Case 1: 62-Year-Old with Persistent AF with Cardiomyopathy and EF of 32%

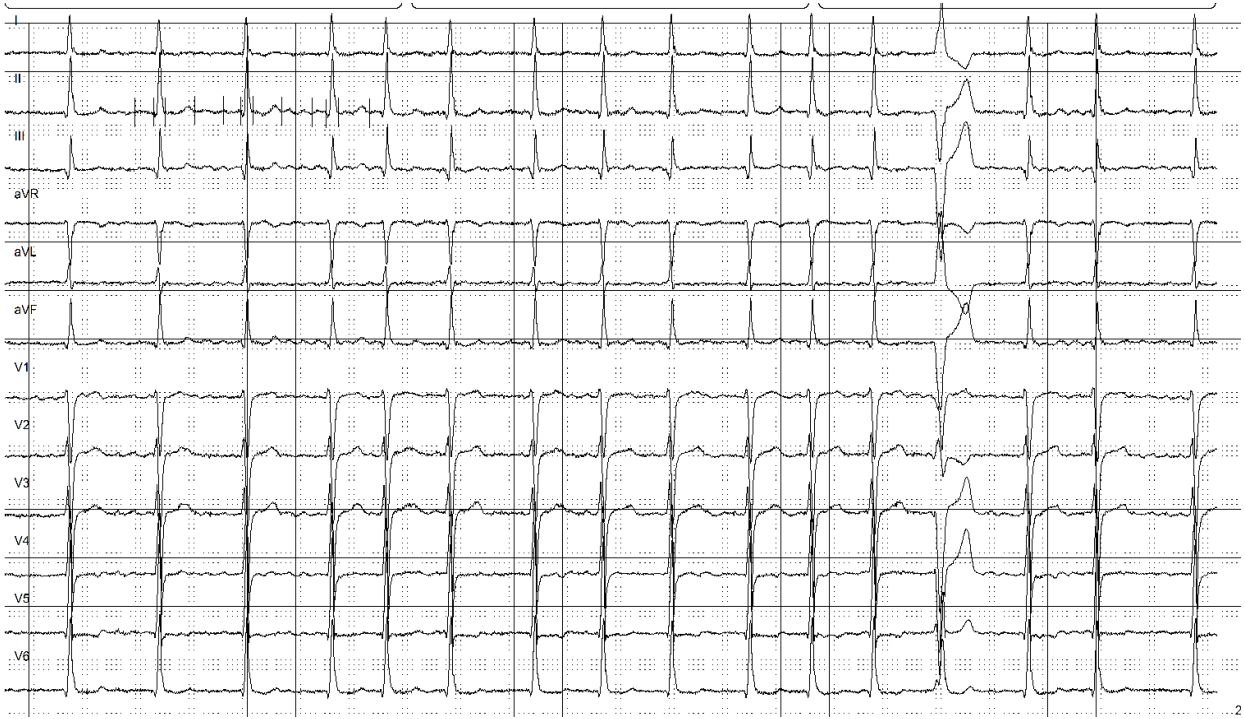
Mélèze HOCINI

Cardiac Electrophysiology and Modeling Institute
LIRYC – University of Bordeaux

CASE PRESENTATION

- 63 years old woman
- Former smoker
- Rhythmic cardiomyopathy discovered in December 2018
  - NYHA III
  - TTE: LVEF 33% w/ global hypokinesia, mild RV hypokinesia, no valvular disease.
  - Coronary angiography: normal
  - Cardiac MRI: LVEF 30%, no gadolinium late enhancement
  - BNP: 626 pg/mL
  - 1 CHF episodes in the last 6 Mo
- Therapeutic management
  - Apixaban 5mg bd
  - B-bloquers + ACE inhibitors + Diuretics
- AF
  - History of AF for 5 years
  - Persistent AF for 12 months
  - Amiodarone failed

