Advances in Cardiac Arrhhythmias and Great Innovations in Cardiology
Torino, 23/24 Ottobre 2015

How should we treat atrial fibrillation in heart failure

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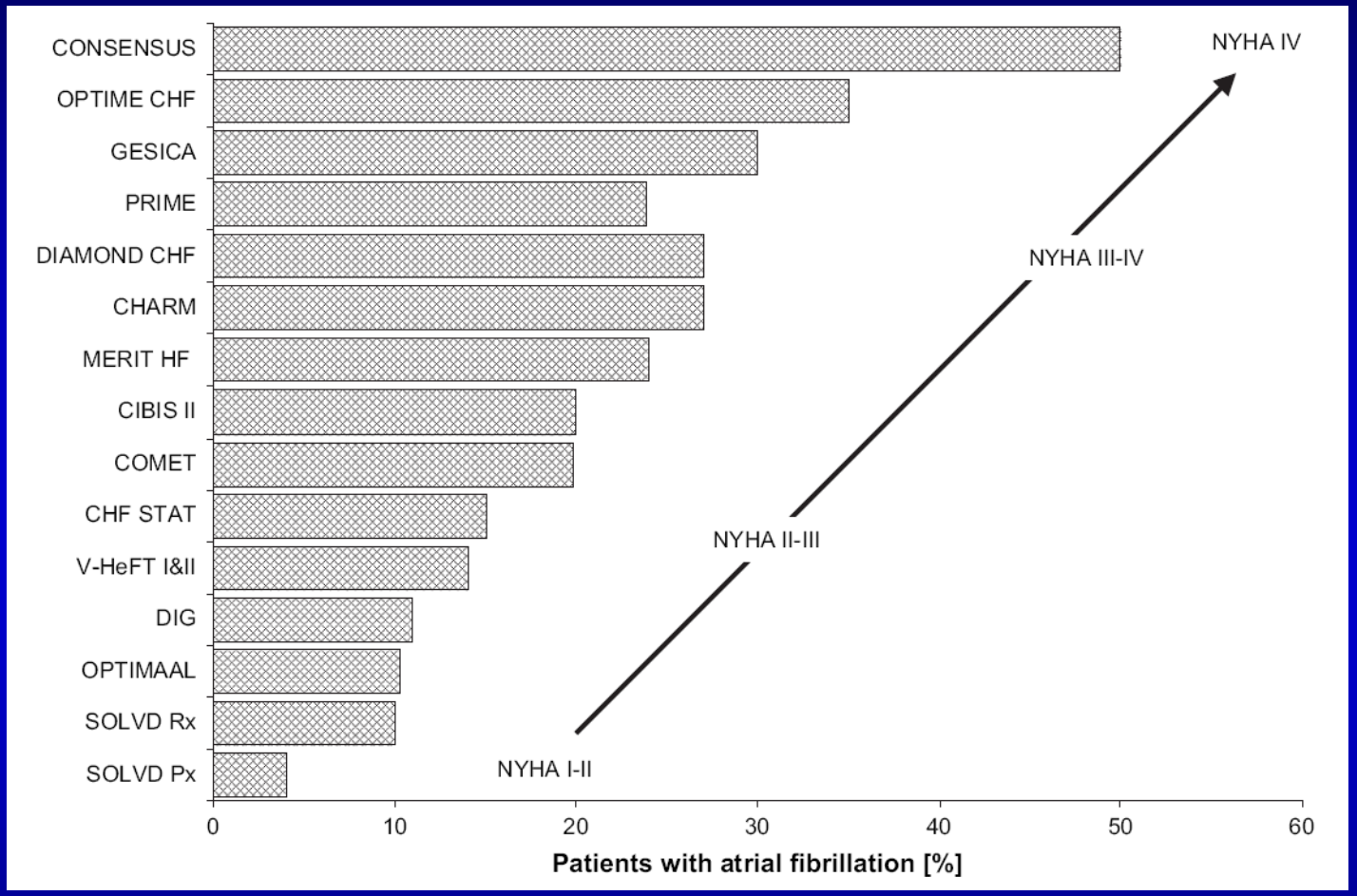
Disclosure:

none related to this topic

Prevalence of AF in clinical studies on CHF



CHF increases the risk of AF by a 4.5 factor in men and 5.9 in women

Savelieva I, Camm J: Europace 2004

AF in patients with HF
increases the risk of death

- **In the VEST study, AF caused an increase of 2.3 times the risk of death in patients with heart failure.**

(Konety, AHA 1998)

- **In the AMIOVIRT study, AF resulted an independent risk factor for mortality (RR 4) in pts with CHF.**

(Strickberger, J Am Coll Cardiol 2004)

- **In the SOLVD study, AF was an independent risk factor for mortality (RR 1.34) and progression of CHF (RR 1.42).**

(Vermes, Circulation 2003)

Pharmacological approaches to treat atrial fibrillation in patients with heart failure

- Amiodarone
- Dronedarone (limited cases)

ANDROMEDA:

ANtiarrhythmic trial with DROnedarone in Moderate to severe CHF Evaluating morbidity DecreAse

The trial was prematurely terminated for an excess mortality in the dronedarone group compared with placebo group

(25 pts, 8.1%, vs 12 pt, 3.8%).

The mortality was predominantly related to worsening of heart failure

Karkowsky AM. FDA Cardiovascular and Renal Advisory Committee. 2009

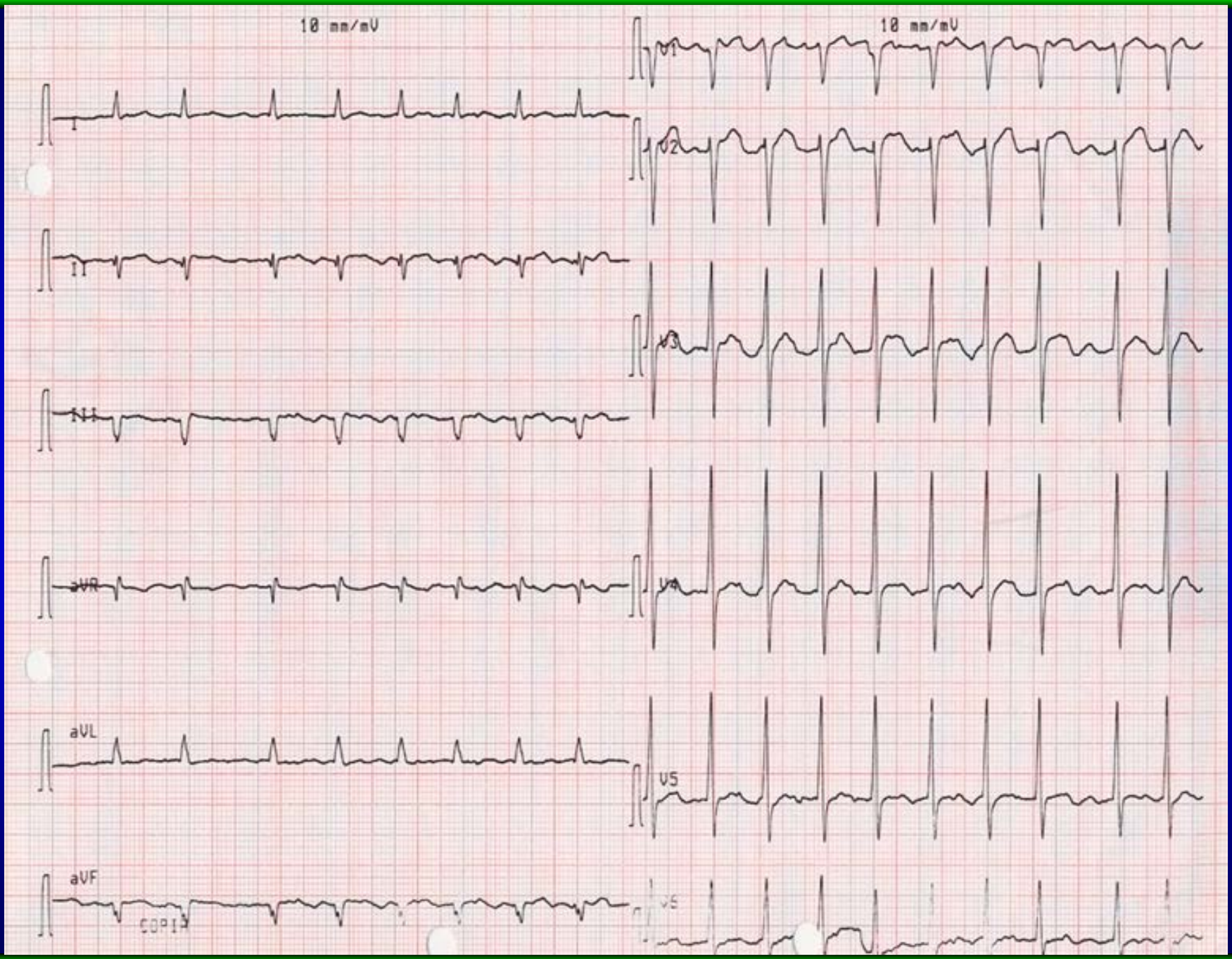
A typical clincal scenario

A 70 years old patient

Hypertension
Mild rheumatic mitral stenosis and regurgitation, normal left ventricle EF

Paroxysmal AF since 2005
Despite pharmacological prophylaxis with IC drugs he required three electrical cardioversions

Following the last cardioversion **amiodarone** was started however, four months later, he presented at the E.R. due to shortness of breath and fatigue


