Treating Atrial Fibrillation

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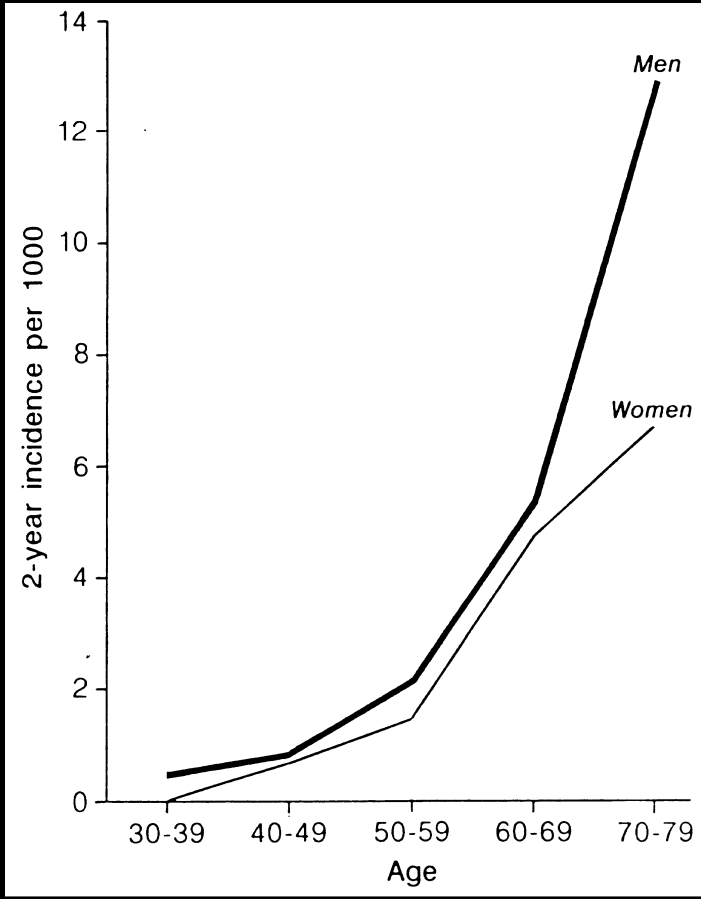
AF burden

- Framingham
  - Lifetime risk of developing AF = 25%
  - Mortality: SMR =1.9 ♀ 1.5 ♂
- NHS audit
  - 1% of budget spent on AF - € 688, 000, 000 in 2000
- ↓↓Quality of life
  - Symptoms of AF
  - Side effects of medication

Benjamin, E. J. et al. "Impact of atrial fibrillation on the risk of death: the Framingham Heart Study." Circulation 98.10 (1998): 946-52.
Stewart, S. et al. "Cost of an emerging epidemic: an economic analysis of atrial fibrillation in the UK." Heart 90.3 (2004): 286-92

ATRIAL FIBRILLATION
Incidence

Framingham Heart Study



Nice guidance for management of AF

- Issued on June 2006
- Aimed to give a UK based simple guidance on management of AF
- Attempts to be evidence based
- And applicable to the majority of patients

Key aims of management

- Diagnosis - everyone with irregular pulse gets ECG
- Identify secondary causes (thyroid, hypertension, valve disease)
- Treatment
  - Stroke prevention
  - Rate control
  - Rhythm control where appropriate

Diagnosis

- AF can only be diagnosed on an ECG recorded during symptoms/signs
- Even asymptomatic patients should have an ECG
- Consider 24 hour to 7 day Holter if intermittent (depending on frequency)
- Or ask patient to attend A+E during symptoms and get a copy of ECG

Investigation

- TFT
- Echo
  - If young
  - If rhythm control strategy
  - If unsure of stroke risk
  - If structural heart disease suspected

Stroke prevention

High risk

- Previous ischaemic stroke/TIA or thromboembolic event
- Age ≥75 with hypertension, diabetes or vascular disease[4]
- Clinical evidence of valve disease or heart failure, or impaired LV function on echocardiography[5]

Moderate risk

- Age ≥65 with no high risk factors
- Age <75 with hypertension, diabetes or vascular disease[4]

Low risk

- Age <65 with no moderate or high risk factors

Warfarin (INR 2-3)

