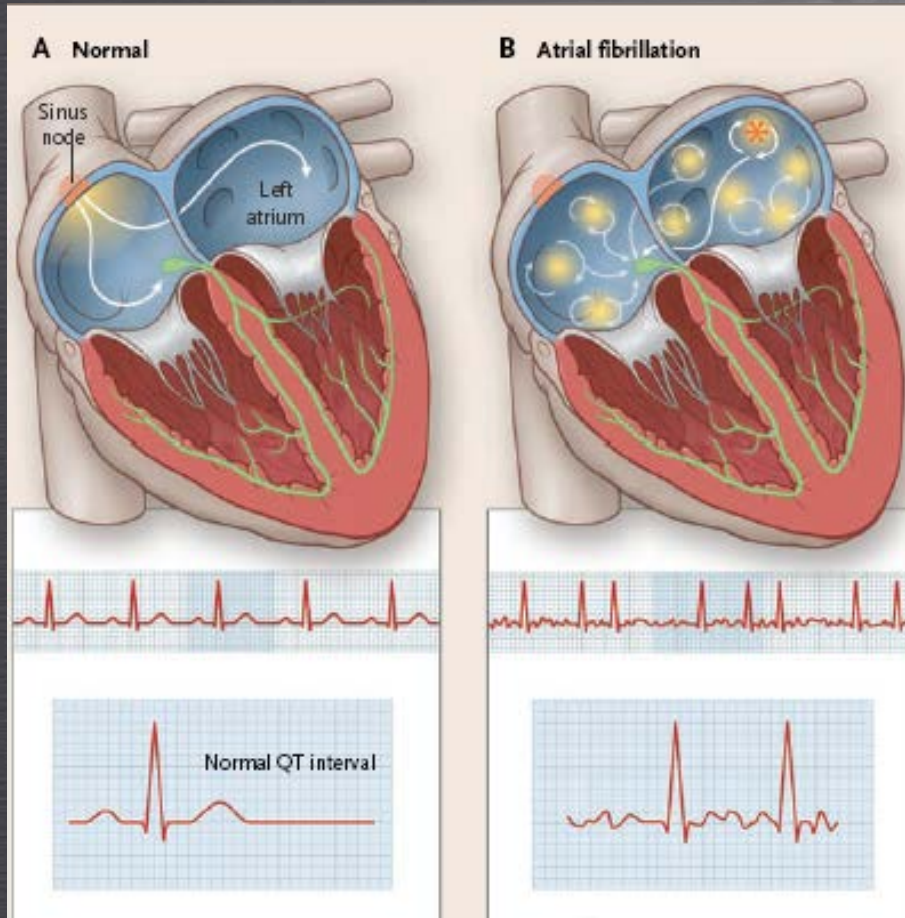


Atrial Fibrillation Transcatheter Ablation in patients with Structural heart disease, LV dysfunction and other challenges

Dipen Shah, MD, FHRS

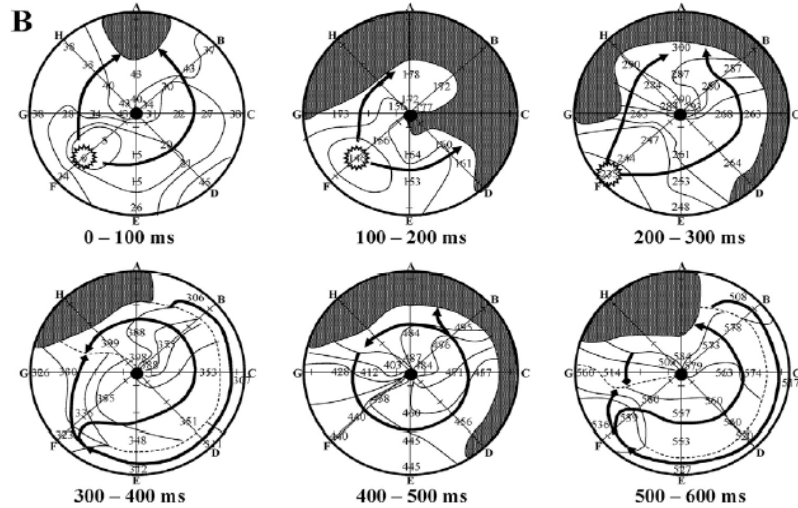
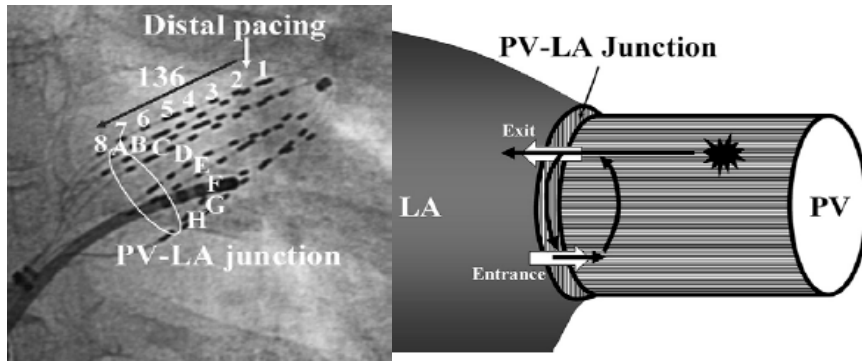
*Service de Cardiologie
Hôpital Cantonal de Genève*

Atrial fibrillation



- Commonest supraventricular arrhythmia
- Incidence increases with age
- significant increase in mortality (1.5 to 4.2)
 - *Framingham, Circulation 1998;98:946-52*
 - *Paris I, Eur Heart J 1999;20:896-9*
- Responsible for cardio-embolic strokes and heart failure

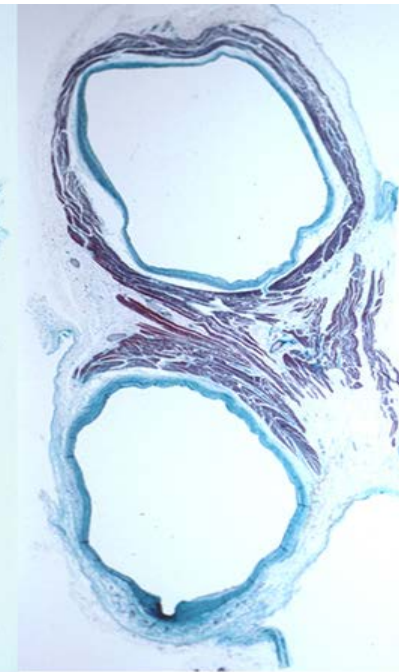
AF in Humans: Intra- PV and PV-LA junction Reentry



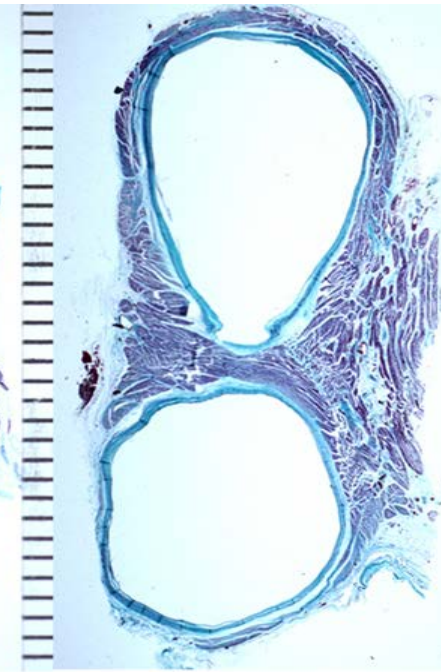
60y Male



60y Male



80y Female



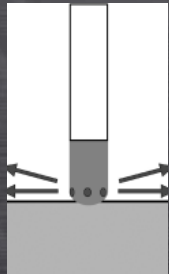
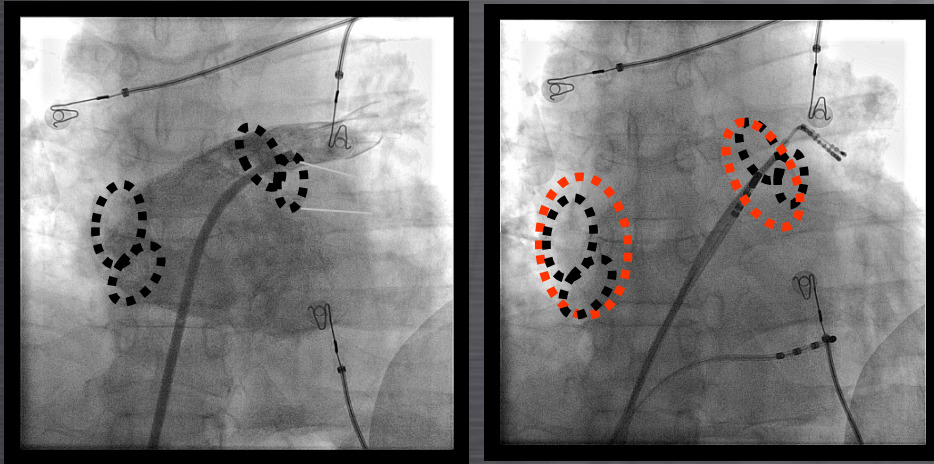
Kumagai et al, JACC 2004, 43, 2281