10 mm/mV
10 mm/mV
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aVL
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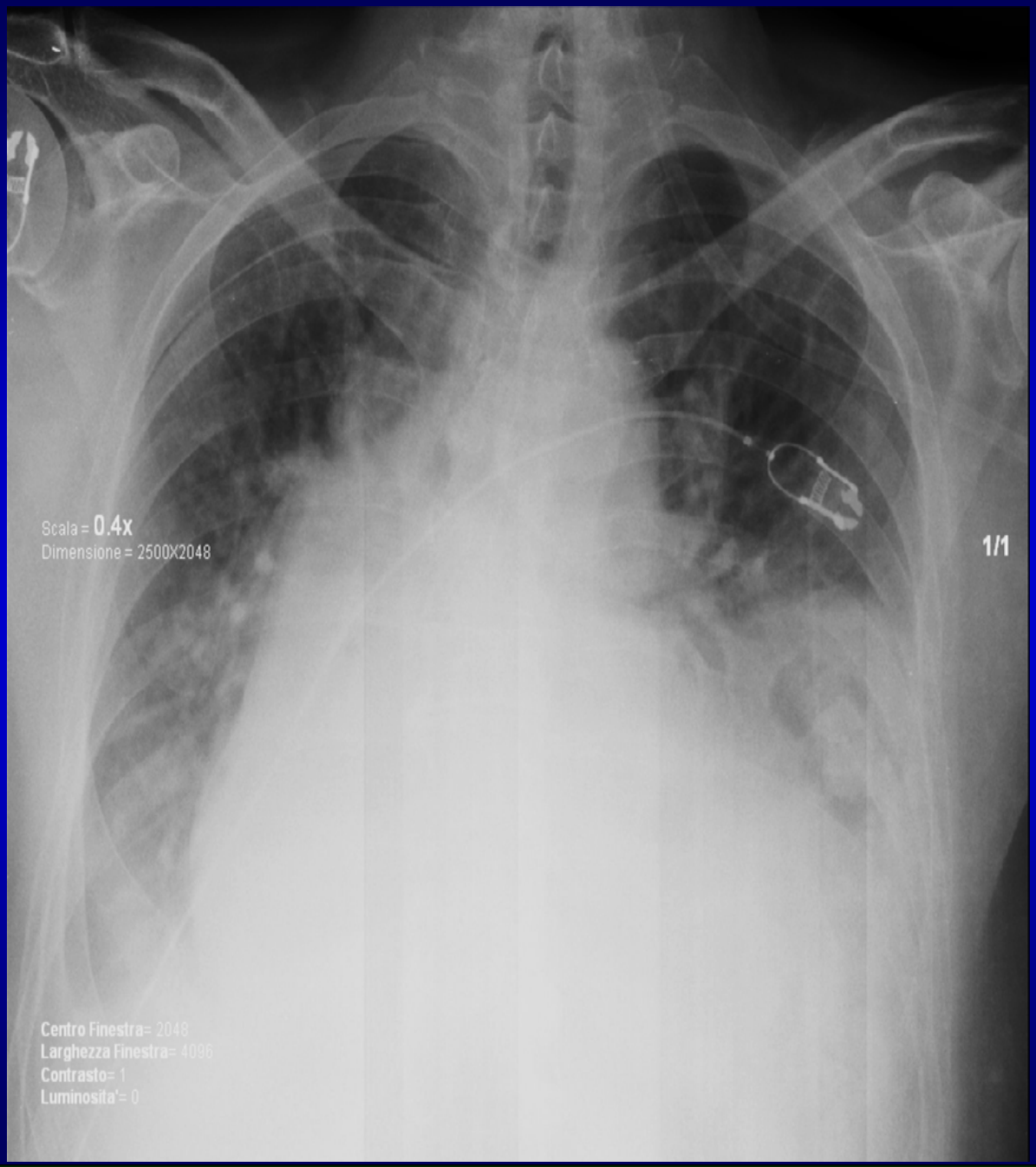
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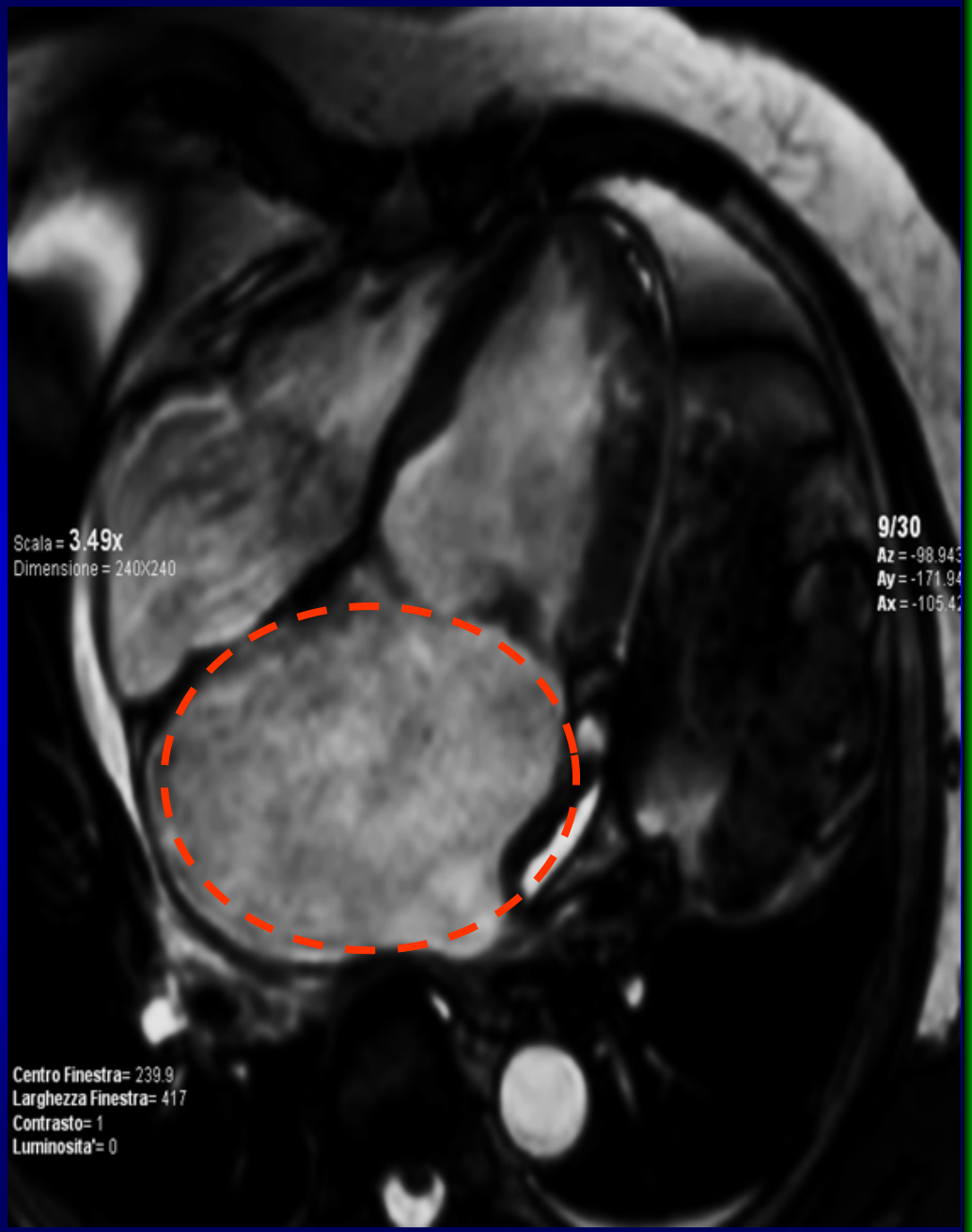
1/1
Centro Finestra= 2048
Larghezza Finestra= 4096
Contrasto= 1
Luminosita'= 0

Echo: dilated left ventricle, EF 35%, severe MR, LA 189 ml/mq (395)

Normal **coronary angio**

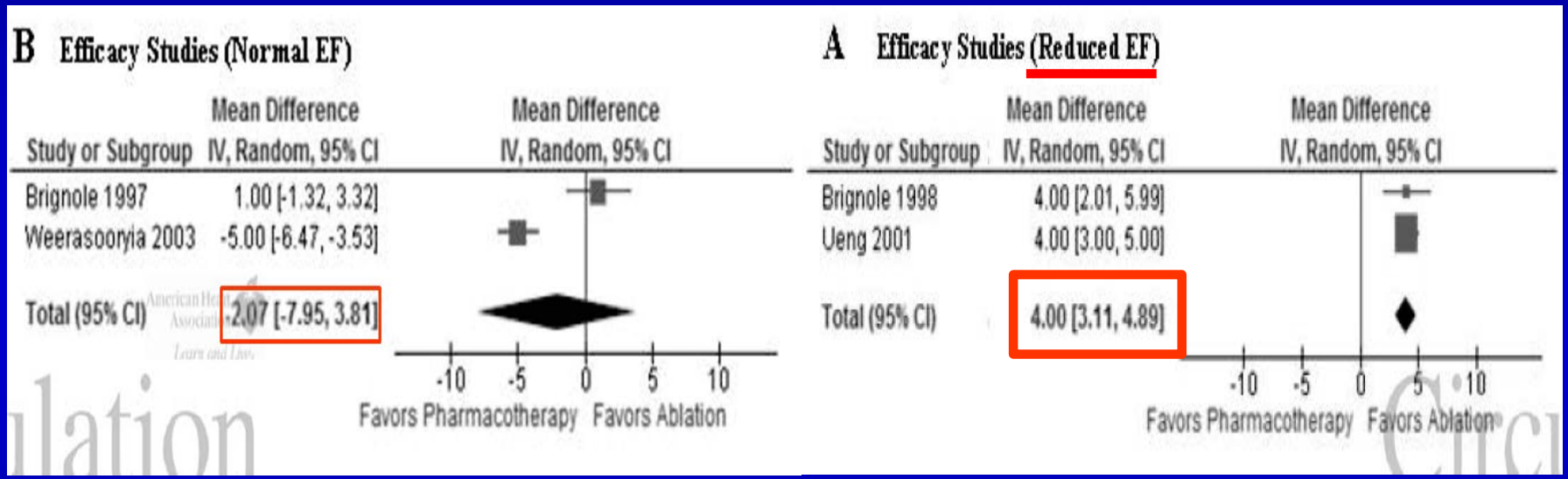
At **cardiac MR**: EF 39%, *subepicardial and intramiocardial late enhancement* at the infero-lateral portion of the left ventricle



Interventional approaches to treat atrial fibrillation in patients with heart failure

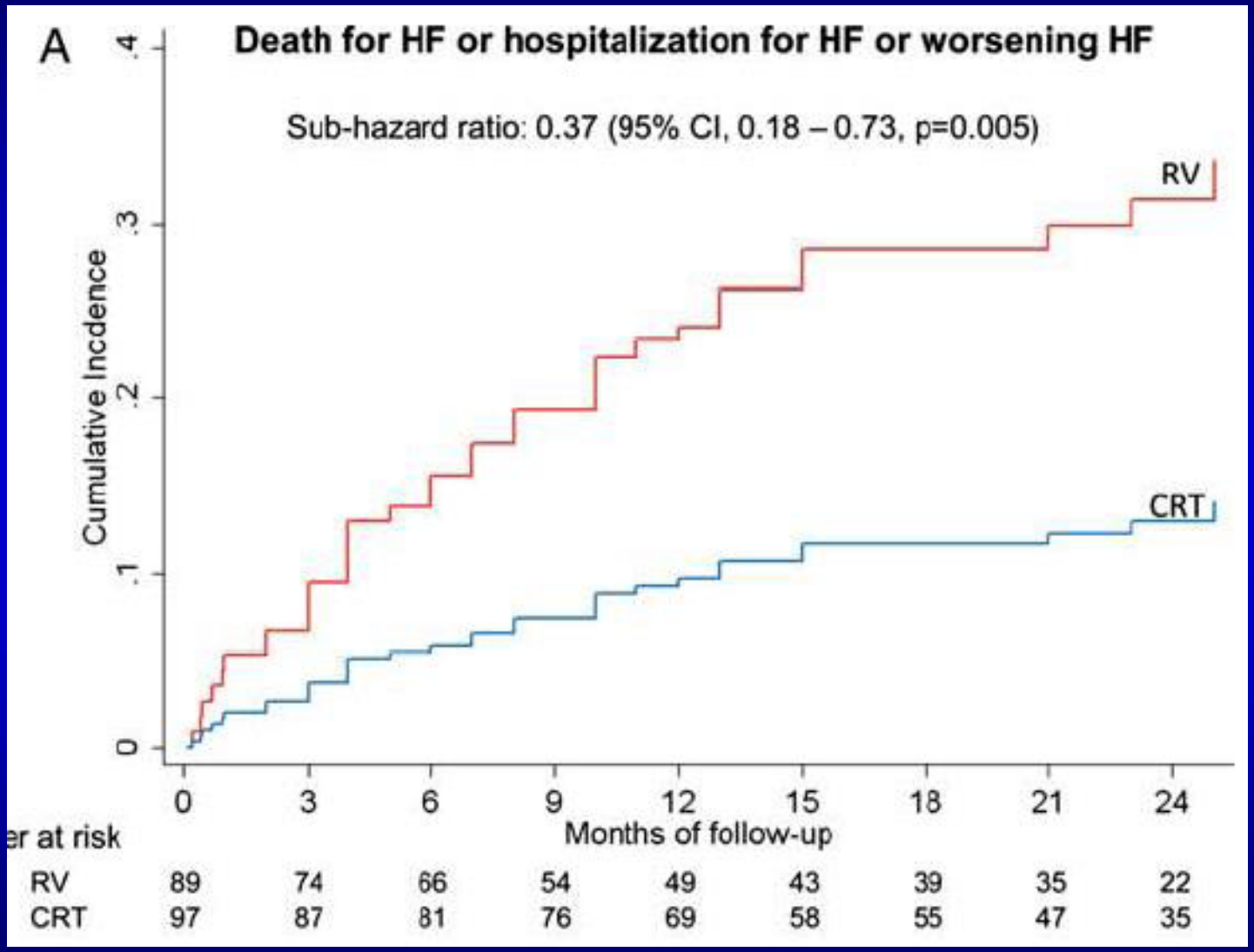
- AV node ablation + RV pacing (1990)
- AV node ablation + CRT (2000)
- Atrial fibrillation ablation (2004)