ECG

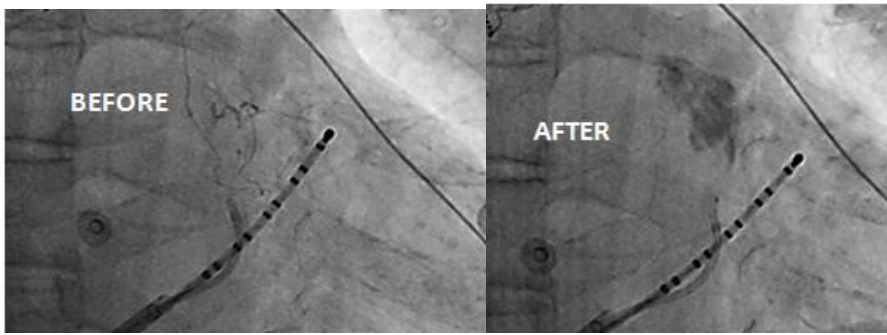


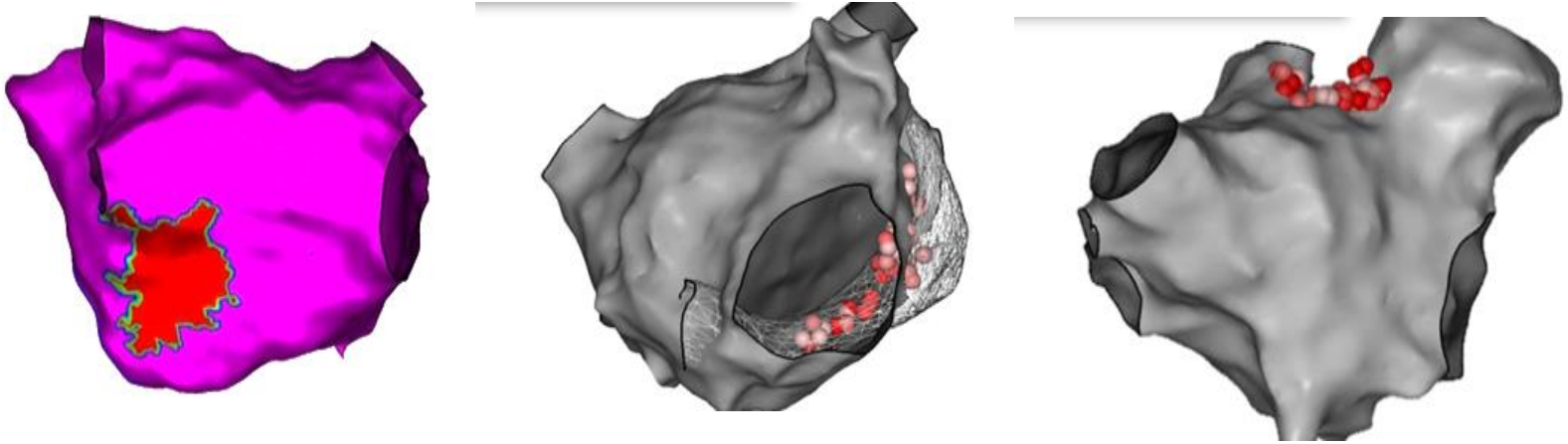
LESIONS SET: MARSHALL Plan for PsAF

STEP I

Marshall Chemical Ablation

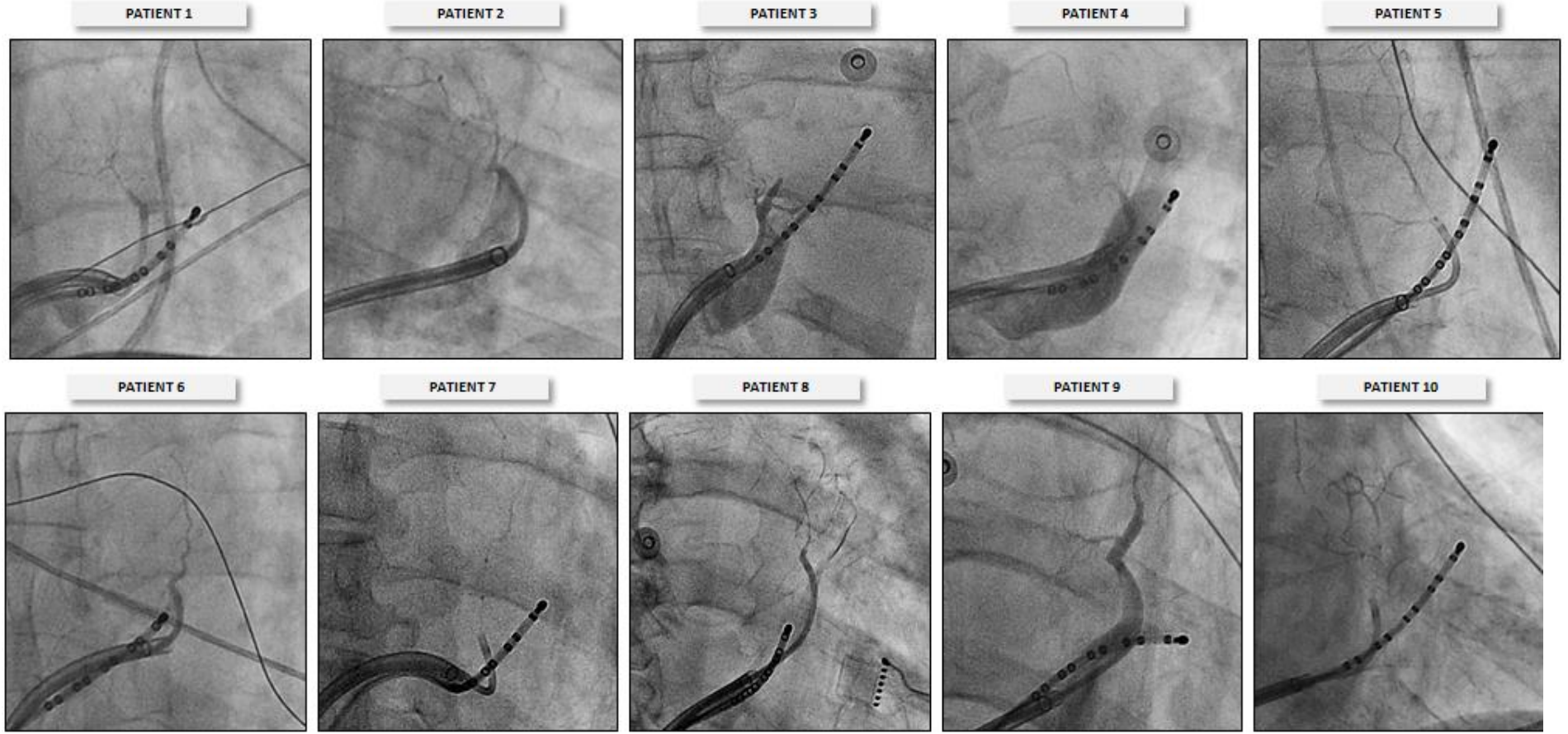
+ RF at both ends



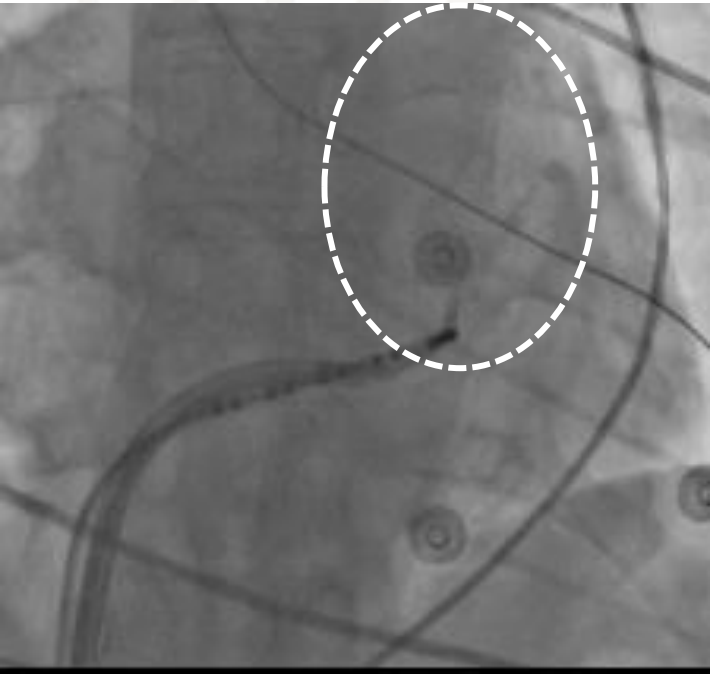


Pambrun T, Hocini M et al MARSHALL bundles elimination, PVI and Lines completion for ANatomical ablation of PsAF: JCE 2019 Jan;30(1):7-15

VOM VARIABILITY

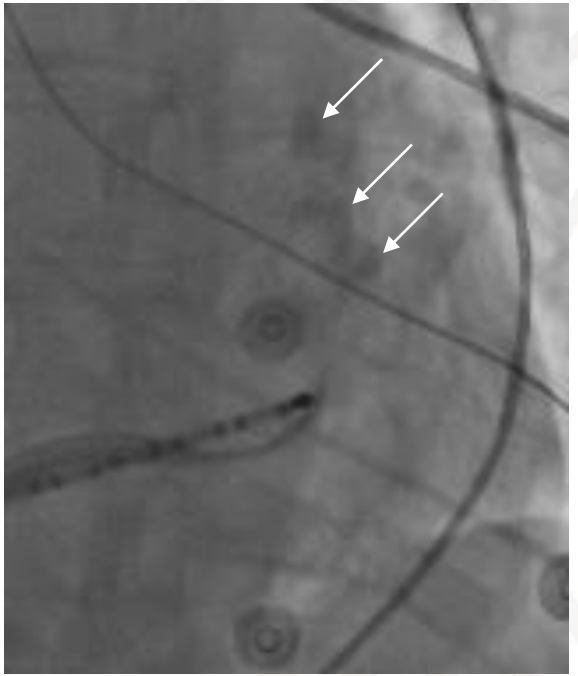


Injection 1 no OH



OH 3cc

OH 10 cc

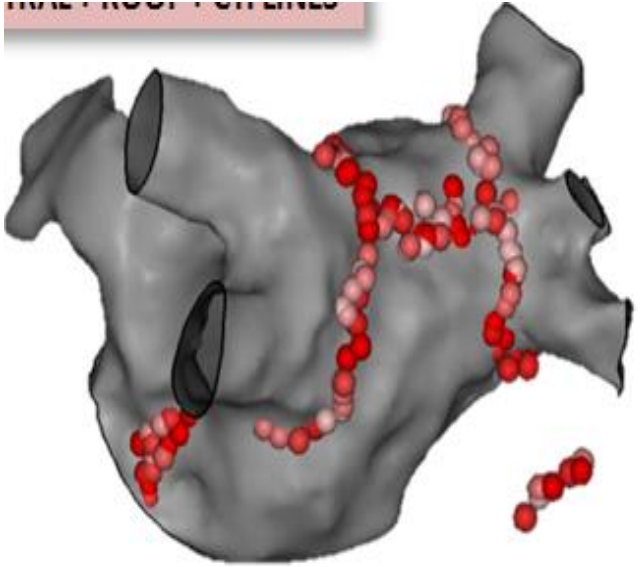


- Long sheath
- IMA catheter
- 0,014 Whisper angioplasty wire
- 8x2.0 OTW angioplasty balloon