Aspirin

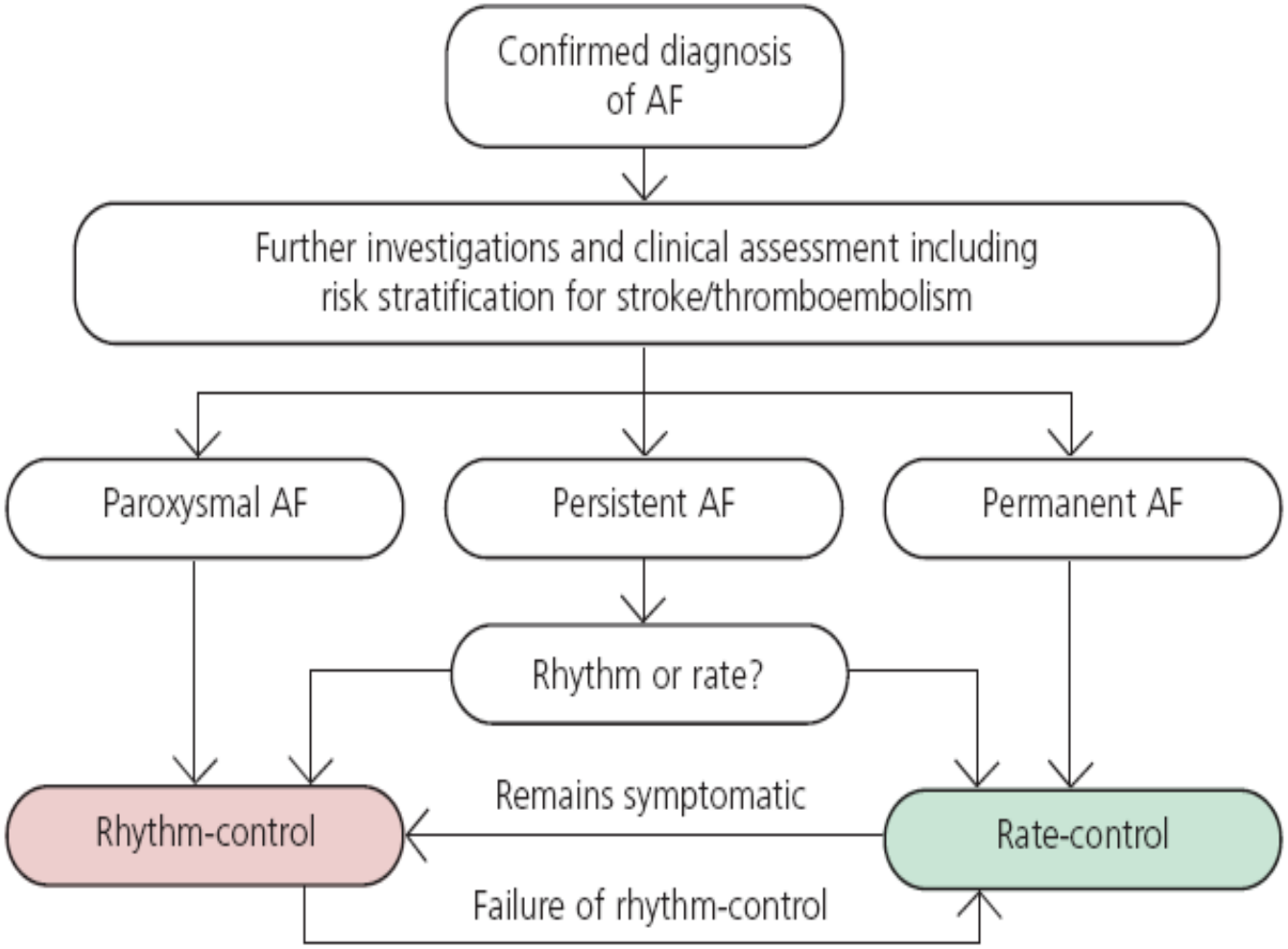
Rate control vs rhythm control

- RACE
  - Mortality 22.6% vs 17.2%
  - 39% vs 10% in SR
- AFFIRM
  - Mortality 23.8% vs 21.3 %
  - ↑ hospitalisation
  - ↑ Side effects
  - SR has a prognostic benefit

Rhythm control - problem

- Cardioversion and drugs maintains SR in 42% at one year (amiodarone)
- Side effects require stopping amiodarone in 25%
- Anticoagulation stopped too early

