

LONG TERM OUTCOME OF AF ABLATION IN DIFFERENT CLINICAL SETTINGS

Lone AF/AF with minimal disease

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Clinica Cardiologica

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MY CONFLICTS OF INTEREST

**Consultancies for:
Biosense Webster
Boston Scientific
St. Jude Medical**

RCT: Catheter Ablation vs AAD

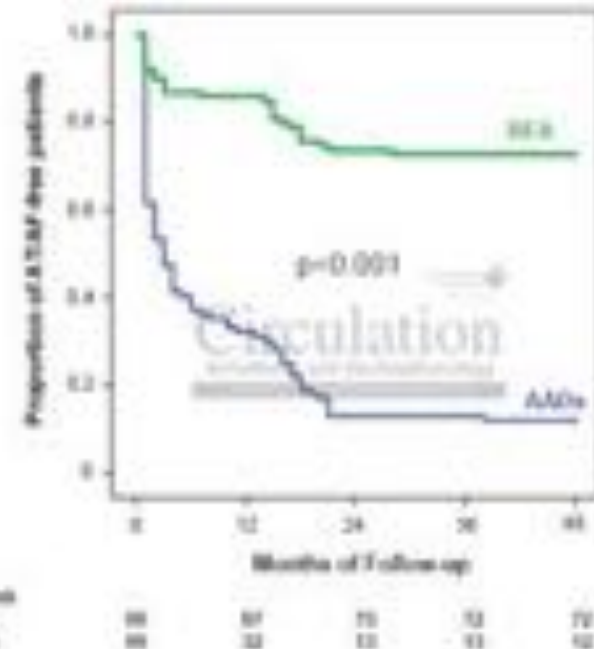
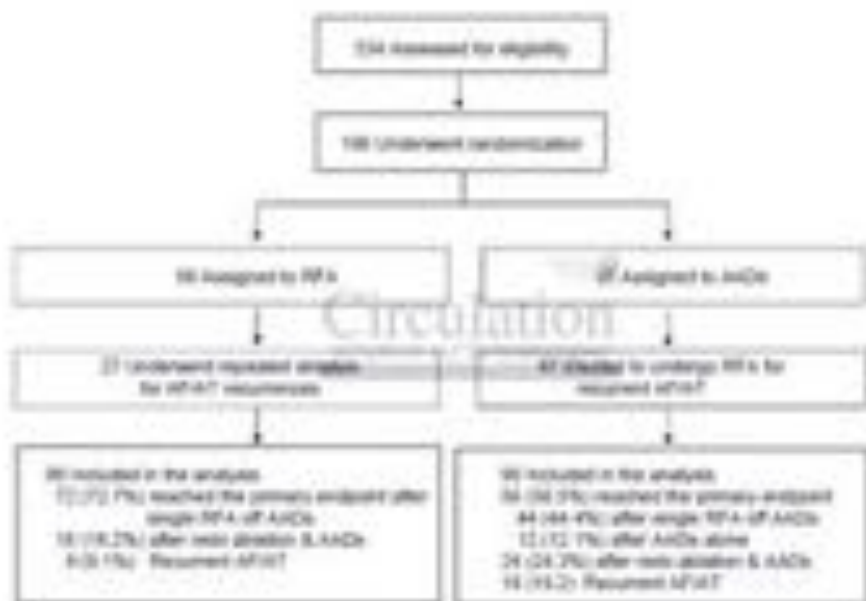
Relapse

Author	Patient (N)	Ablation (%)	AAD (%)
Wazni	70	13	63
Stabile	137	44*	91
Oral	148	22	96*
Pappone	198	16	76
Jais	112	11	77
Wilber	167	34	84
Packer	245	30	93
Nielsen^	294	15	29
Mont	146	27	56
Morillo^	127	55	72
Bertaglia^	129	86	78
Total	1773	32.7	74.1

Catheter Ablation: Long Term Efficacy

Radiofrequency Catheter Ablation and Antiarrhythmic Drug Therapy: A Prospective, Randomized 4-Year Follow-Up Trial - The APAF Study

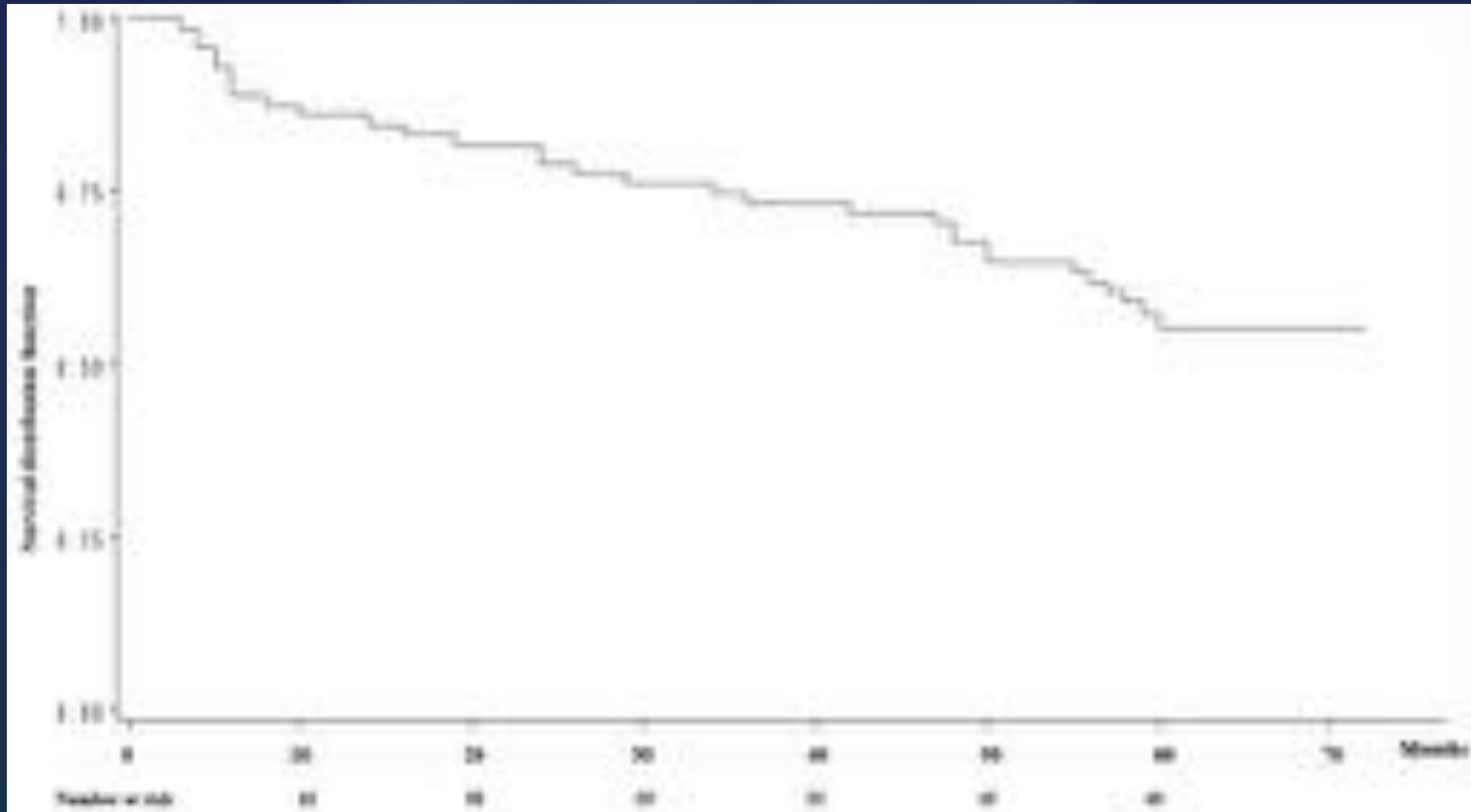
Carlo Pappone, Gabriele Vicedomini, Augello Giuseppe, Francesco Manguso, Massimo Saviano, Mario Baldi, Andrea Petretta, Luigi Giannelli, Zarko Calovic, Vladimir Guluta, Luigi Tavazzi and Vincenzo Santinelli



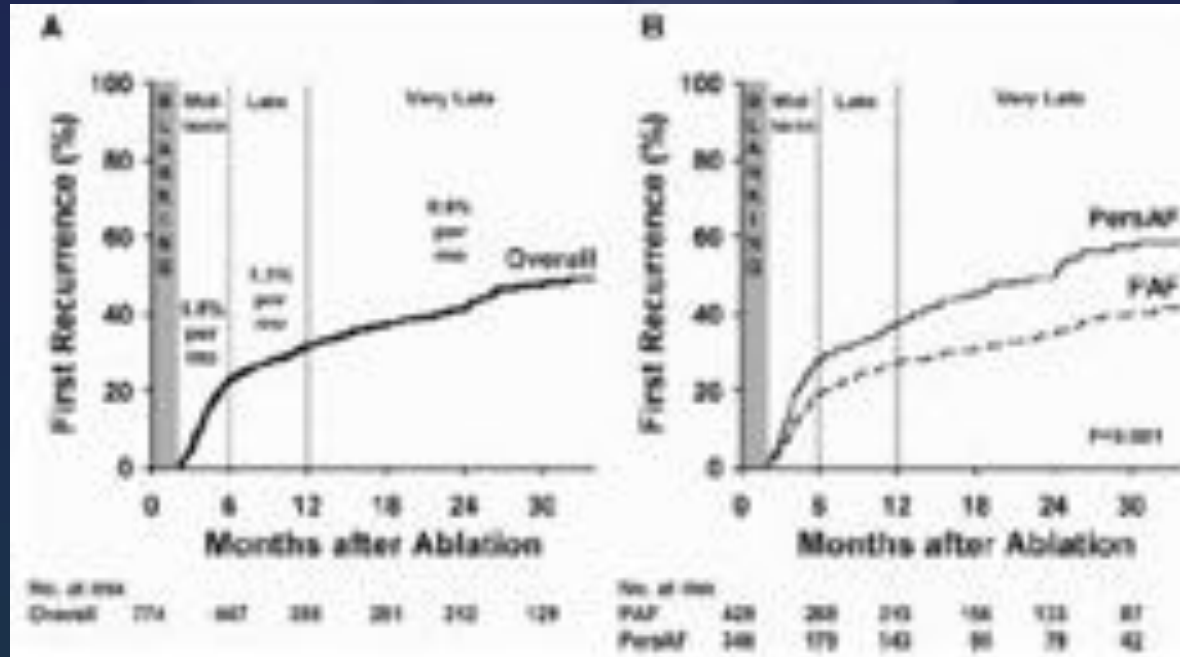
Catheter Ablation: Long Term Efficacy

Author	Patients (N)	Paroxysmal AF (%)	Follow-up (months)	Relapse after a single procedure (%)
Shah	350	87	28	31
Miyazaki	474	100	30	33
Wokhlu	774	55	36	31
Chao	88	0	36	72
Medi	100	100	39	51
Gaita	125	100	40	46
Katritsis	39	100	42	79
Pappone	99	100	48	27
Fiala	110	100	48	43
Bertaglia*	229	58	50	55
Hussein	831	69	55	33
Ouyang	161	100	57	53
Barghava	1404	52	57	27
Tzou	239	85	60	64
Weerasooriya	100	63	60	71
Sawhney	71	100	63	44
Steinberg*	445	72	66	22