MARSHALL Plan for PsAF

STEP II

Wide Antral PVI



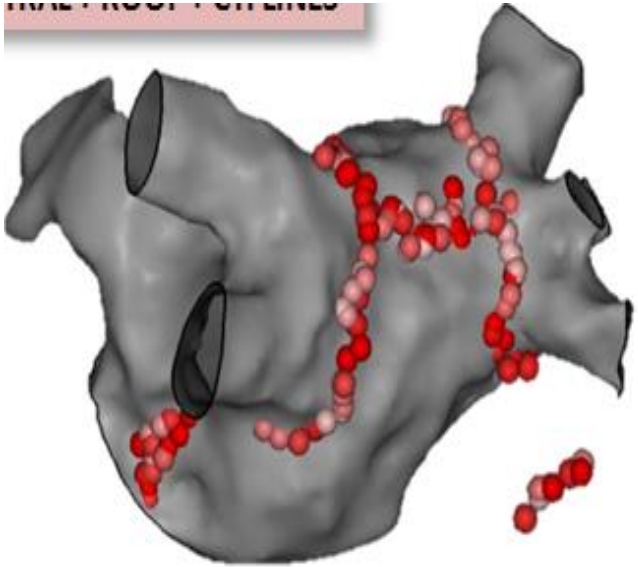
MARSHALL Plan for PsAF

STEP III

Mitral isthmus

Roof line

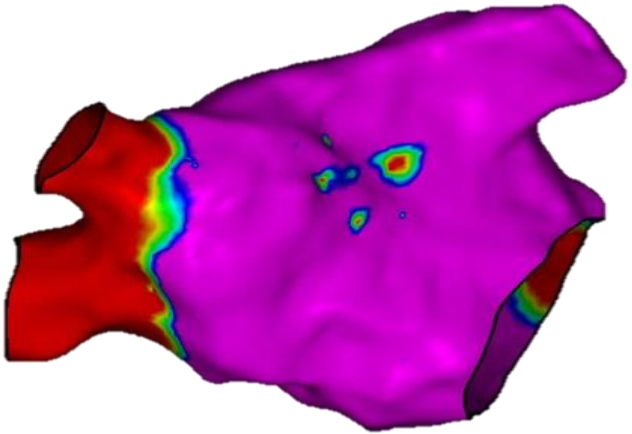
CTI

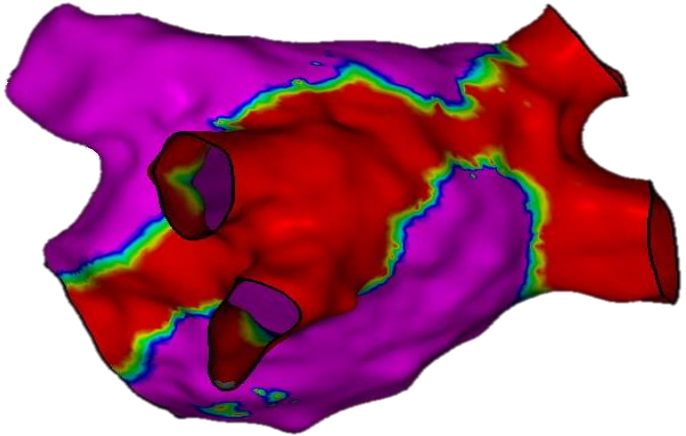


AF ablation: after full lesions set

AF Ablation Dec 22th 2018
Initial AF CL: 136 ms in LAA
Cardioversion

AP



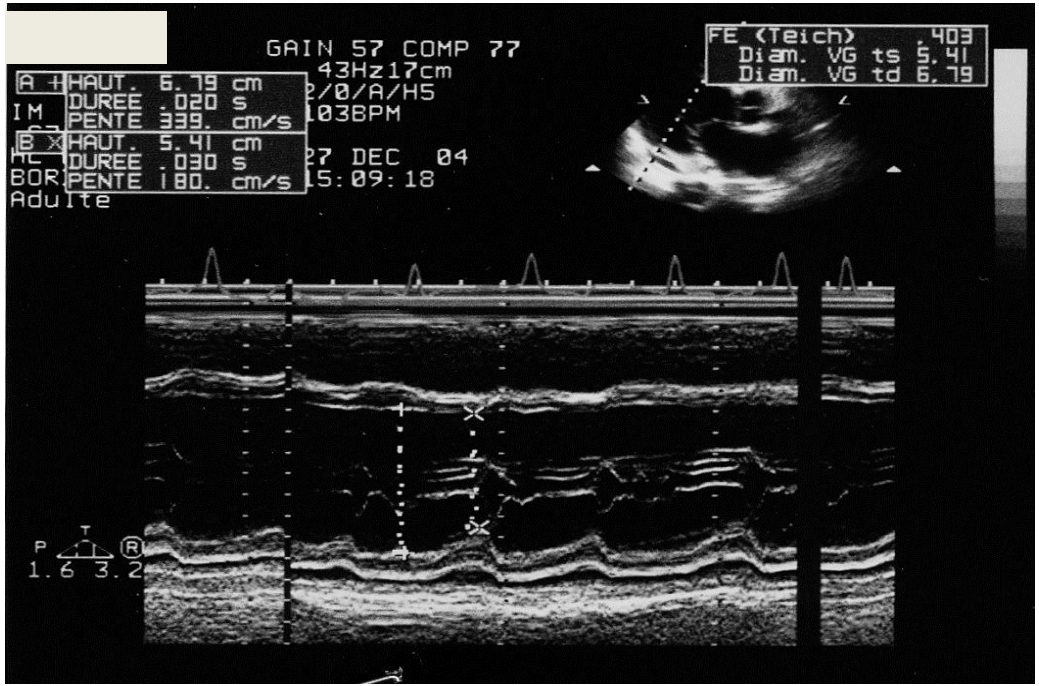


PA

LA VOLUME **193** ML

ECHOCARDIOGRAMME

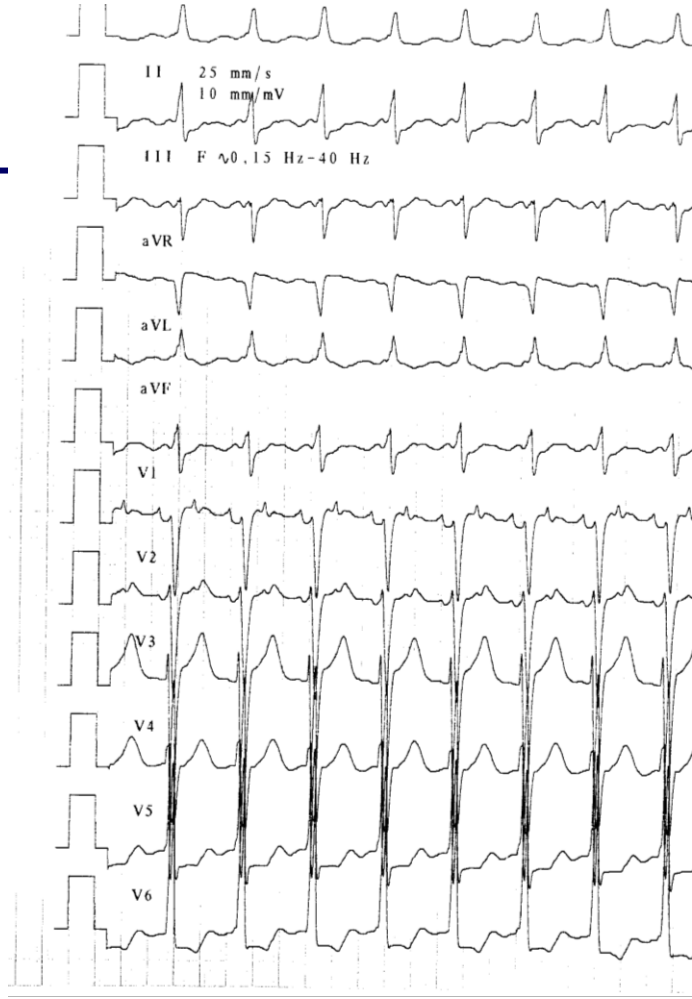
- Dec 27 th post Abl, SR



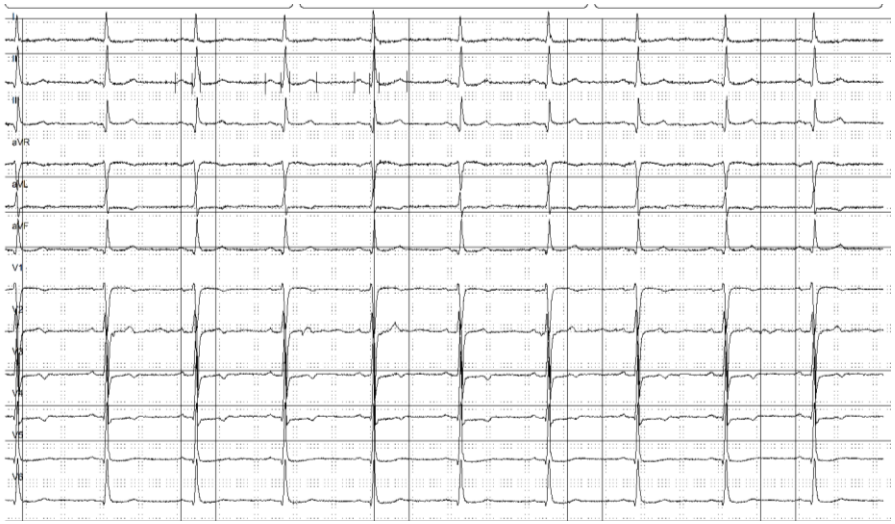
LV EF: 32% (Simpson)
MR : II to III

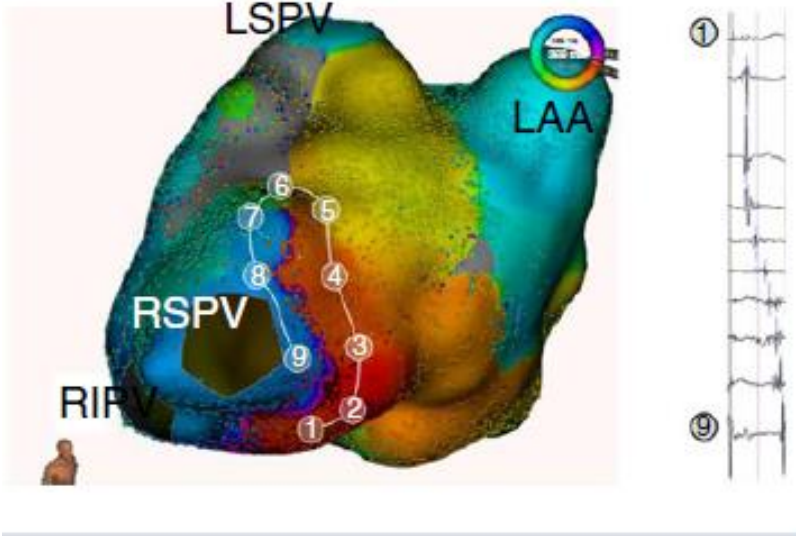
FOLLOW UP

- Jan 2019: Recurrence of arrhythmia:
- Atypical Flutter
- No CHF episode
- Cardioversion