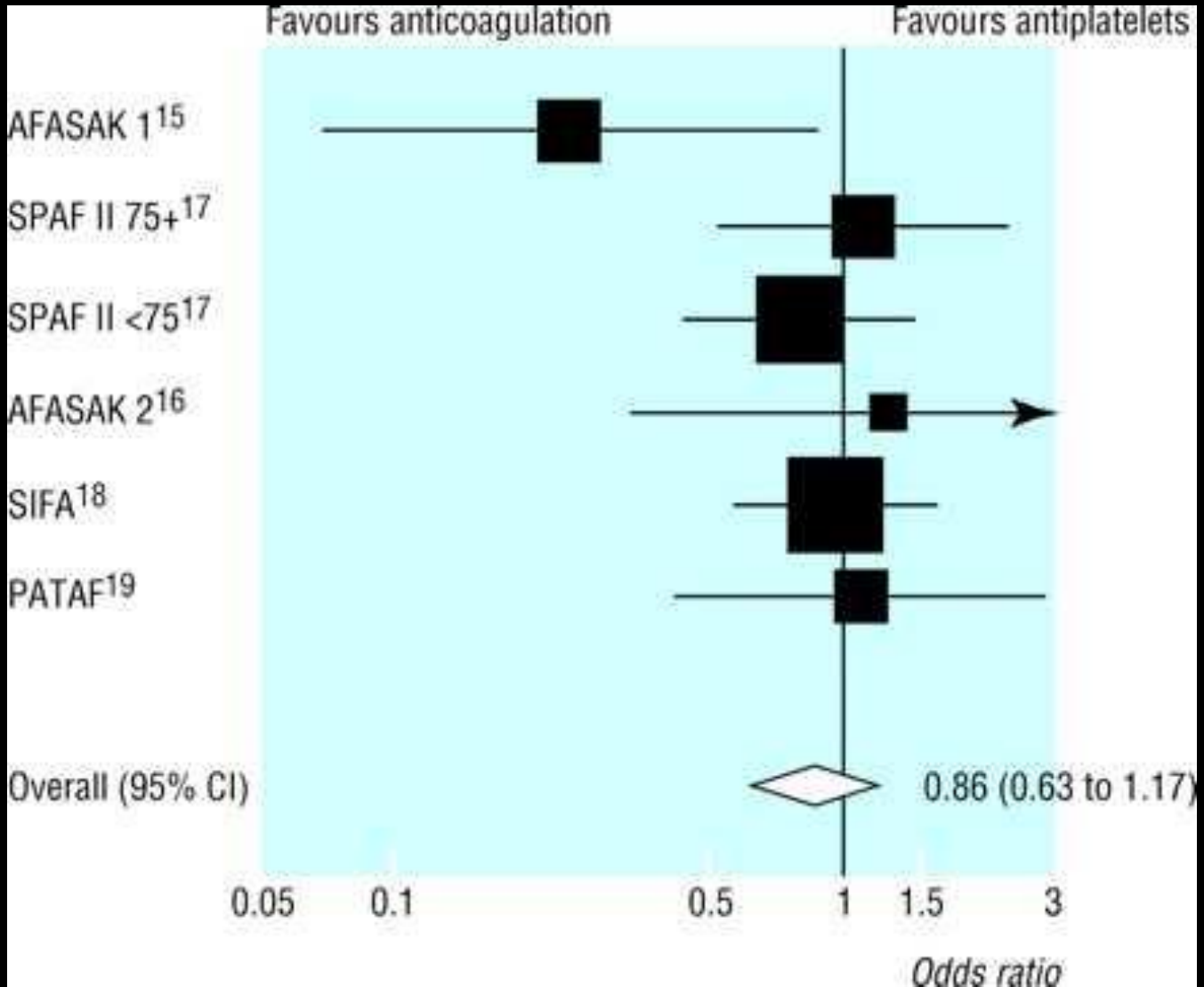
Treatment decision tree



Advantages of Warfarin over Aspirin

Risk Stratification	Annual Stroke Rate with Aspirin Therapy	Treatment with Warfarin Instead of Aspirin	
		Number Needed to Treat for 1 y To Prevent 1 Stroke	Number of Strokes Saved Yearly per 1000 Given Warfarin
	%	*n*	
Primary prevention*			
Low risk	1	250	4
Moderate risk	3	83	12
High risk	6	42†	24†
Secondary prevention	10	25†	40†

Advantages of Warfarin over Aspirin



rhythm vs rate control

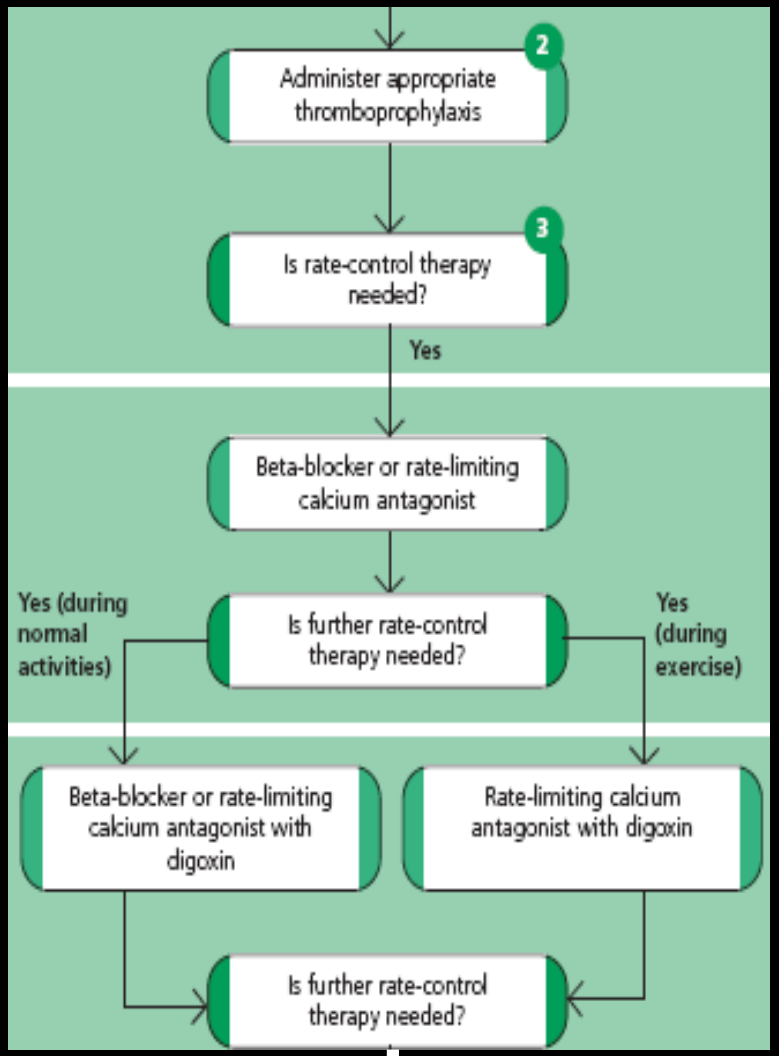
Try rhythm-control first for patients with persistent AF:

- who are symptomatic
- who are younger
- presenting for the first time with lone AF
- secondary to a treated or corrected precipitant
- with congestive heart failure.