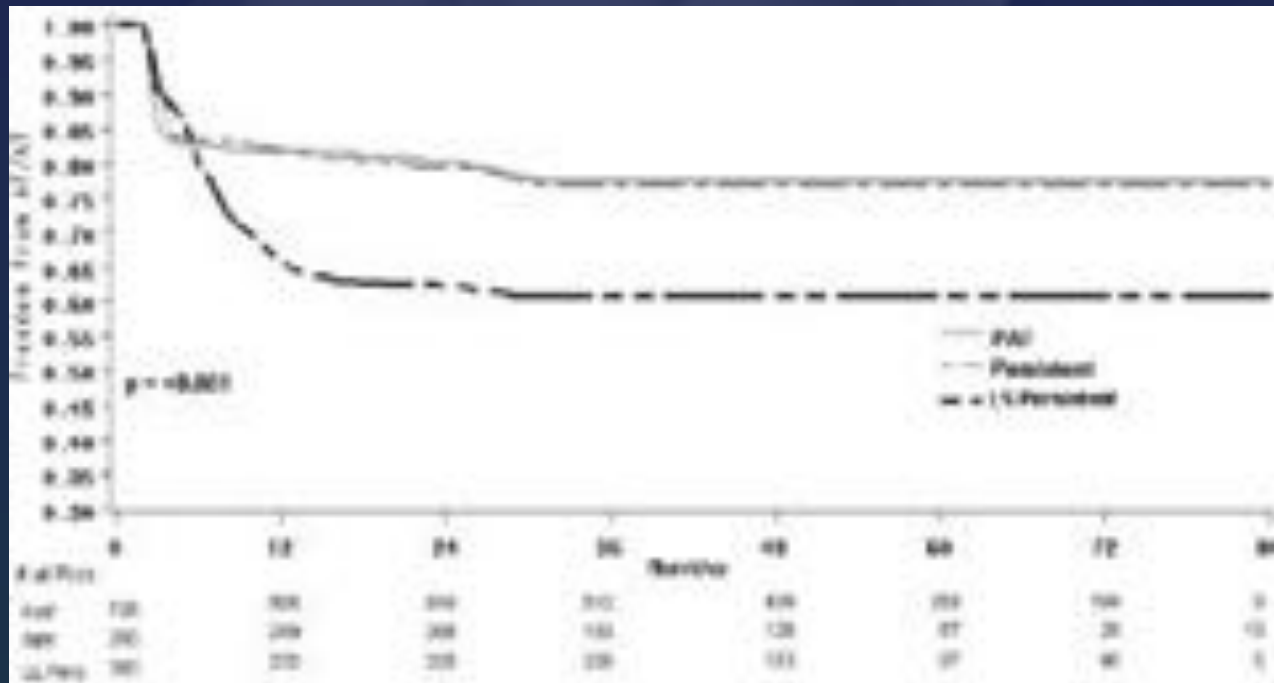
Catheter Ablation: Long Term Efficacy in Paroxysmal AF



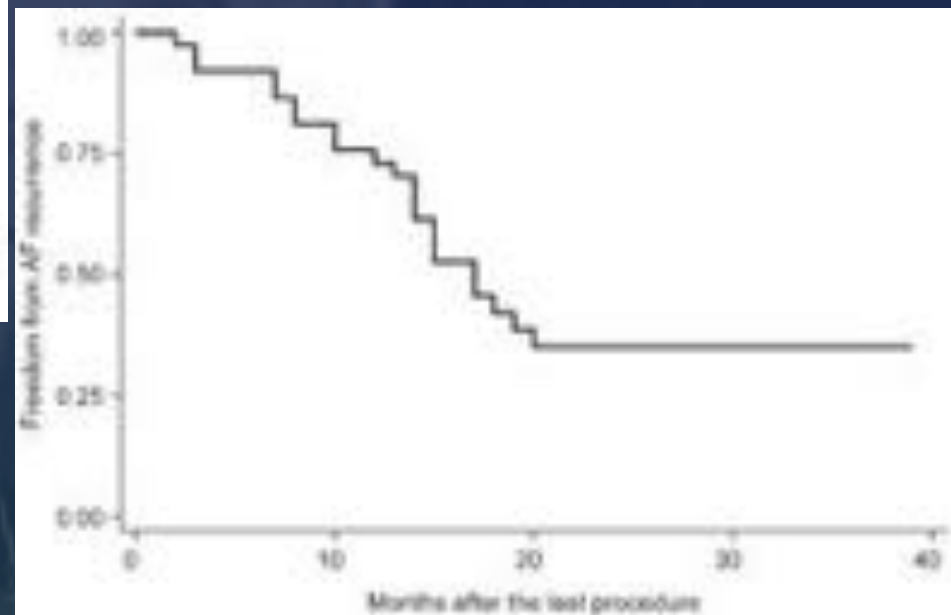
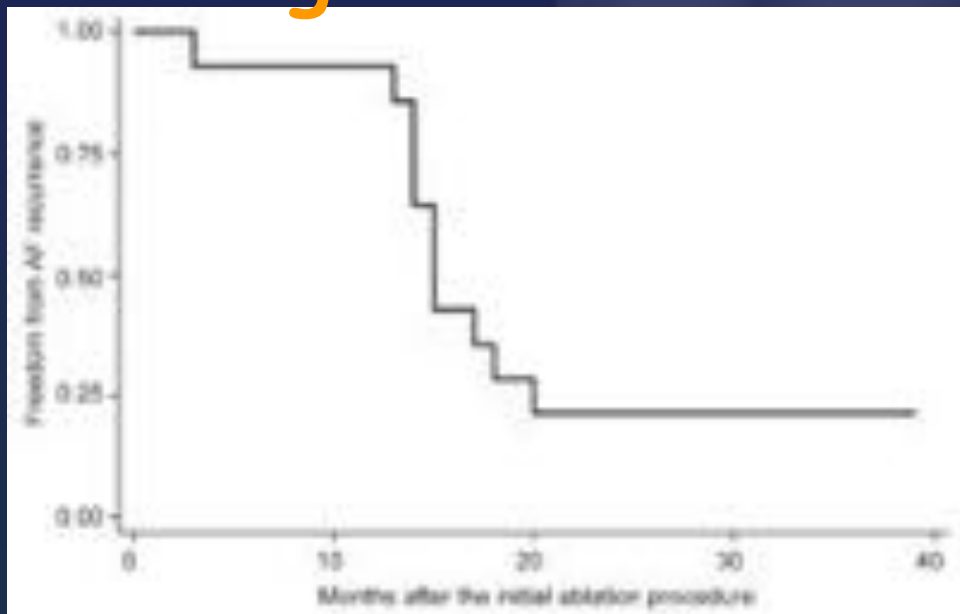
Long Term Efficacy of Catheter Ablation: Paroxysmal vs Persistent



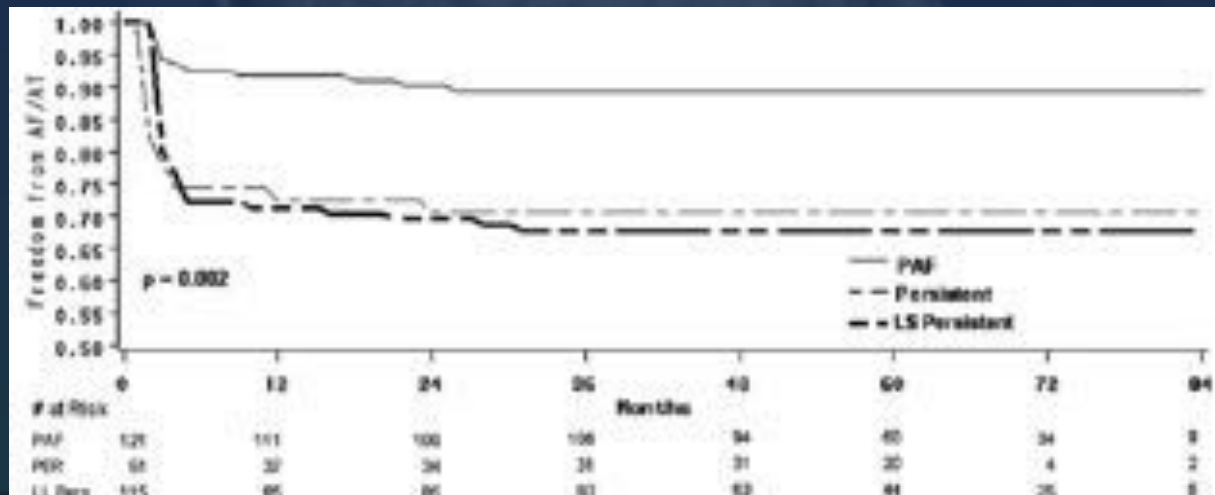
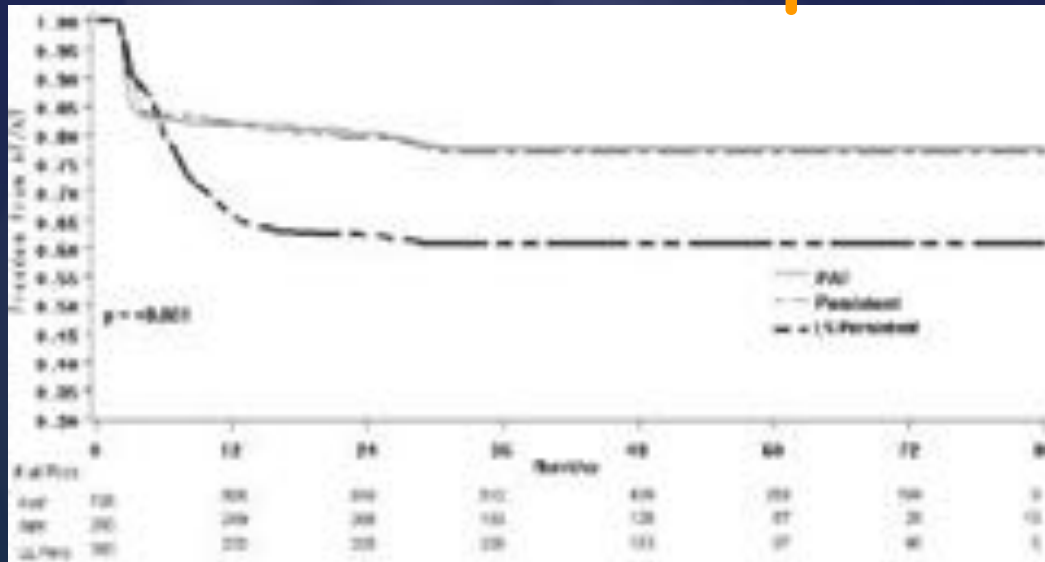
Long Term Efficacy of Catheter Ablation: Paroxysmal vs Persistent