Ho SY et al, Heart 2001

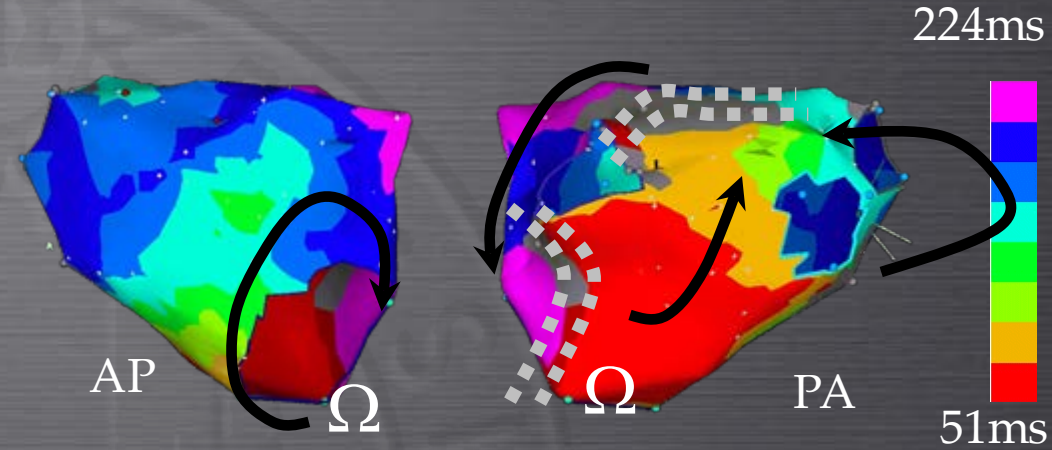


PV Isolation for *all* patients

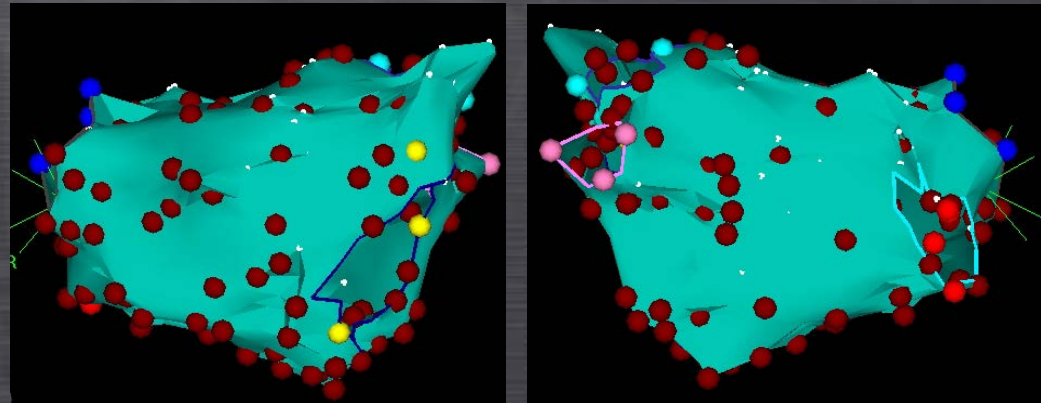
Single ostial isolation



Linear LA Lesions for persistent/permanent AF *



Electrogram substrate
Ablation



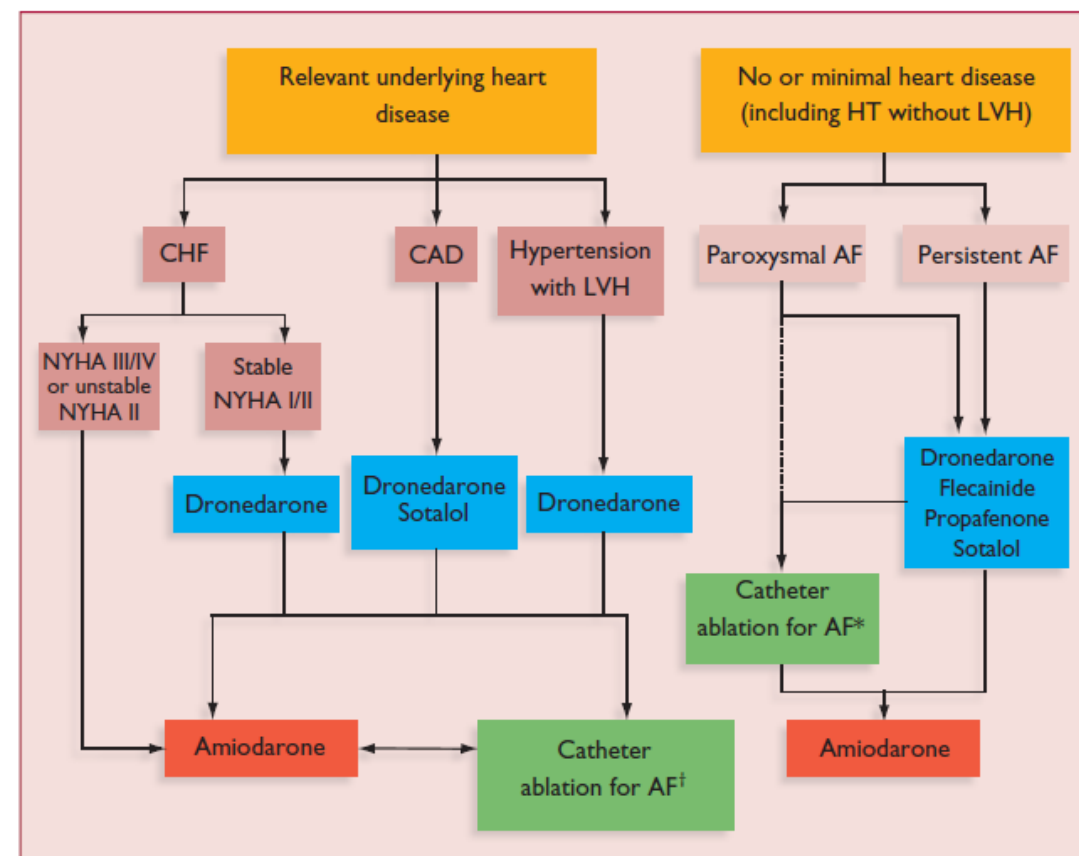
Guidelines for the management of atrial fibrillation

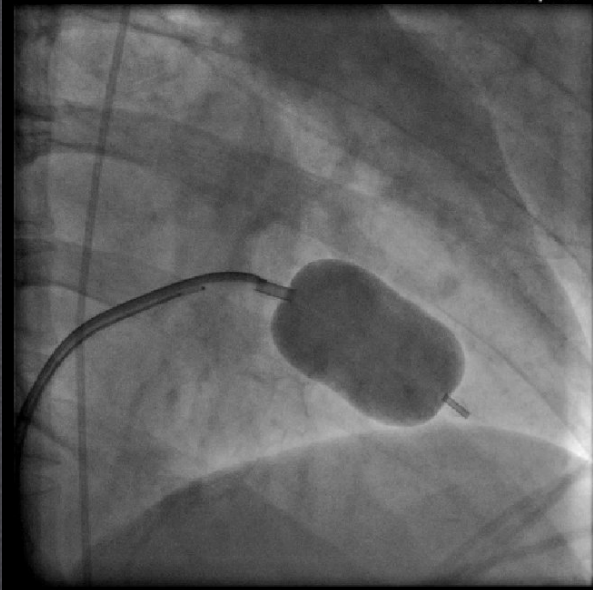
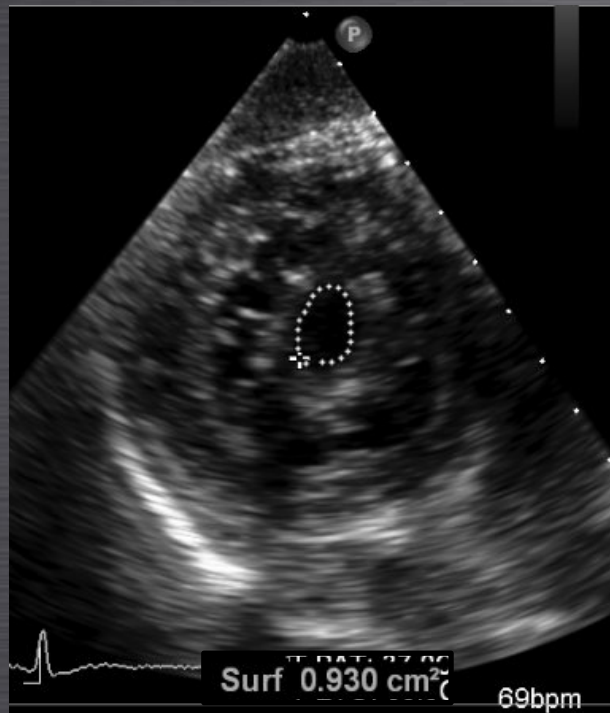
The Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC)

European Heart Journal doi:10.1093/eurheartj/ehq278
ESC GUIDELINES 2010

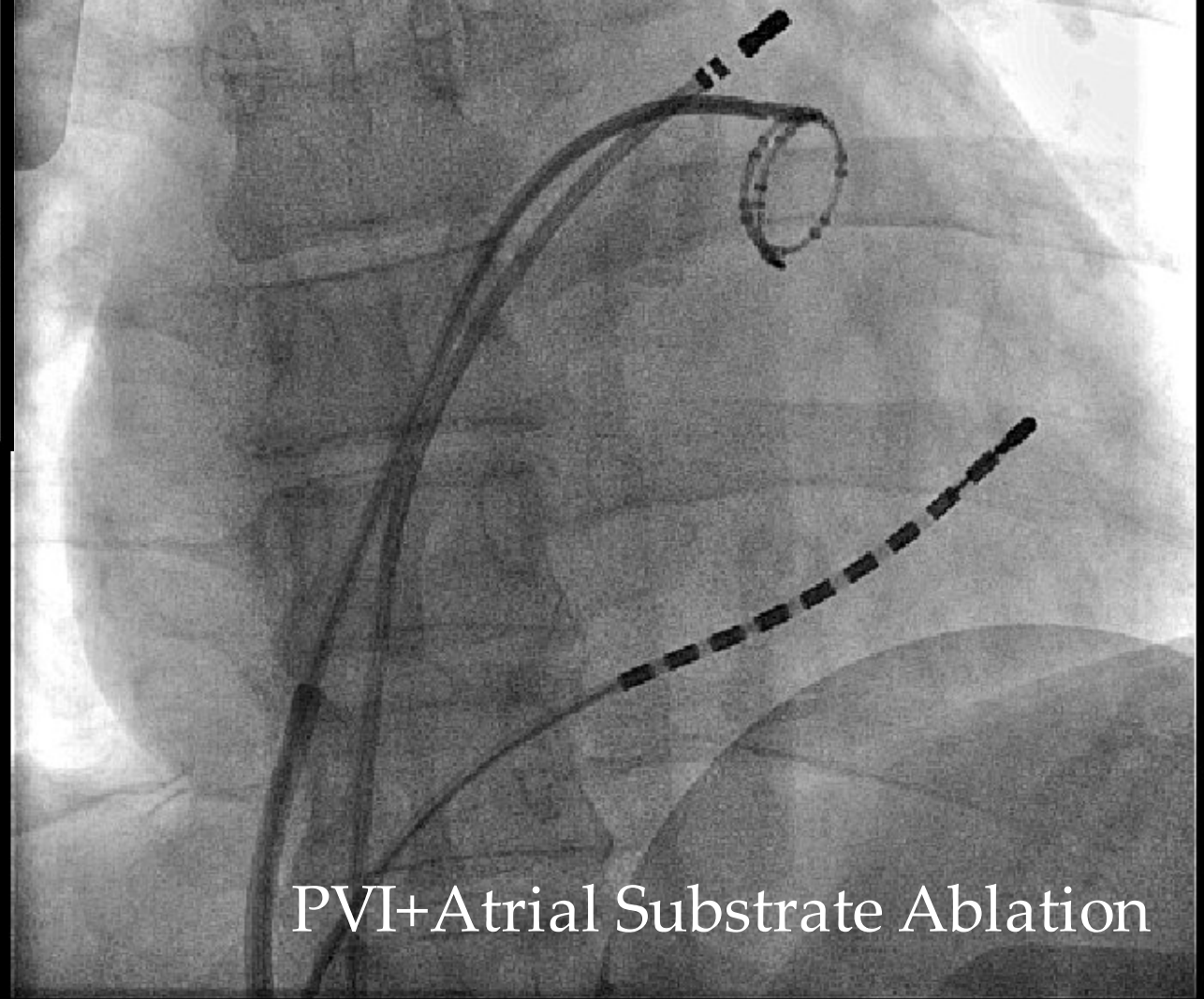
Recommendations	Class	Level
Ablation of persistent symptomatic AF refractory to AAD therapy should be considered a treatment option	IIa	B
Catheter ablation of AF may be considered in patients with symptomatic long-standing persistent AF refractory to AADs	IIb	C

Recommendations	Class	Level
Catheter ablation of AF may be considered prior to antiarrhythmic drug therapy in symptomatic patients despite adequate rate control with paroxysmal symptomatic AF and no significant underlying heart disease	IIb	B