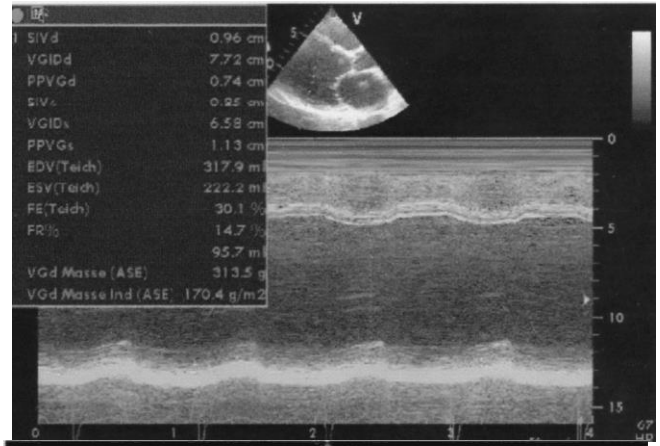


Second procedure Feb 2019: Ablation of 1 AT from RSPV

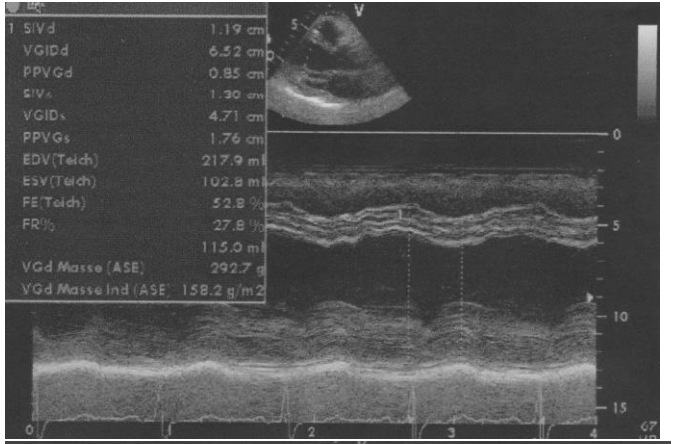




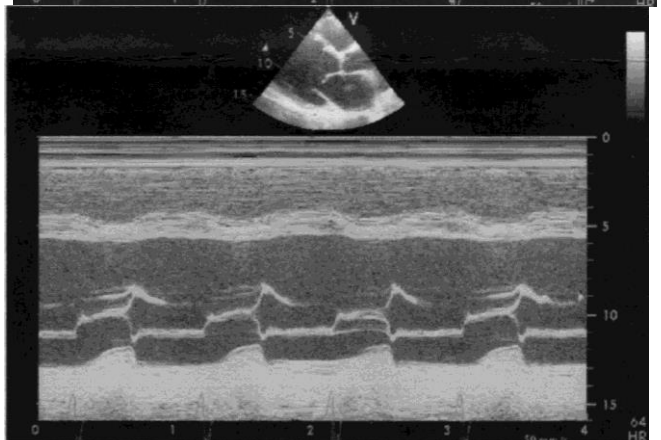
FOLLOW UP AT 9 MONTHS

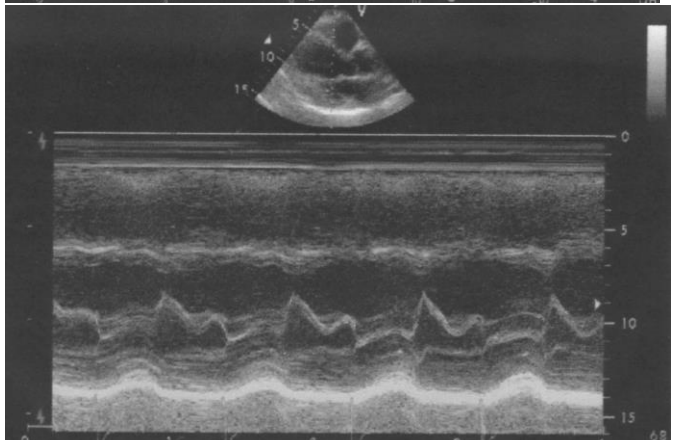


@1mth
LVEDD: 77
LVESD: 65
EF: 32%

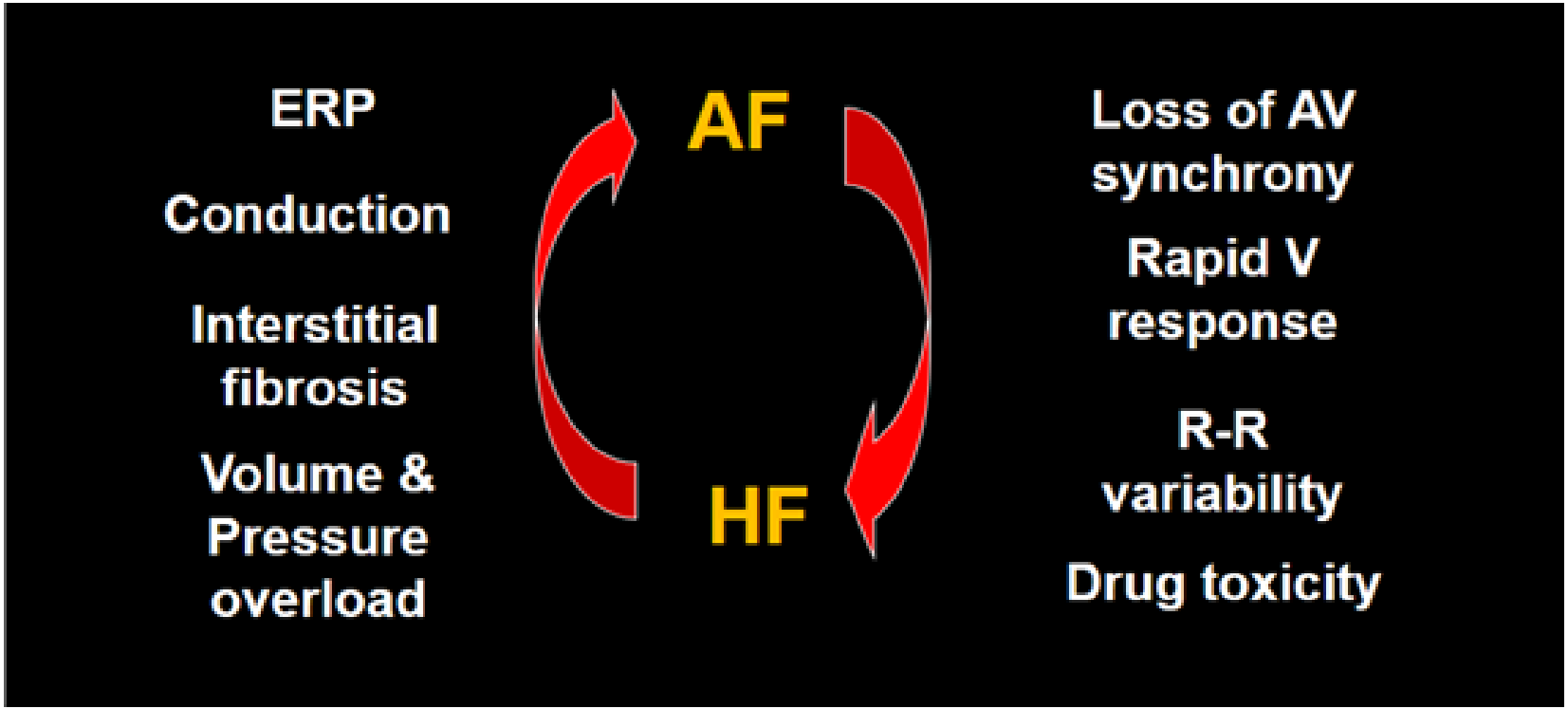


@3mths
LVEDD: 65
LVESD: 47
EF: 52%





AF begets HF: HF begets AF



2017 HRS/EHRA/ECAS/APHRS/SOLAECE consensus statement on AF ablation in HF

Indications for AF ablation in populations of patients are not well represented in clinical trials