AV node ablation + RV pacing

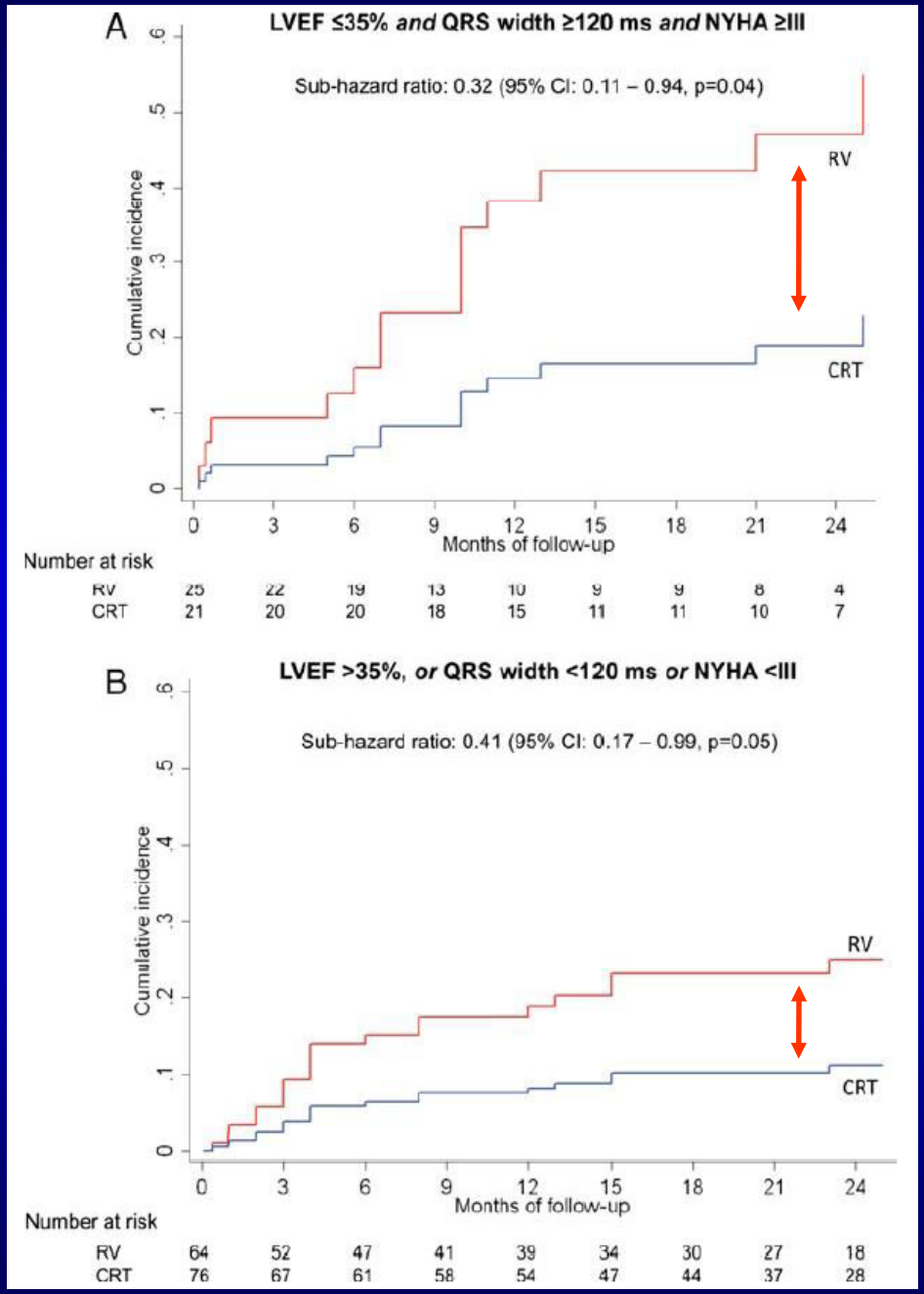


Chatterjee N Circ AE 2011

AV node ablation + RV vs CRT pacing

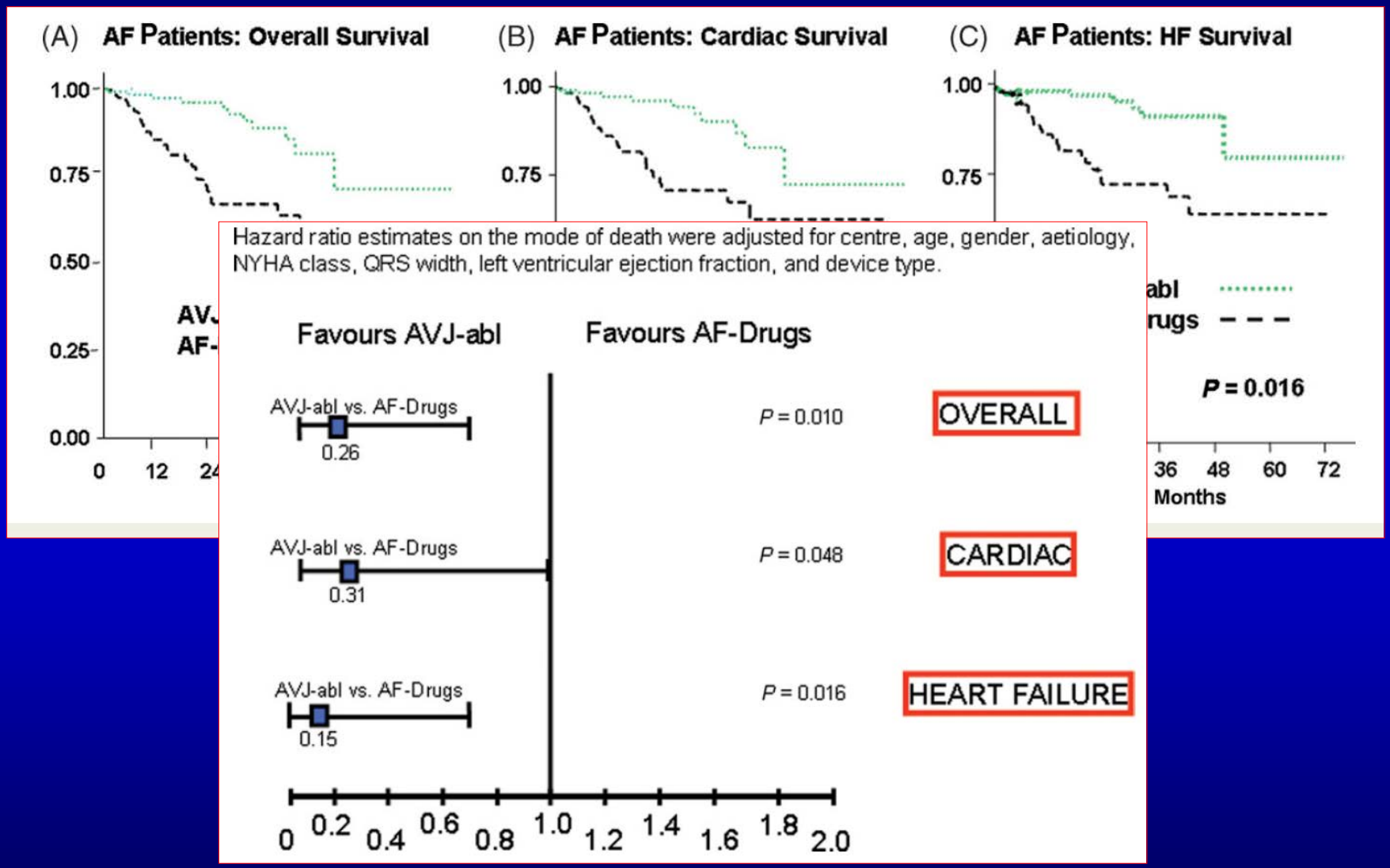


Brignole Eur Heart J 2011



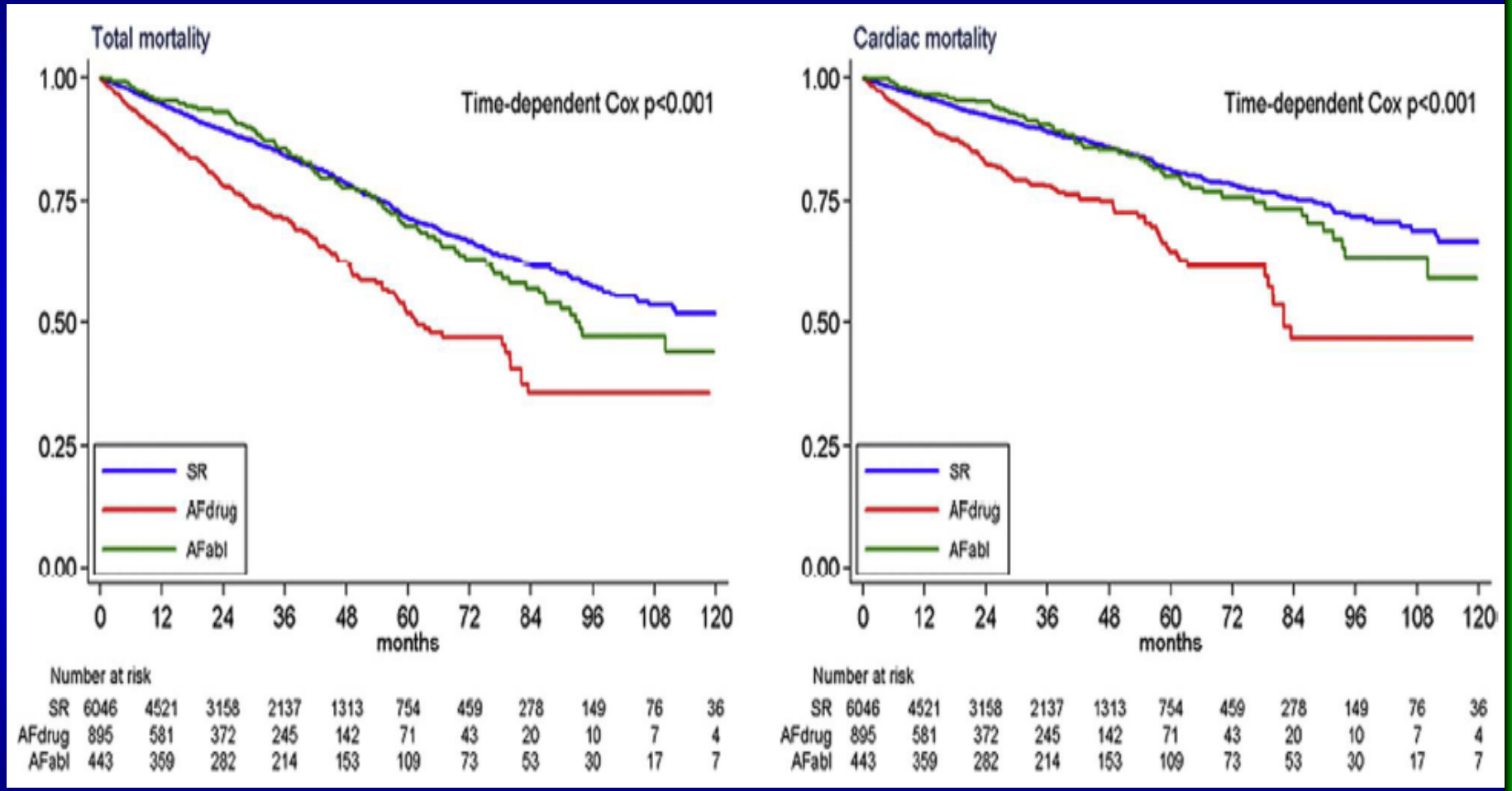
Brignole Eur Heart J 2011

CRT + AV ablation vs. Drugs MILOS study



Gasparini et al. Eur Heart J 2008

CRT + AV ablation vs Drugs CERTIFY study



Gasparini JACC Heart Fail 2013

Atrial fibrillation and heart failure

Triggered activity

Heterogeneous conduction

Atrial fibrosis

Atrial stretch

Pressure and volume overload

~~Atrial fibrillation~~

Heart failure

Fast ventricular rate

Irregular cycles

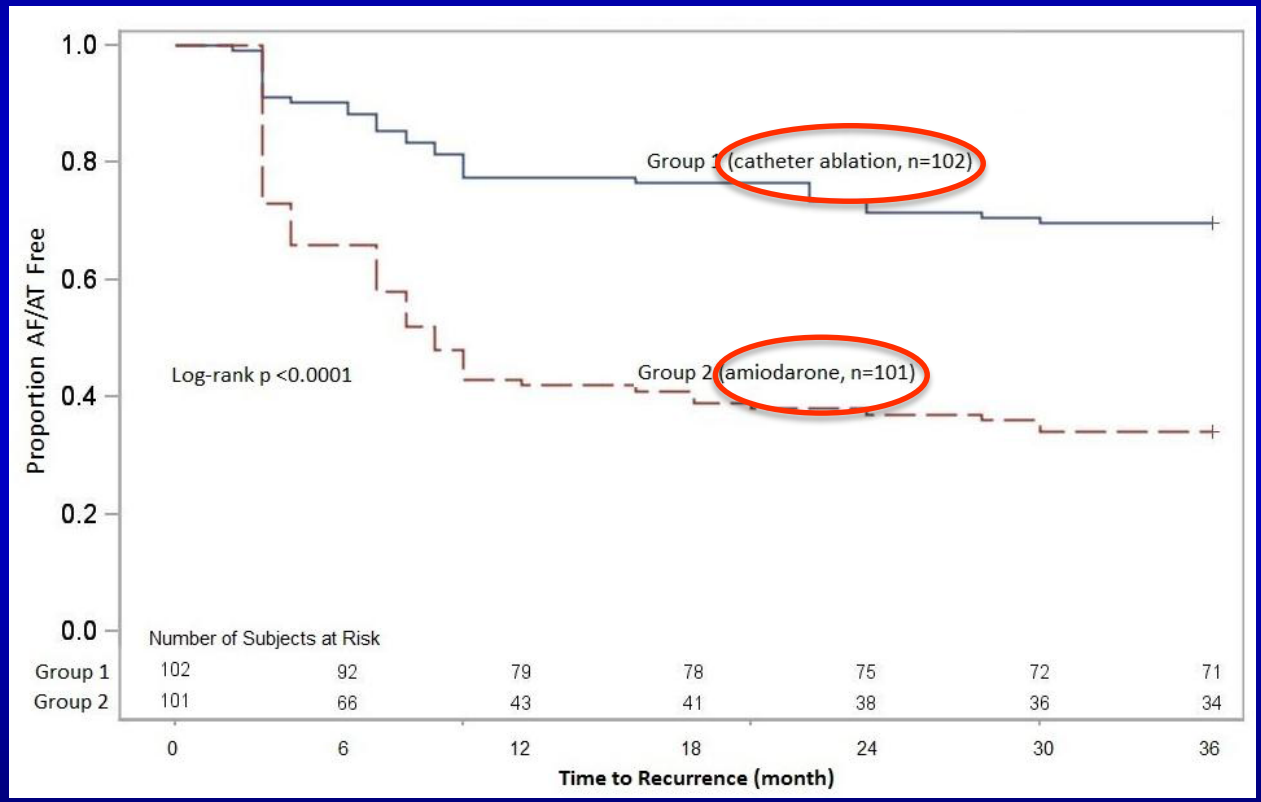
Loss of atrial contraction

Mitral and tricuspid regurgitation

AATAC-AF in Heart Failure

Ablation vs. Amiodarone for Treatment of Atrial Fibrillation in Patients with Congestive Heart Failure and an Implanted ICD/CRTD

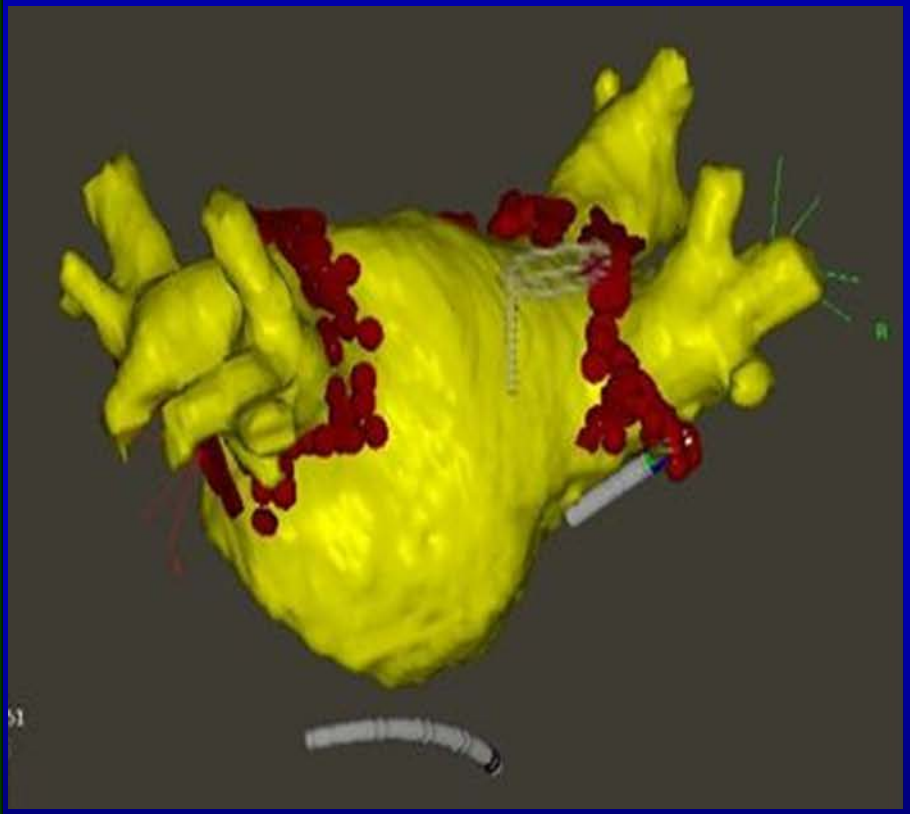
203 patients
Persistent AF
ICD/CRTD
NYHA II-III
LV EF ≤40%

