



**«Παρακολούθηση των ασθενών μετά την
επέμβαση κατάλυσης κολπικής μαρμαρυγής.
Τι προσδοκούμε;»**

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Θεσσαλονίκη 20/2/2010*

AF ablation: What do we really expect?

	Method	Pts No	Paroxysmal (%)	Follow-up (months)	Success Rate (%)
Haissaguerre et al AJC 2000	PVI	225	100	12	70
Pappone et al Circulation 2001	CPVA	251	71	10,4	85
Oral et al Circulation 2003	CPVA	40	100	6	88
Pappone et al Circulation 2004	CPVA+ Vagal responses	102	100	12	99
Karch et al Circulation 2005	CPVA	50	100	6	42
Wazni et al JAMA 2005	PVI Lasso	50	97	12	87
Stabile et al EHJ 2006	CPVA		61	12	59
Wilber et al JAMA 2010	CPVA	106	100	9	66

Success rate after AF ablation

- Catheter Ablation for symptomatic, drug refractory AF (71% paroxysmal)
- n=251pt **85% success rate**

Follow-up: 10.4 +/-4.5 months

- outpatient visits with serial echocardiograms
- and 24h Holter monitoring performed at discharge and monthly for ≥ 3 months
- symptom recurrence.

- Catheter Ablation for paroxysmal AF vs AAD
- n=167pt (randomized 2:1)
- **66% success rate (Abl) vs 16% AAD**

Follow-up: 9 months

- ECG and Holter 1, 3, 6, 9, and 12 months,
- Transtelephonic monitoring weekly for the first 8 weeks, then monthly until the final visit and on symptomatic cardiac episodes

Success rate after AF ablation

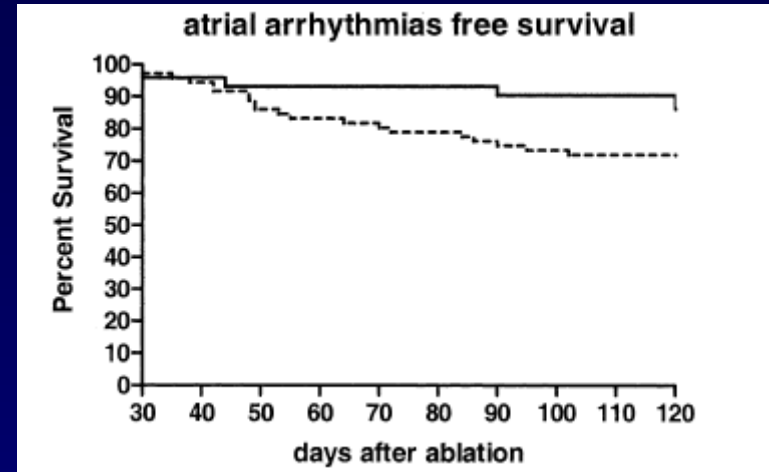
- Catheter Ablation of Long-Lasting Persistent AF
 - 95% success rate
 - 38% redo
- Catheter Ablation for paroxysmal AF vs AAD
 - n=167pt (randomized 2:1)
 - 66% success rate (Abl) vs 16% AAD
 - Redo after 80 d considered treatment failure

Haissaguerre et al. J C E, 2005;16:1138-47

Wilber et al JAMA. 2010;303(4):333-340

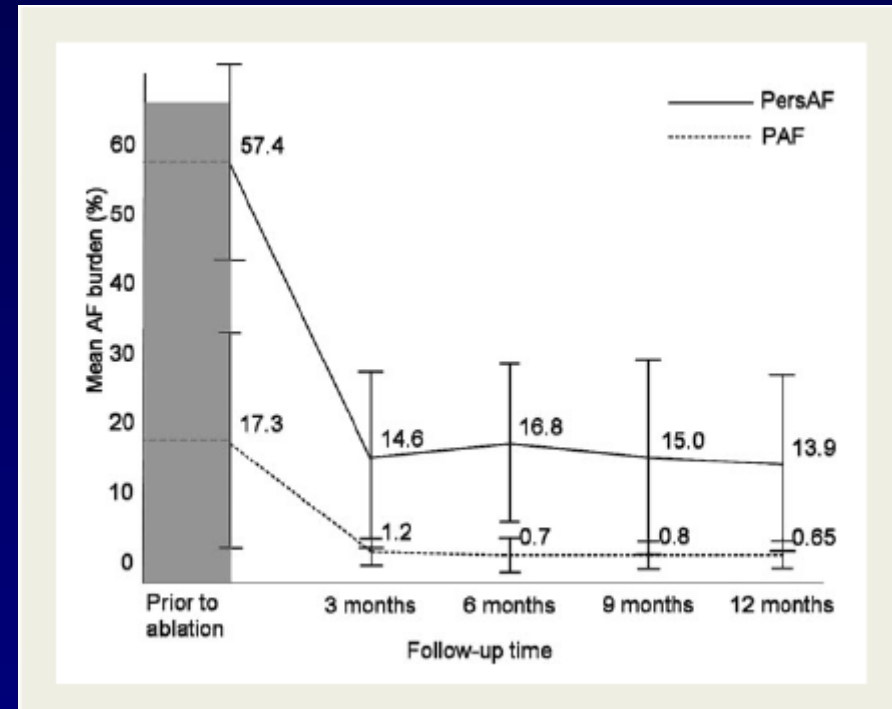
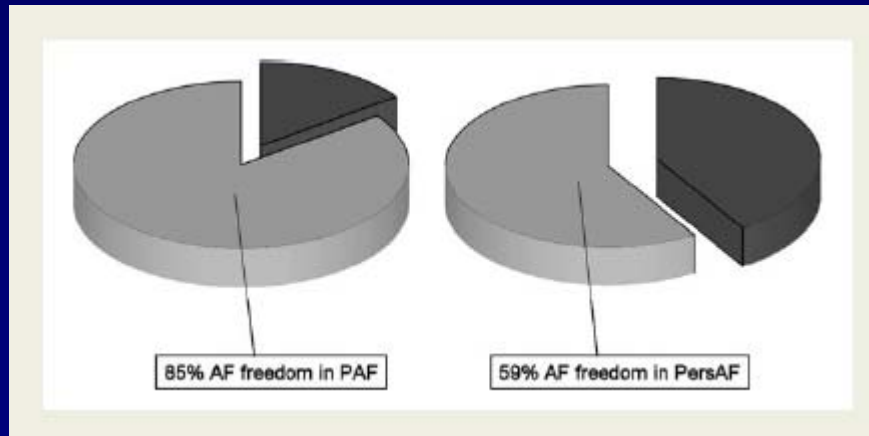
Monitoring for recurrences

- 72 patients with paroxysmal (n=37) or persistent AF underwent CPVA
- Monitoring: Standard ECG and Holter recordings one and four months after ablation + daily TT ECG, from 30 to 120 days after ablation or in the event of symptoms
- Transtelephonic ECG is better than standard ECG and 24h Holter recordings in evaluating AF relapses after RCA