Long Term Efficacy of Catheter Ablation: Single Procedure vs Multiple Procedures



Long Term Efficacy of Catheter Ablation: Single Procedure vs Multiple Procedures



Long Term Efficacy of Catheter Ablation: relapses after the first 12 months

Does catheter ablation cure atrial fibrillation? Single-procedure outcome of drug-refractory atrial fibrillation ablation: a 6-year multicentre experience

Emanuele Bertaglia^{1*}, Claudio Tondo², Antonio De Simone³, Franco Zoppo¹, Massimo Mantica⁴, Pietro Turco³, Assunta Iuliano⁵, Giovanni Forleo⁴, Vincenzo La Rocca³, and Giuseppe Stabile⁵

¹Ospedale Civile di Milano, Via Crivelli, 25, 20123 Milano, Italy; ²Ospedale San Carlo, Rome, Italy; ³Clinica San Michele, Paderno (CB), Italy; ⁴Istituto Clinico San Antonio, Milano, Italy; and ⁵Clinica Medica, Napoli, Italy

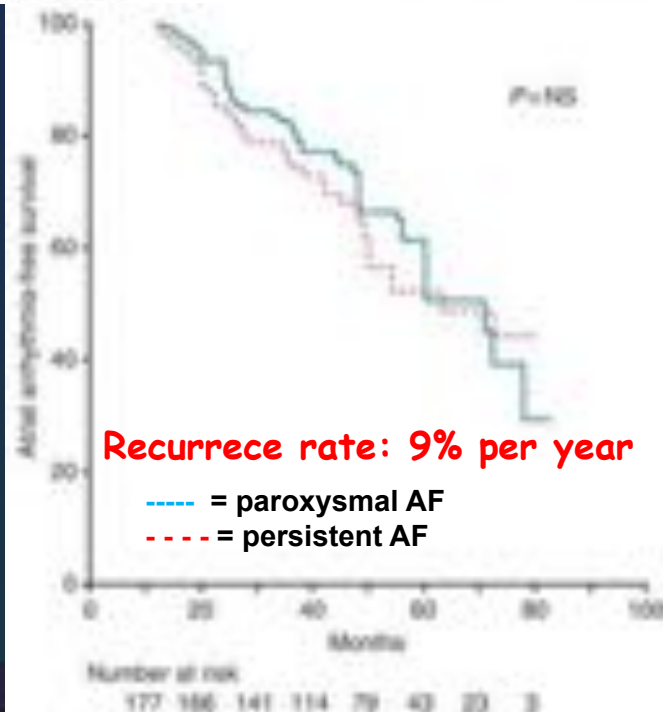


Table 1. Clinical Characteristics

	n=177
Male (%)	74.6
Age, years	59.1±10.5
Paroxysmal AF (%)	57.6
AF duration (years)	5.3±3.8
SHD (%)	42.9
Hypertensive HD (%)	31.7
Dilated cardiomyopathy (%)	5.5
Ischemic HD (%)	3.5
Valvular HD (%)	2.2
Left atrial size, mm	46.1±4.3
LVEF, %	57.7±5.6

Bertaglia et al *Europace* 2009;12:181-7

University of Padova

Long Term Efficacy of Catheter Ablation: relapses after the first 12 months

Very long-term outcome after initially successful catheter ablation of atrial fibrillation

Jonathan S. Steinberg, MD, FHRS, Rachel Palekar, BA, Tina Sichrovsky, MD, Aysha Arshad, MD, Mark Preminger, MD, Dan Musat, MD, Richard E. Shaw, PhD, Suneet Mittal, MD, FHRS

Table 1 Clinical characteristics of the study patients (N = 445)

Age (y)	63.6 ± 15.7
Sex: male	327 (73.5)
Hypertension	226 (50.8)
Diabetes	40 (8.9)
Hyperlipidemia	297 (66.7)
Coronary artery disease	64 (14.4)
AF pattern	
Paroxysmal	319 (71.7)
Persistent	126 (28.3)
Duration of AF before PVI (mo)	49.6 ± 46.7
Left atrial diameter (mm)	41.0 ± 5.6
Ejection fraction (%)	55.6 ± 9.5
CHA ₂ DS ₂ score ≥ 2	79 (18)
Chronic medical therapy	
ACEI/ARB	147 (33)
Beta-blocker	178 (40)
Statin	187 (42)

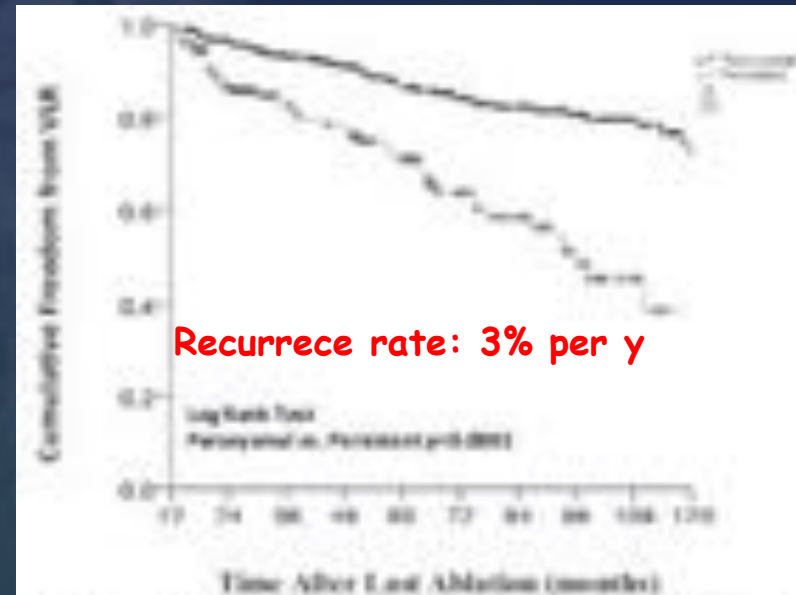
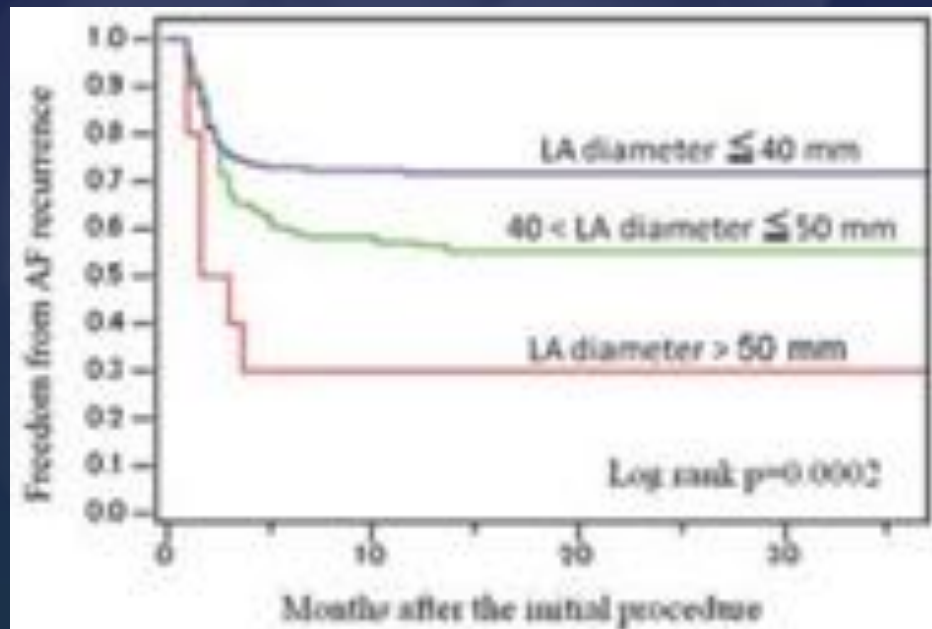


Figure 2 Kaplan-Meier plot for freedom from atrial fibrillation (AF) after catheter ablation comparing outcomes of patients with paroxysmal AF (n = 305) and persistent AF (n = 126) according to type of arrhythmia protocol. VLEM is very late recurrence.

Long Term Efficacy of CA in Paroxysmal AF: Predictors of Relapses

Author	LAD	Age	Hypertension	Hiperlipemia	Valvular	BNPlog
Wokhlu	X					
Miyazaki	X					
Shah			X	X		
Bertaglia	X					
Ouyang						
Hussein	X	X				X
Barghava	X					
Tzou		X				
Weerasooriya					X	
Sawhney			X			

Long Term Efficacy of CA in Paroxysmal AF: Predictors of Relapses



Long Term Efficacy of Catheter Ablation: Unresolved Issues

- ✓ very long term efficacy (> 10 y) of CA
- ✓ efficacy on cumulative survival

RCT: CACAF Study



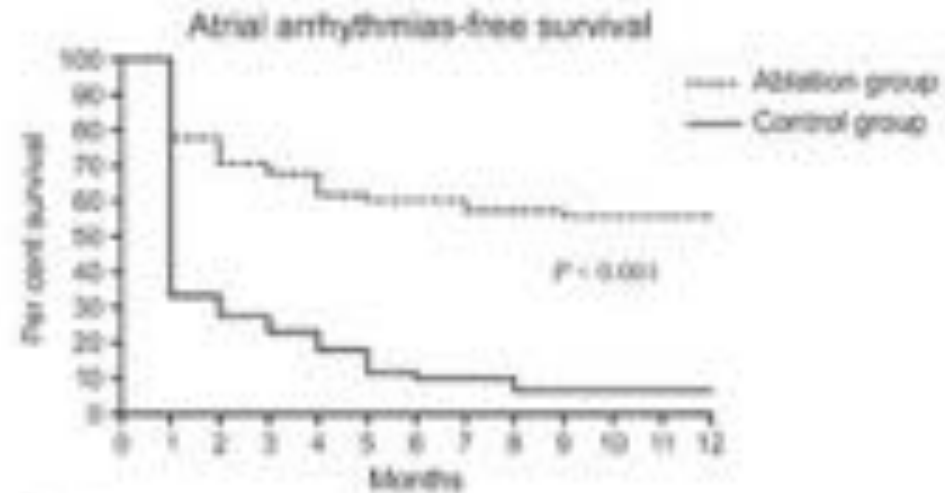
European Heart Journal (2006) 27, 219–221
doi:10.1093/eurheartj/ehi080