Congestive Heart Failure	**It is reasonable to use similar indications for AF ablation in selected patients with HF as in patients without HF**	**IIa**

Calkins et al, Heart rhythm 2017

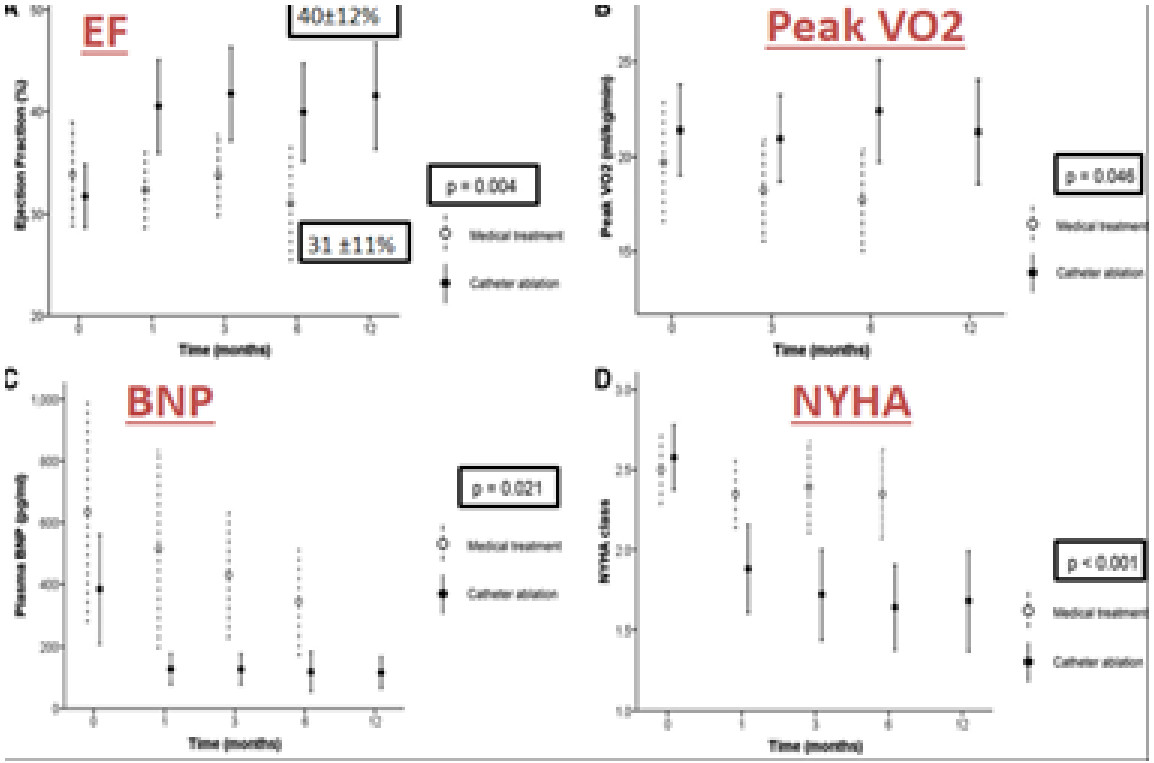
Registries evaluating AF Ablation vs medical ttt: Consistent improvement in outcomes

	AF RFA (n)	Mortality HR (95% CI)	Stroke HR (95% CI)	Follow-up (yrs)
Reynolds CCQO 2012	801	NA	.62 (.44-.86)	3
Chang CAE 2014	846	.88 (.62-1.23)	.57 (.35-.94)	3.5
Karasoy EHJ 2015	4050	NA	.53 (.43-.65)	3.4
Friberg EHJ 2016	2836	.5 (.37-.62)	.69 (.51-.93)	4.4
Saliba HR 2017	969	.57 (.47-.66)	.62 (.47-.82)	NA
Srivatsa CAE 2018	4169	.59 (.45–.77)	.68 (.47-.97)	3.6
Noseworthy EHJ 2019	6907	.60 (.53–.69)	.56 (.43–.73)	2.3

AF ablation in CHF Pts: Impact on EF in controlled studies

	Pts n	RFA % Success	EF%	EF increase	Pe AF	RF	F/up (mths)
Khan NEJM 2008	40	88%	27%	+8%	51%	PVI+ vs AVJ+BiV	6
MacDonald Heart 2011	20	50%	36%	+4.5% (ns)	100%	Stepwise	6
Jones, JACC 2013	52	88%	21%	+10.9%	100%	Stepwise	12
Hunter CAE 2014	50	73%	32%	+8%	100%	Stepwise vs Rate	12
DiBiase Circ 2016	203	70%	29%	+8%	100%	Stepwise vs Amio	24
Prabhu JACC 2017	66	75%	32%	+18%	100%	PVI+Post' LA vs Rate	6
Marrouche NEJM 2018	263	50%	33%	+8%	70%	PVI+ vs Rate/Rhythm	60

AF ablation vs rate control for AF/CHF pts
CAMTAF trial: 50 pts



Hunter et al, Circ AE 2014

CA vs rate control in AF an systolic dysfunction CAMERA-MRI: multicentre randomised trial

Aims:

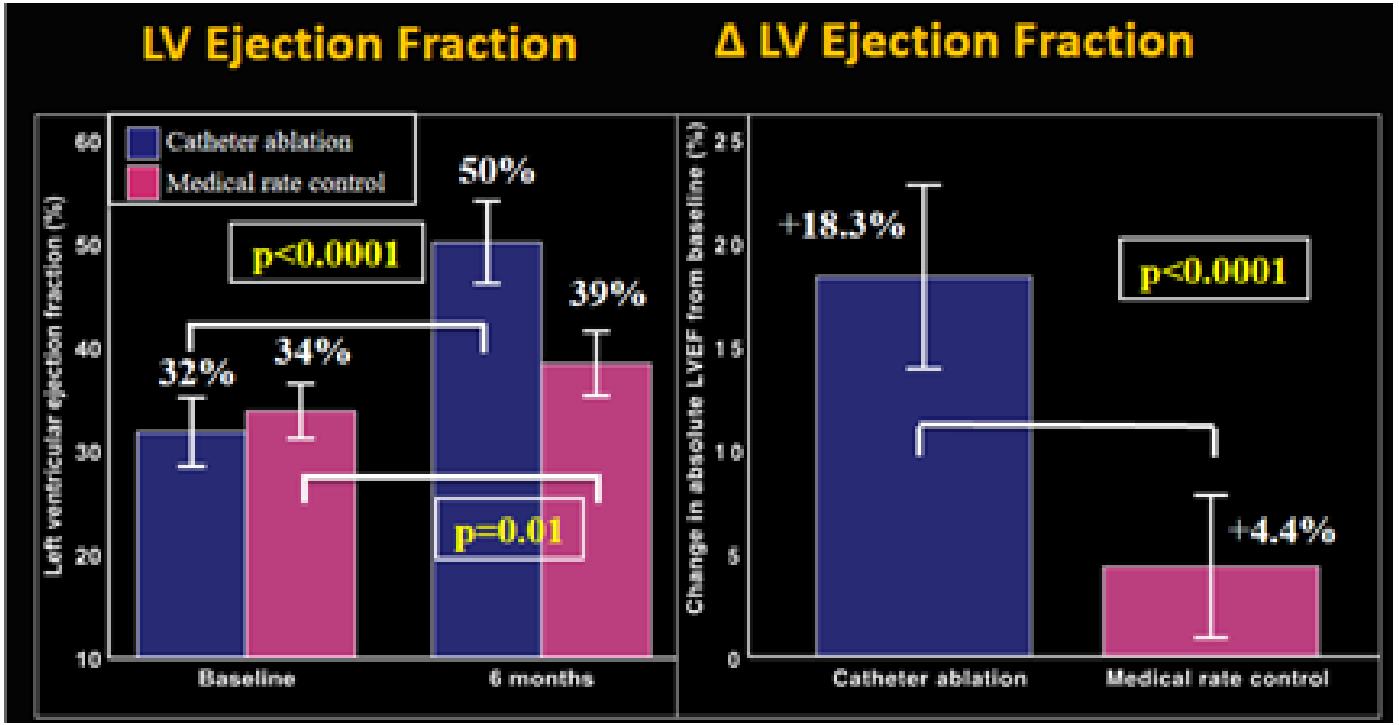
- To determine whether
  - CA is superior to medical rate control in PsAF and idiopathic cardiomyopathy
  - The absence of ventricular fibrosis on cardiac MRI predicts LV recovery with CA