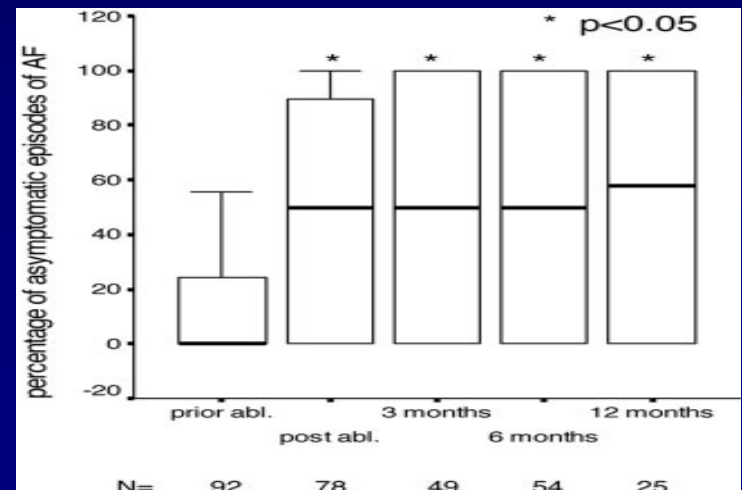
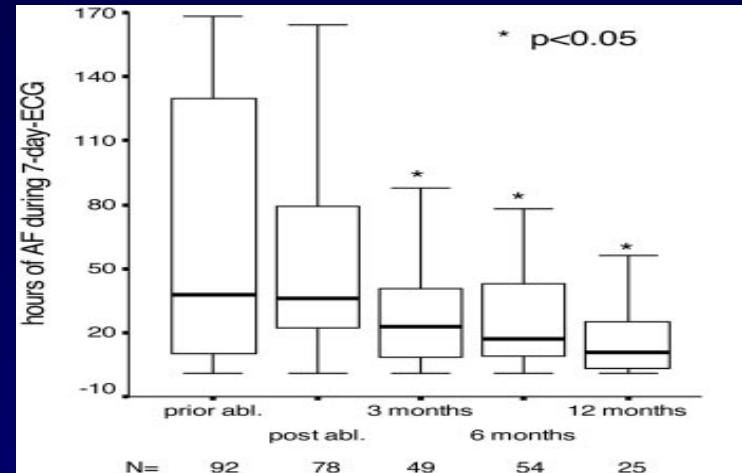
Monitoring for recurrences

37 pts with prior pacemaker/ICD underwent ablation for PAF (n=20) or Pers AF



Perception of AF before and after ablation

- Higher incidence of asymptomatic episodes after catheter ablation
- Symptom based follow-up would overestimate the success rate



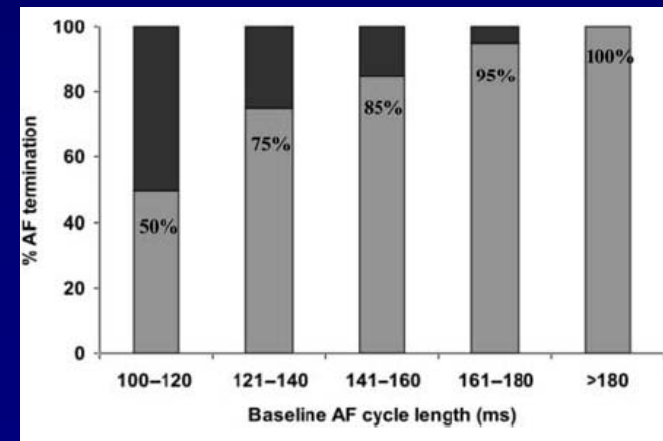
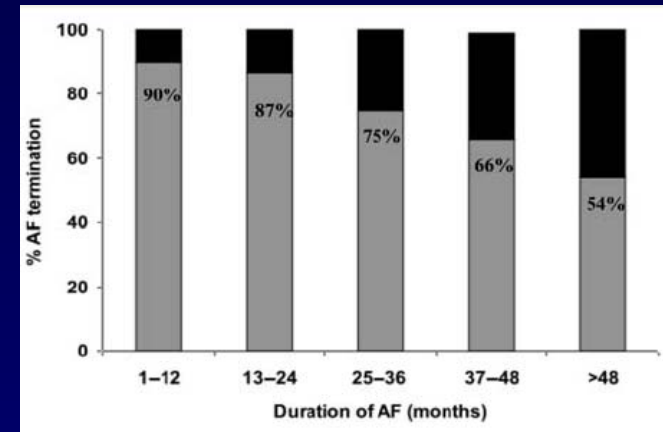
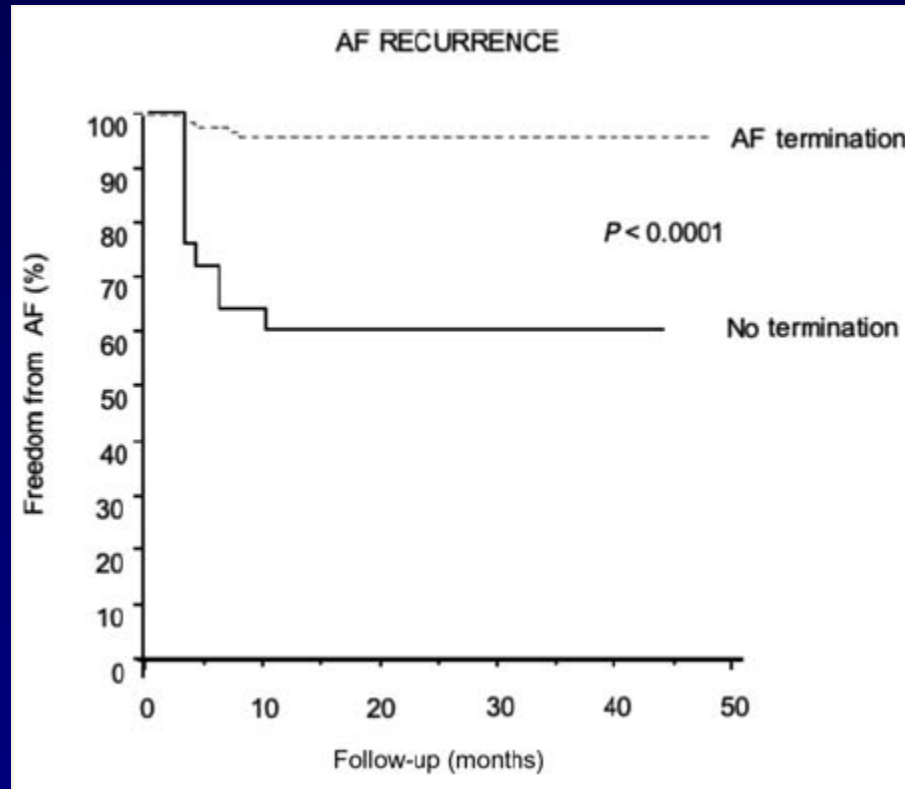
Perception of AF before and after ablation

TABLE 2. Use of β -Blockers and Antiarrhythmic Drugs, Mean Heart Rate During AF, and Mean Heart Rate During SR in Patients With AF