Try rate-control first for patients with persistent AF:

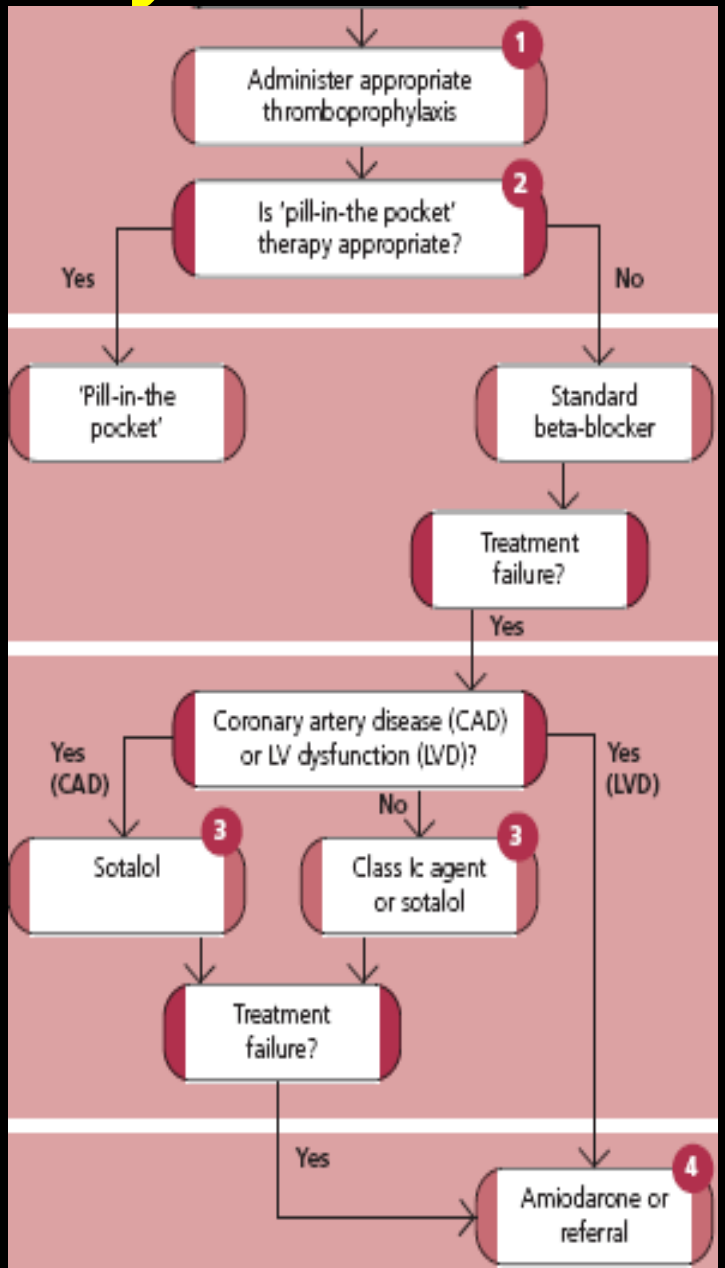
- over 65
- with coronary artery disease
- with contraindications to antiarrhythmic drugs
- unsuitable for cardioversion[3].