Clinical research

Catheter ablation treatment in patients with drug-refractory atrial fibrillation: a prospective, multi-centre, randomized, controlled study (Catheter Ablation For The Cure Of Atrial Fibrillation Study)[†]

Giuseppe Stabile^{1*}, Emanuele Bertaglia², Gaetano Senatore³, Anton Giovanni Donnici³, Pietro Turco², Pietro Pascotto², Massimo Fazzari⁴

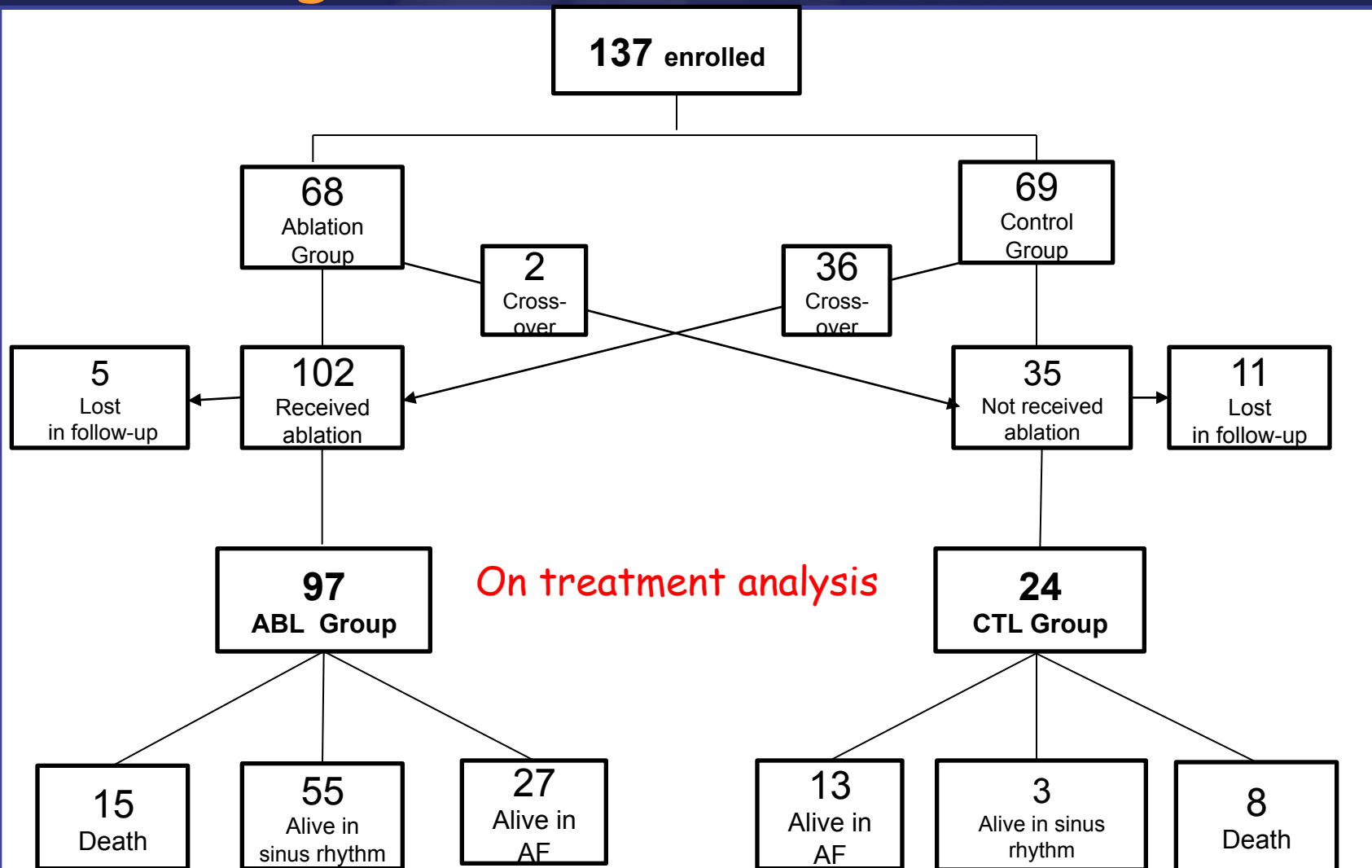
¹Laboratorio di Elettrofisiologia, Casa di Cura San Michele, Mediolanum (CE), Italy; ²CE Italy; ³Ospedale Civile di Cirié, Cirié (TO), Italy; and ⁴Fondazione Salvatore Maugeri, I Sesto (BN), Italy



No. at risk

Months	0	1	2	3	4	5	6	7	8	9	10	11	12
Ablation	48	47	35	40	44	42	41	44	39	34	30	28	26
Control	48	48	25	18	14	11	7	6	6	4	3	4	4

Long term CACAF: flow chart



Long term CACAF: Methods

- ✓ CACAF Study patients received an in-office visit or phone interview 144 ± 3 months after randomization.
- ✓ Patients were invited to repeat a 12-lead ECG.

Long term CACAF: End points

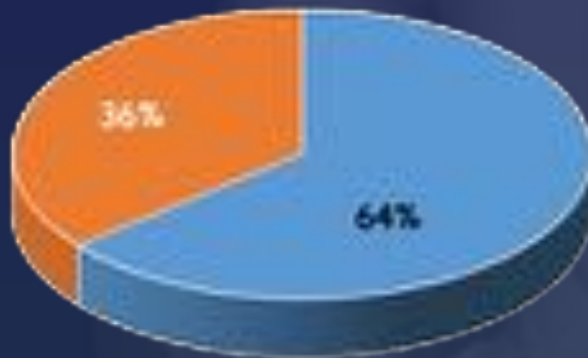
- ✓ **Primary end point:** survival in sinus rhythm at the end of follow up.
- ✓ **Secondary end point:** cumulative survival.

Long term CACAF: Study populations

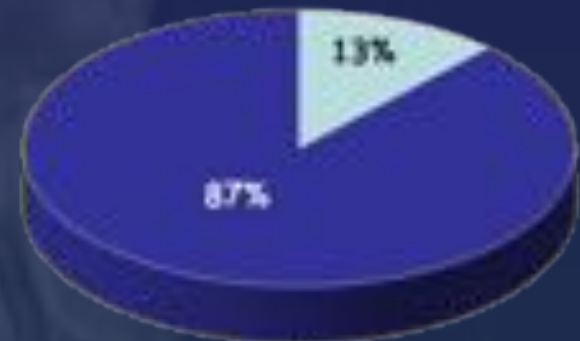
	Total (n=121)	CTL group (n=24)	ABL group (n=97)	p value
Paroxysmal AF, n [%]	79 [66.4%]	15 [65.2%]	64 [66.7%]	0.895
Male gender, n [%]	73 [61.3%]	11 [47.6%]	62 [64.6%]	0.138
Age, years	62.3 ± 9.8	65.1 ± 10.9	61.7 ± 9.6	0.176
Years from the first episode	4 (2-8)	5 (3-10)	4 (2-7)	0.373
Cardiopathy, n [%]	78 [65.5%]	16 [69.6%]	62 [64.6%]	0.652
LA A-P diameter, mm	45.6 ± 5.3	46.1 ± 5.2	45.3 ± 5.1	0.609
LVEF, %	60 (55-65)	55 (55-65)	60 (55-65)	0.440
Previous ablation, n [%]	6, [5.0%]	1 [4.3%]	5 [5.2%]	0.865
CHA ₂ DS ₂ VASc score	2 (1-3)	1 (1-2.5)	1 (0-3)	0.057