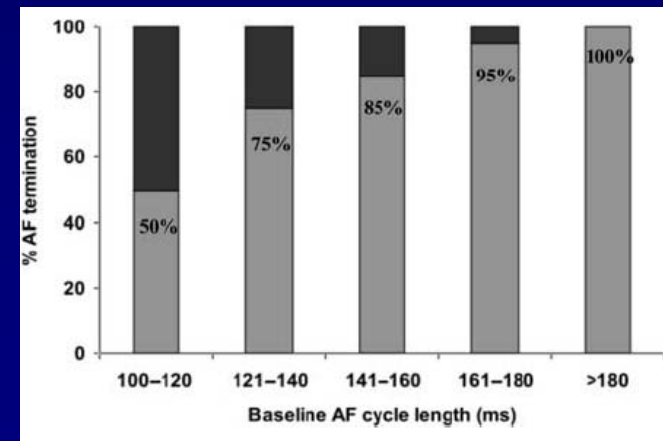
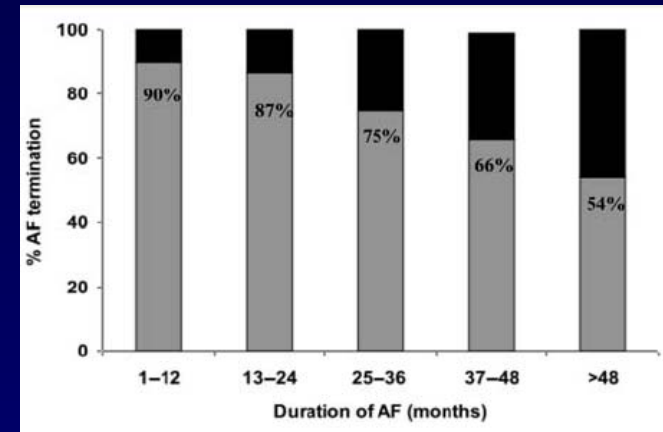
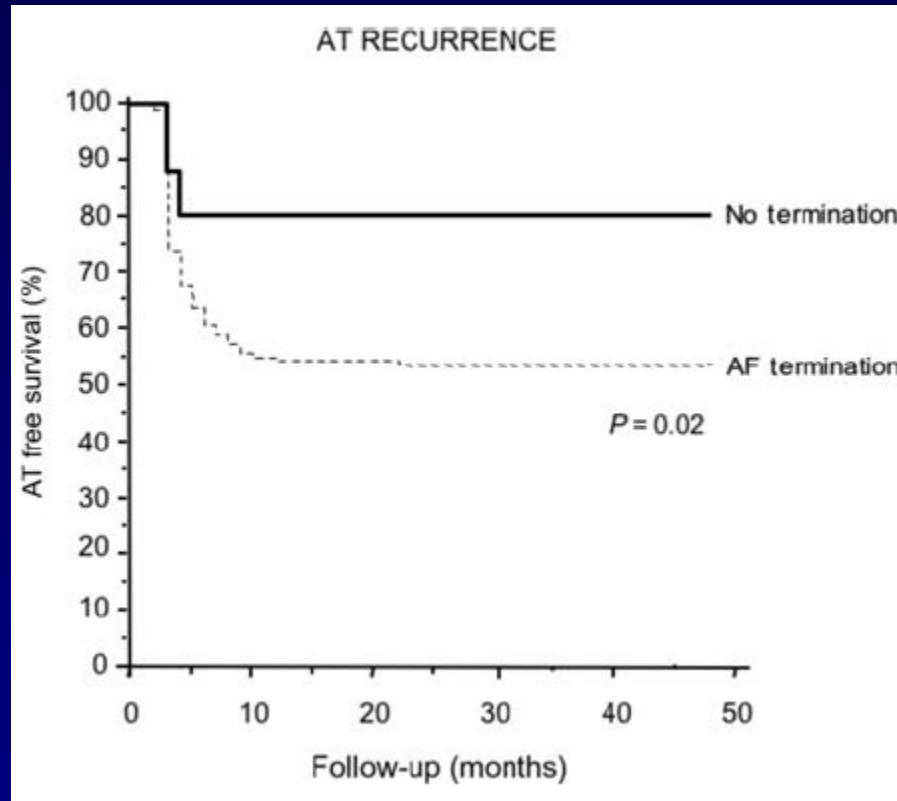
	Before Ablation	After Ablation	3 Months	6 Months	12 Months
No.	114	114	114	108	70
No. of patients with AF	92 (81%)	78 (68%)	49 (43%)	54 (50%)	25 (36%)
β -Blockers	57%	77% $P=0.013$	86% $P=0.012$	70% $P=0.14$	72% $P=0.1$
Class Ic antiarrhythmics	51%	58% $P=0.16$	51% $P=0.51$	35% $P=0.014$	24% $P=0.001$
Class III antiarrhythmics	41%	23% $P=0.002$	30% $P=0.08$	16% $P=0.001$	16% $P=0.001$
AF-HR (25th, 75th percentile)	110 (95, 120)	100 (90, 120) $P=0.08$	100 (91, 120) $P=0.64$	110 (90, 120) $P=0.73$	110 (90, 130) $P=0.45$
SR-HR (25th, 75th percentile)	66 (60, 75)	66 (60, 72) $P=0.99$	65 (60, 72) $P=0.52$	65 (56, 74) $P=0.43$	70 (59, 74) $P=0.99$

- During 6,9,12 m follow-up the % of pts taking b-blockers remained stable and the % of pts taking antiarrhythmic drugs significantly decreased
- The mean heart rate during AF was not significantly different
- Possible explanations for asymptomatic arrhythmias:
 - placebo effect
 - ablation-induced change in arrhythmia pattern
 - ablation-induced modulation of the autonomic nervous system.

Procedural and pre-procedural predictors of clinical outcome



Procedural and pre-procedural predictors of clinical outcome



Clinical Significance of Early Recurrences of Atrial Fibrillation

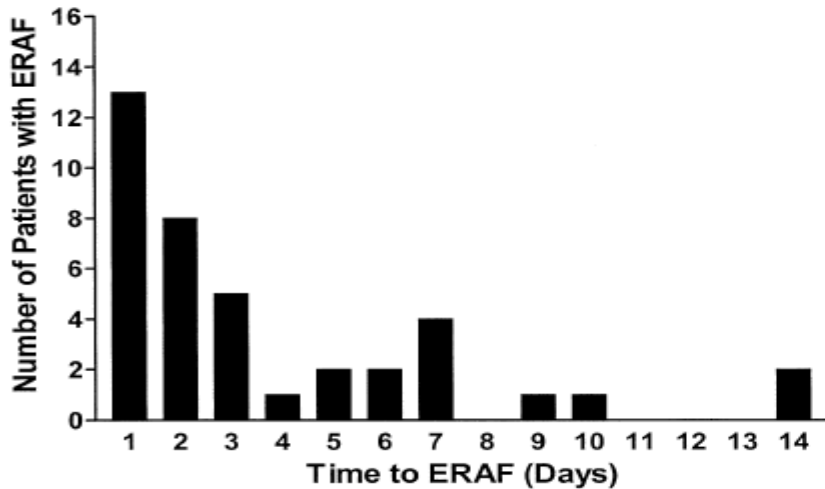
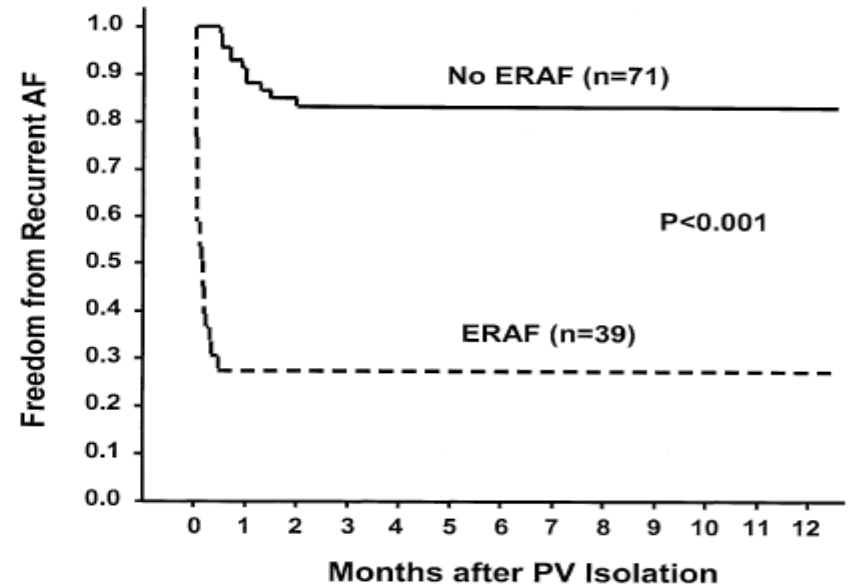


Figure 2. Time to the first episode of atrial fibrillation in 39 patients who had early recurrence of atrial fibrillation (ERAF).



Oral et al. JACC 2002;40:100–4

- Early recurrence of AF is predictor of long-term ablation failure
- Approximately 30-50% of patients with early recurrence have no further symptomatic AF during long-term follow-up

Bertaglia et al. PACE 2005;28(5):366-71

Richter et al. Am J Cardiol 2008;101(6):843-7

Possible mechanisms of post-ablation early transient arrhythmias

- Transient stimulatory effect of RF secondary to the inflammatory response developing after thermal injury and/or pericarditis
- Transient imbalance of the autonomic system ultimately acting as an arrhythmia trigger and
- Delayed effect of RF ablation likely attributable to growth or maturation of the ablation lesions in the days immediately after the procedure.