Persistent AF rate control



Specialist referral

Rhythm control



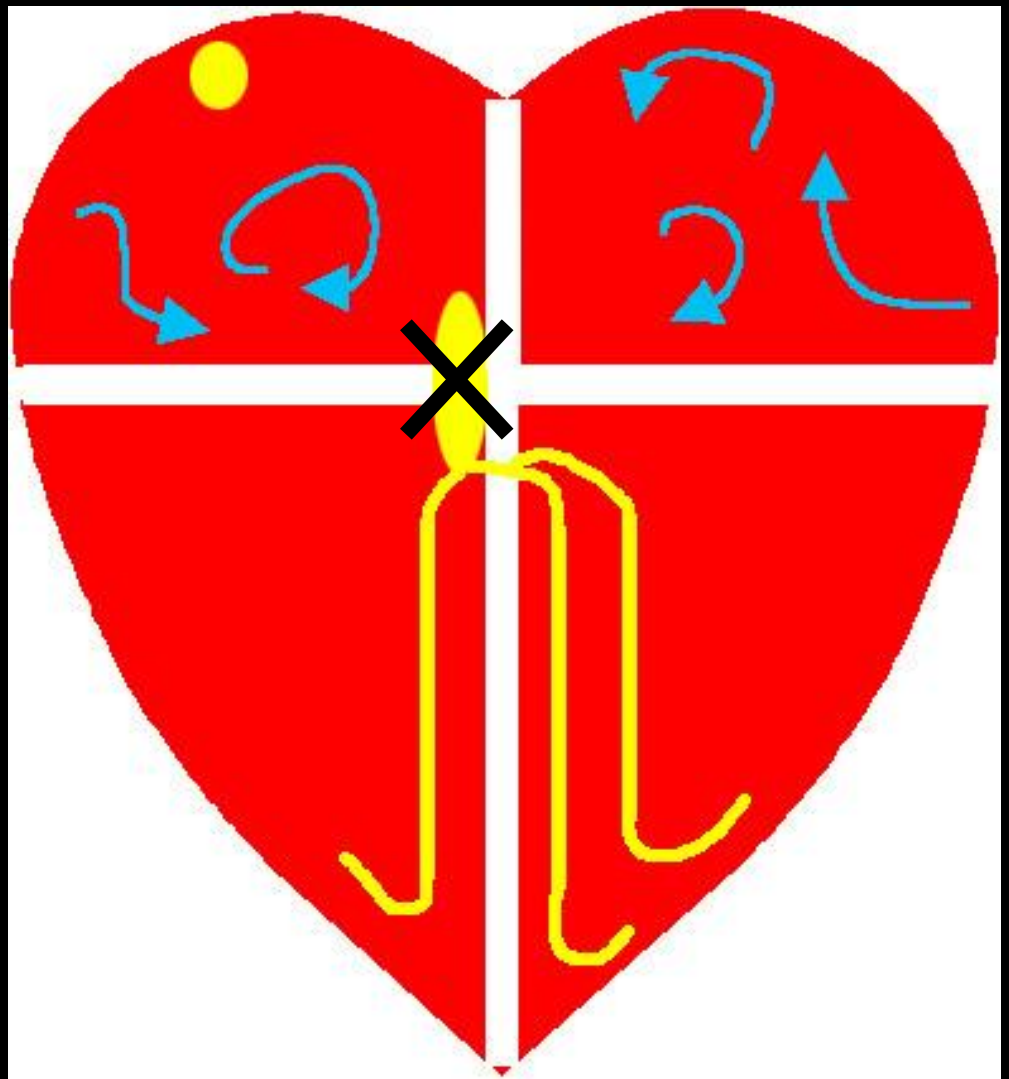
Rate control vs Rhythm control

- AF is dangerous
- SR is better and confers mortality benefit
- Conventional therapies are poor at maintaining SR
- The population is aging

What specialist treatments are available?

