30/1015
- Baseline SBI associated with risk of dementia (OR= 2.26)

Vermeer SE et al. N Engl J Med 2003

AF in stroke free Pt is Associated with Memory Impairment and Hippocampal Atrophy

Knecht S et al. Eur Heart J 2008

SAS and AF Ablation

	No OSA N = 292	OSA N = 32	P
Age (years)	57 ± 11	59 ± 7	0.35
Gender (Male / Female)	220/72	26/6	0.52
Left atrial diameter (mm)	43 ± 7	48 ± 7	0.002
Left ventricular ejection fraction	0.56 ± 0.09	0.51 ± 0.01	0.003
Paroxysmal atrial fibrillation	211 (72)	23 (72)	1.000
Chronic atrial fibrillation	81 (28)	9 (28)	
Body weight (kg)	93 ± 19	112 ± 20	<0.001
BMI (kg/m^2)	29 ± 6	35 ± 7	<0.001
BMI			
Normal (<25 kg/m^2)	58 (20)	0	<0.001
Overweight (≥25 and <30 kg/m^2)	118 (40%)	8 (25%)	<0.001
Obese (>30 kg/m^2)	116 (40%)	24 (75%)	<0.001
Hypertension	127 (44)	23 (72)	0.003
Coronary artery disease	27 (9)	7 (22)	0.06

- RFA in 324 pts (57±11 y)
- PAF (234) or chronic (90) AF
- Baseline OSA in 32 pts (10%)

- RFA to eliminate CFAE
- FU = 7 ± 4 mths (1 proc)
- AF free in 63% wo OSA & 41% with OSA (P = 0.02)

Multivariate Analysis of Predictors of Recurrence of AF After Catheter Ablation

Variables	OR	95% CI	P
Age	1.02	0.99–1.05	0.10
Female	1.23	0.65–2.37	0.51
BMI	0.99	0.95–1.04	0.73
Chronic atrial fibrillation	1.66	0.93–2.99	0.09
Duration of atrial fibrillation	1.03	0.99–1.09	0.20
OSA	3.04	1.11–8.32	0.03
Left atrial size	1.04	1.00–1.09	0.08
Left ventricular ejection fraction	0.97	0.94–1.00	0.06
Hypertension	0.89	0.51–1.56	0.67

OSA is a predictor of recurrent AF after RFA independent of its association with BMI and LA size

Jongnarangsin K et Al. J Cardiovasc Electrophysiol. 2008

Success Rates Relative to Number of Procedures Performed per Center

No. of Procedures per Center	No. of Centers	No. of Patients	Overall Success	
			n	Rate, %
1–30	35	547	328	59.9
31–60	15	639	431	67.5
61–90	12	923	652	70.6
91–120	7	728	594	81.6
121–150	4	556	347	62.4
151–180	4	671	496	74.0
181–230	3	607	458	75.4
231–300	3	830	755	91.0
>300	7	3244	2583	87.9
Total	90	8745	6644	75.9

Cappato R et al. *Circulation 2005*.

Unresolved issues

- Optimal ablation technique
- Persistant significant complication rates
- Role of comorbidities: Age, Sleep Apnea syndrome, Obesity, Sport, Alcohol, HBP
- Prevention of SBI/cognitive decline

Conclusion

- Reasonable alternative to AAd to prevent recurrent AF in symptomatic patients wo LA enlargement
- In persistent/permanent AF RFCA has to be tailored to every patient
- Pt must be extremely well informed of the decision process.