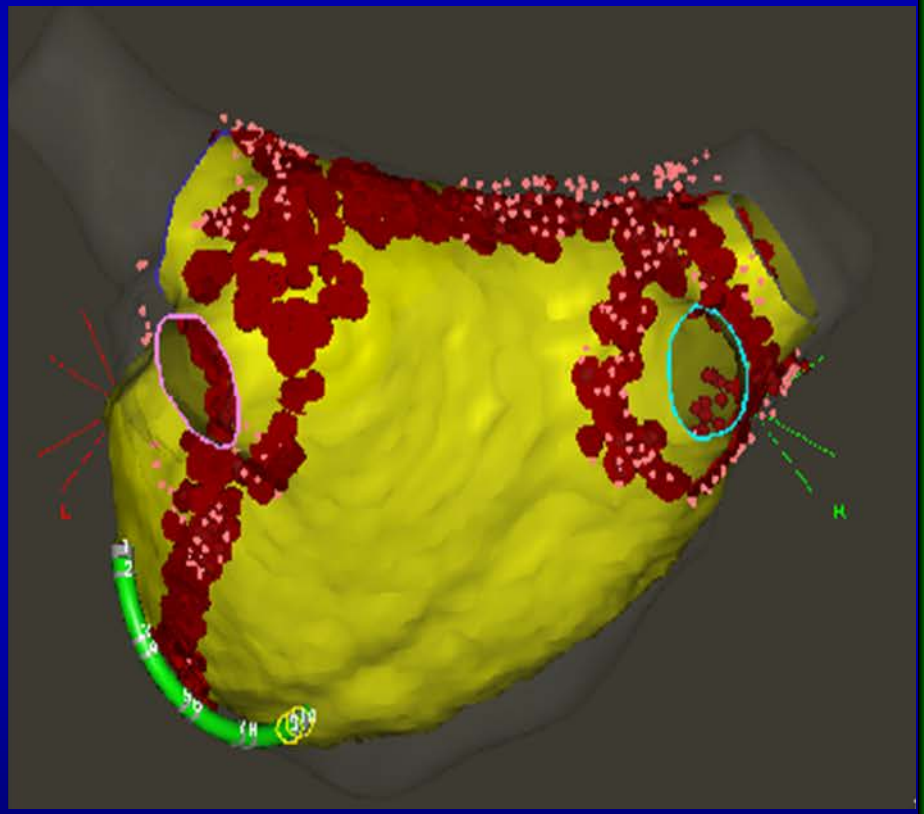


10% of Amiodarone discontinuation due to side effect

Di Biase L, et al. Presented at: American College of Cardiology, San Diego 2015

Transcatheter atrial fibrillation ablation in patients with heart failure





AF ablation in patients with reduced left ventricular ejection fraction

Author, Year (Ref)	N. pts	F-U months	Success single (%)	Redo (%)	Success final (%)	LVEF (%)
Chen 2004	94	14	52	22	73	36→41
Hsu 2004	58	12	28	50	78	35→56
Tondo 2006	40	14	55	33	87	33→47
Gentlesk 2007	67	6	55	31	86	42→56
Nademanee 2008	129	27	-	21	79	30→37
Lutomsky 2008	18	6	50	-	-	41→52
De Potter 2010	36	16	50	31	69	41→58
Cha 2011	111	12	-	-	76	35→56
Anselmino 2013	196	46	45	30	62	40→50
Calvo 2013	36	6	70	31	83	41→48
Nedios 2014	69	28	40	46	65	33→48
Bunch 2015	267	60	39	-	-	27→42
Khan 2008	41	6	71	20	88	27→35
MacDonald 2010	22	10	-	30	50	36→41
Jones 2013	26	10	69	19	88	21→32
Hunter 2014	26	6	38	54	81	32→40

Circulation
Arrhythmia and Electrophysiology

American Heart Association.