Long term CACAF: Last therapy

ABL group



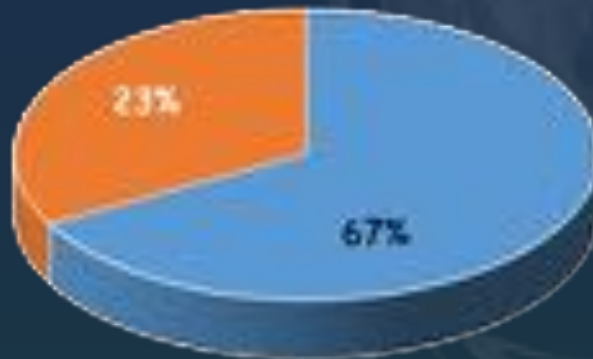
CTL group



$P < 0.001$

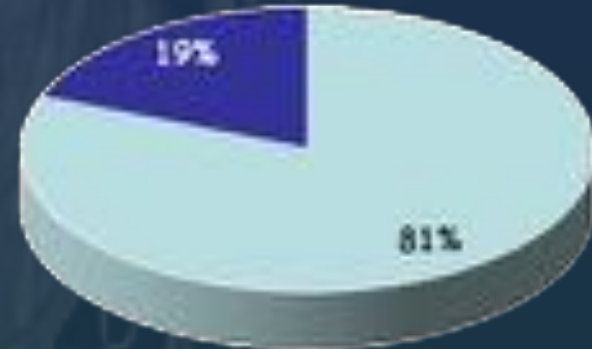
■ AAO ■

ABL group



■ AAO ■

CTL group



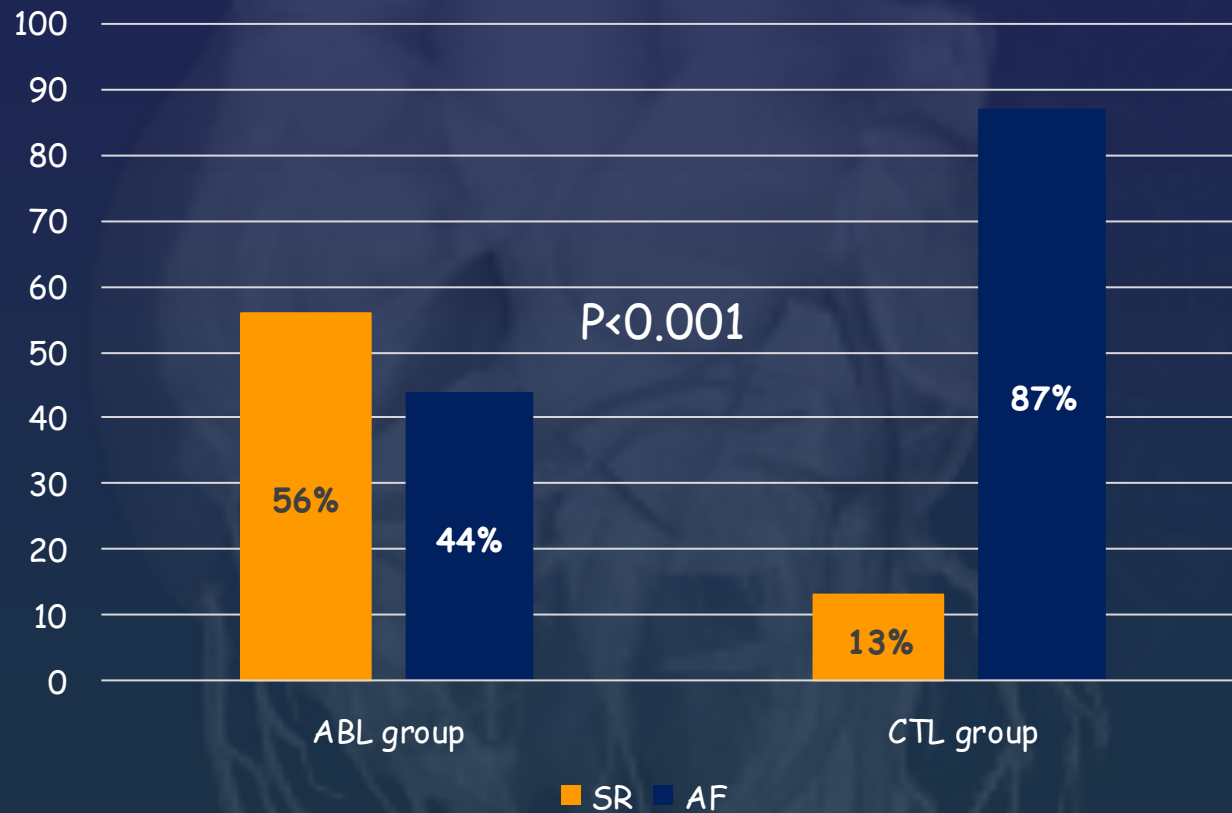
$P = 0.249$

■ TAO ■

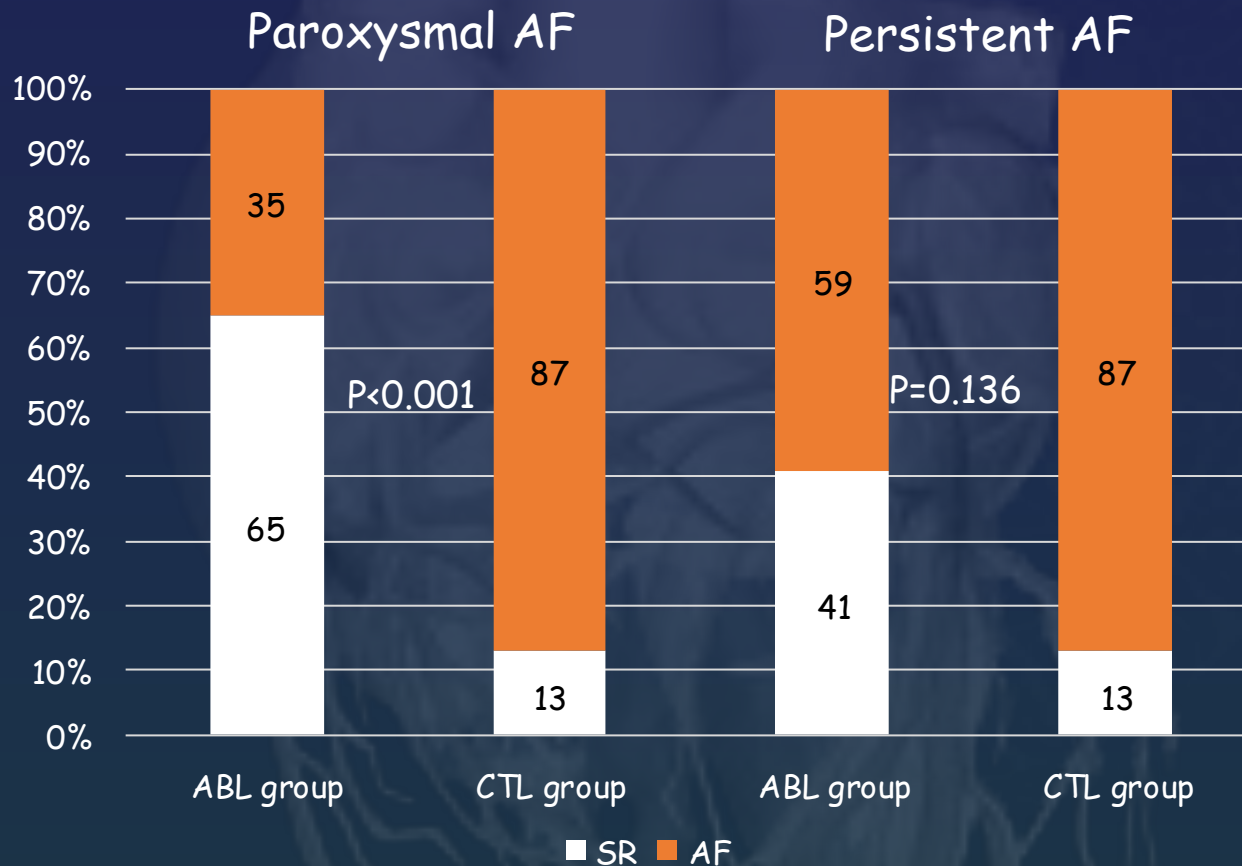
■ TAO ■

Long term CACAF

Results: survival in sinus rhythm



Long term CACAF: Results - survival in sinus rhythm

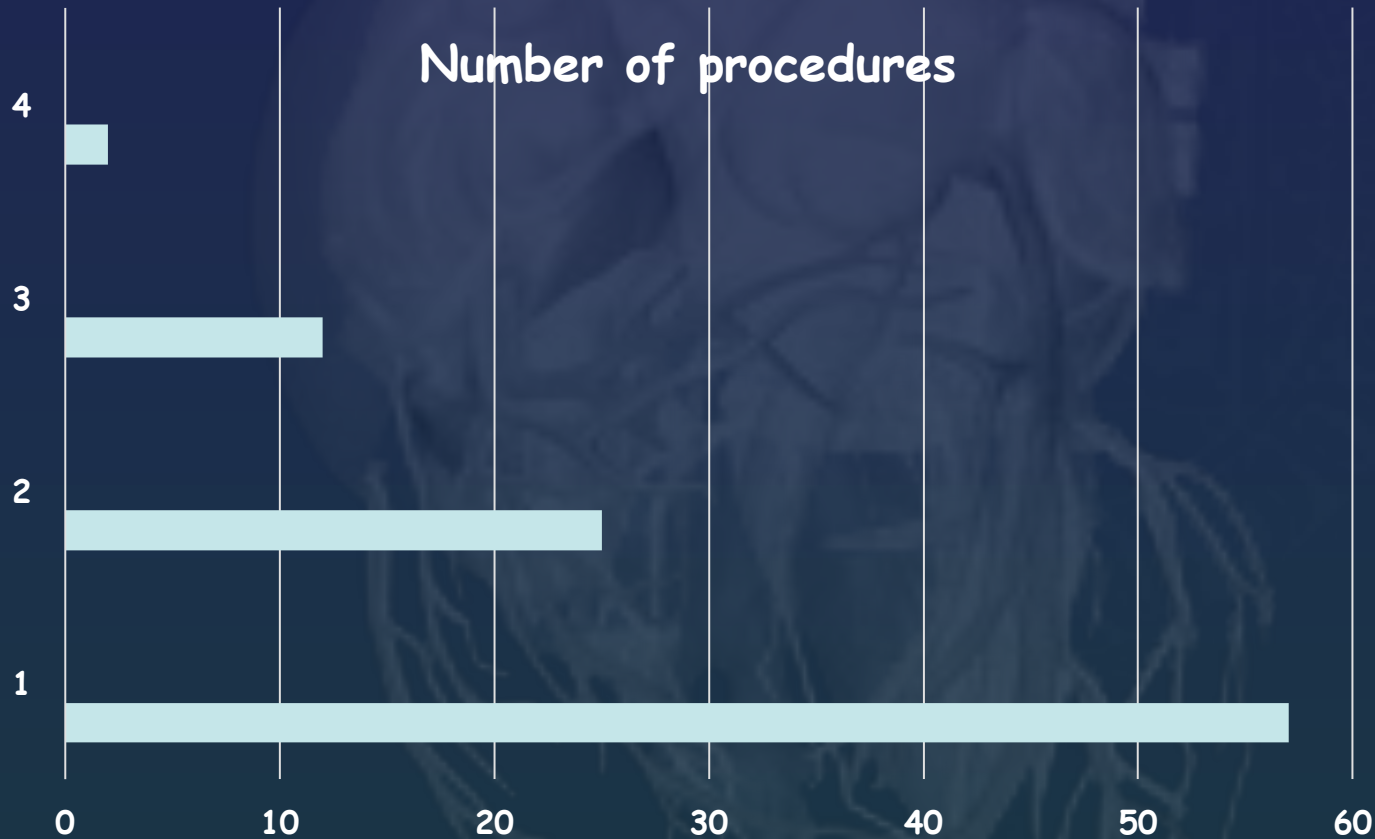


Long term CACAF: Predictors of survival in sinus rhythm

	P Wald	OR	IC 95%
ABL group	0.001	8.68	1.09-6.16
Paroxysmal AF	0.031	2.59	2.37-31.81