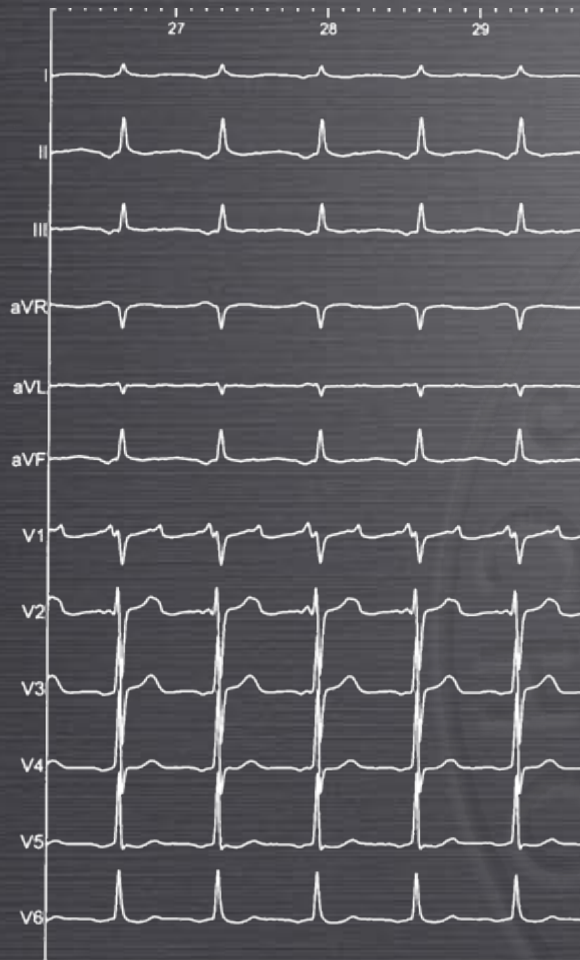


40 yrs, M, Rheumatic Mitral stenosis,
Post BMV, Persistent AF

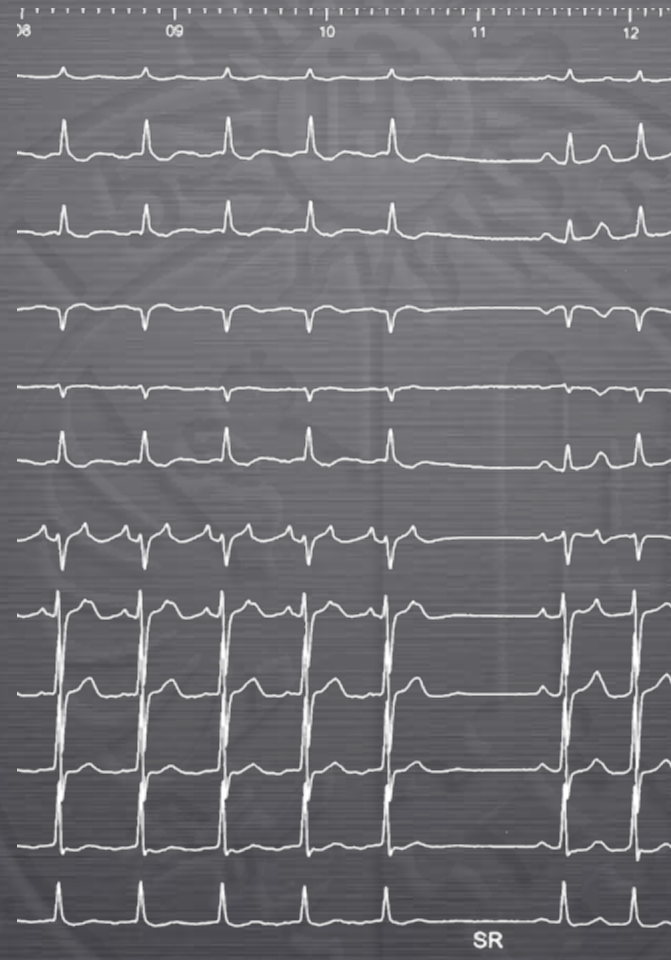


PVI+Atrial Substrate Ablation

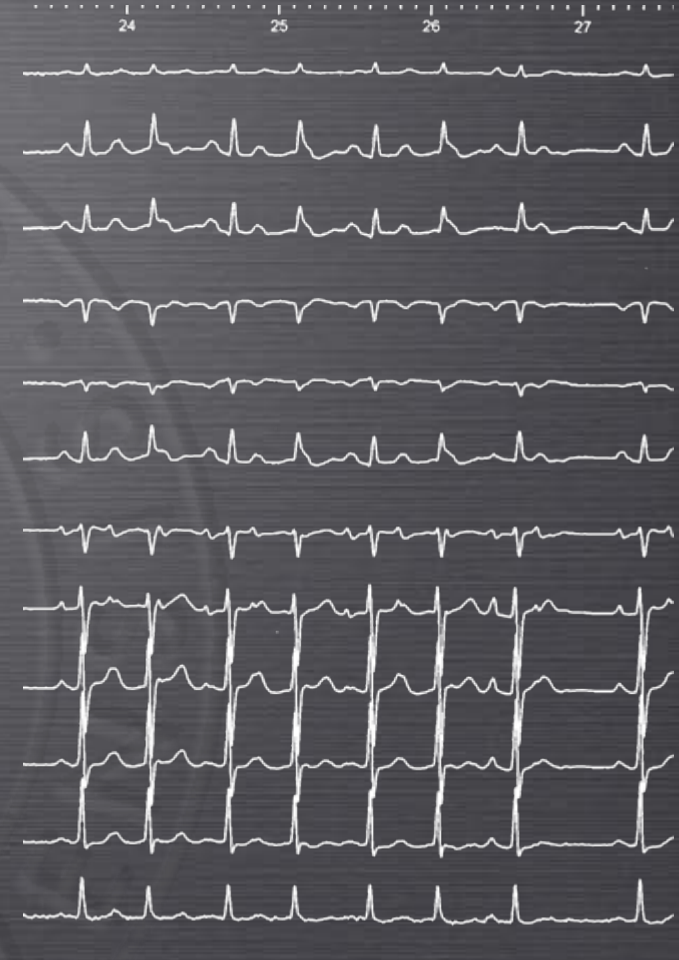
5 months later...



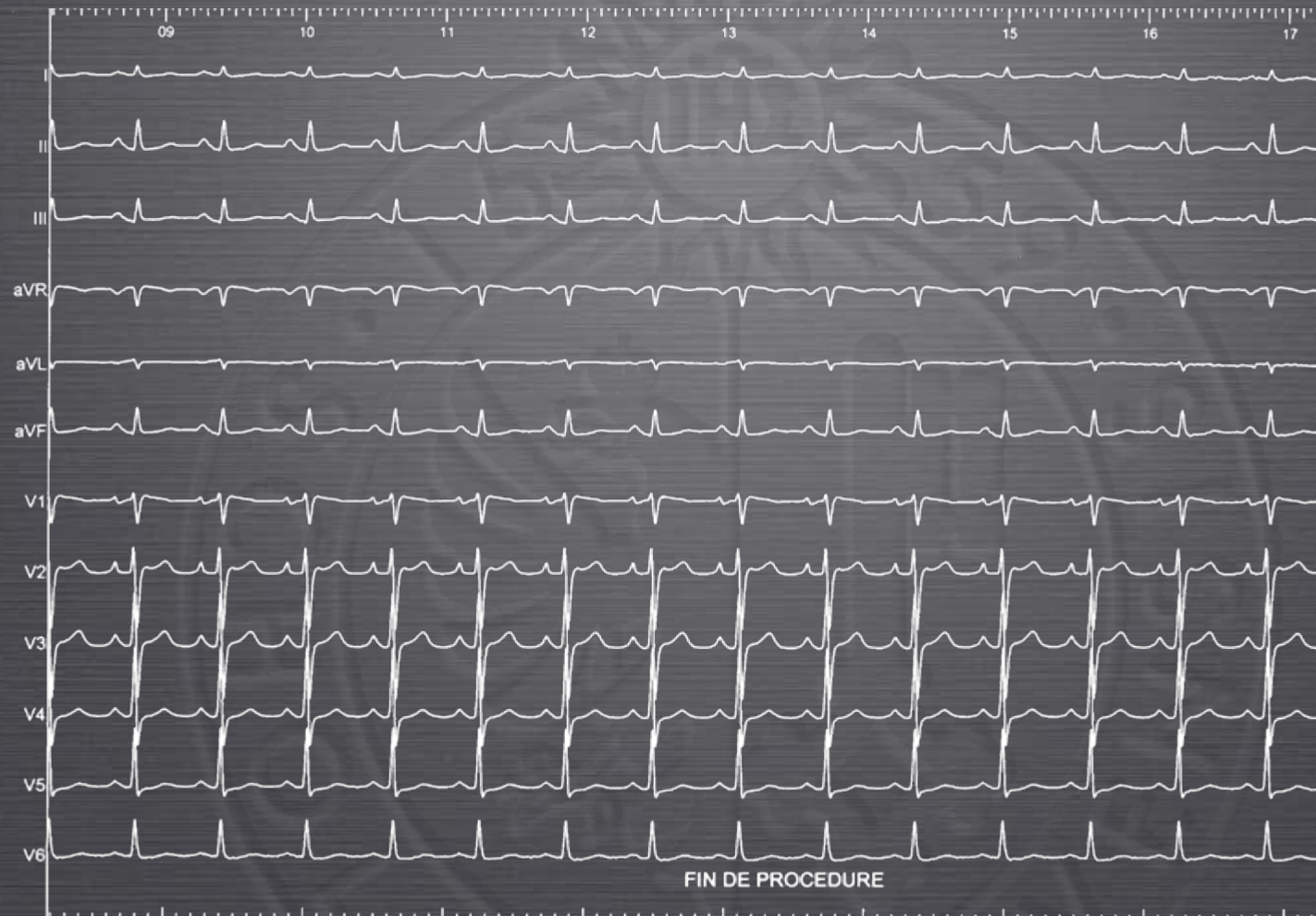
.....Flutter 6



Flutter 7

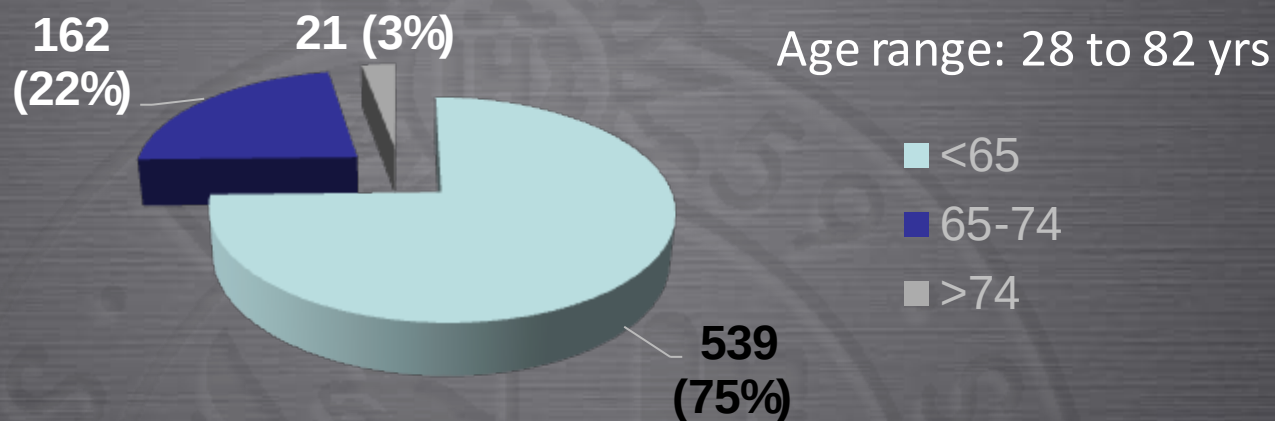


Atrial Tachycardia 5



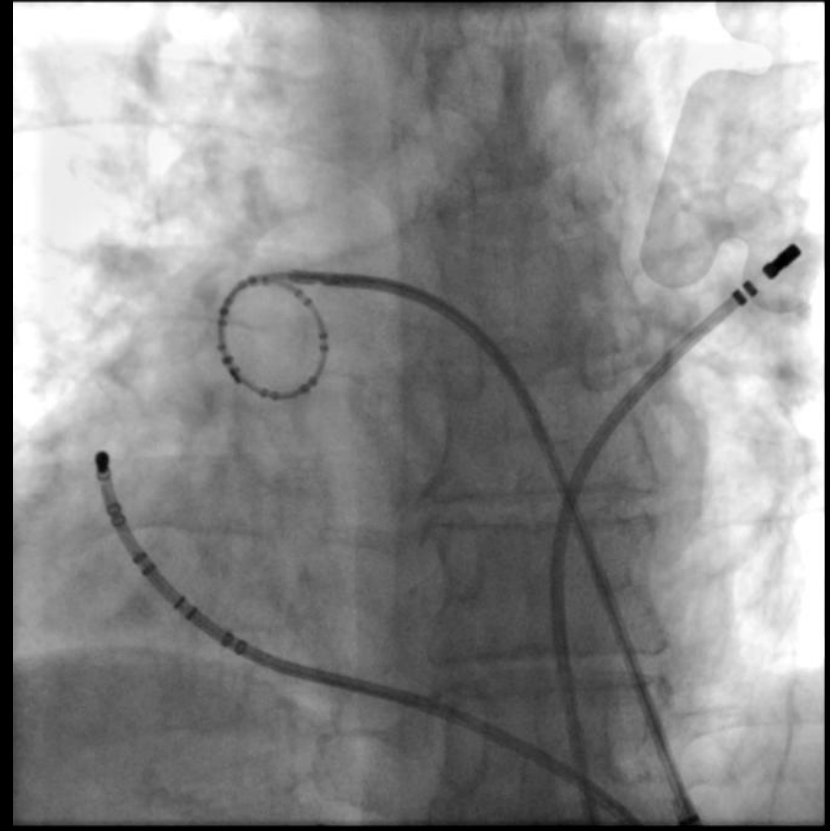
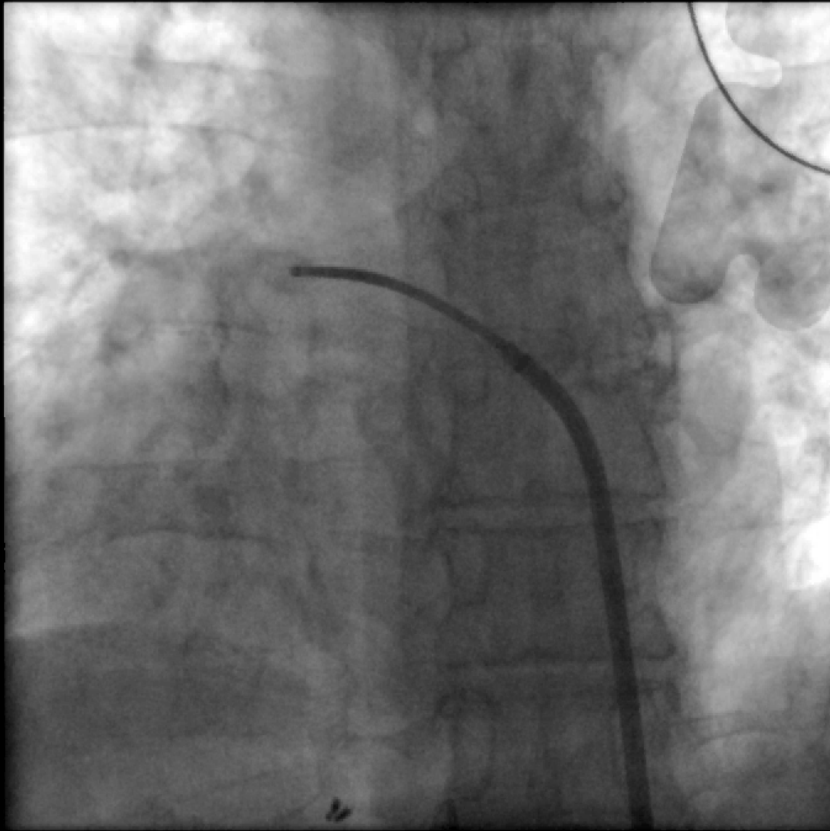
Final Result