Prabhu et al, JACC 2017

CAMERA-MRI: Baseline Characteristics

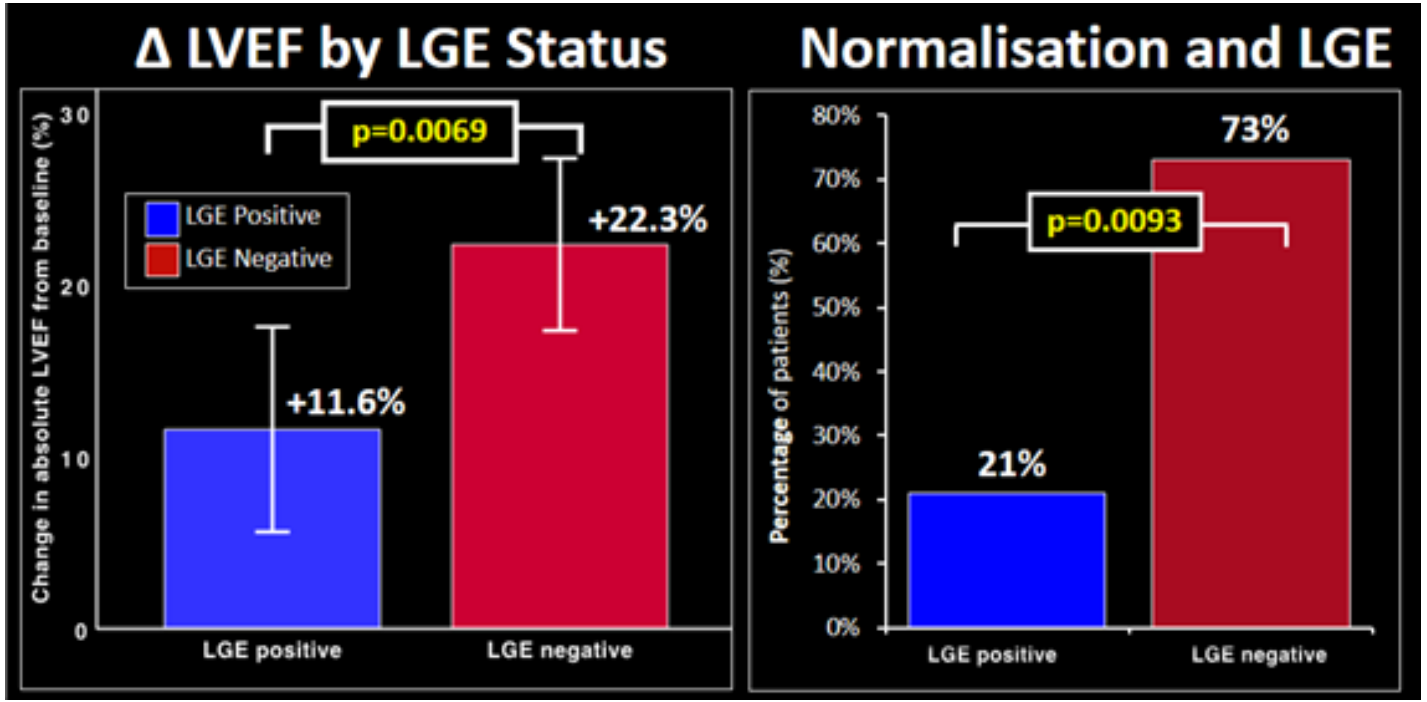
Characteristics	Catheter ablation (n=33)	Medical Rate Control (n=33)
Age (years)	59 ± 11	62 ± 9.4
Male (%)	94% (31)	88% (29)
CHA_2DS_2VASc score	2.42 ± 0.87	2.36 ± 0.96
LVEF (MRI)	32 ± 9.4%	34 ± 7.8%
Late gadolinium present (%)	36% (12)	36% (12)
Mean duration continuous AF(mths)	23 ± 18	21 ± 15
24hr average HR (bpm)	86 ± 14	85 ± 17
DCR attempts per patient	2.1 ± 0.8	2.0 ± 0.7
Amiodarone failed or C/I (%)	91% (30)	82% (27)
ACE inhibitor or ARB (%)	94% (31)	94% (31)
Beta-blocker (%)	97% (32)	97% (32)

CAMERA-MRI: Primary Endpoint

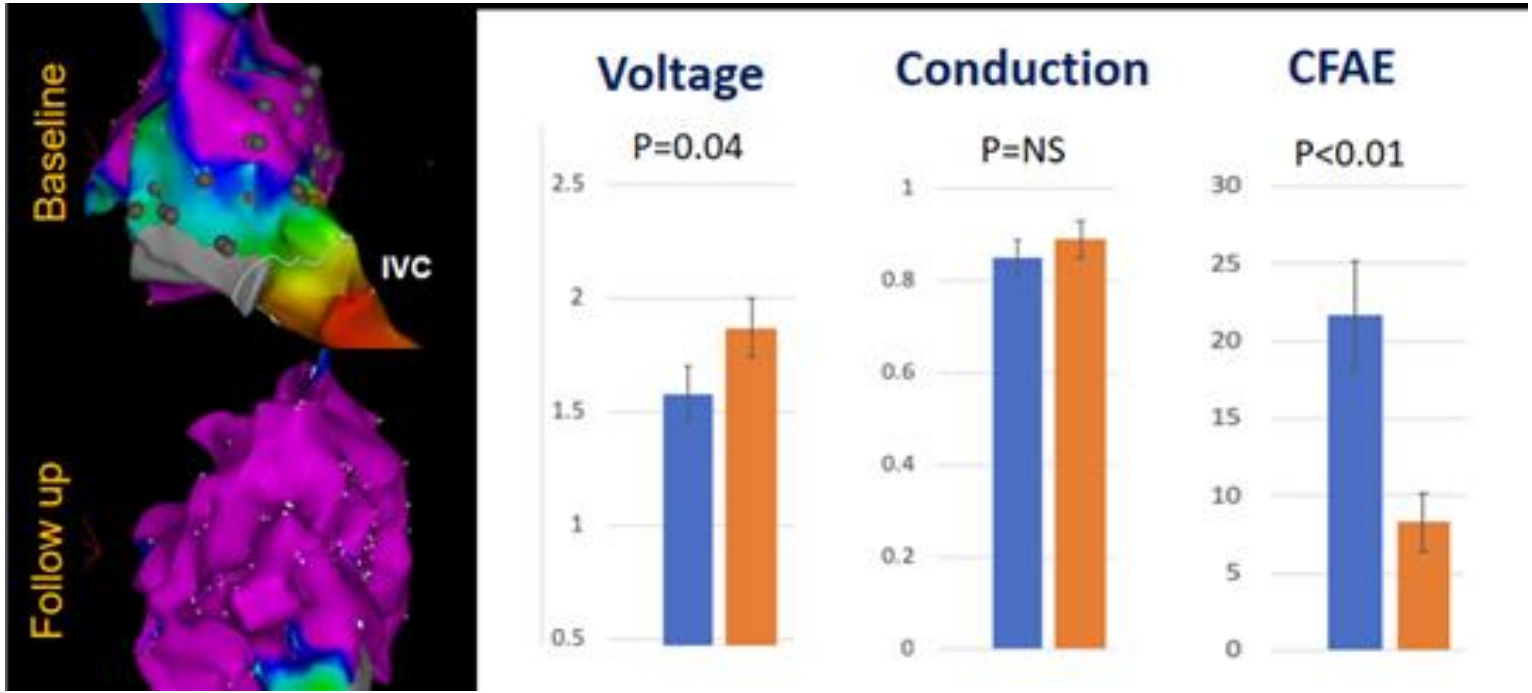


Mean difference=14%
95% CI(8,5%, 19,5%)

LV EF in CA groupe: LGE status



Reverse atrial remodeling at 24 months



Sugumar et al, JACC 2019

Conclusions: CAMERA MRI

- AF is an important under appreciated reversible cause of cardiomyopathy
  - Despite adequate rate control
- Restoration of SR with CA improves LVEF
- Absence of LGE on CMR identified “super responders’