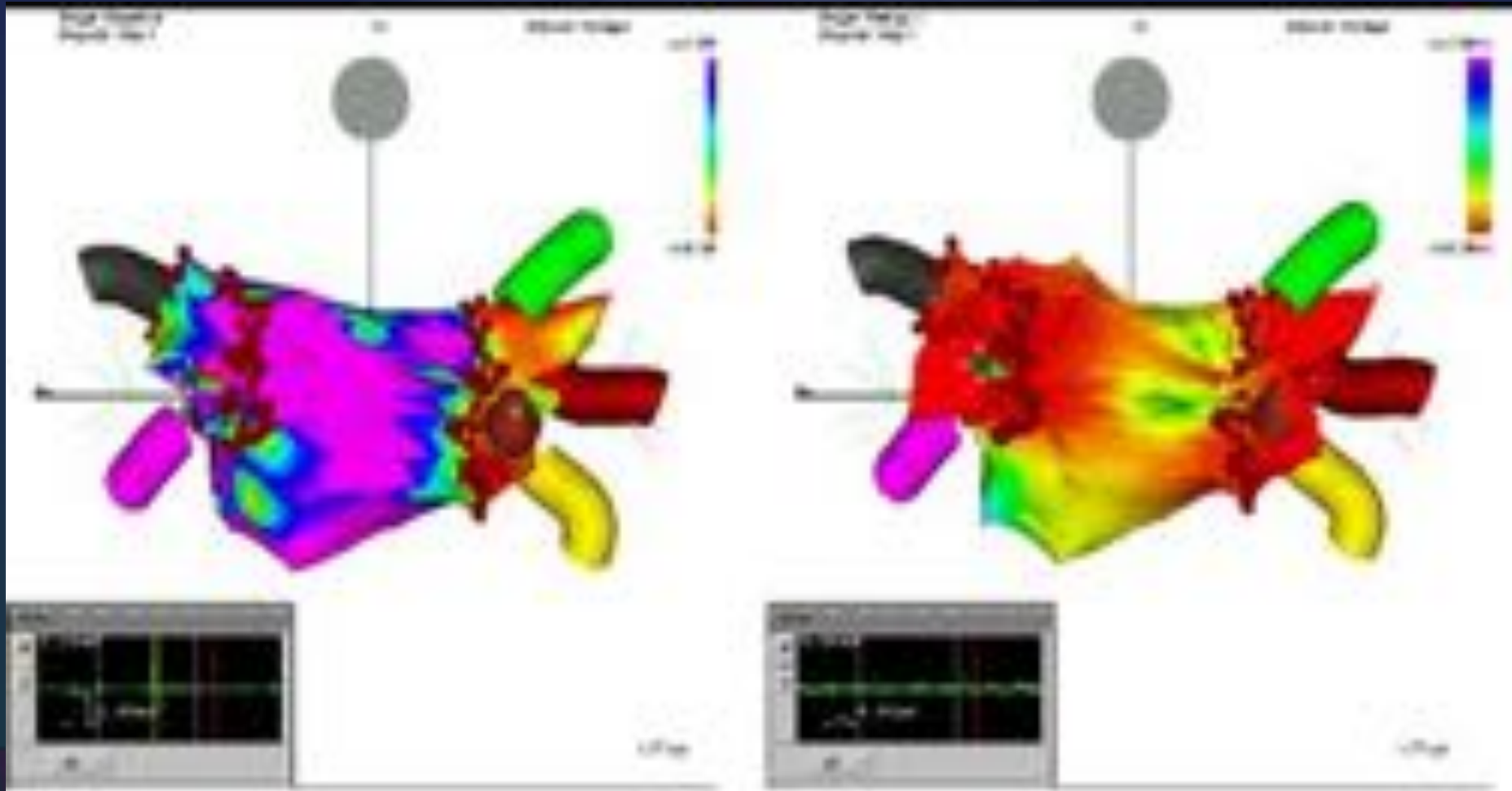
Long term CACAF: Ablation therapy

Complications: 4/97 (4.1%) patients



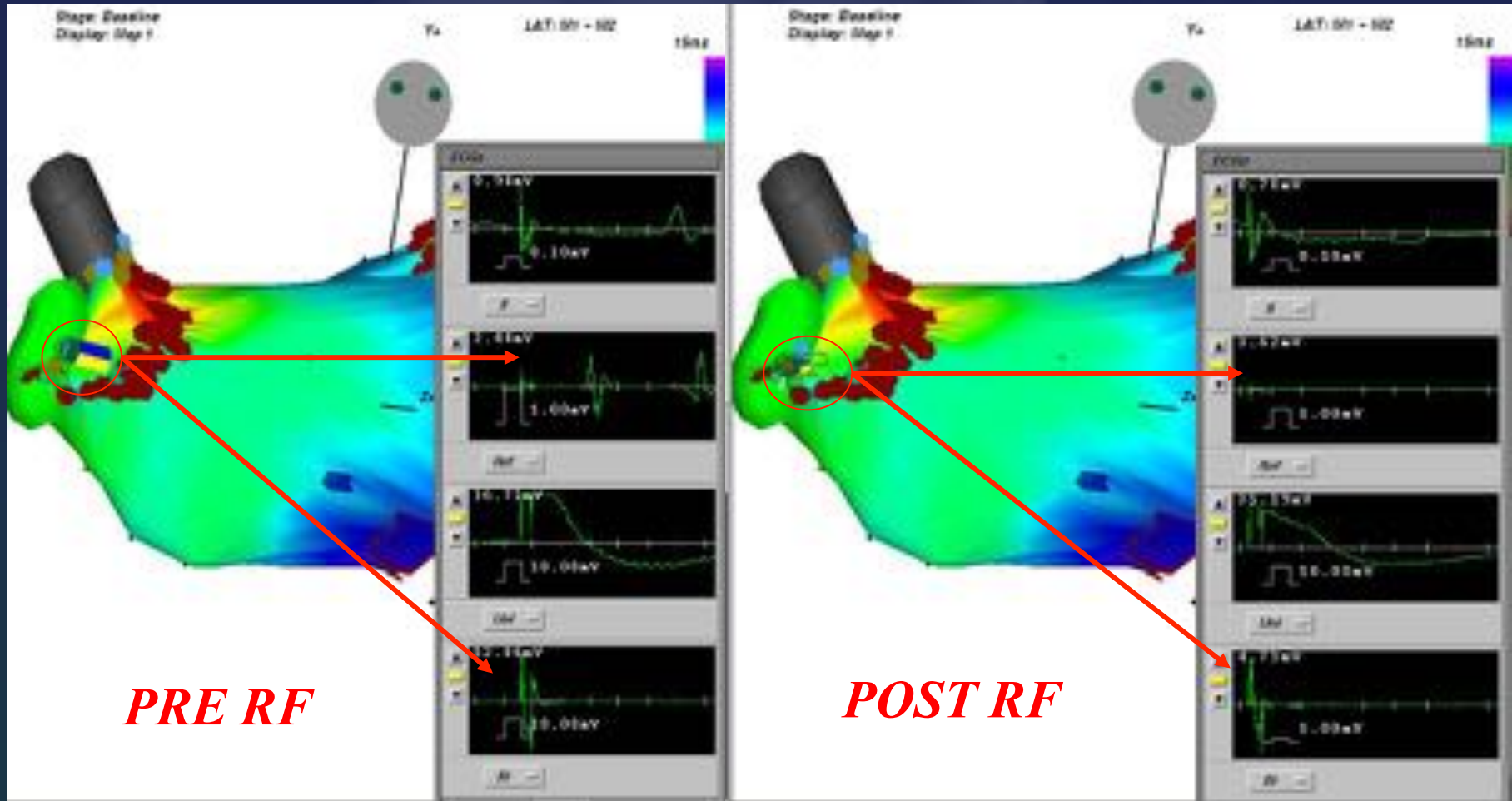
CACAF Study

Ablation design

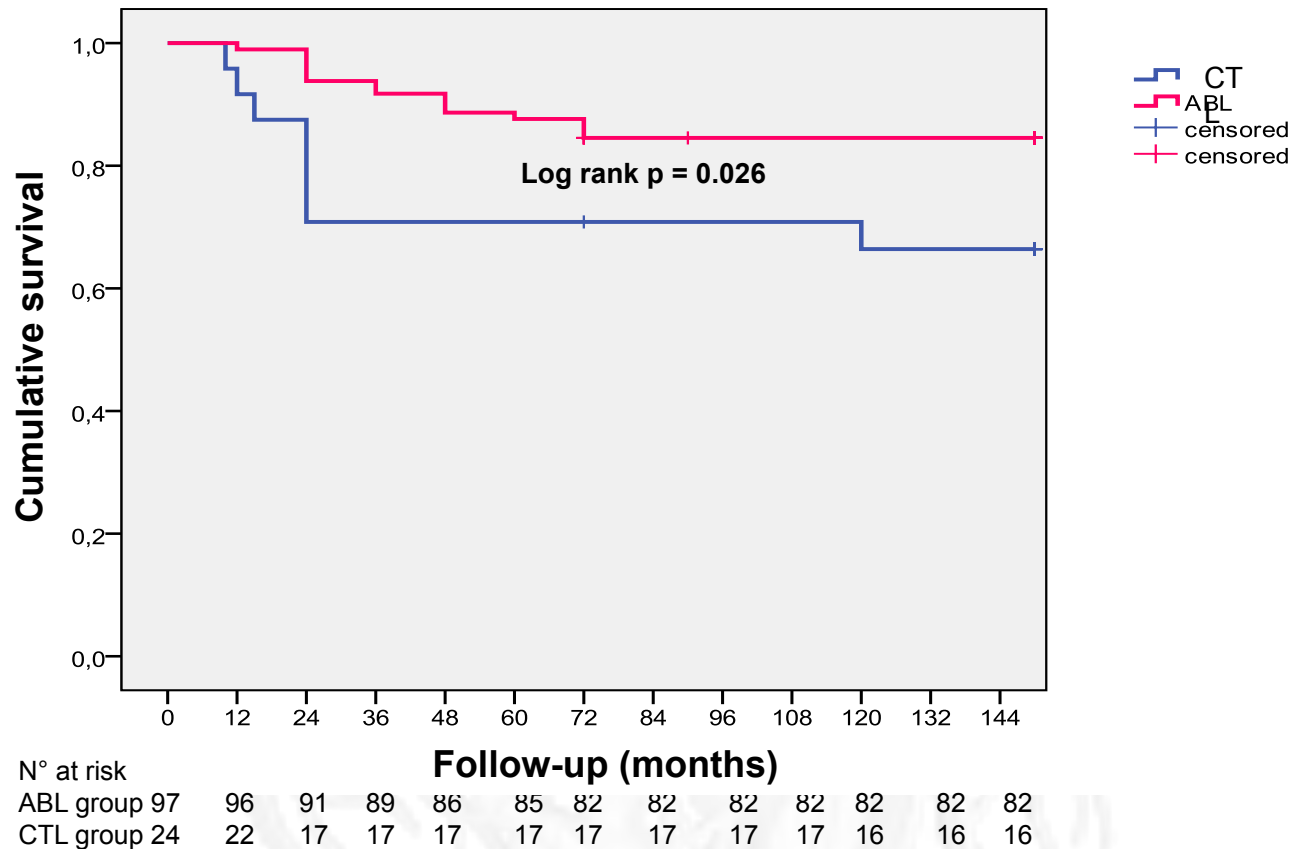


CACAF Study

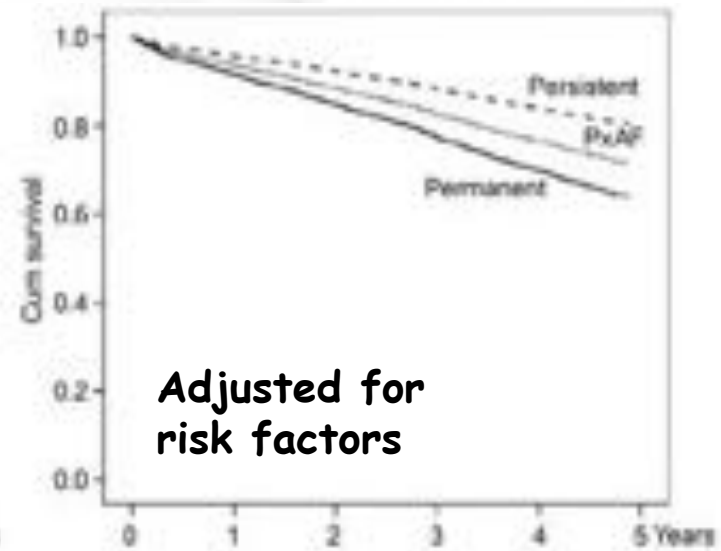
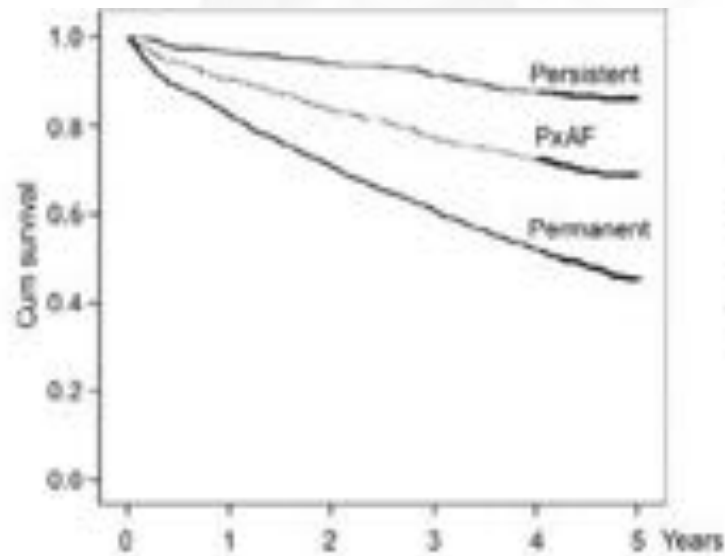
Ablation design