Atrial Fibrillation ablation, 2002-2010; HUG: n=722

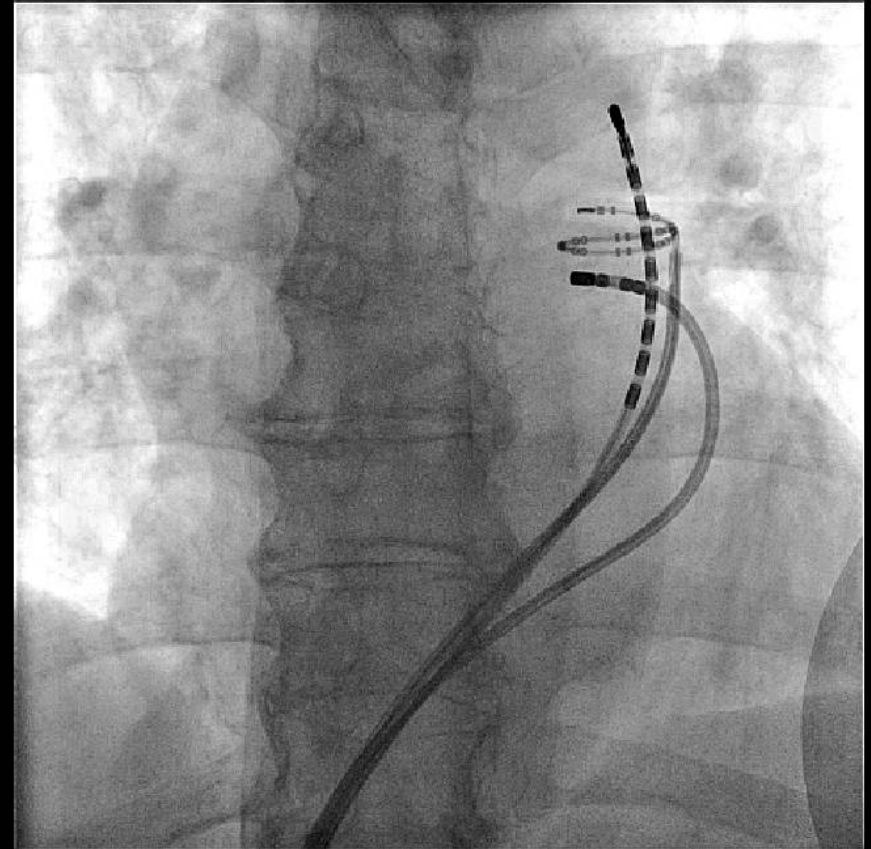
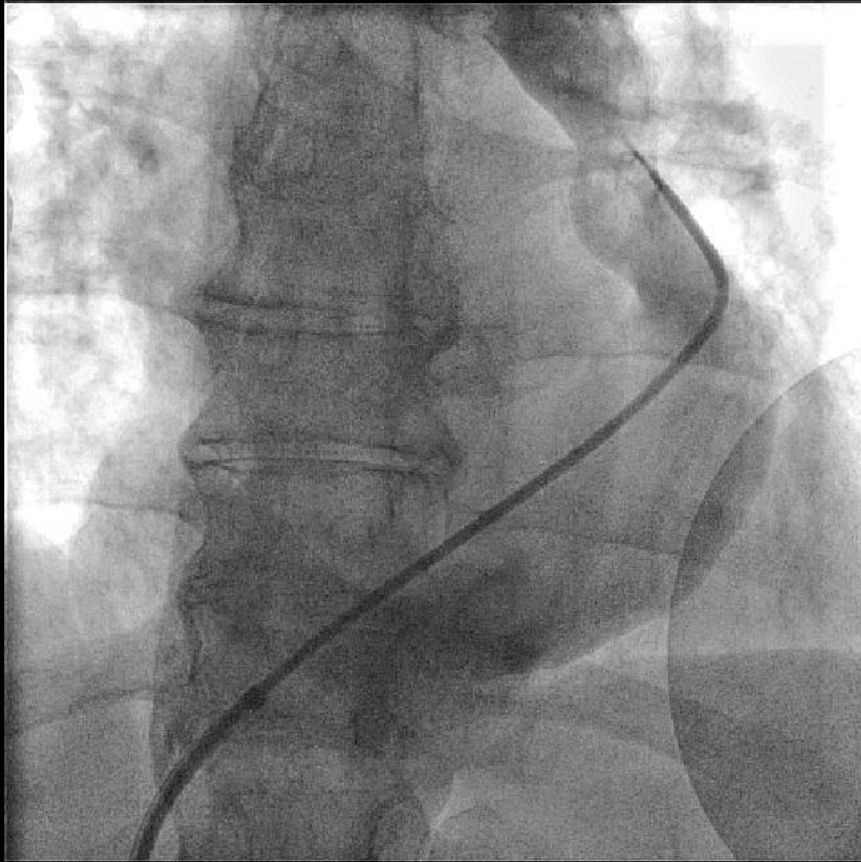


N = 188	<65 yrs	65-74 yrs	>74 yrs
n	154 (82%)	31 (16%)	3 (1.4%)
AF Parox/Persistent	73%/27%	68%/32%	66%/34%
AF Duration	73±65 mnths (54)	84±72 mnths (51)	88 mnths
LA size (echo)	4.2±0.7 cm	4.3±0.6 cm	5.1±0.8 cm
Follow-up	40±20 mnths		
Stable SR w/o AAD	77%	61%	66%

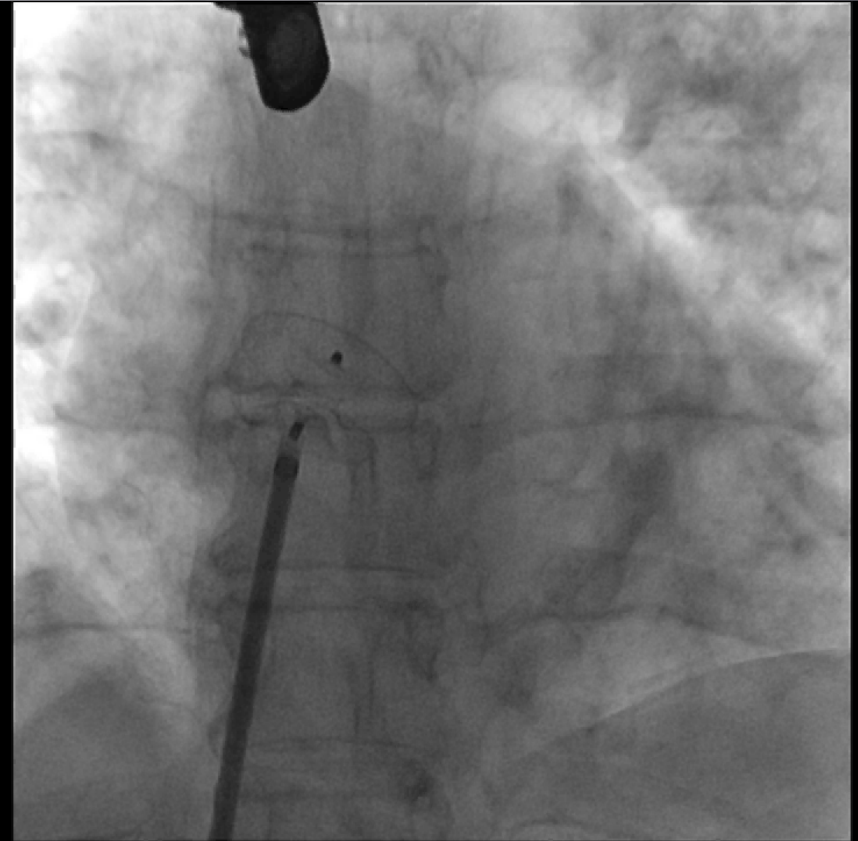
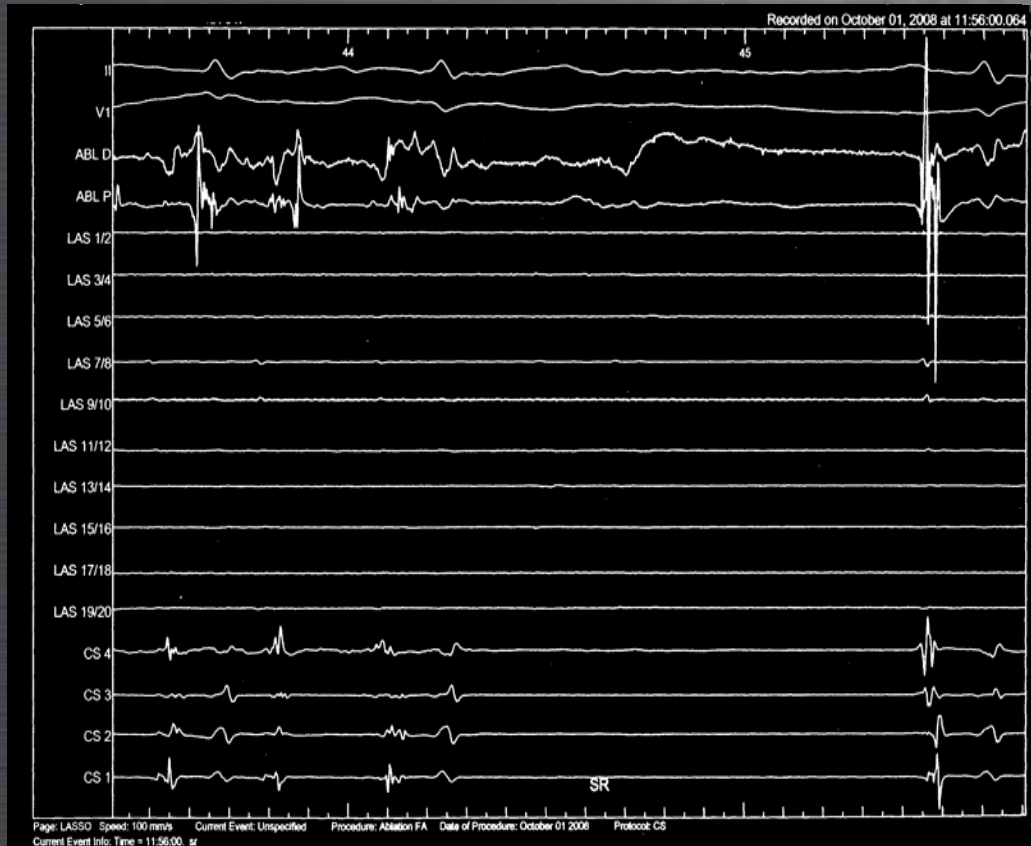
Situs Inversus & AF



Persistent LSVC & AF



ASD & AF



AF Ablation and Congenital Heart Disease

Main constraints:

- LA access
- Difficult catheter manipulation
- Additional non-traditional substrate/trigger

Commonest category: ASD patients

- Post surgical closure
- Post percutaneous closure
- PFO/small ASD
- Associated anomalies

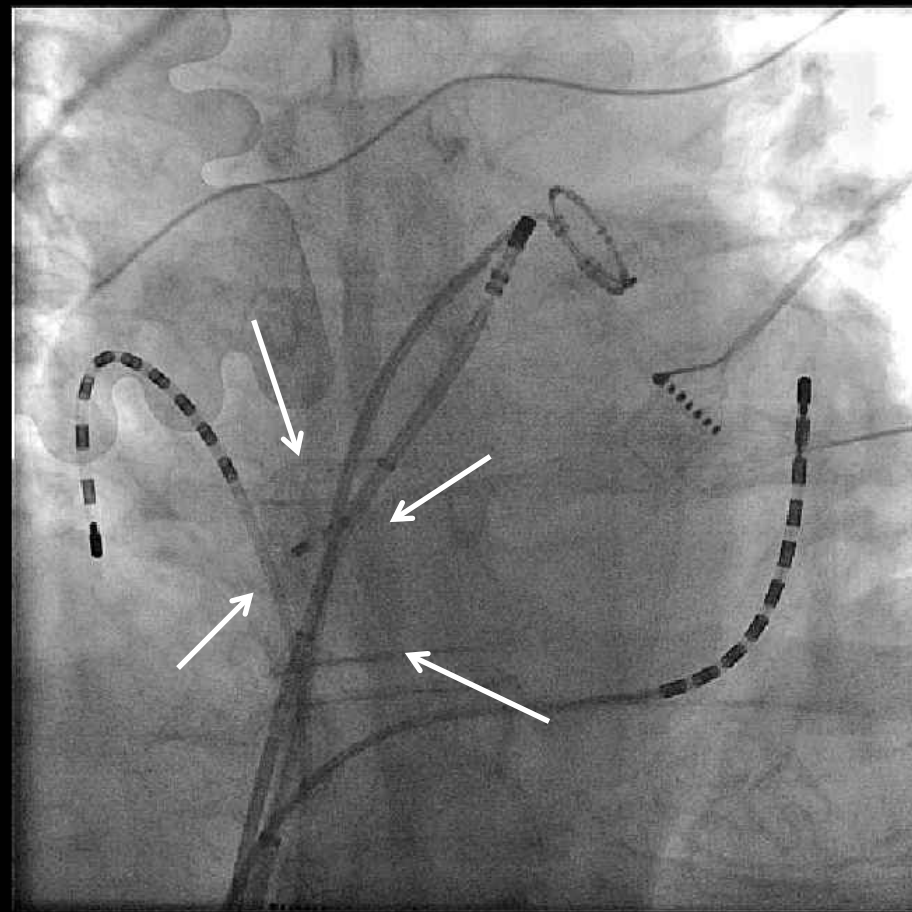
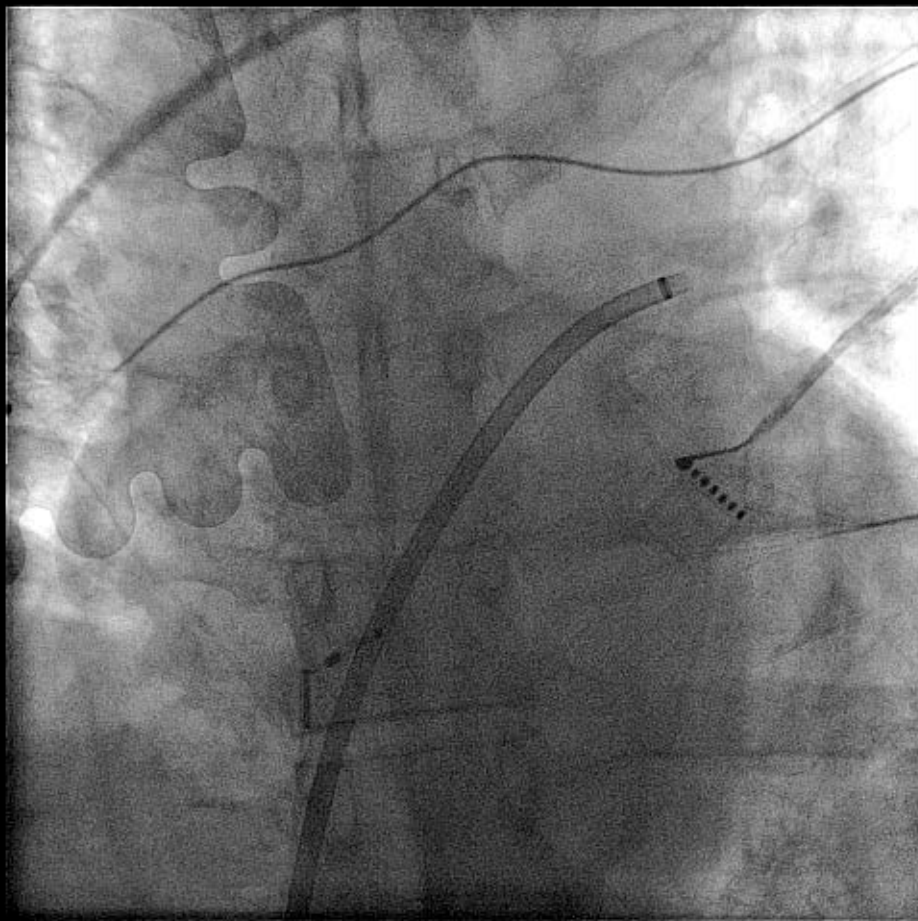
Post surgical closure:

- Suture closure, pericardial patch closure → simple direct puncture
- Dacron/PTFE/Goretex → puncture around defect

PFO

- No need for puncture
- Passing second catheter easy
- Use steerable sheath if required

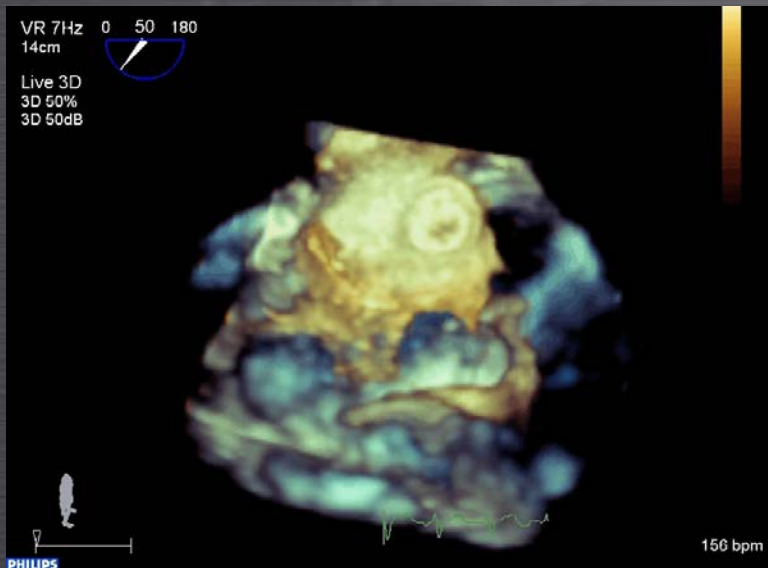
MT, 54 yrs



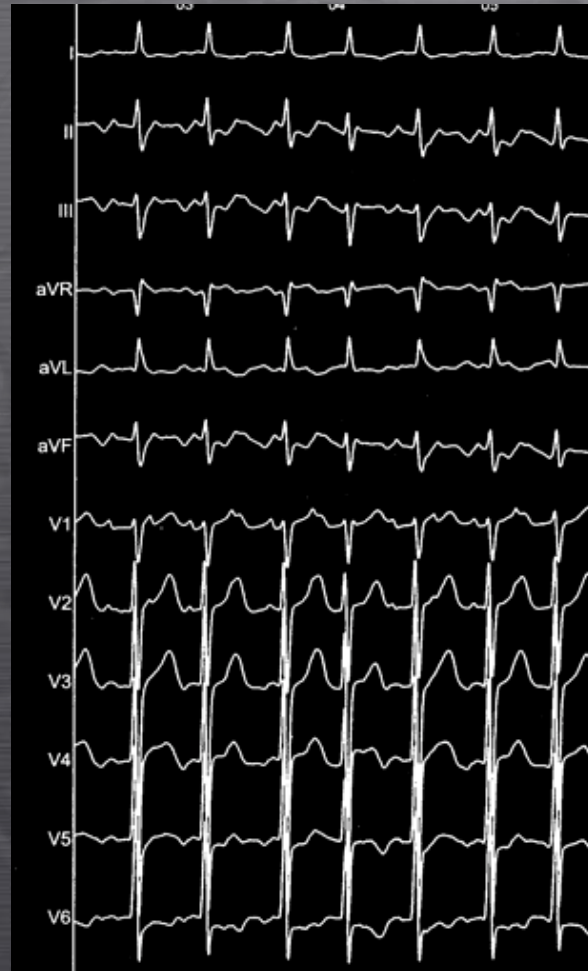
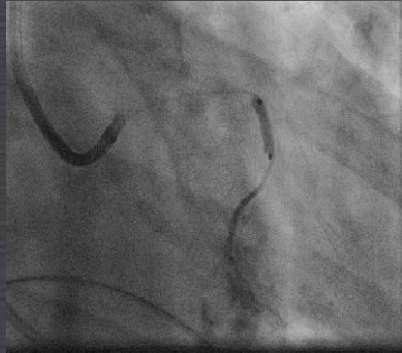
AF ablation after percutaneous ASD closure



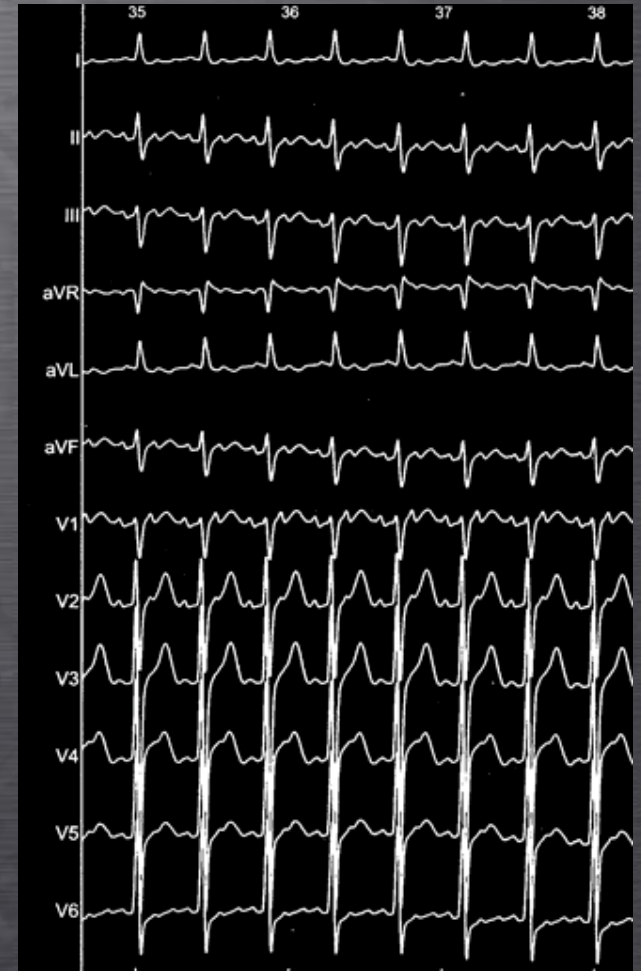
- TEE pre-procedure to evaluate residual leaks and residual uncovered septum
- ICE guided puncture through residual septum
- Usually posterior
- Caveat: not too posterior!



Hypertrophic Cardiomyopathy & Persistent AF



Typical Flutter



LA Flutter (Peri LPV)

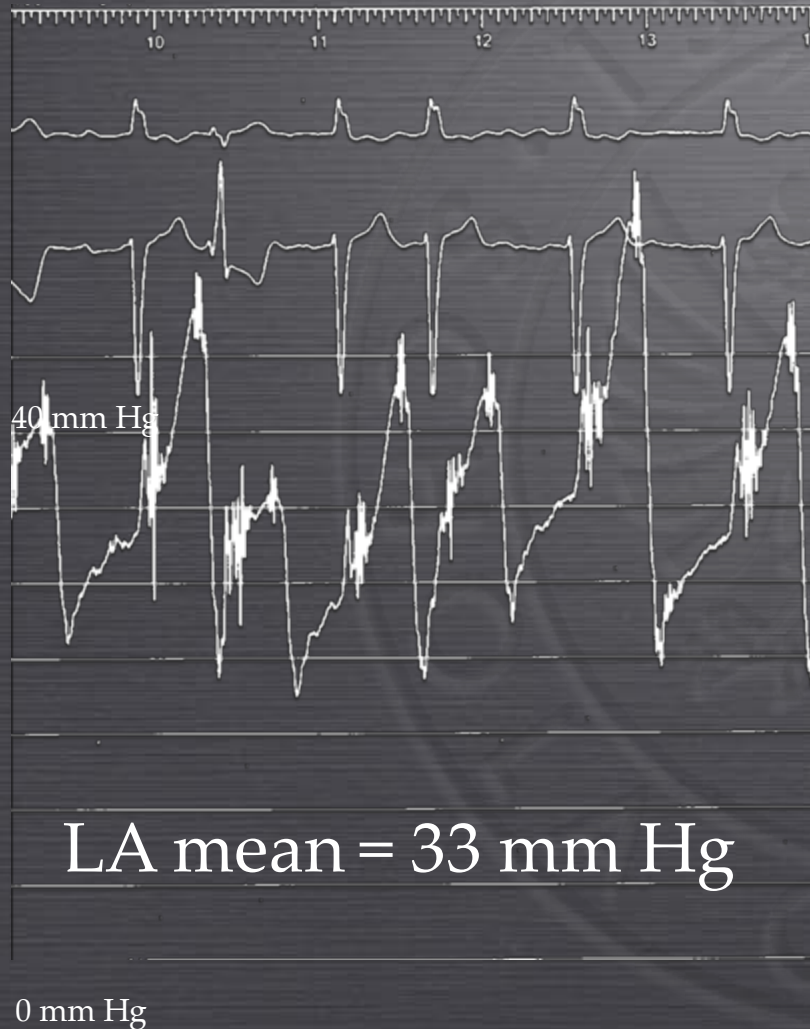
AF Ablation and Coronary Artery Disease

Main constraints:

- Double platelet antiaggregant use
- Tachycardia sensitivity
- Coronary artery lesions
- No option but continued anti-platelet agent use
- Limit time in tachycardia
- Avoid ablation overlying coronary calcification e.g. mitral isthmus line and Cx calcification

Mr.J

57 yrs, Persistent AF, S/P ICD implantation, CABG 1995, LVEF 20%



Extended PVI+ LA lesions



Stable sinus rhythm w/o AADs



Persisting class III
dyspnea and
orthopnea...