Catheter Ablation of Atrial Fibrillation in Patients with Left Ventricular Systolic Dysfunction: A Systematic Review and Meta-Analysis

Matteo Anselmino, Mario Matta, Fabrizio D'Ascenzo, T. Jared Bunch, Richard J. Schilling, Ross J. Hunter, Carlo Pappone, Thomas Neumann, Georg Noelker, Martin Fiala, Emanuele Bertaglia, Antonio Frontera, Edward Duncan, Chrishan Nalliah, Pierre Jaïs, Rukshen Weerasooriya, Jon M. Kalman and Fiorenzo Gaita

25 trials and observational studies,
including **1,838** patients
from 9 countries and 3 continents

Baseline characteristics

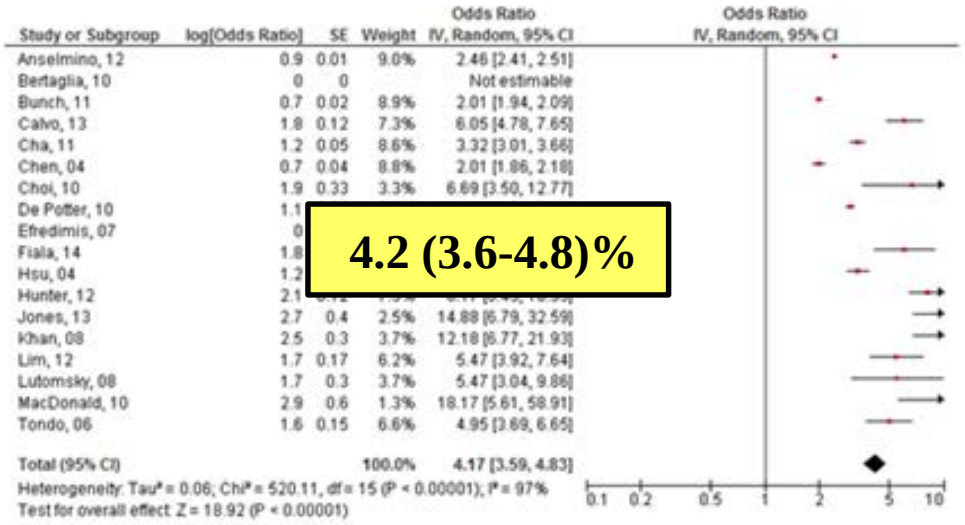
	Mean value	*Lower confidence interval*	*Upper confidence interval*
Age, years	**59**	51	61
Paroxysmal AF, %	**45**	41	56
Persistent AF, %	**50**	35	54
Long-standing persistent, %	**5**	2	7
Time since first atrial fibrillation diagnosis, months	**42**	29	46
Time since first heart failure diagnosis, months	**27**	20	28
Basal pro-BNP (pg/ml)	**11,187**	678	11,400
Cardiomiopathy			
- Ischemic, %	**41**	35	46
- Hypertensive, %	**10**	5	14
- Valvular heart disease, %	**10**	6	15
- Idiopathic, %	**39**	35	45
LV ejection fraction, %	**40**	35	46

Anselmino, Gaita; Circ Arrhythm Electrophysiol 2014

Mean follow-up:

23 (18-40) months

A. Procedural complications

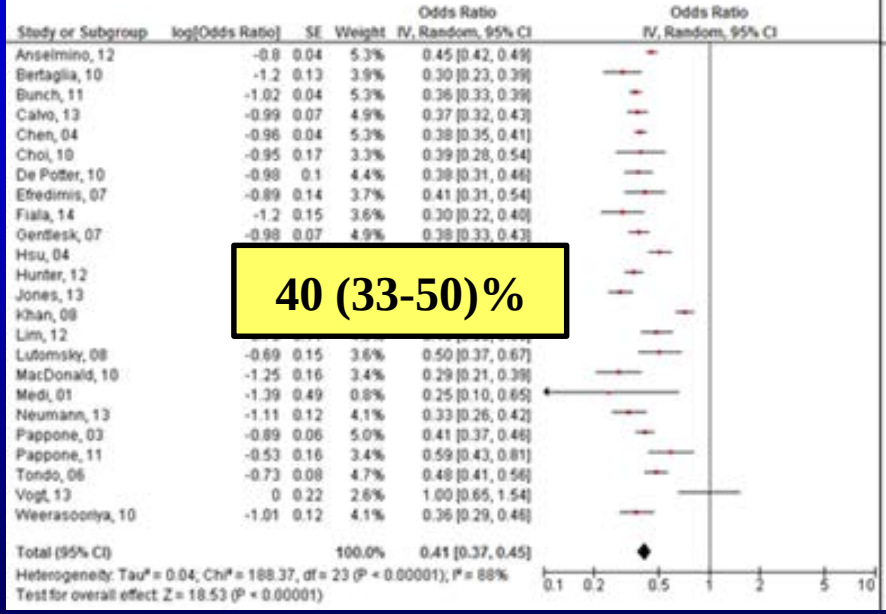


4.2 (3.6-4.8)%

Redo procedures:

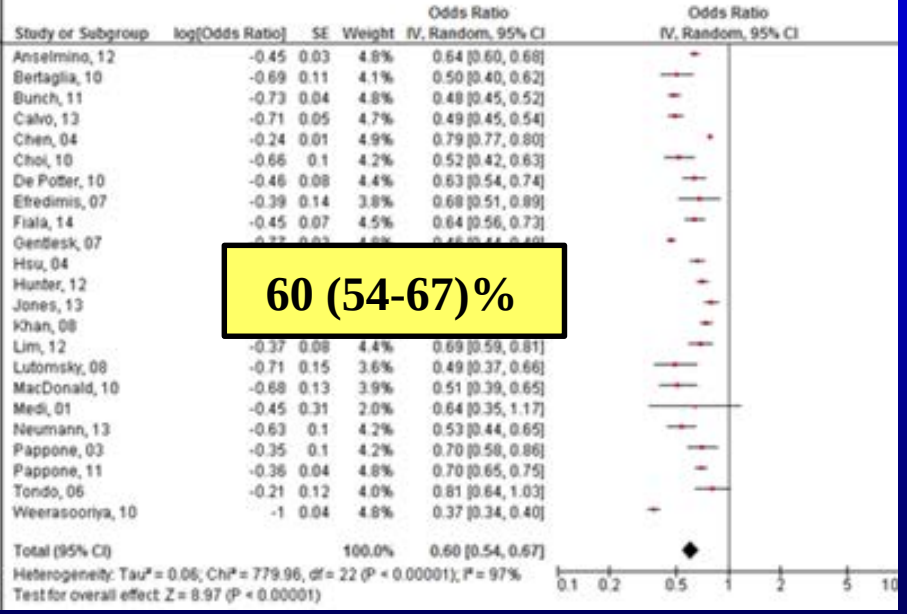
32 (25-38)%

B. Catheter ablation efficacy after the first procedure



40 (33-50)%

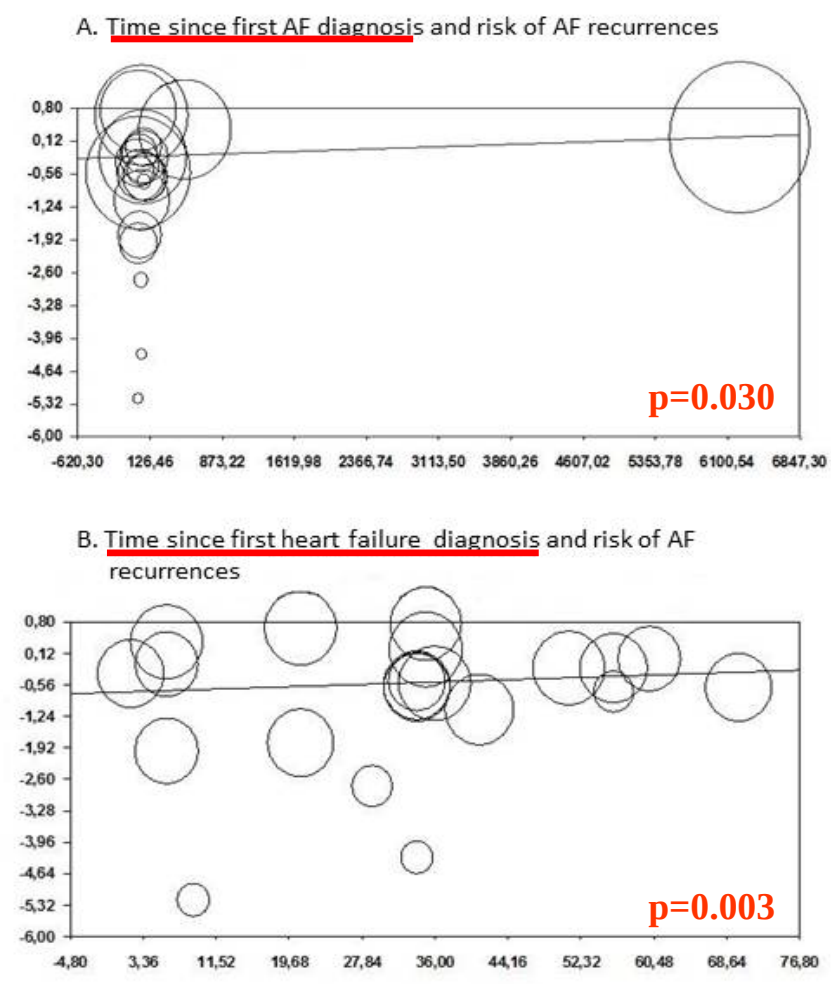
C. Catheter ablation efficacy at the end of follow-up