- Antiarrhythmic drugs
- Pacemaker
- Catheter ablation
- Surgical ablation

AV node ablation and pacing

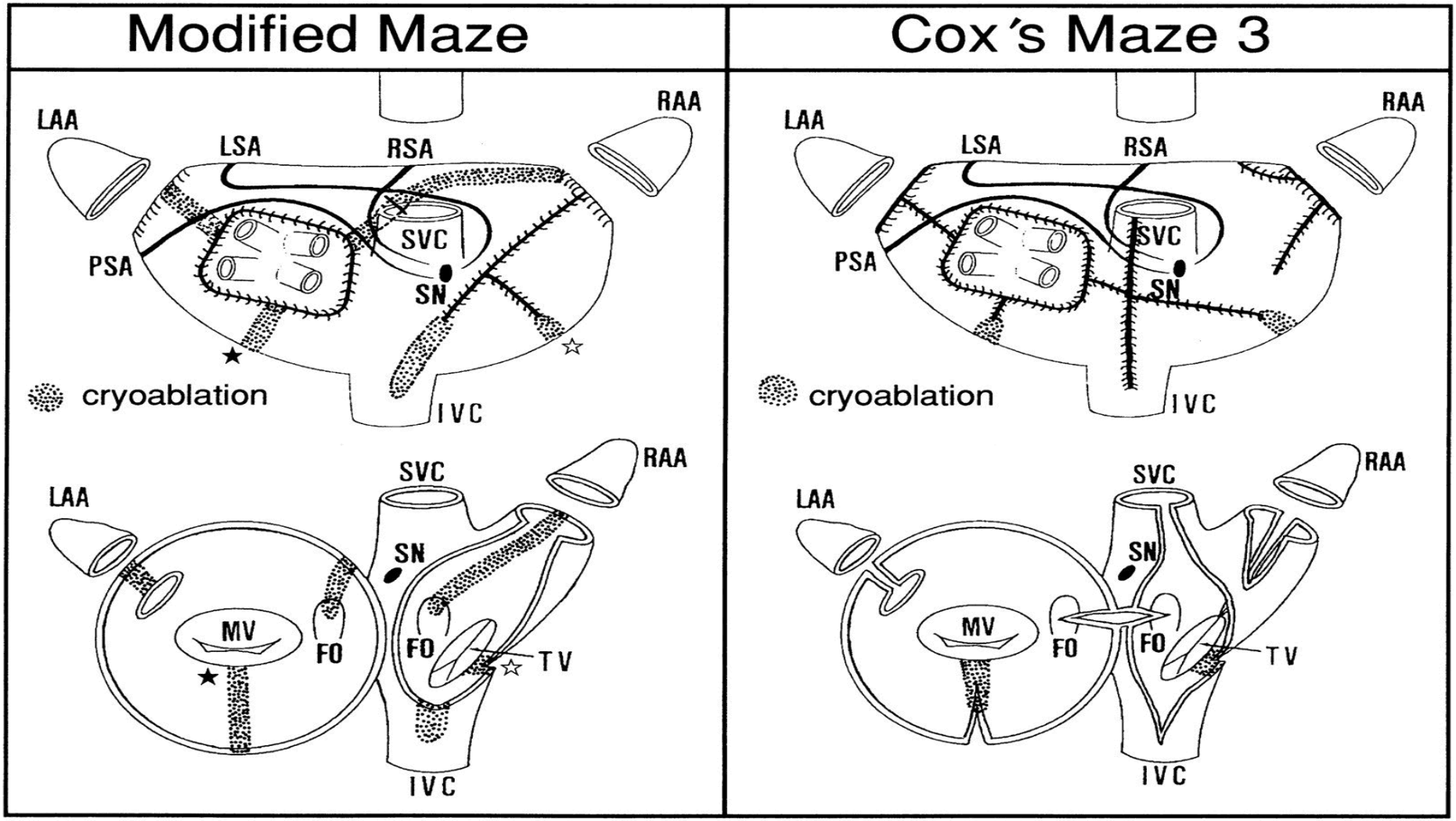


AV node ablation and pacing

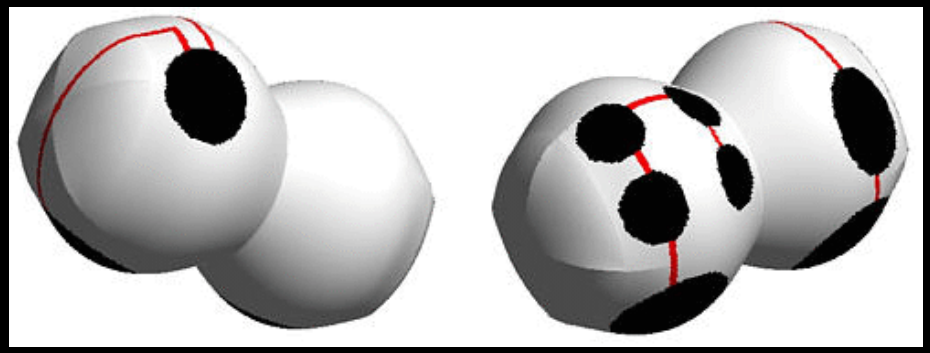
- “hides” the AF
- Easy to perform (99%) success
- No atrial transport (turbo)
- Pacing dependent (LBBB)
- No going back
- Refuge of the elderly and desperate