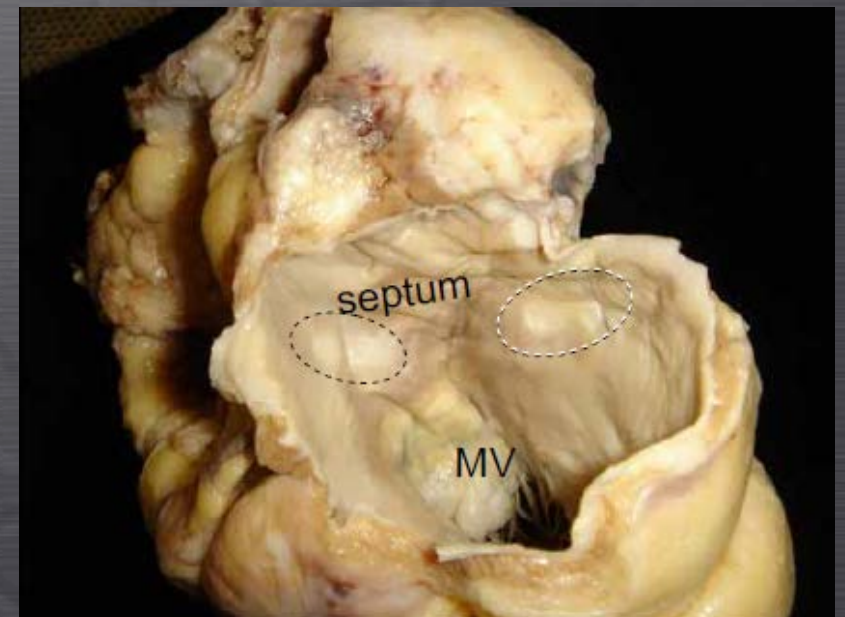
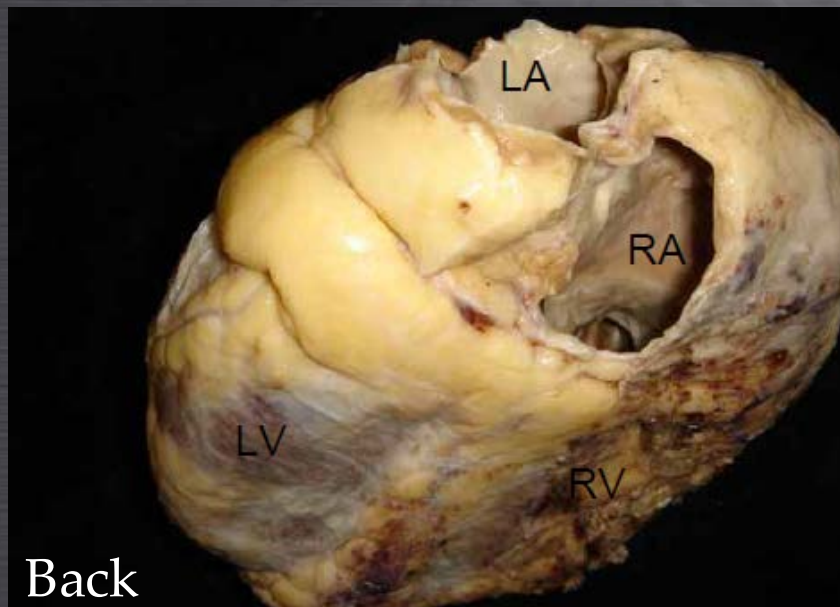
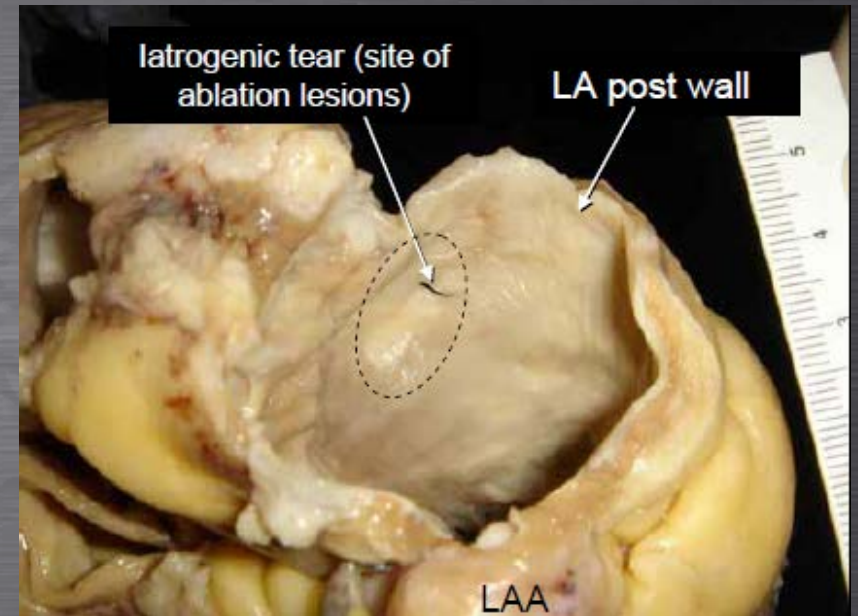
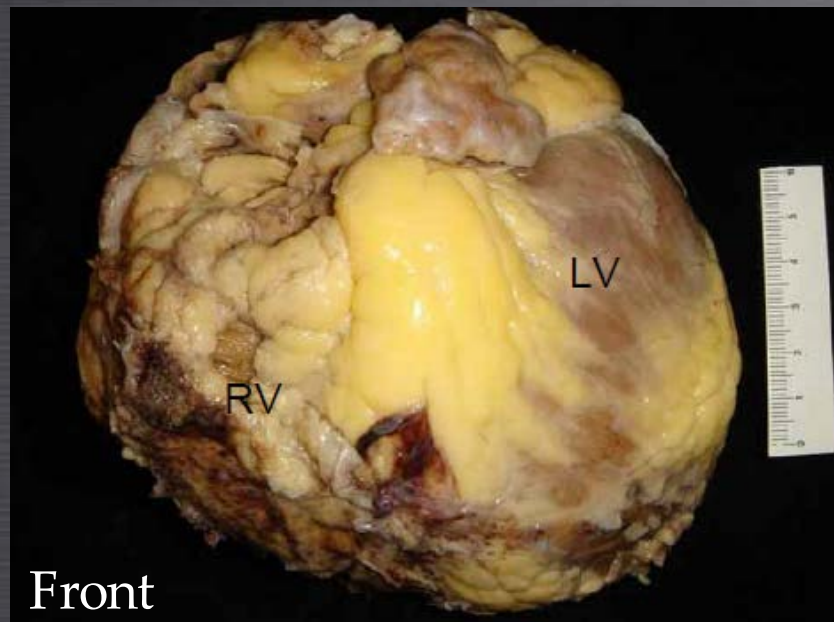
Cardiac resynchronisation in stable
sinus rhythm ...



Persisting HF

Cardiac transplantation in stable sinus
rhythm ...

Mr.J's Heart



AF Ablation and Heart Failure

Main constraints:

- Volume sensitivity
- Systolic function sensitivity
- Lowest possible irrigation rates: consider optimised irrigation catheters,
- Limited or no contrast agent use: consider MRI import
- Optimise anaesthesia to avoid myocardial depression
- Consider ablation in sinus rhythm
- Monitor LA pressures or PACWP

AF Ablation and Cardiac Devices

Main constraints:

- Venous occlusion
- Difficult catheter manipulation
- Lead displacement or damage
- RF interference
- Program device therapy off
- Program to VVI 45 or VOO 50
- Recognise catheter-lead intertwining early: biplane fluoro useful
- Avoid ablation close to leads
- Careful manipulation in case of CS leads (poor fixation)
- Post ablation verification of lead impedance and thresholds

AF Ablation and Prosthetic Valves

Main constraints:

- Interference with valve function
- Associated substrate modification

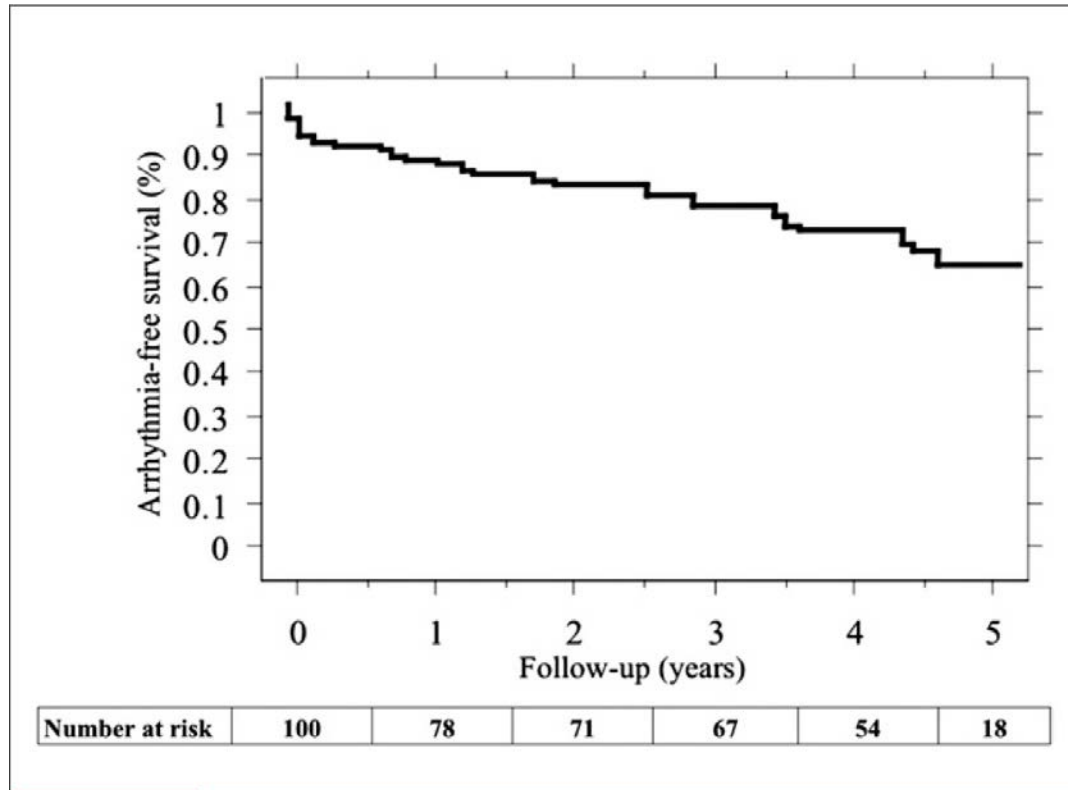
Aortic prosthetic valve:

- Limited or little effect
- No interference with valve function
- Little additional substrate effect
- Fluoroscopic marker for transseptal puncture

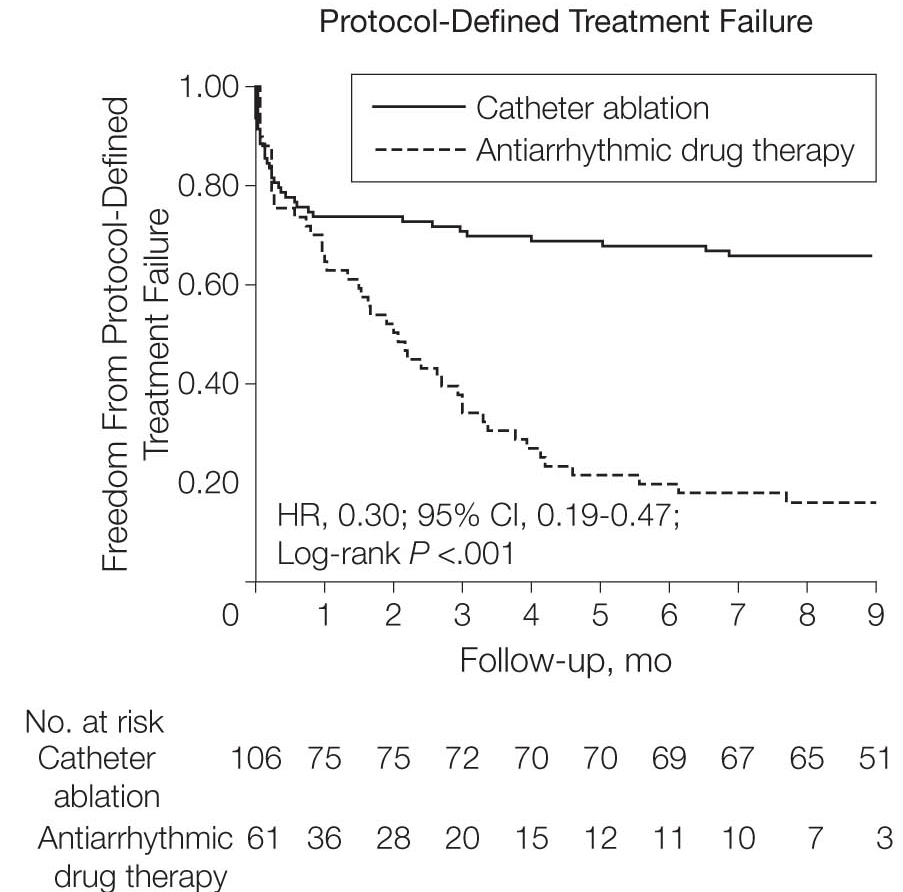
Mitral prosthetic valve

- Nearly always associated with moderate or severe LA enlargement
- Associated substrate changes prominent
- Dilated LA a challenge to reach all areas
- Mitral isthmus linear lesion a challenge as well
- Anterior line easier if LA scar/LAA amputation
- Higher embolic risk
- Fluoroscopic marker for transseptal puncture

Catheter Ablation of AF: Recent Trials



Weerasooriya et al, J Am Coll Cardiol 2011;57:160–6)