60 (54-67)%

AF ablation in heart failure

Predictors of AF recurrence



Anselmino, Gaita; Circ Arrhythm Electrophysiol 2014

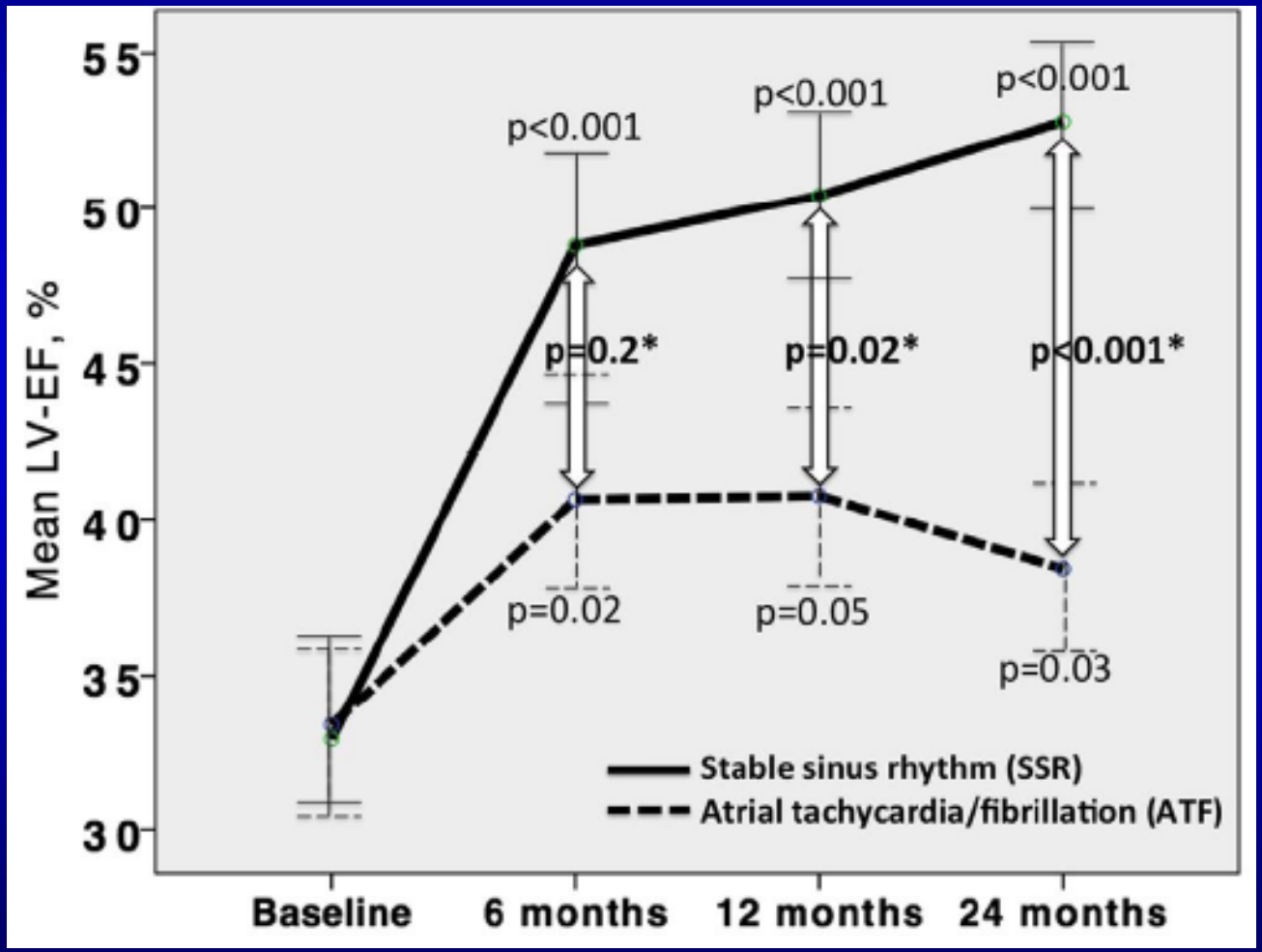
AF ablation in heart failure

Impact on left ventricular function

Anselmino, Gaita; Circ Arrhythm Electrophysiol 2014

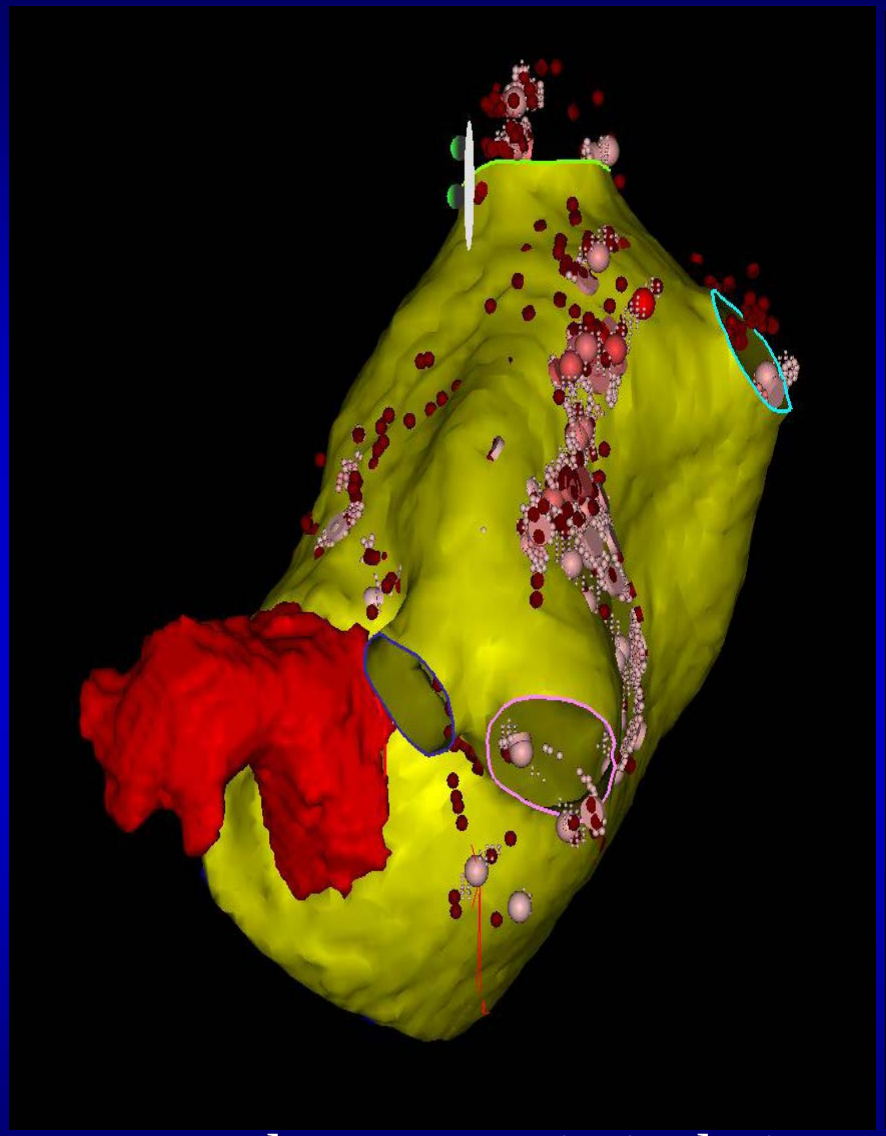
AF ablation in heart failure

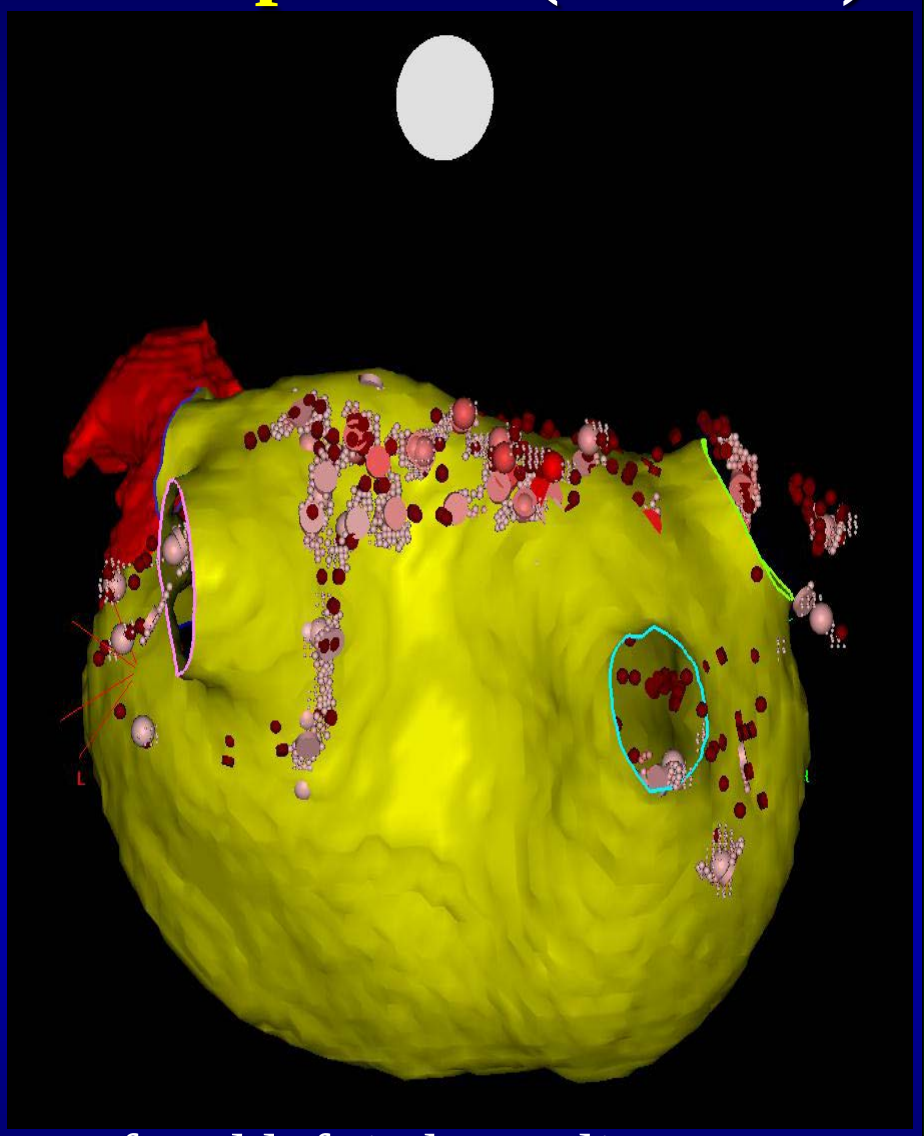
Impact of follow-up heart rhythm on LVEF