Catheter ablation for AF and heart failure: CASTLE AF

- Hypothesis:

AF ablation improves mortality and hospitalization rates in pts with LV dysfunction & AF compared to conventional treatment

- Primary Endpoint:

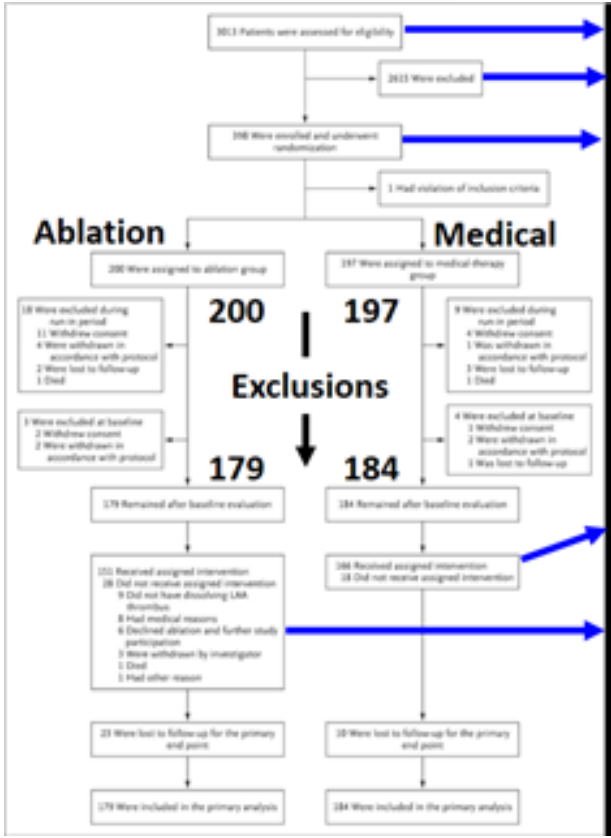
Composite of death from any cause or heart failure hospitalization

Marrouche et al NEJM 2018

Catheter ablation for AF and heart failure: CASTLE AF

- **Design** :
  - Multicenter studies (33 centers EU, USA et AUS)
  - Randomisation 1:1
- **Patients** :
  - PAF or PsAF
  - NYHA II, III ou IV
  - LVEF< 35%
  - Indication for ICD due to primary prevention
  - Dual chamber ICD or CRT-D already implanted

FLOW CHART: CASTLE AF



ASSESSED - 3013

EXCLUSIONS - 2615

ENROLLED - 398

RANDOMIZATION

18 (10%) in medical arm underwent ablation

28 (16%) in ablation arm were not ablated

LOST TO FOLLOW-UP - 33
(23 in Ablation group)

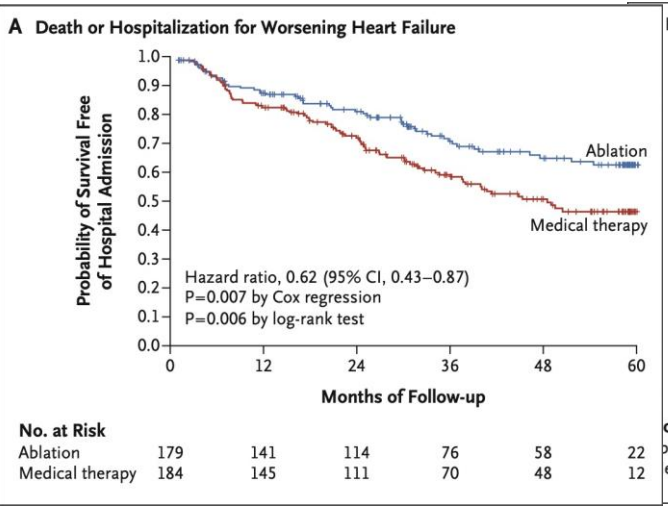
Follow-up : 37.6 ± 20.4 mths

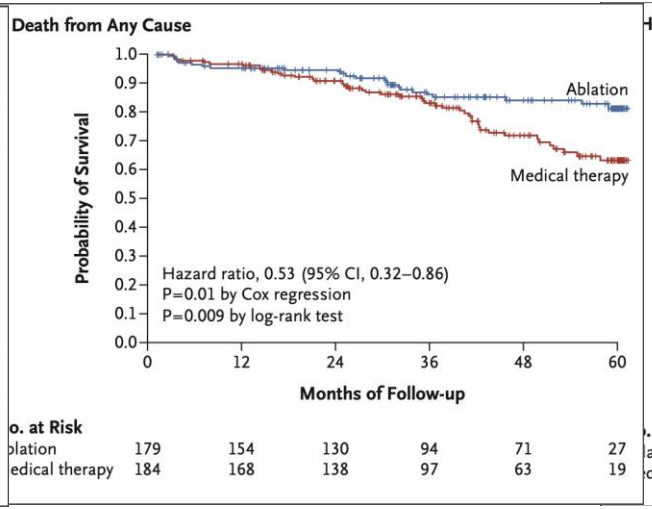
PATIENTS CHARACTERISTICS

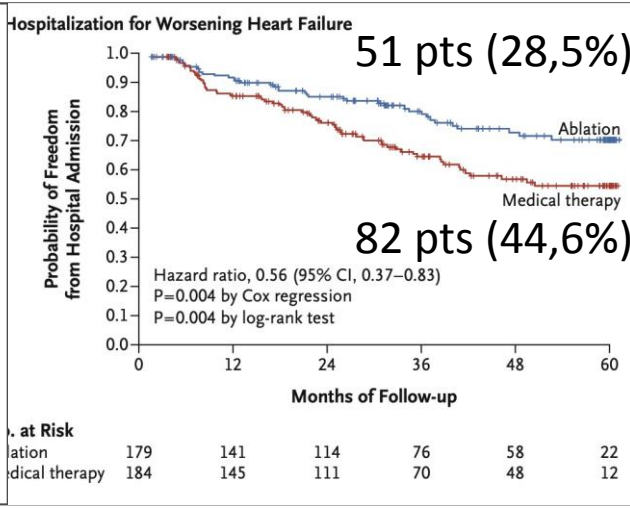
Characteristic	Treatment of Atrial Fibrillation	
	Ablation group (179 patients)	Pharmacological group (184 patients)
New York Heart Association class		
I – no. (%)	0 (0% vs. 11%*)	0 (0% vs. 11%*)
II – no. (%)	107 (60% vs. 58%*)	107 (58% vs 61%*)
III – no. (%)	66 (37% vs. 29%*)	75 (41% vs. 27%*)
IV – no. (%)	6 (3% vs. 2%*)	2 (1%)
†Body-mass index – kg/m²	28.7 (25.7-32.3)	29.1 (25.8-32.2)
†Left ventricular ejection fraction – %	29.0 (25.0-32.0)	30.0 (25.0-32.0)
Medication	n=179	n=183
ACE-inhibitor or ARB – no. (%)	168 (94%)	166 (91%)
Beta-blocker – no. (%)	164 (92%)	174 (95%)
Diuretics including spironolactone – no. (%)	170 (95%, vs. 93%*)	168 (92%, vs. 93%*)
Digitalis – no. (%)	36 (20%, vs. 18%*)‡	56 (31%)‡
Antiarrhythmic drug (class Ia, Ic, or III) – no. (%)	51 (29%, vs. 32%*)	51 (28%, vs. 31%*)
Amiodarone – no. (%)	50 (28%, vs. 31%*)	46 (25%), n=182, (vs. 26%*)
Current type of atrial fibrillation		
Paroxysmal – no. (%)	66 (33)	72 (37)
Persistent – no. (%)	134 (67)	125 (63)
Long-standing persistent (>1-year duration) – no.	55	56
†Left atrial diameter – mm	Not available	Not available
†Left ventricular ejection fraction – %	29.0 (25.0-32.0)	30.0 (25.0-32.0)

	Initial Procedure*		Chronic Repeat Ablations (after blanking period of 12 weeks)	
	Ablation group 151 pts	Pharmacological group 18 pts	Ablation group 37 pts	Pharmacological group 5 pts
Time of initial procedure since baseline – days				
Mean ± SD	6 ± 24	268 ± 270		
Median (IQR)	1 (0-1)	212 (62-372)		
Minimum-maximum	0-256†	0-1107		
Time between initial procedure and 1st repeat ablation – days				
Mean ± SD			427 ± 354	233 ± 133
Median (IQR)			336 (134-630)	260 (111-273)
Minimum-maximum			95-1345	98-421
Patients with repeat procedures – no. of pts				
One repeat procedure – no. of pts			34	3
Two repeat procedures – no. of pts			3	2
Three repeat procedures – no. of pts			0	0
Total number of repeat procedures – no.			40	7
PVI only – no. of pts	74	8	16	3
PVI + additional lesions – no. of pts	77	10	21	2