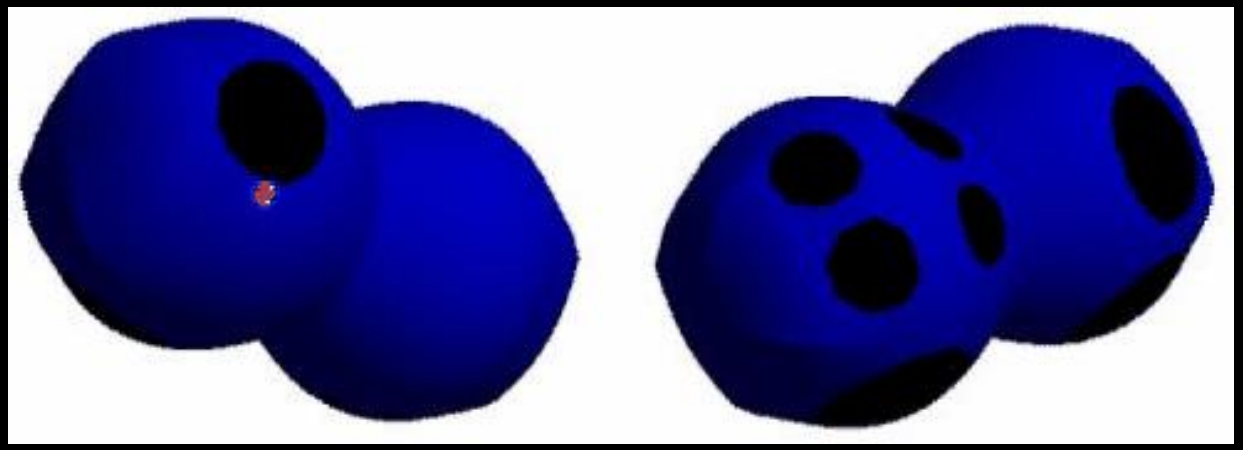
The first curative procedure Maze

JL Cox et al 1991

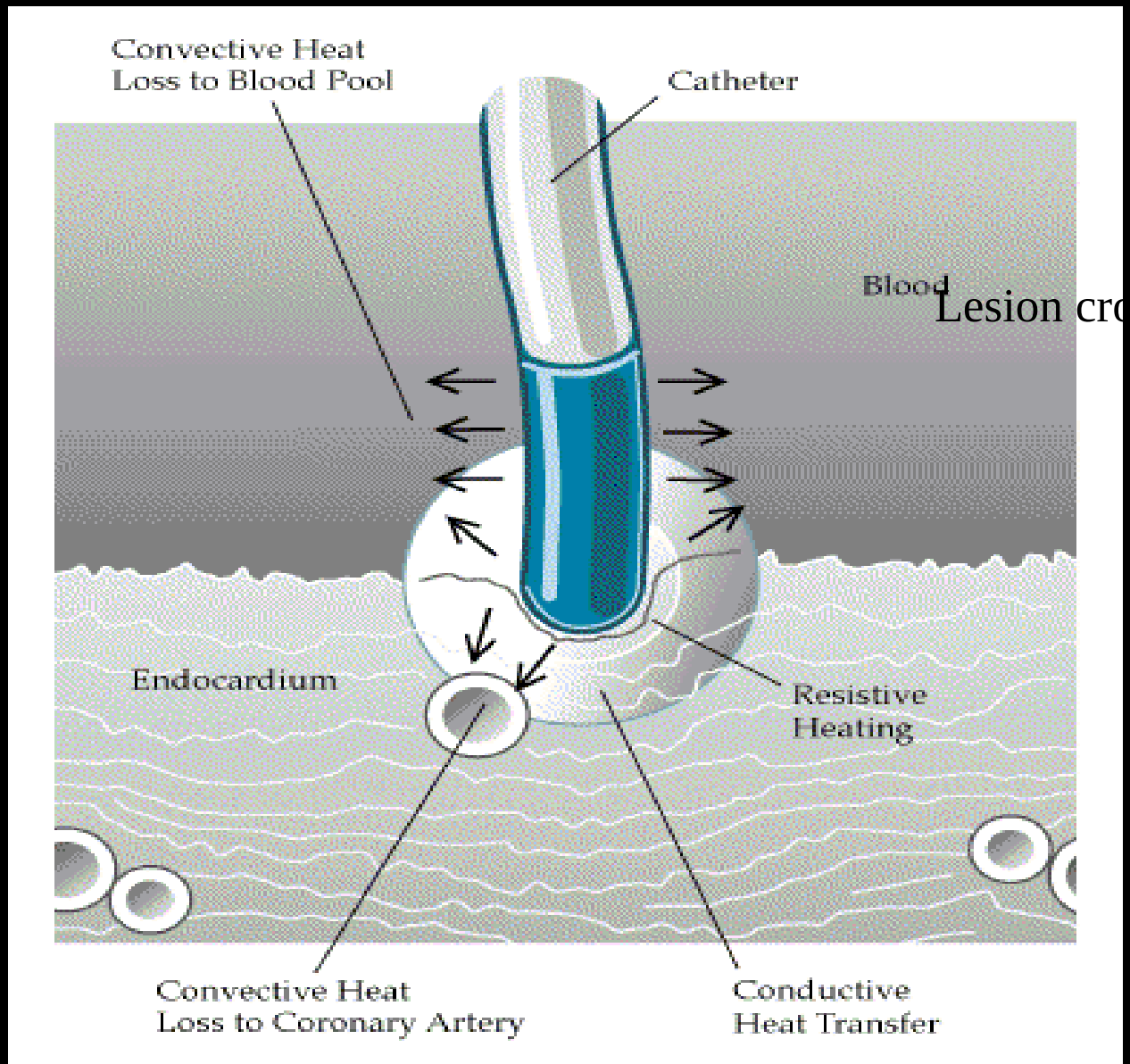


Why does the maze work?