Long term CACAF: Cumulative survival

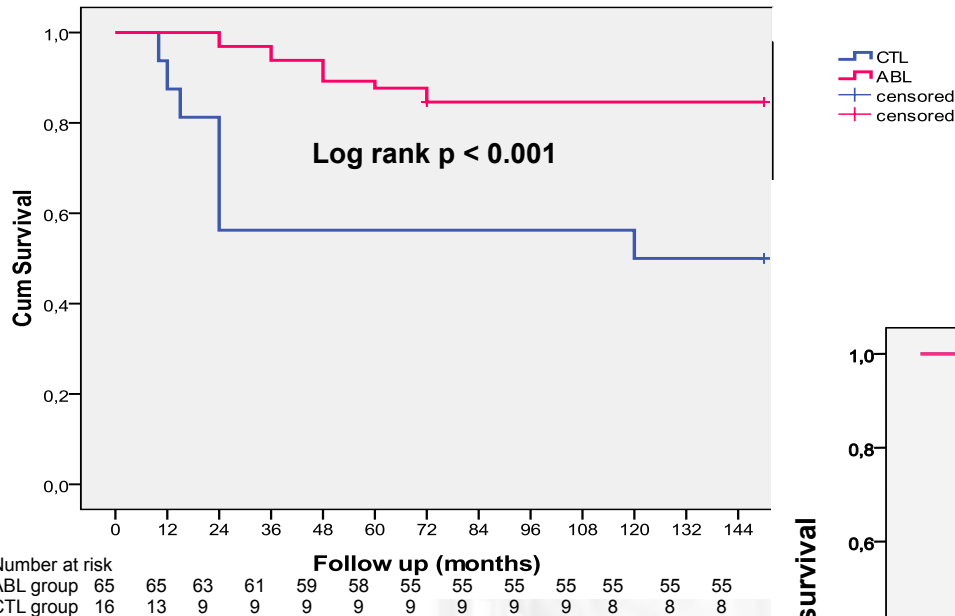


AF and risk of mortality

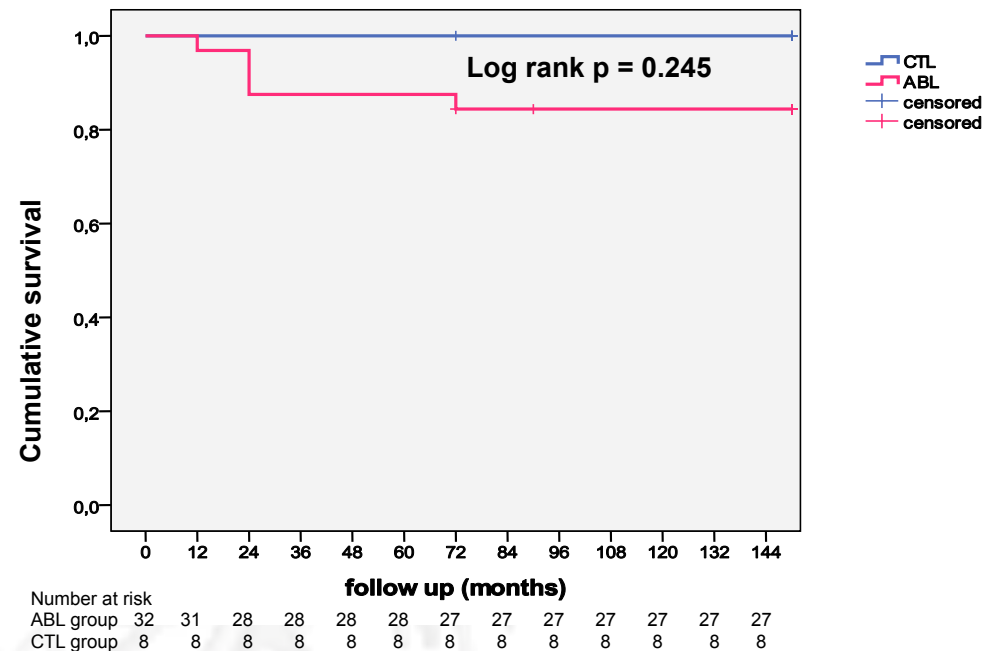


Long term CACAF: Cumulative survival

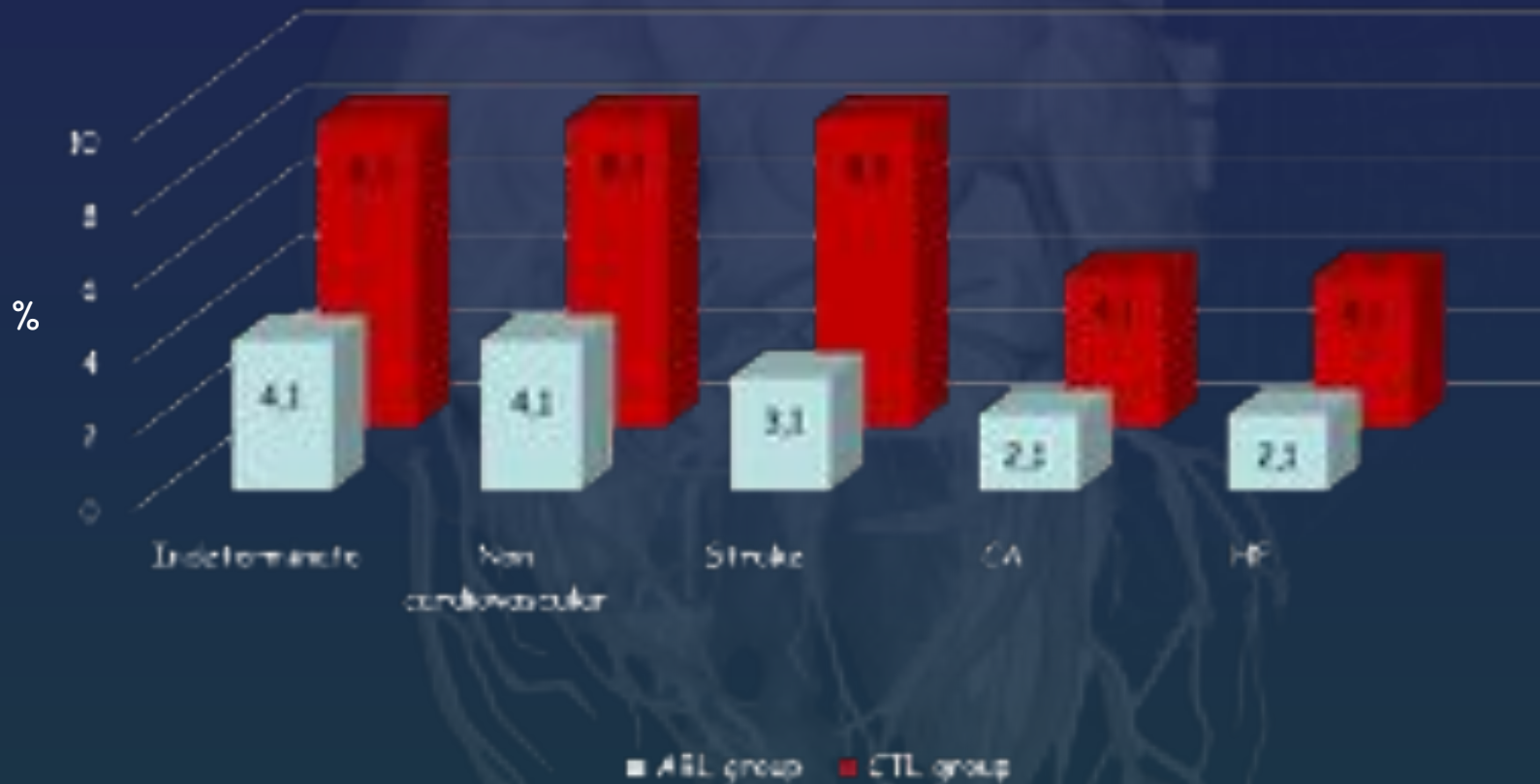
Paroxysmal AF patients



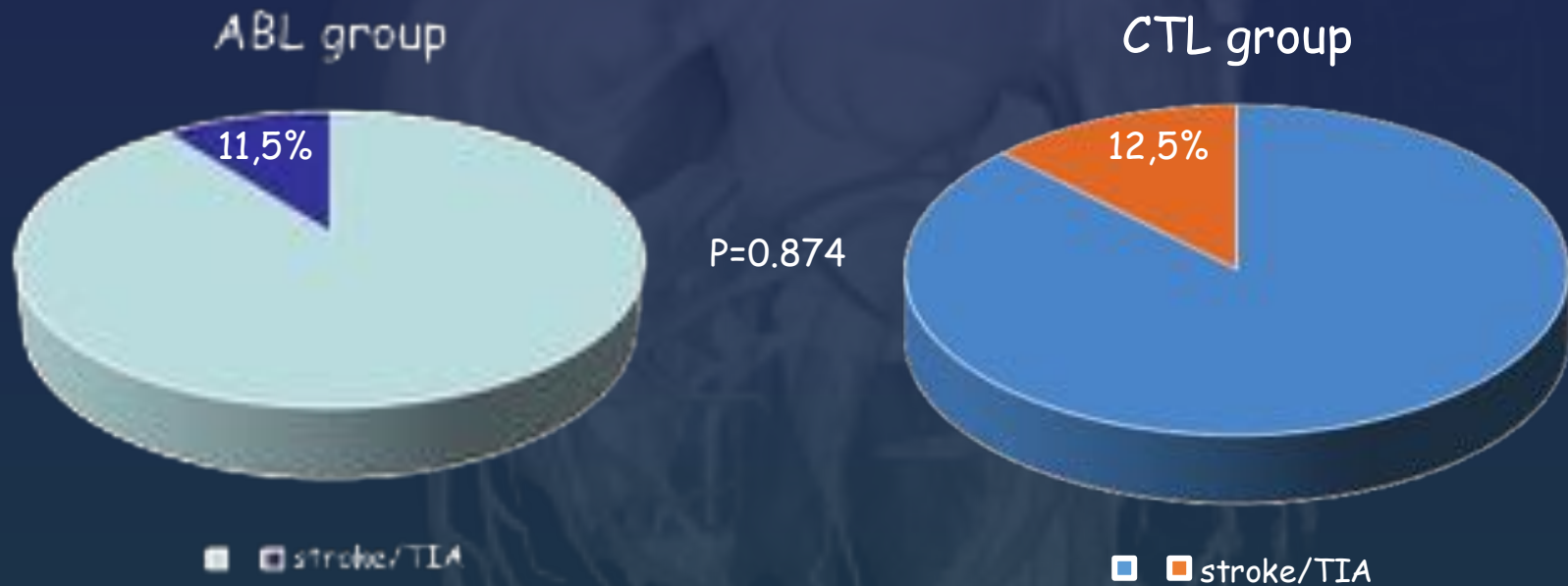
Persistent AF patients



Long term CACAF: Results - causes of death



Long term CACAF: Results - cerebrovascular accidents



All but 1 patients who suffered from stroke/TIA during the follow-up, presented a **paroxysmal AF** at the enrollment

CONCLUSIONS

- Catheter ablation is more efficacious than AADs in promoting maintenance of sinus rhythm over a very long period both in paroxysmal AF and persistent AF.
- AF relapses can occur even after the first 12 months, with a rate ranging from 1% to 10% per year.
- Patients with larger left atria are those at higher risk
- Paroxysmal AF patients are at higher risk of cardiovascular complications and mortality than persistent AF patients
- Catheter ablation reduces all-cause mortality only in paroxysmal AF patients.

Emanuele Bertaglia,^a

Giuseppe Stabile,^b

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Franco Zoppo,^e

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^aDipartimento di Scienza Cardiache, Toraciche e Vascolari, Università degli Studi di Padova, Padova; ^bClinica Mediterranea, Napoli; ^cOspedale Civile, Ciriè; ^dCasa di Cura San Michele, Maddaloni (CE); ^eOspedale Civile, Mirano, Italy.

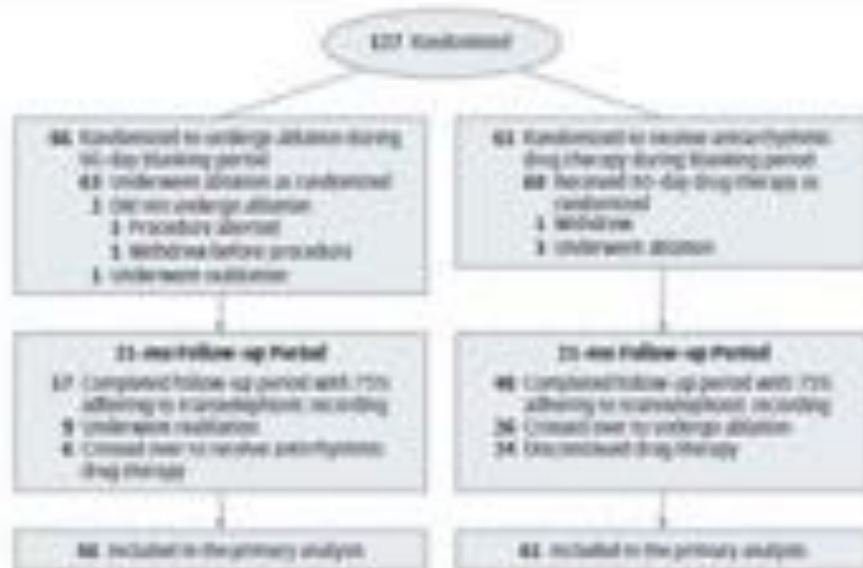
RCT: First Line CA vs AAD

Original Investigation

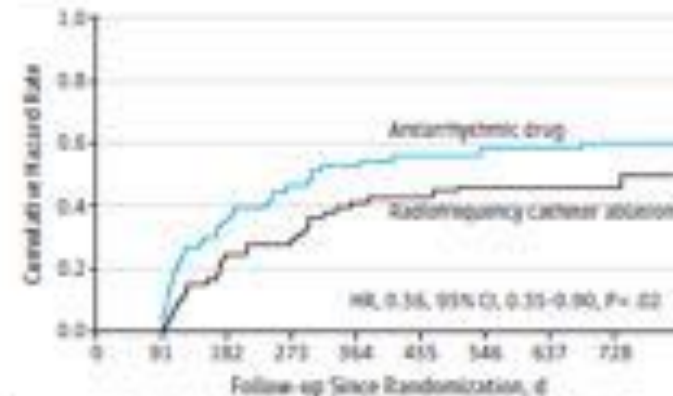
Radiofrequency Ablation vs Antiarrhythmic Drugs as First-Line Treatment of Paroxysmal Atrial Fibrillation (RAAFT-2) A Randomized Trial