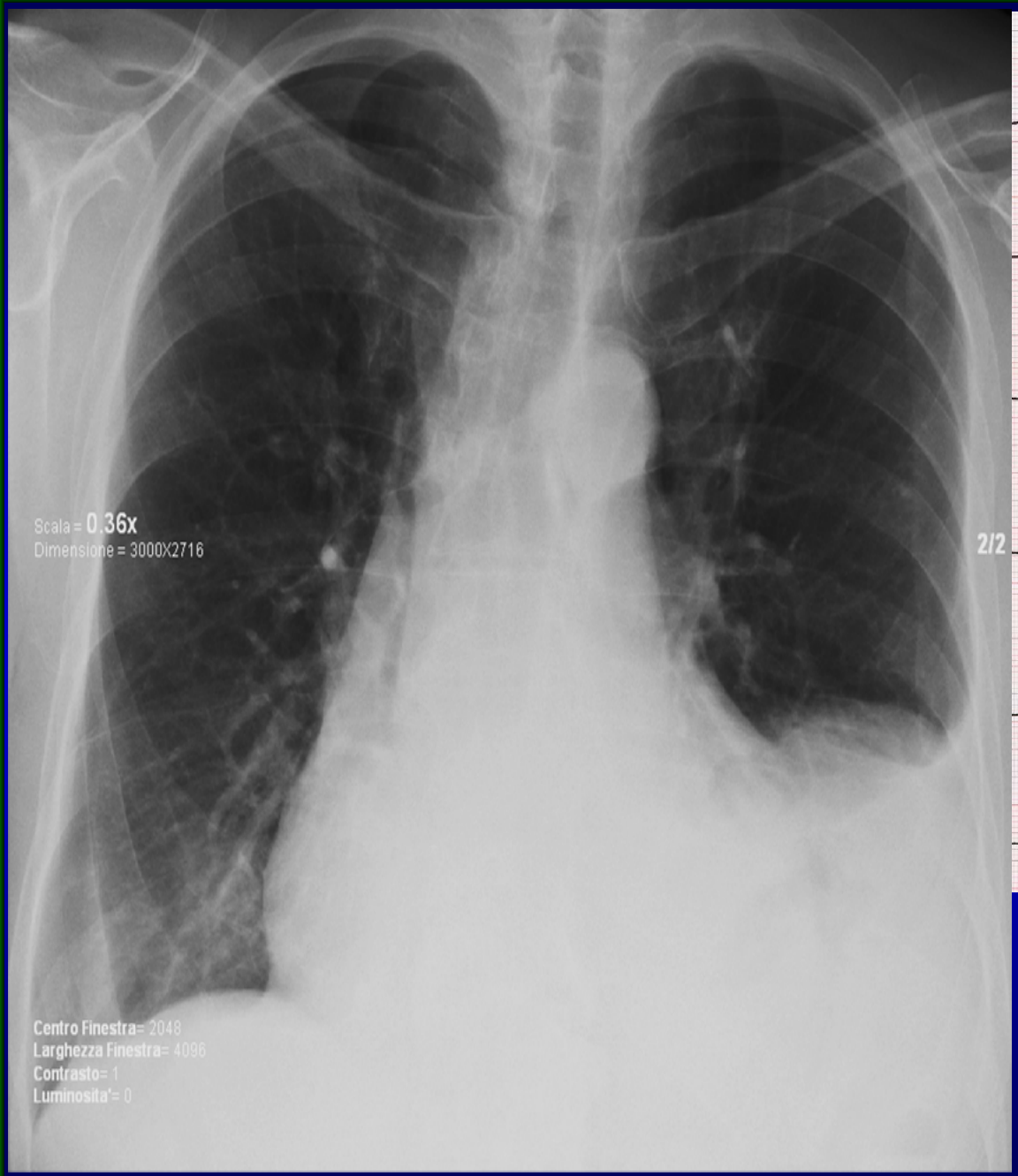
Nedios, Heart Rhythm 2014

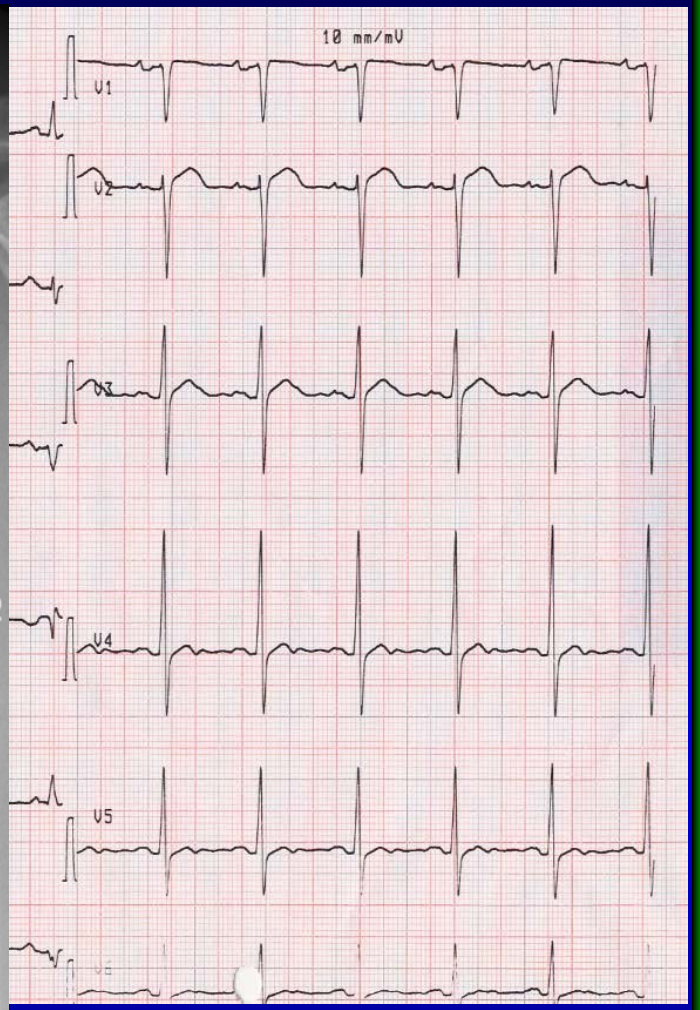
Transcatheter ablation in our patient (10/2014)





Pulmonary vein isolation + roof and left isthmus lines
+ CFAEs (anterior wall and interatrial septum)





Echo: mildly dilated left ventricle, EF 50%, mild MR, LA 78 ml/mq (163)

AF ablation vs CRT + AV node ablation?

Radiofrequency ablation for persistent atrial fibrillation in patients with advanced heart failure and severe left ventricular systolic dysfunction: a randomised controlled trial

Michael R MacDonald,[1] Derek T Connelly,[1,2] Nathaniel M Hawkins,[3] Tracey Steedman,[4] John Payne,[1] Morag Shaw,[4] Martin Denvir,[5] Sai Bhagra,[1] Sandy Small,[2] William Martin,[2] John J V McMurray,[6] Mark C Petrie[1]

Heart 2011

A Randomized Trial to Assess Catheter Ablation Versus Rate Control in the Management of Persistent Atrial Fibrillation in Heart Failure

David G. Jones, MD,*† Shouvik K. Haldar, MBBS,*† Wajid Hussain, MB, ChB,*† Rakesh Sharma, PhD,*† Darrel P. Francis, MD,† Shelley L. Rahman-Haley, MD,* Theresa A. McDonagh, MD,*† S. Richard Underwood, MD,*† Vias Markides, MD,*† Tom Wong, MD*†

J Am Coll Cardiol 2013

A Randomized Controlled Trial of Catheter Ablation Versus Medical Treatment of Atrial Fibrillation in Heart Failure (The CAMTAF Trial)

Ross J. Hunter, MRCP, PhD; Thomas J. Berriman, MBBS; Ihab Diab, MD, MRCP; Ravindu Kamdar, MD, MRCP; Laura Richmond, MSc; Victoria Baker, MSc; Farai Goromonzi, MSc; Vinit Sawhney, MRCP; Edward Duncan, MRCP, PhD; Stephen P. Page, MD, MRCP; Waqas Ullah, MRCP; Beth Unsworth, PhD; Jamil Mayet, MD, FESC; Mehul Dhinoja, FRCP; Mark J. Earley, MD, FRCP; Simon Sporton, MD, FRCP; Richard J. Schilling, MD, FRCP

Circ Arrhythm Electrophysiol 2014

Catheter Ablation Versus Rate Control …

AF ablation vs CRT + AV node ablation

PABA-CHF

81 pts

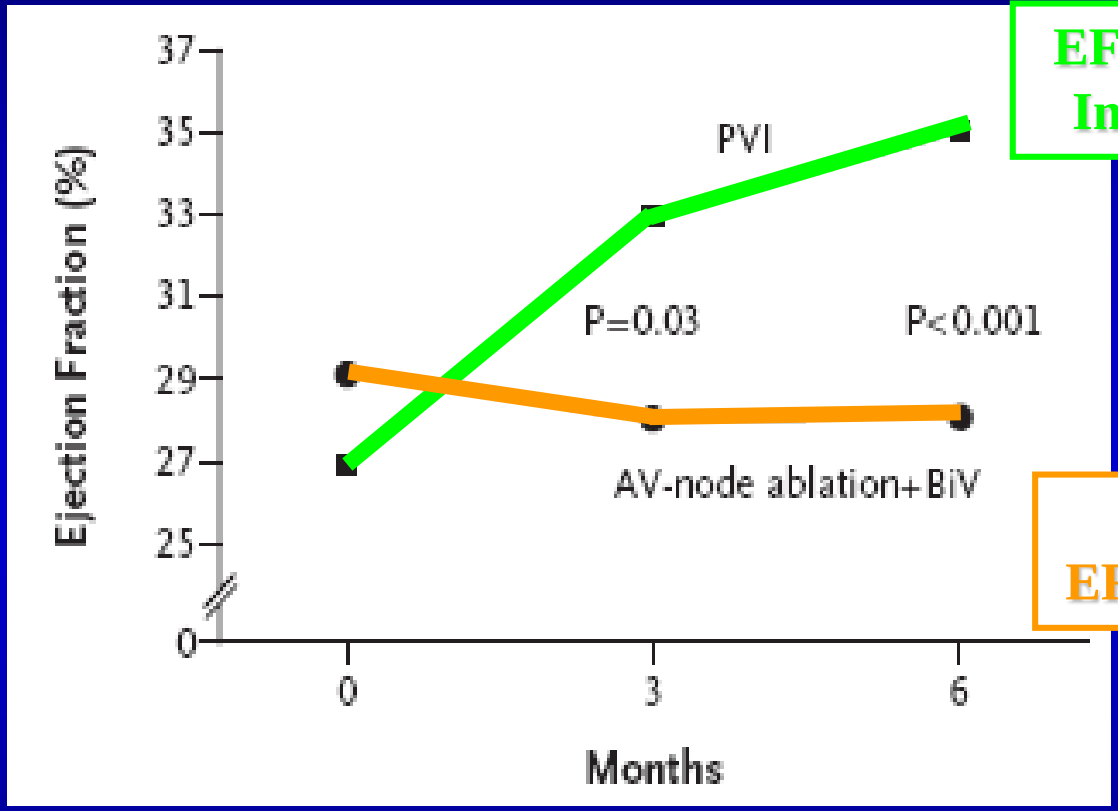
41 pts → **PVI ablation**

40 pts → **AV node ablation and Biv pacing**

Characteristic	Pulmonary-Vein Isolation (N=41)	AV-Node Ablation with Biventricular Pacing (N=40)
Coronary artery disease (%)	73	68
Type of atrial fibrillation (%)		
Paroxysmal	49	54
Persistent or long-standing persistent	51	46
Duration of atrial fibrillation (yr)	4.0±2.4	3.9±2.8
Ejection fraction (%)	27±8	29±7
Left atrial internal diameter (cm)	4.9±0.5	4.7±0.6

Khan M et al; NEJM 2008

PVs ISOLATION



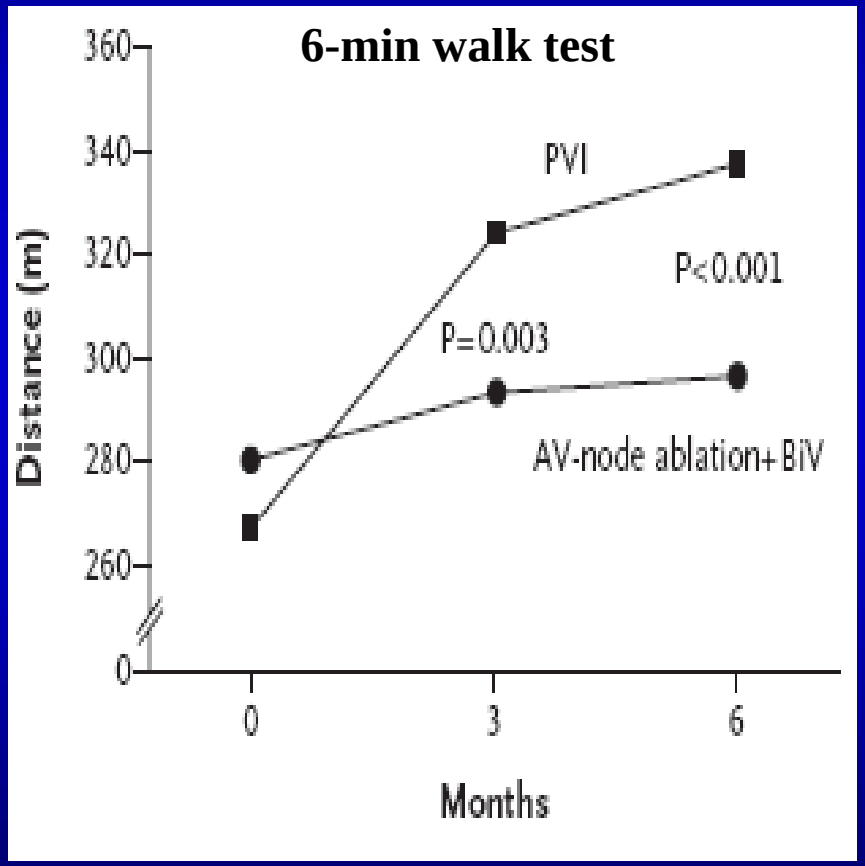
EF improved in 76% of patients
Improvement in EF by 8±8%