Calkins et al. Europace 2007;9:335–379

Pharmacological treatment: Antiarrhythmic therapy post ablation

- AAD therapy enhances the efficacy of the procedure
- The mechanism of post ablation AF may be different from clinical arrhythmia
- Catheter ablation may be partially effective and allow a patient with AF previously refractory to antiarrhythmic therapy to be drug responsive

Optimal timing for the second procedure

- Pharmacological treatment of symptomatic recurrences (rhythm and rate control)
- Waiting for edema and inflammation process to resolve
- More symptomatic arrhythmias must be treated interventionally

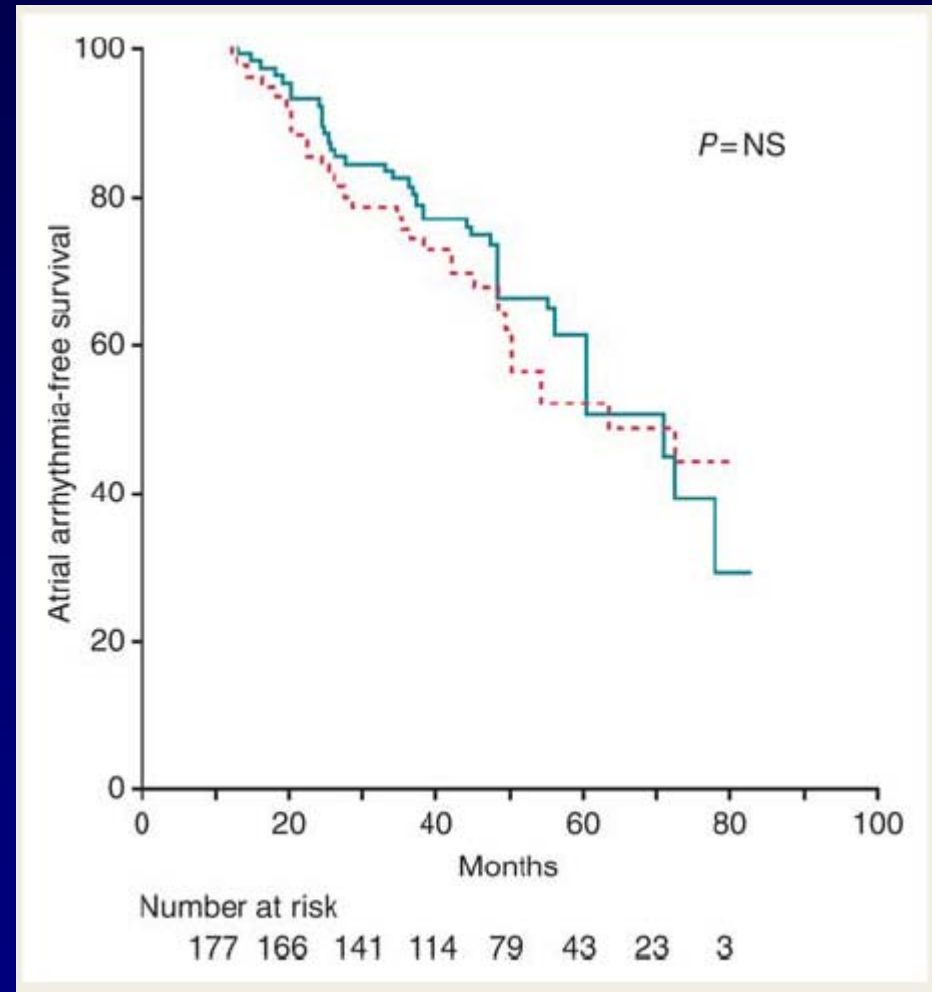
Does catheter ablation cure AF?

Long term follow-up

- 229 pt (Feb 2001 - Oct 2003)
- 77% success rate at 12m

Recurrence rate:

- 13.0% at 2 years
- 21.8% at 3 years
- 35.0% at 4 years
- 46.8% at 5 years
- 54.6% at 6 years



Bertaglia et al. Europace 2010;12:181–187

Pharmacological treatment: anticoagulants

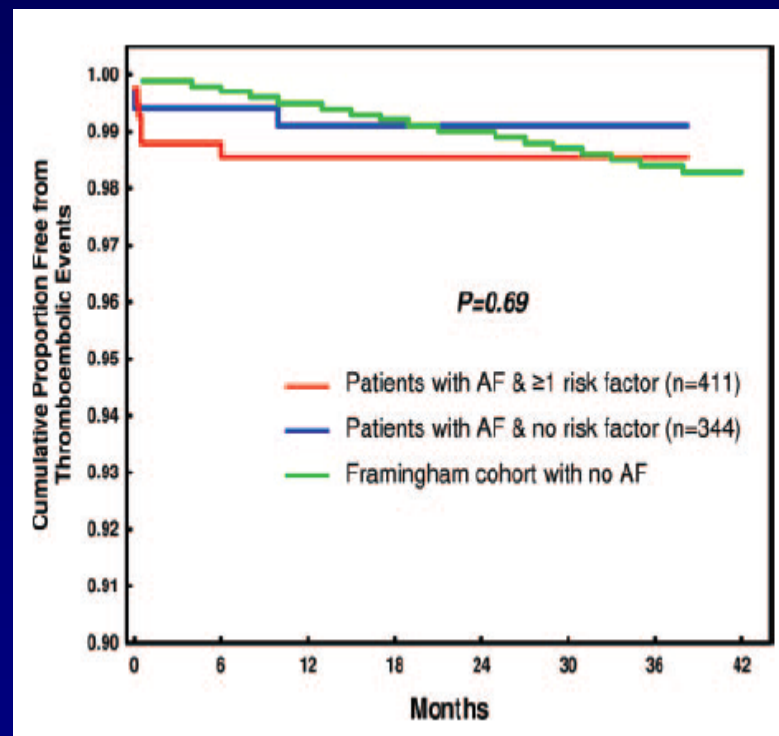
- Is it safe to stop anticoagulation therapy after successful ablation?

Risk of Thromboembolic Events After Percutaneous Left Atrial Radiofrequency Ablation of Atrial Fibrillation

Hakan Oral, MD; Aman Chugh, MD; Mehmet Özaydın, MD; Eric Good, DO; Jackie Fortino, RN; Sundar Sankaran, MD; Scott Reich, MD; Petar Igic, MD; Darryl Elmouchi, MD; David Tschopp, MD; Alan Wimmer, MD; Sujoya Dey, MD; Thomas Crawford, MD; Frank Pelosi, Jr, MD; Krit Jongnarangsin, MD; Frank Bogun, MD; Fred Morady, MD

The risk of a TE after ablation is 1.1%, with most events occurring within 2 weeks after the procedure.

Discontinuation of anticoagulant therapy appears to be safe after successful ablation, both in patients without risk factors for stroke and in patients with risk factors other than age 65 years and history of stroke.



Circulation. 2006;114:759-765.