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

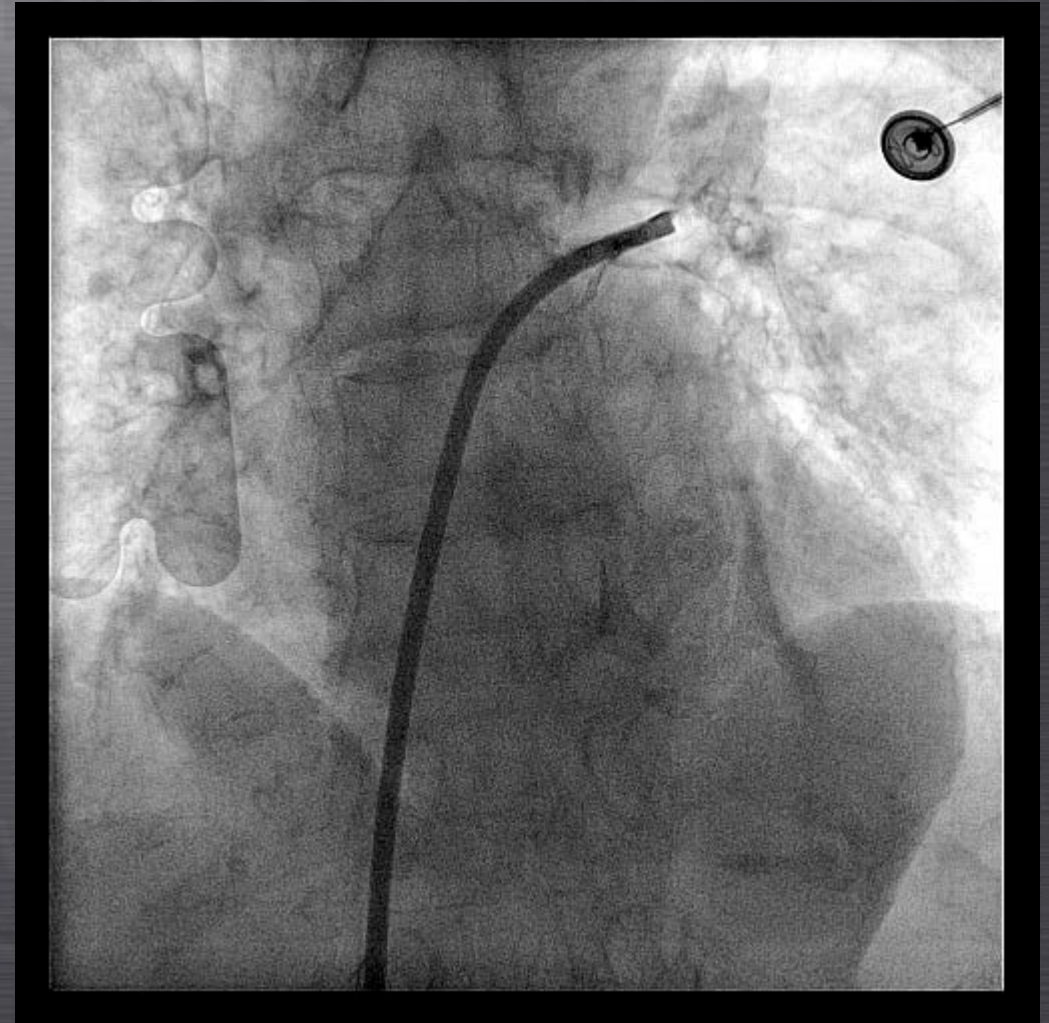
Hypothesis

- Terminating AF by catheter ablation may involve a different mechanism compared with *preventing* initiation and maintenance of AF
- Termination of AF as an endpoint of catheter ablation may lead to excessive ablation, iatrogenic atrial tachycardias and possible mechanical atrial dysfunction
- Pacing induced AF may allow evaluation of the 'initiating substrate'

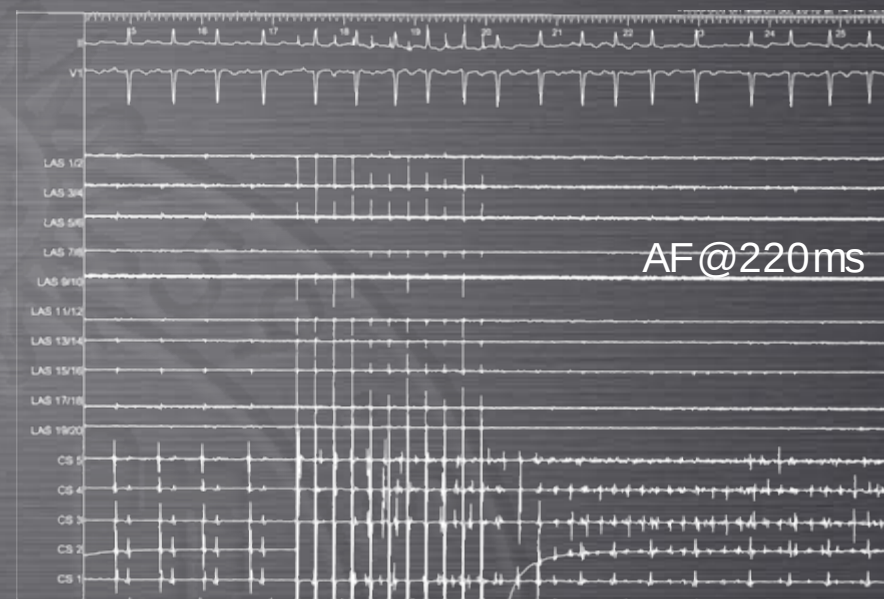
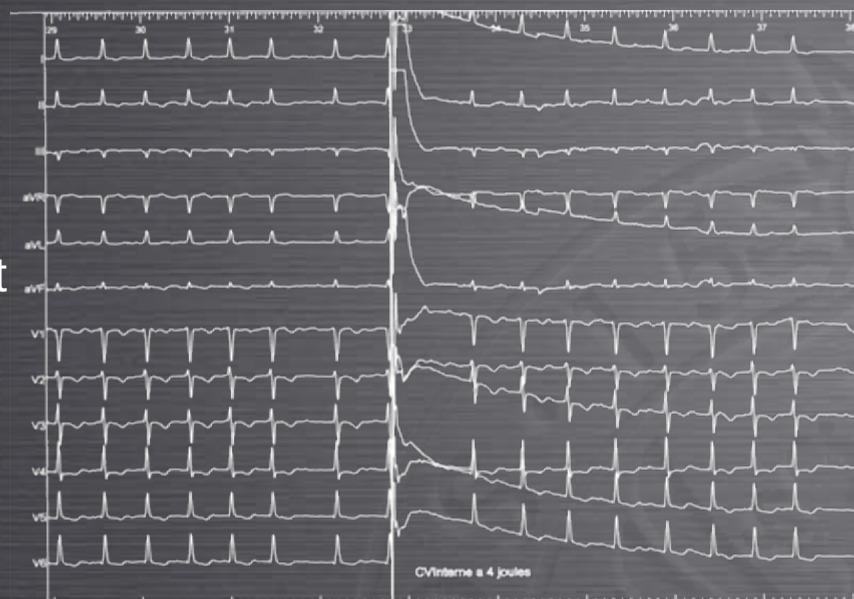
Persistent AF with Prosthetic Aortic Valve

73 yr old lady

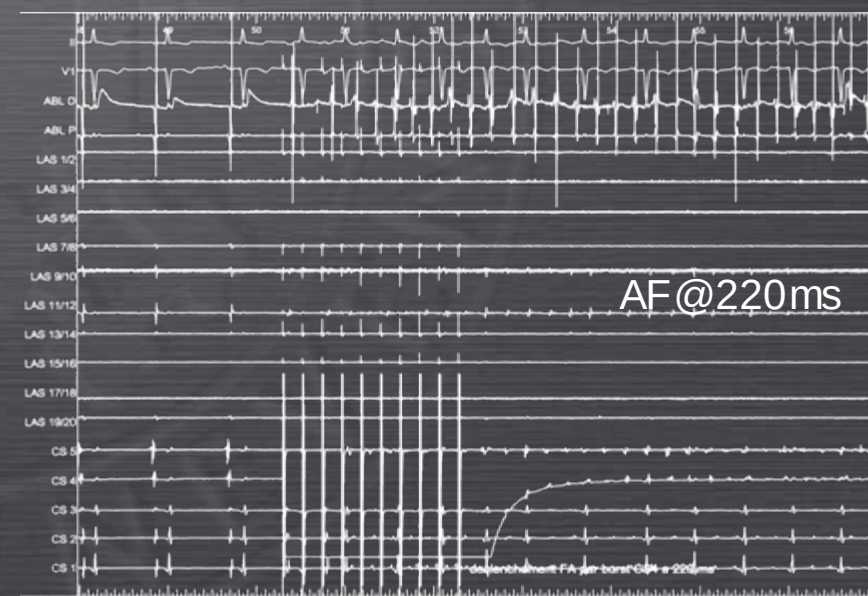
- Mechanical Aortic valve prosthesis in 1983
- Palpitations since 2005,
- Ao Valve gradient $\uparrow$ since 2007
- AF with fast ventricular rate 11/2009: DC Cardioversion with recurrence 4h later
- Class III DOE, orthopnea, nycturia with persistent AF



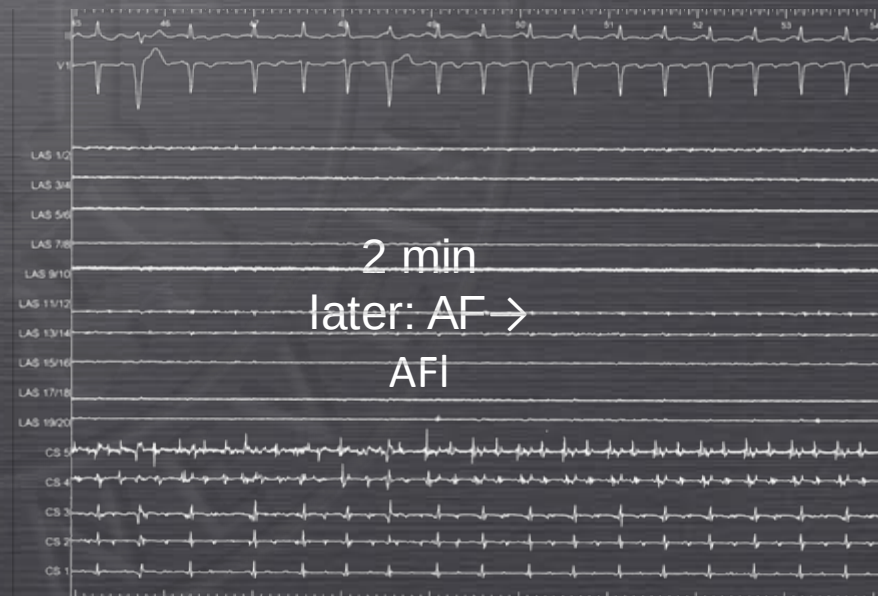
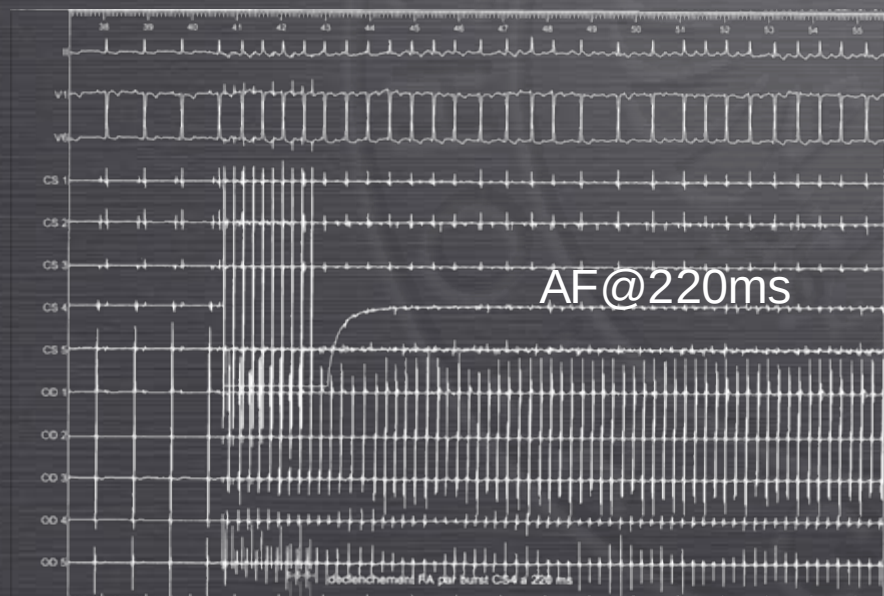
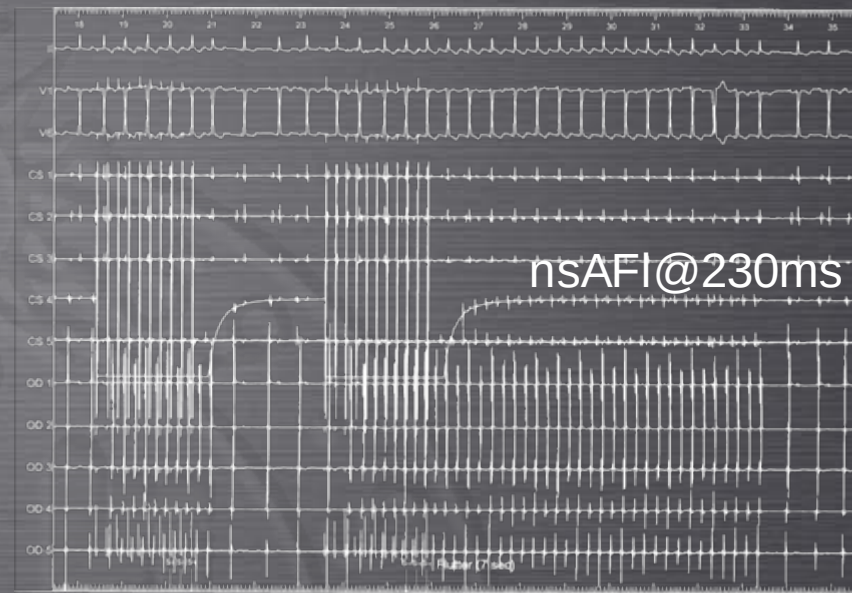
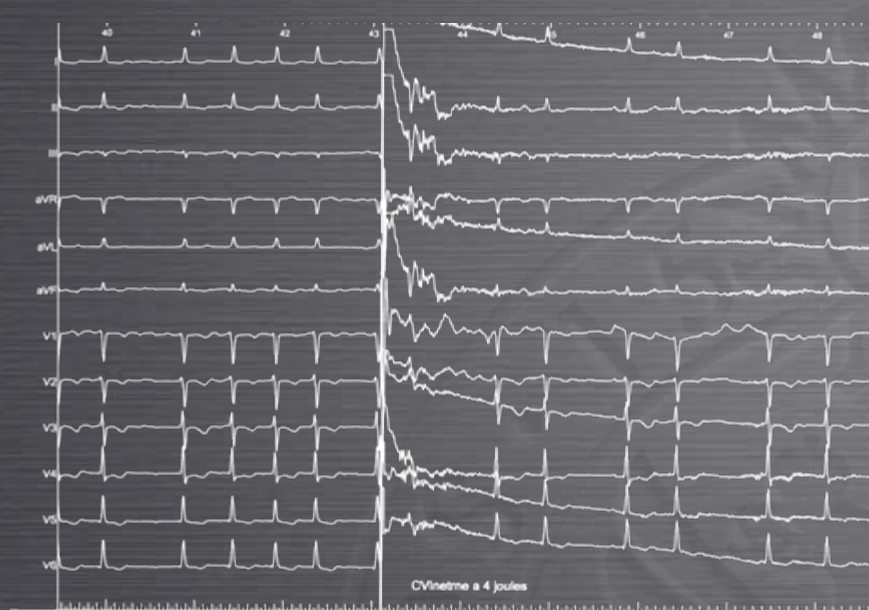
Post
PVI