Survival Free of Death from any cause or admission for worsening heart failure







Conclusions: CASTLE AF

- CASTLE AF supports and expands upon findings from multiple previous trials
- AF ablation in CHF pts results in more SR, improved EF, functional status and QoL
- Now adds mortality benefit
- Establish a new paradigm for management of CHF pts with HF

Ablation of AF in HF pts: additional outcomes of the CABANA trial

- Purpose:

To determine the impact of AF ablation compared to drug therapy in pts with HF in the CABANAA trial

- Primary Endpoint:

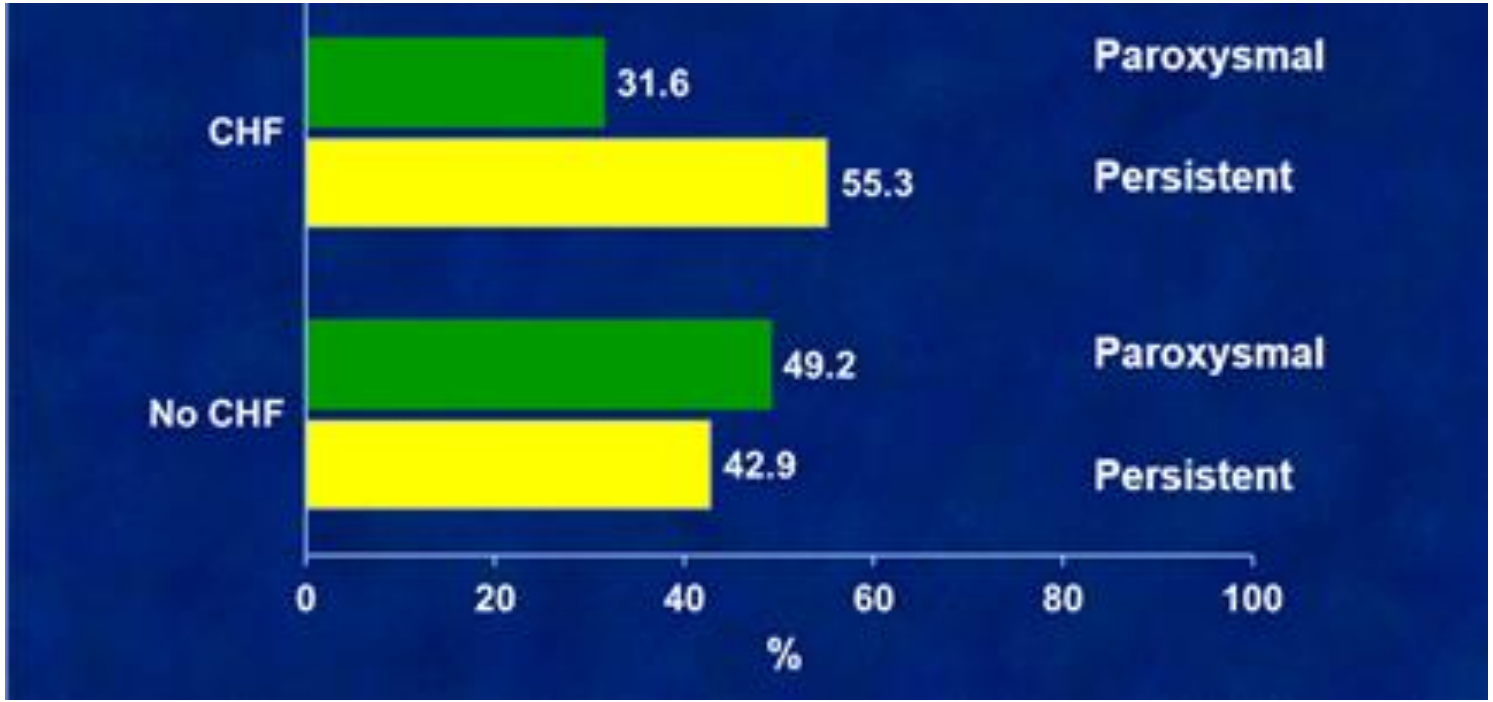
Composite of death from any cause or heart failure hospitalization

CABANA HRS 2019

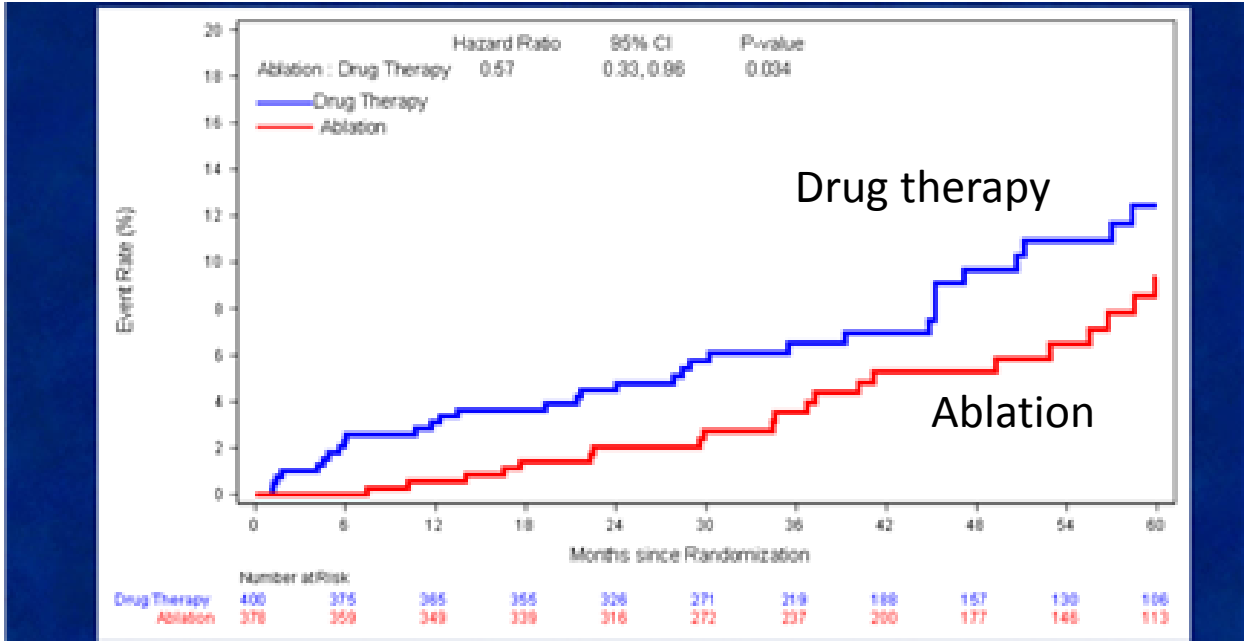
HF patient characteristics

	Non-HF Subjects N=1422	HF Subjects N=778	P-Value
Age, Median (Q1, Q3)	68 (62,72)	68 (62,73)	0.185
<65 yrs	480/1422 (33.8%)	284/778 (36.5%)	
65 to <75yrs	765/1422 (53.8%)	363/778 (46.7%)	
≥ 75	177/1422 (12.4%)	131/778 (16.8%)	
Sex (Female)	472/1422 (33.2%)	345/778 (44.3%)	<.001
Minority	164/1418 (11.6%)	61/778 (7.8%)	0.006
BMI, Median (Q1, Q3)	30 (26,34)	31 (27,35)	0.002

AF type at enrollment



Risk of all cause mortality ITT: impact of HF



Conclusions: CASTLE AF

- 60% of HF patients have persistent AF
- Reduction of mortality in HF patients with ablation therapy
- AF recurrences is also reduced in HF patients with ablation therapy

FINAL CONCLUSION: AF and HF

6.3.4. Catheter Ablation in HF

Recommendation for Catheter Ablation in HF Referenced studies that support the new recommendation are summarized in Online Data Supplement 7.		
COR	**LOE**	**Recommendation**
IIb	**B-R**	**1. AF catheter ablation may be reasonable in selected patients with symptomatic AF and HF with reduced left ventricular (LV) ejection fraction (HFrEF) to potentially lower mortality rate and reduce hospitalization for HF (S6.3.4-1, S6.3.4-2).** **NEW**: New evidence, including data on improved mortality rate, has been published for AF catheter ablation compared with medical therapy in patients with HF.