Thromboembolic events occur despite sinus rhythm maintenance in patients treated for atrial fibrillation: The Canadian Trial of Atrial Fibrillation experience

Bernard Thibault MD¹, Mario Talajic MD², Marc Dubuc MD¹, Peter Guerra MD¹, Pierre Gagné MD¹, Denis Roy MD¹

Thromboembolic events associated with suboptimal levels of anticoagulation and occur despite sinus rhythm maintenance

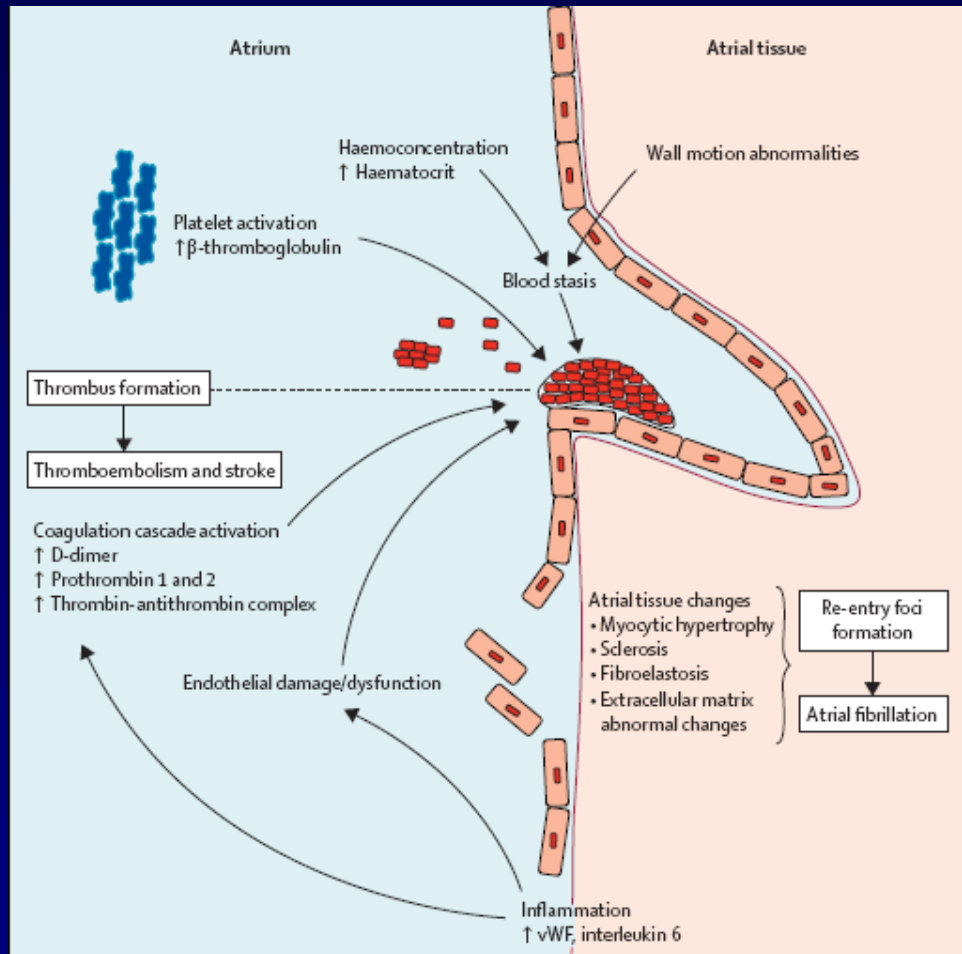
TABLE 3

Details of the nine thromboembolic events that occurred in patients enrolled in the Canadian Trial of Atrial Fibrillation

Patient	Age (years)	Major RF	Minor RF	Medication	Rhythm	Event	Time of event
1	75	Age	DB	ASA	SR	Stroke	18 months
2	74	HTN	Age		SR	Stroke	2 months
3	75	Age+SHD		Warfarin*	SR	Stroke	3 months
4	52	SHD+TIA		Warfarin†	SR	TIA	6 months
5	83	Age+HTN		Warfarin‡	AF	TIA	12 months
6	57		CAD	Warfarin§	SR	TIA	20 days
7	62	TIA		Warfarin¶	SR	TIA	24 h
8	60	HTN		ASA	SR	TIA	5 months
9	69	HTN	Age	ASA	SR	SE	5 months

*International normalization ratio (INR) is 1.4; †INR is 2.9; ‡INR is 1.7; §INR is 2.0; ¶INR is 2.1. AF Atrial fibrillation; ASA Acetylsalicylic acid; CAD Coronary artery disease with preserved left ventricular function; DB Diabetes; HTN Hypertension; RF Risk factor; SE Systemic embolism; SHD Structural heart disease; SR Sinus rhythm; TIA Transient cerebral ischemic attack

Mechanisms of stroke in AF patients



Post-procedure Management

- Low molecular weight heparin or intravenous heparin should be used as a bridge to resumption of systemic anticoagulation following AF ablation.
- Warfarin is recommended for all patients for at least two months following an AF ablation procedure.
- Decisions regarding the use of warfarin more than two months following ablation should be based on the patient's risk factors for stroke and not on the presence or type of AF.
- Discontinuation of warfarin therapy post ablation is generally not recommended in patients who have a CHADs score ≥ 2 .

Calkins et al. Europace 2007;9:335–379

CABANA TRIAL

Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation Trial

- 3000 patients will be randomized in a 1:1 ratio to treatment with the strategy of catheter ablation vs. that of state-of-the-art drug therapy for either rate or rhythm control.
- 3 yrs of enrollment
- **Primary Endpoint and Objective**
 - Mortality
- **Secondary Endpoints and Objectives**
 - A composite endpoint consisting of total cardiovascular mortality, disabling stroke, cardiac arrest, or heart failure hospitalization
 - Cardiovascular death
 - Disabling stroke
 - Arrhythmic death and cardiac arrest
 - Heart failure death and hospitalization
 - Life threatening complications from therapy
 - Time to clinical AF recurrence
 - AF burden
 - Medical costs and medical resource utilization
 - Quality of Life

Follow-up: Diagnosis and treatment of non-acute complications

- Esophageal injury/atrio-esophageal fistula
 - incidence < 0,25%
 - presents 2-4 weeks after the ablation
 - symptoms: fever, chills, recurrent neurological events, septic shock or death
- Pulmonary vein stenosis
 - Incidence 0-38%
 - Symptoms include chest pain, dyspnea, cough, hemoptysis, recurrent lung infections, and those of pulmonary hypertension
- Phrenic nerve injury
 - Incidence 0-0,48%
 - asymptomatic , dyspnea, hiccups, atelectasis, pleural effusion, cough, thoracic pain
 - phrenic nerve function recovered between 1 day and more than 12 months

AF ablation in HF pts: The need for success

	Pts No	Pers-Perm AF (%)	Mean EF (%)	Follow-up (months)	Success Rate (%)	EF improvement (%)
De Potter et al. <i>Europace 2010</i>	36	61	41,4	16±13	69	18
Bortone et al. <i>Europace 2009</i>	6	100	25,8	18,1±5,7	100	97
Khan et al./ PABA invest <i>NEJM 2008</i>	41	51	27	6	88	29
Lutomsky et al. <i>Europace 2008</i>	18	0	41	5±1,3	50	24
Efremidis et al. <i>Hell J C 2008</i>	13	100	35	12	62	60
Gentlisk et al. <i>JCE 2007</i>	67	55	42	6	86	33
Tondo et al. <i>PACE 2006</i>	40	50	33	14±2	87	42
Hsu et al. <i>NEJM 2004</i>	58	91	35	12±7	78	21
Chen et al. <i>JACC 2004</i>	94	57	36	14±6	73	14

Atrial fibrillation in heart failure: The chicken or the egg?