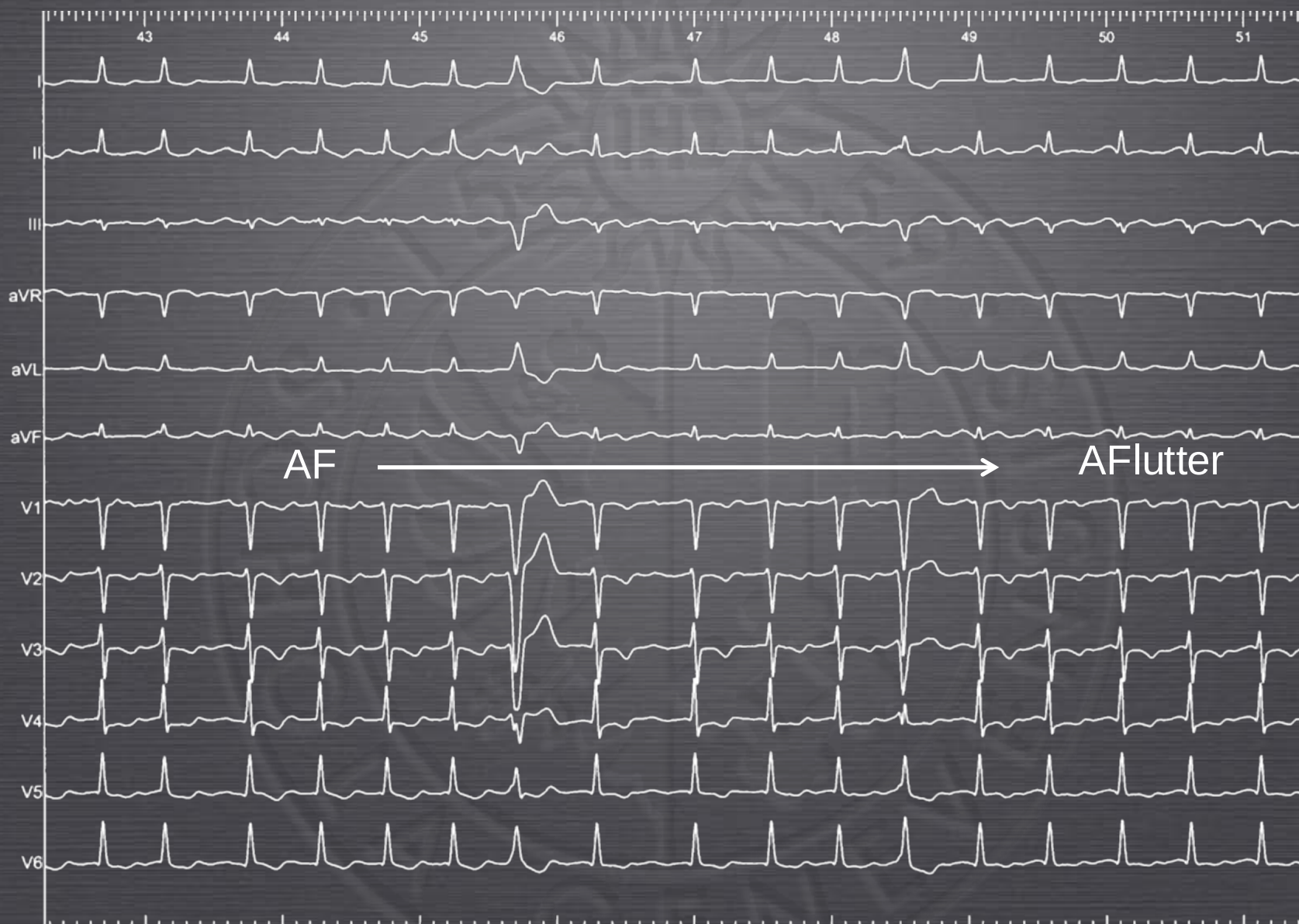


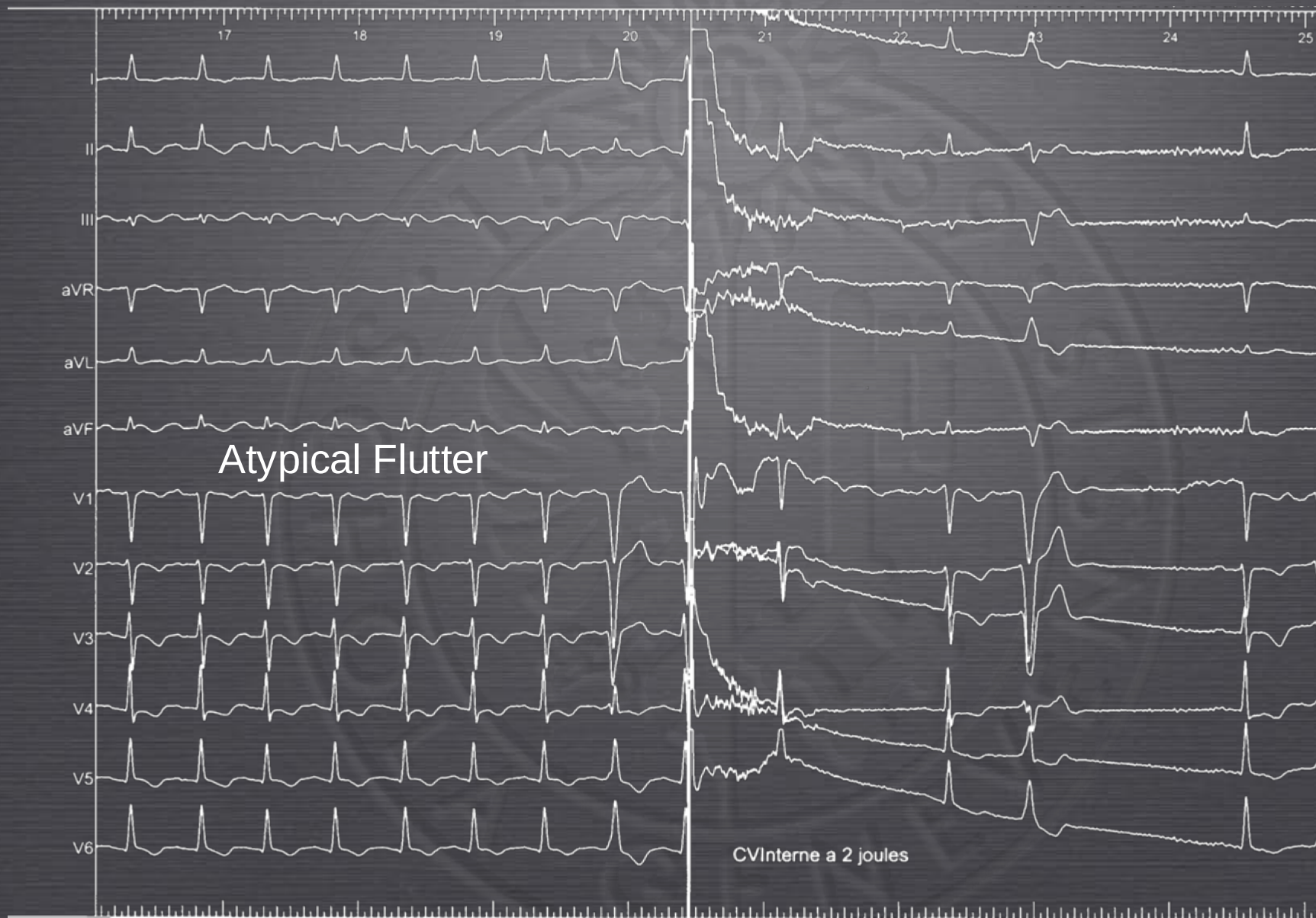
Post
CS
abln



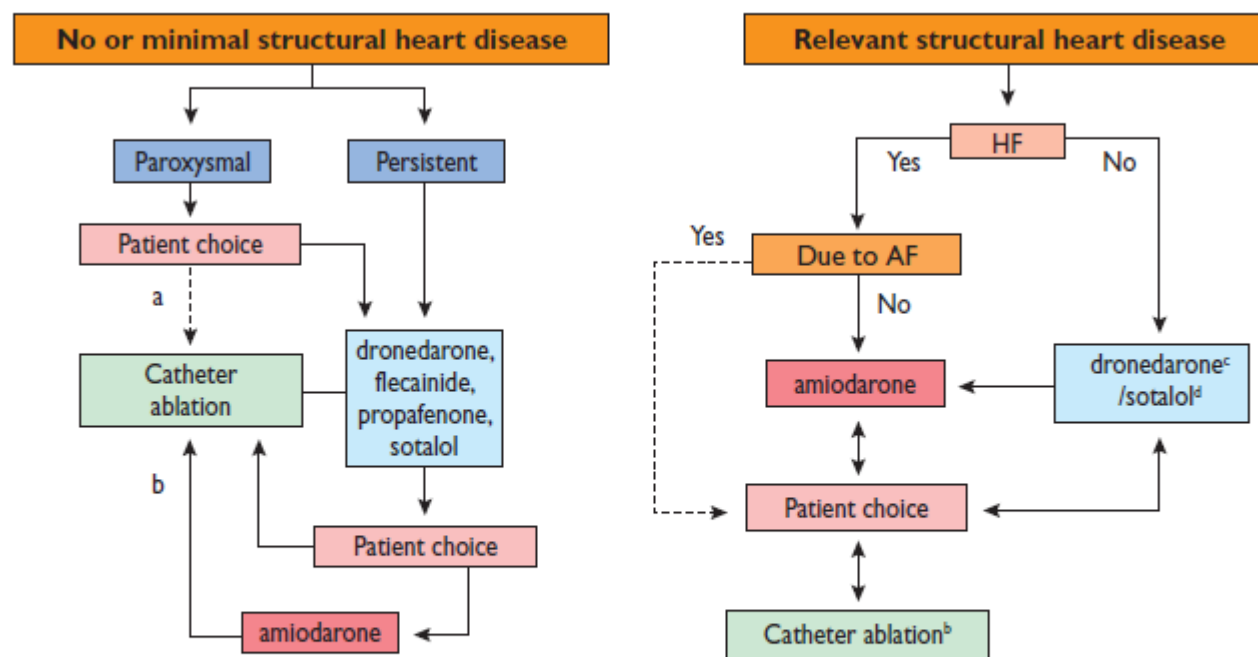
Post
LA
abln.







2012 focused update of the ESC Guidelines for the management of atrial fibrillation



AF = atrial fibrillation; HF = heart failure. ^aUsually pulmonary vein isolation is appropriate. ^bMore extensive left atrial ablation may be needed.

^cCaution with coronary heart disease. ^dNot recommended with left ventricular hypertrophy. Heart failure due to AF = tachycardiomyopathy.

Figure 5 Antiarrhythmic drugs and/or left atrial ablation for rhythm control in AF.