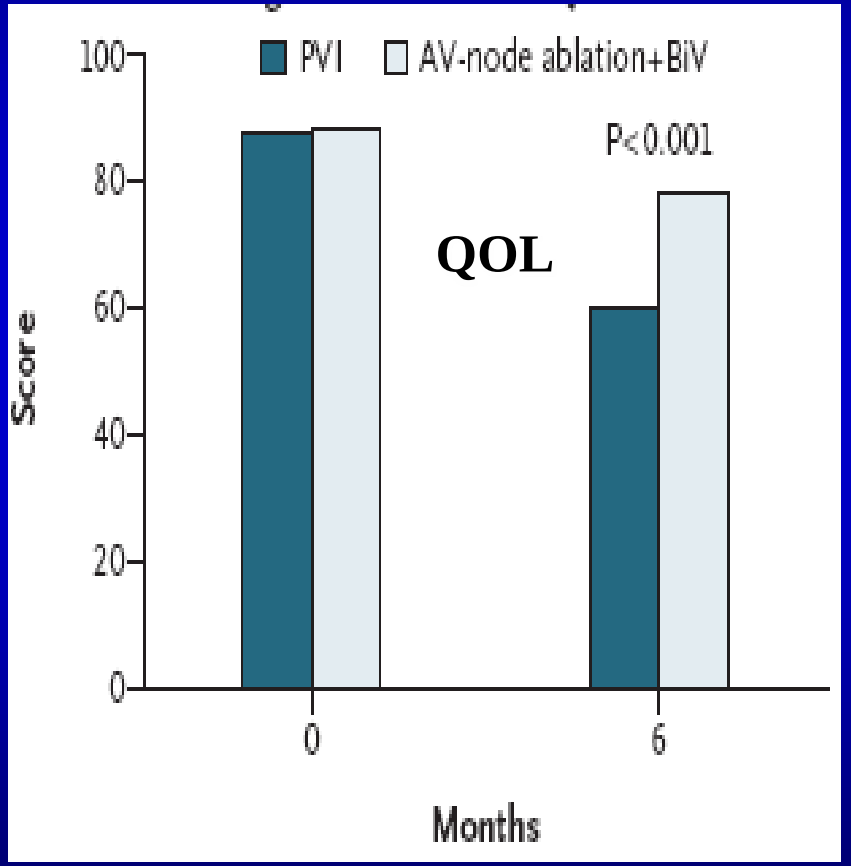
AV-node ablation+BIV

Decrease in EF by 1±4%
EF improved in only 25% of pts

Khan M et al; NEJM 2008

Pulmonary-vein isolation improved functional capacity (6-minute walk test) and QOL

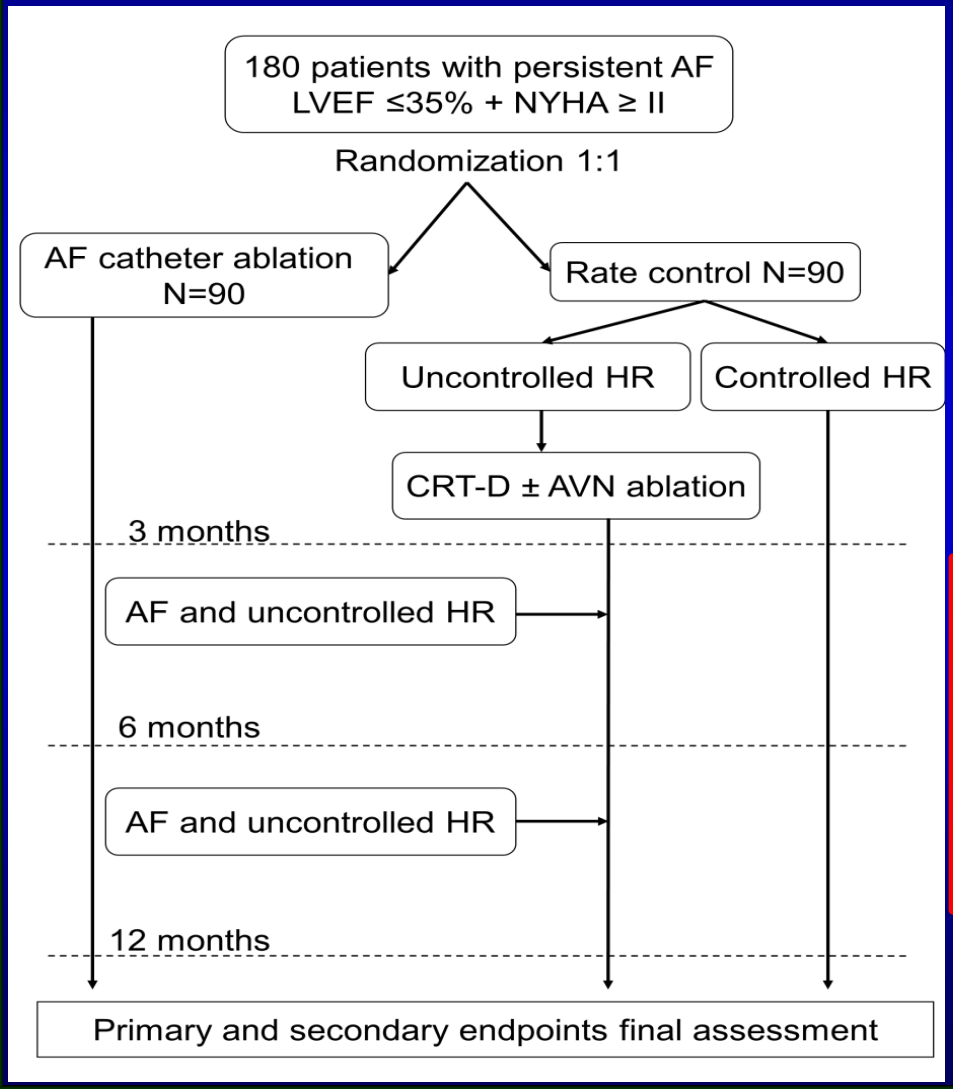




Khan M et al; NEJM 2008

The **AFARC-LVF** trial design

Atrial Fibrillation Ablation compared to Rate Control strategy in patients with recently diagnosed impaired LV Function



Group A: **AF catheter ablation**
Group B: **Rate control**
(medical therapy + ICD or CRT-D ± AV node ablation)

Primary endpoint: composite of the improvement of **LVEF higher than 35%** and **NYHA class lower than II.**

Clinicaltrial.gov NCT02509754

European Journal of Heart Failure (2015) 0, 0–0
doi:10.1002/ejhf.411

EDITORIAL

- **Paroxysmal AF**
- **Persistent AF below 6 months**
- **Left atrium volume < 150 ml**

heart failure: state-of-the-art and future

Propose AF ablation at the earliest stage possible!

Matteo Anselmino, Mario Matta, Davide Castagno, Carla Giustetto, and Fiorenzo Gaita*

Division of Cardiology, Department of Medical Sciences, 'Città della Salute e della Scienza' Hospital, University of Turin, Torino, Italy

This article is published simultaneously in the *European Journal of Heart Failure* and is available online at: http://onlinelibrary

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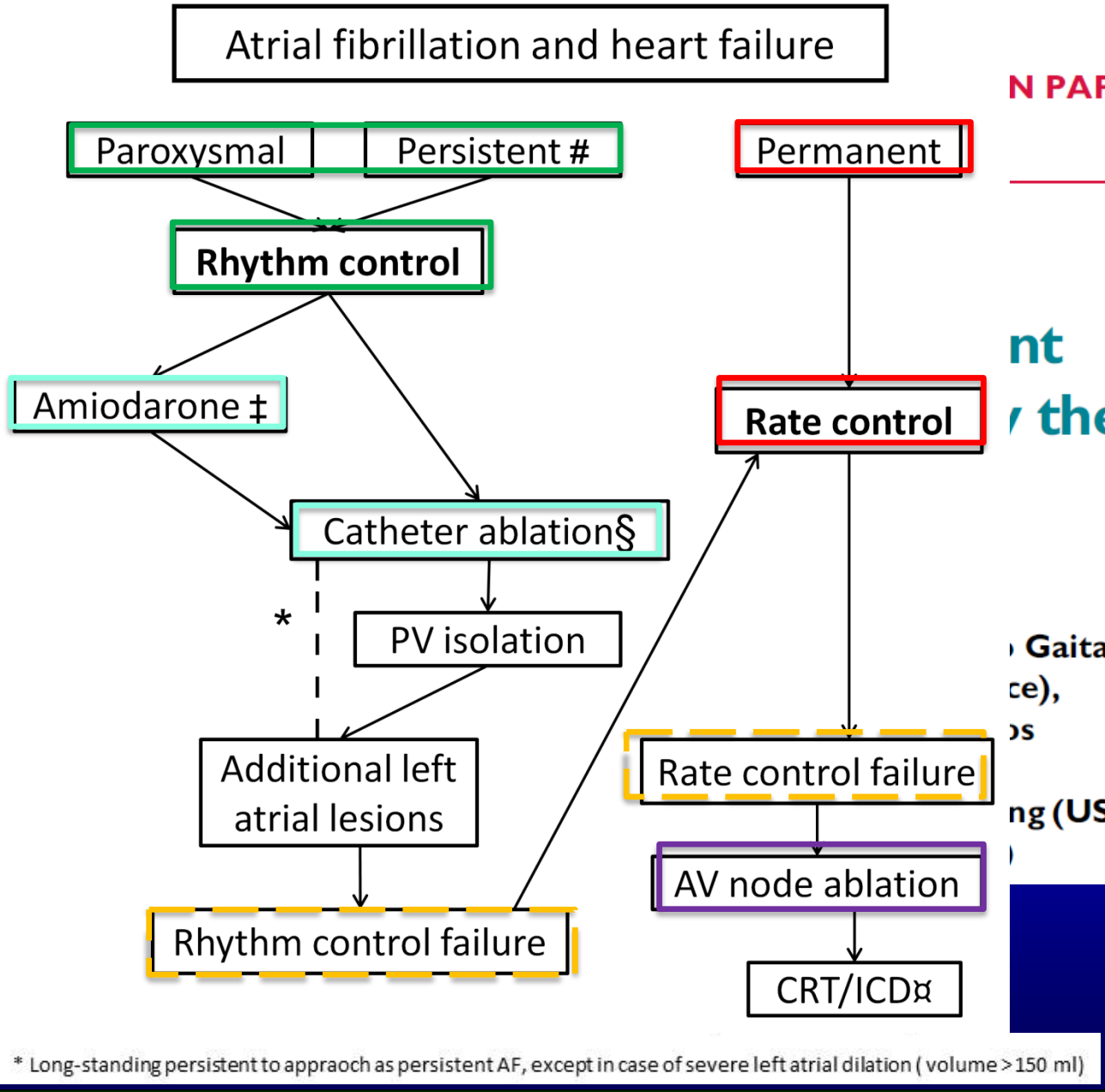

* Long-standing persistent to appraoch as persistent AF, except in case of severe left atrial dilation (volume >150 ml)

In conclusion

Drug therapy is to date
the **first and most used** approach but achieves
poor results and **side effects**

AF ablation presents similar outcome than in the general population and should be considered the **first interventional option** (at the **early stage**) to improve **LVEF and symptoms**

AV node ablation + CRT±D
may be considered in **late stage** AF
in selected cases


Thanks for your attention!