- What is the contribution of tachymyocardiopathy on cardiac function?
- The answer to this question can help in patient selection for catheter ablation

♂ 64ys hypertension, DM

1st CV
successful

2nd CV
successful

3rd CV
unsuccessful

6,5 y in AF

CPVA

AF →

Amio

propafenon

B-blocker



1999

2001

2002

2008

EF=50%

EF=50%

EF=20%

LVEDD=70mm

LAD=58mm

MR: 2-3+/4+

NYHA III-IV

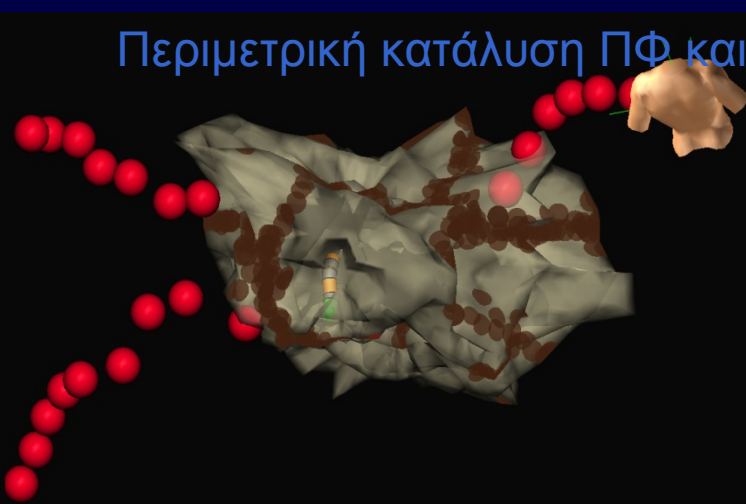
HR: 70 bpm

QRS:160ms

Coro: No significant lesions



Περιμετρική κατάλυση ΠΦ και δημιουργία γραμμών στον αριστερό κόλπο



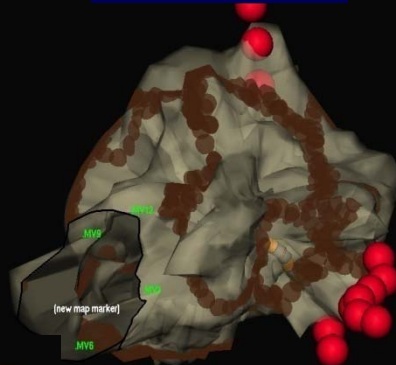
Electrode spacing: | Distal | D-2 | 2-3 | 3-4 |
Nominal (mm) 4.0 2.0 5.0 2.0