Carlos A. Morillo, MD, FRCP; Atul Verma, MD, FRCP; Stuart J. Connolly, MD, FRCP; Karl H. Kuck, MD, FHRS; Girish M. Nair, MBBS, FRCP; Jean Champagne, MD, FRCP; Laurence D. Sterns, MD, FRCP; Heather Beresh, MSc; Jeffrey S. Healey, MD, MSc, FRCP; Andrea Natale, MD; for the RAAFT-2 Investigators

Figure 1. Patient Flow Diagram



A Primary efficacy outcome



No. at risk	0	91	182	273	364	455	546	637	728
Antiarrhythmic drug	61	61	35	25	21	18	17	17	12
Radiofrequency catheter ablation	66	66	46	39	32	30	28	27	18

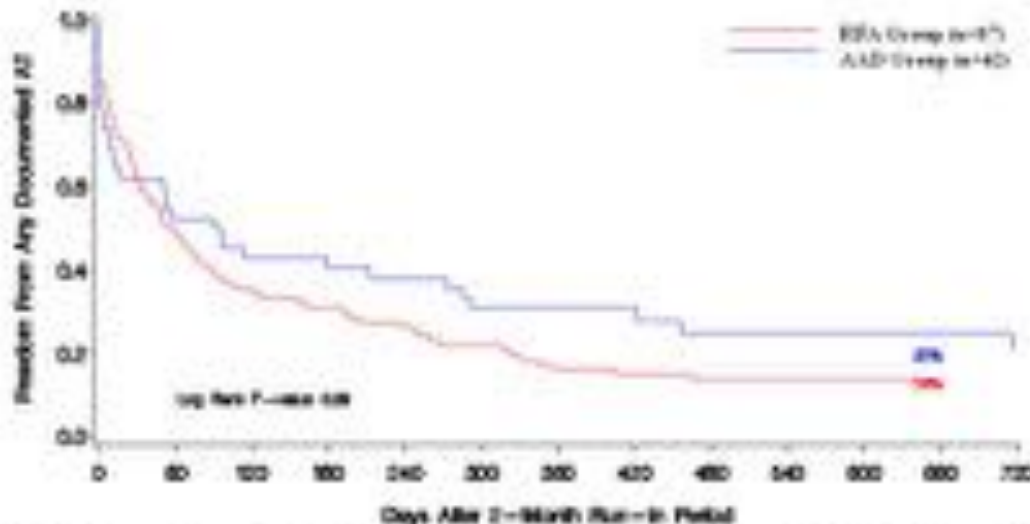
JAMA2014;311:692-9

RCT CA vs AAD: Persistent AF

A Clinical Evaluation of Pulmonary Vein Encirculation Compared to Antiarrhythmic Drug Treatment in Patients with Persistent Atrial Fibrillation (Catheter Ablation for the Cure of Atrial Fibrillation – 2 Study)

Emanuele Bortolotti, MD, Giuseppe Stabile, MD, Gaetano Seratore, MD, Claudio Pratola, MD, Andrea Colicci, MD, Roberto Veriato, MD, Martin Lowe, MD, Pekka Rastakainen, MD, Filippo Lambertucci, MD, Pietro Turchi, MD, Maurizio Del Gaudio, MD, and Roberto Mantovan, MD, PhD, on the behalf of the CACAF 2 Study Investigators.

Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy; Mediterranean Clinic, Naples, Italy; Civic Hospital, Cirié, Italy; Sant'Anna Hospital, Ferrara, Italy; Careggi Hospital, Florence, Italy; Pietro Cosma Hospital, Camposampiero, Italy; Heart Hospital, London, UK; Heart Center Co, Tampere University Hospital, Tampere, Finland; San Eugenio Hospital, Rome, Italy; Multimedica Hospital, Milano, Italy; Santa Maria del Carmine Hospital, Rovereto, Italy; Bufalini Hospital, Cesena, Italy.



Primary end point:
freedom from
persistent AT

CA 31.0% vs AADT 40.5%
(p=0.324)

Personal data