Απομόνωση ΠΦ και γραμμές στο οπίσθιο τοίχωμα

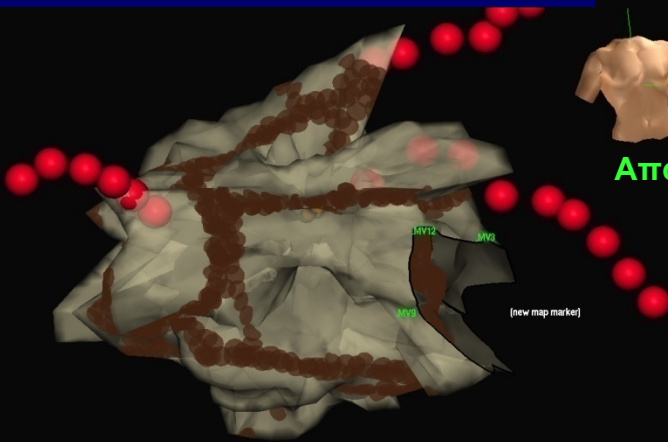


Electrode spacing: | Distal | D-2 | 2-3 | 3-4 |
Nominal (mm) 4.0 2.0 5.0 2.0

Γραμμή αριστερού ισθμού

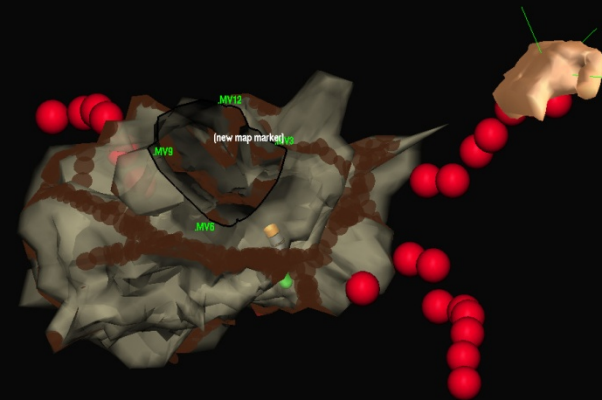


Απομόνωση του αριστερού ωτίου



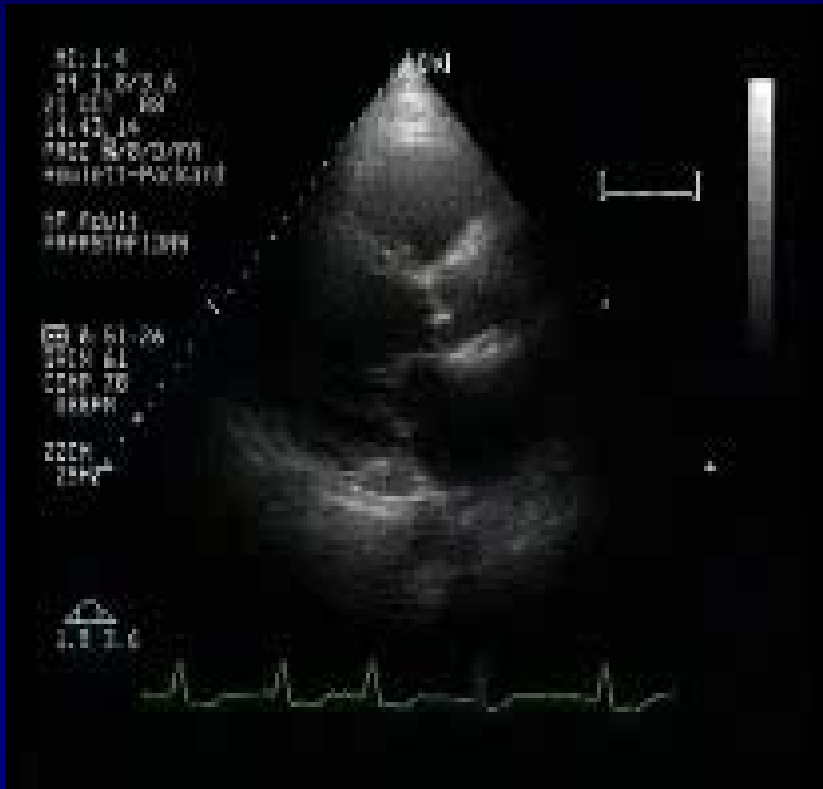
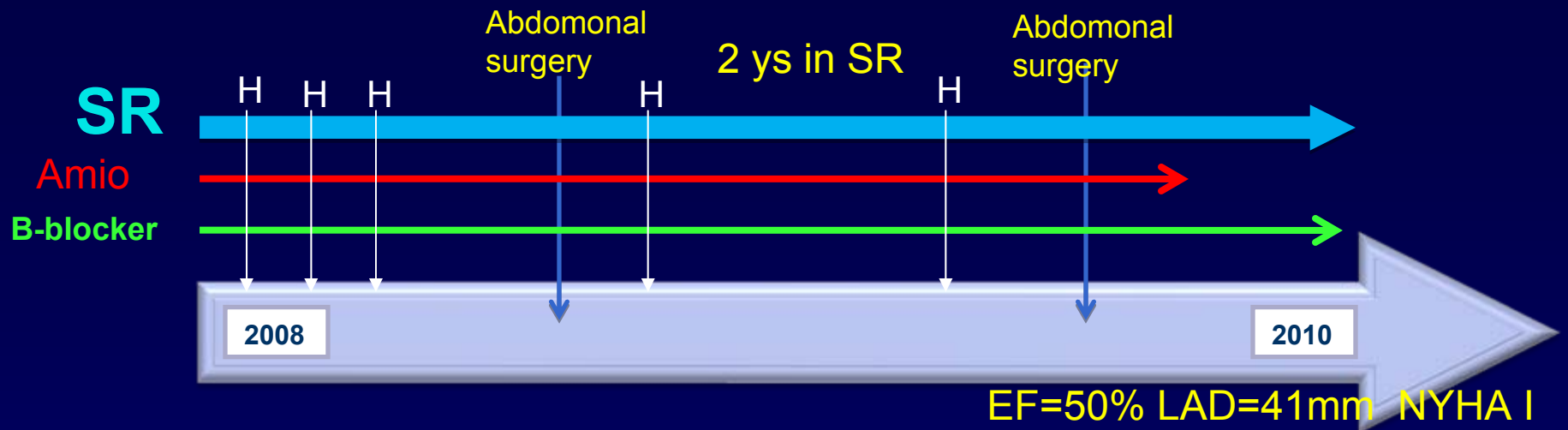
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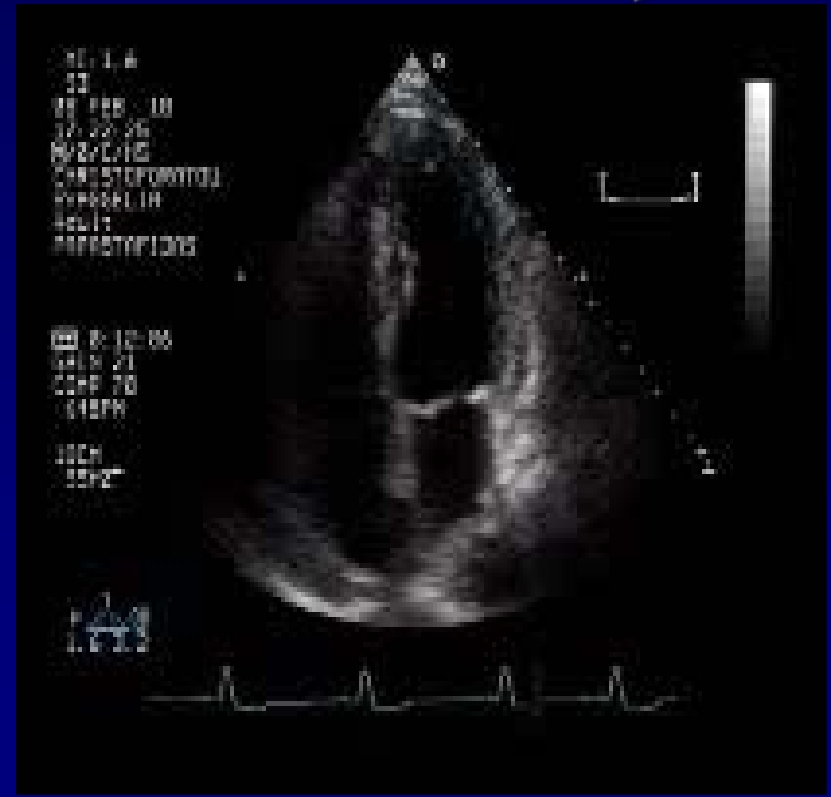
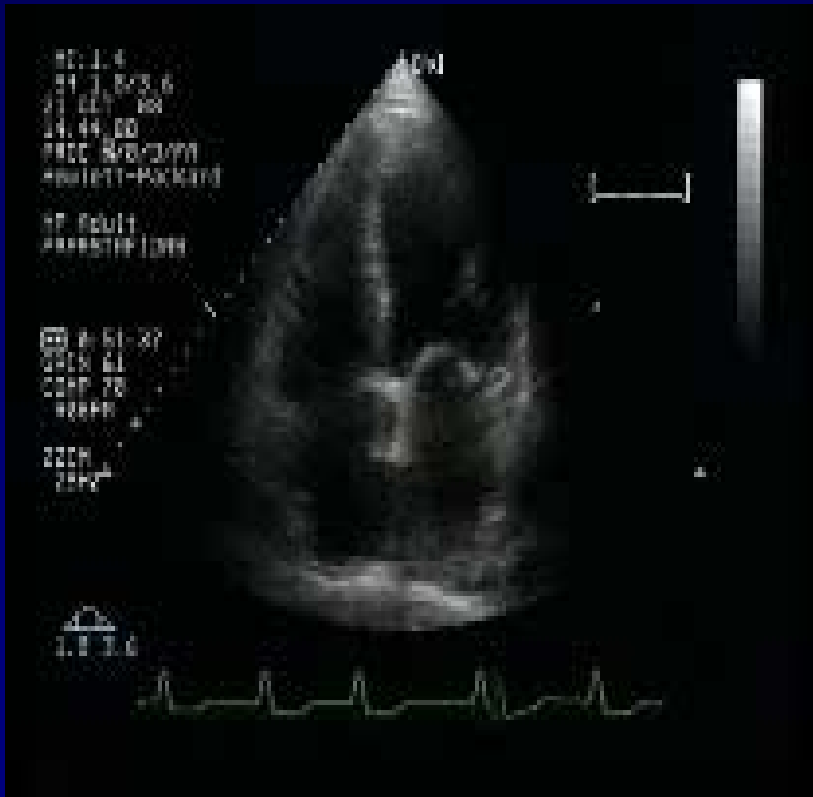
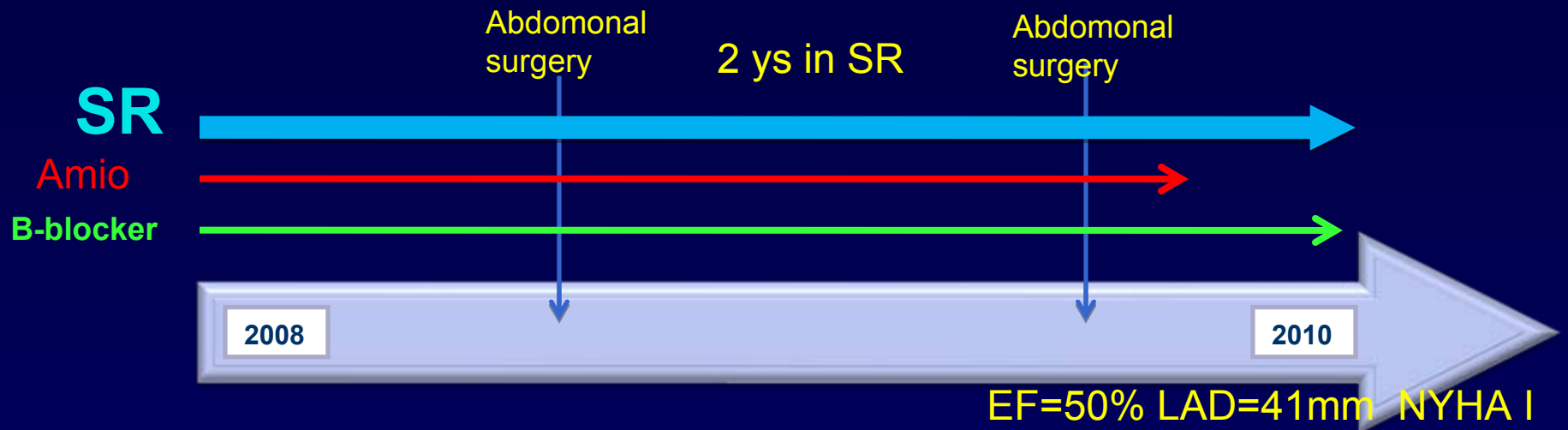
Γραμμές στο ανώτερο και κατώτερο μεσοκολπικό

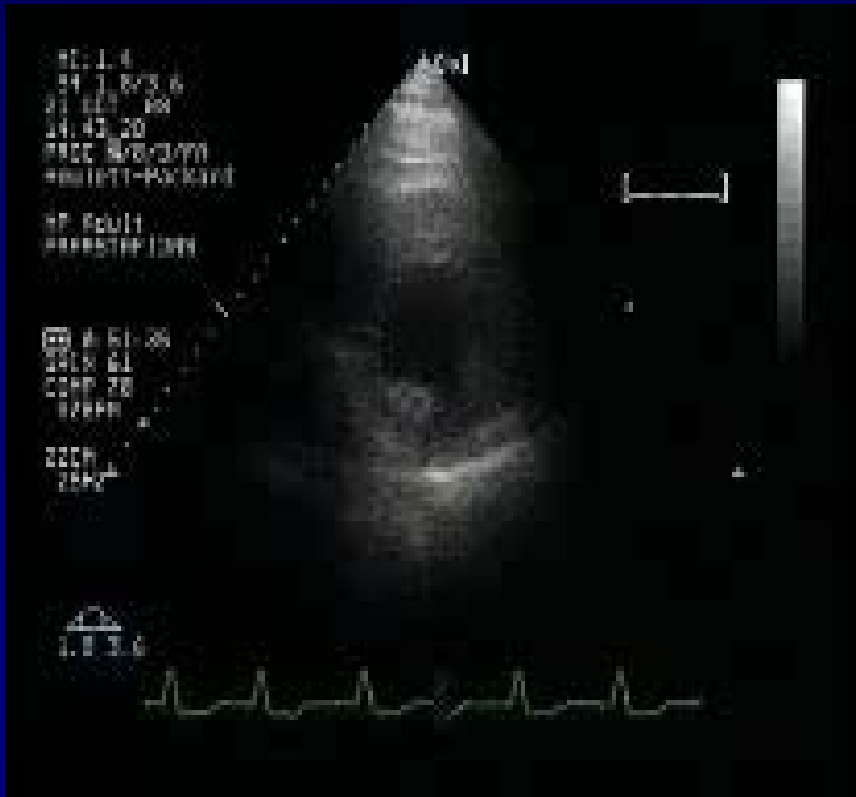
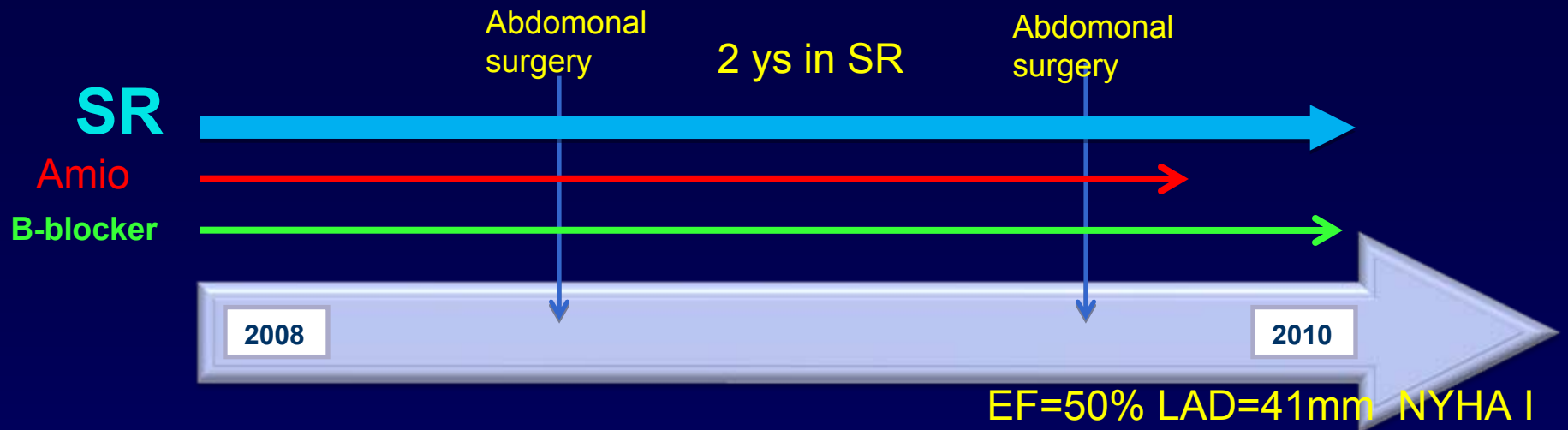


Electrode spacing: | Distal | D-2 | 2-3 | 3-4 |
Nominal (mm) 4.0 2.0 5.0 2.0

Γραμμή παράλληλα στον κατώτερο ΜΑ







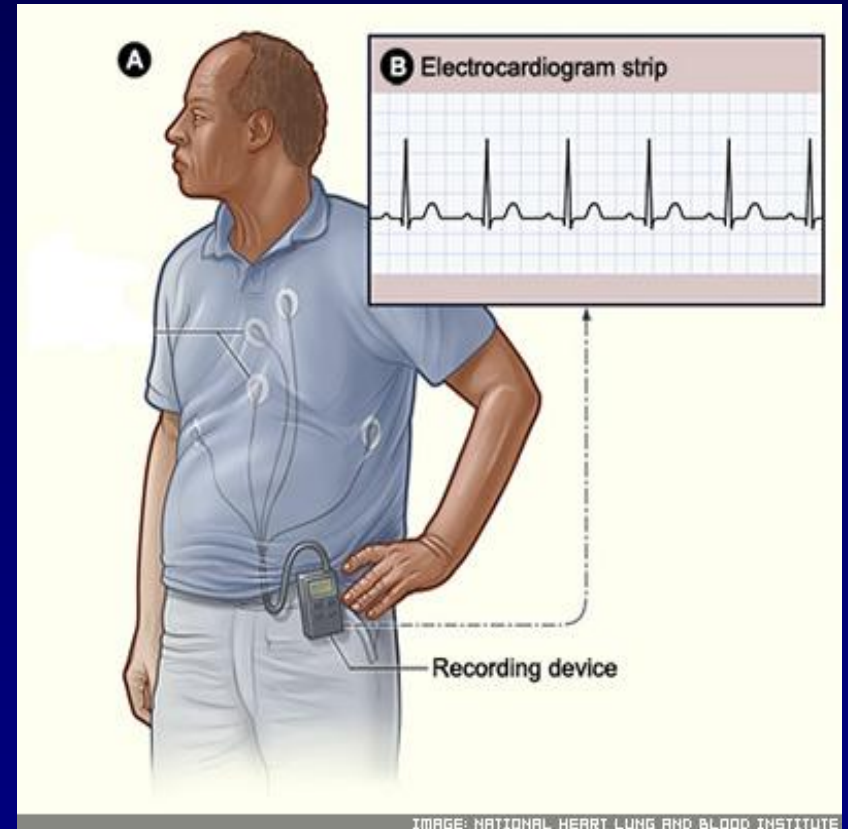
CASTLE-AF Trial

Catheter ablation versus standard conventional treatment in patients with left ventricular dysfunction and atrial fibrillation

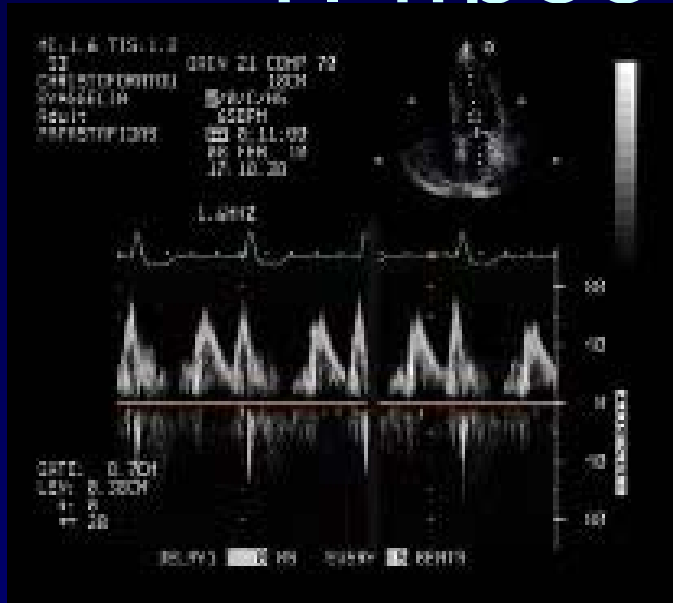
- 420 patients for a minimum of 3 y FU
- Randomization: Catheter ablation vs conventional treatment
- Primary endpoint
 - composite of all-cause mortality or worsening of heart failure
- Secondary endpoints
 - all-cause mortality
 - cardiovascular mortality
 - cerebrovascular accidents,
 - worsening of heart failure requiring unplanned hospitalization
 - all-cause hospitalization
 - quality of life,
 - number of therapies (shock and antitachycardia pacing) delivered by the ICD
 - time to first ICD therapy,
 - number of device-detected VT-VF
 - AF burden
 - left ventricular function
 - percentage of RV pacing.

Marrouche et al. PACE 2009;32:987-94

Τι προσδοκούμε;



Τι προσδοκούμε:



Morbidity ↓
Mortality ↓