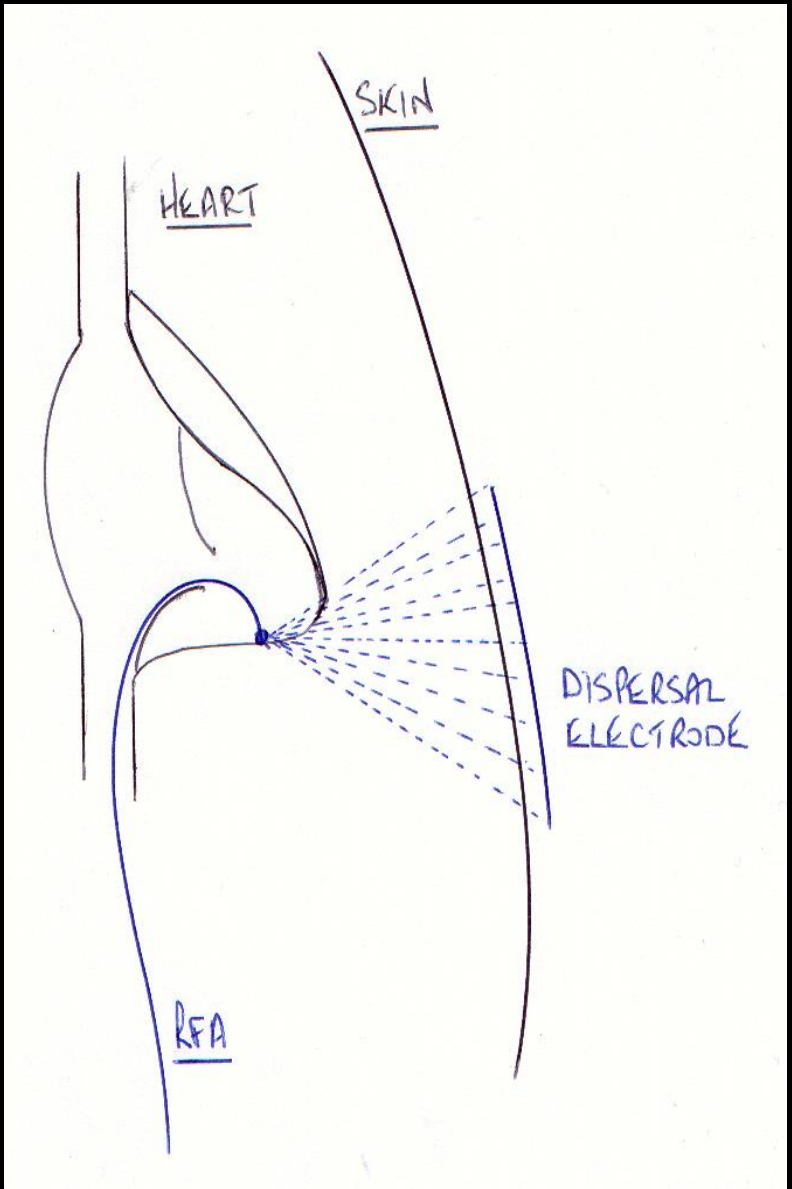


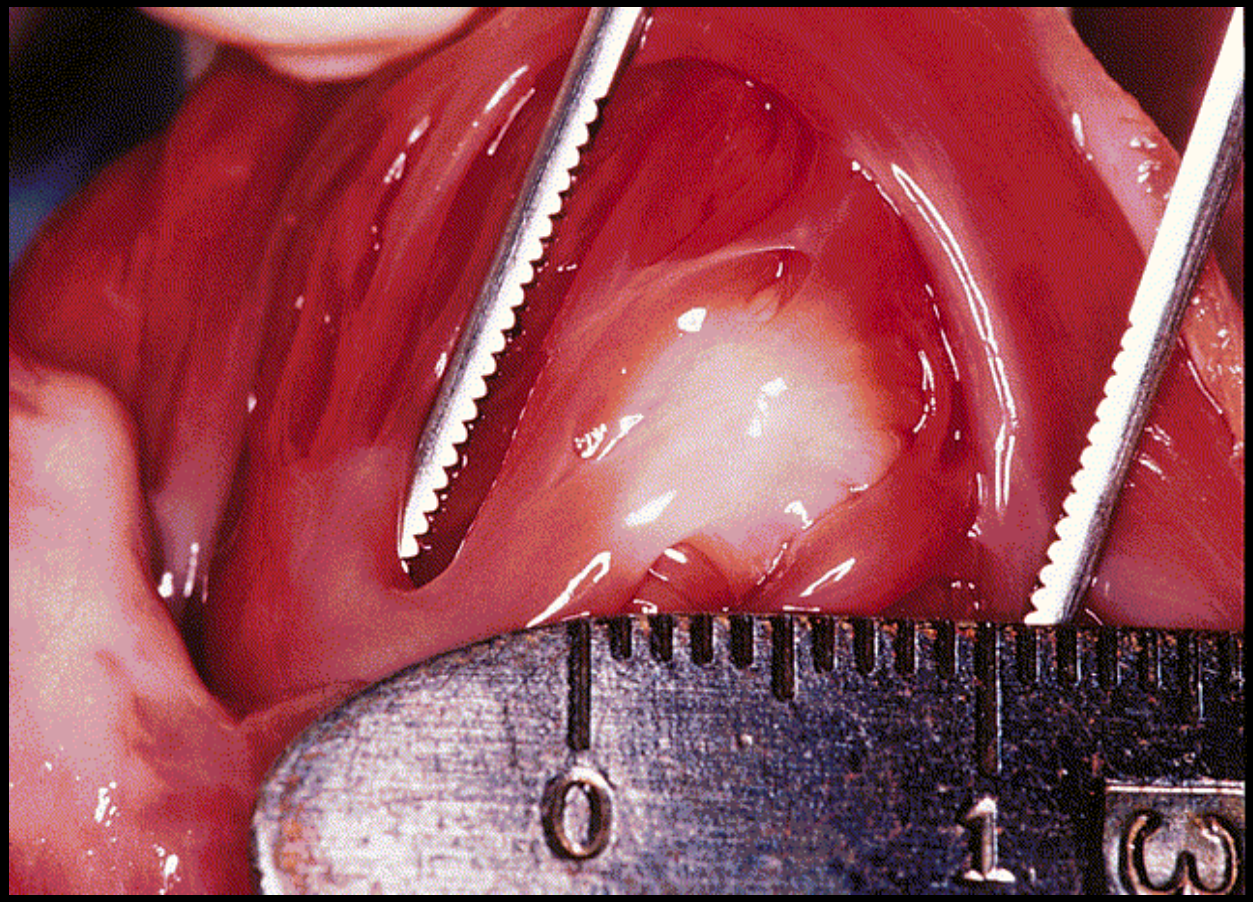


Radiofrequency Ablation Catheter



How is RF energy applied

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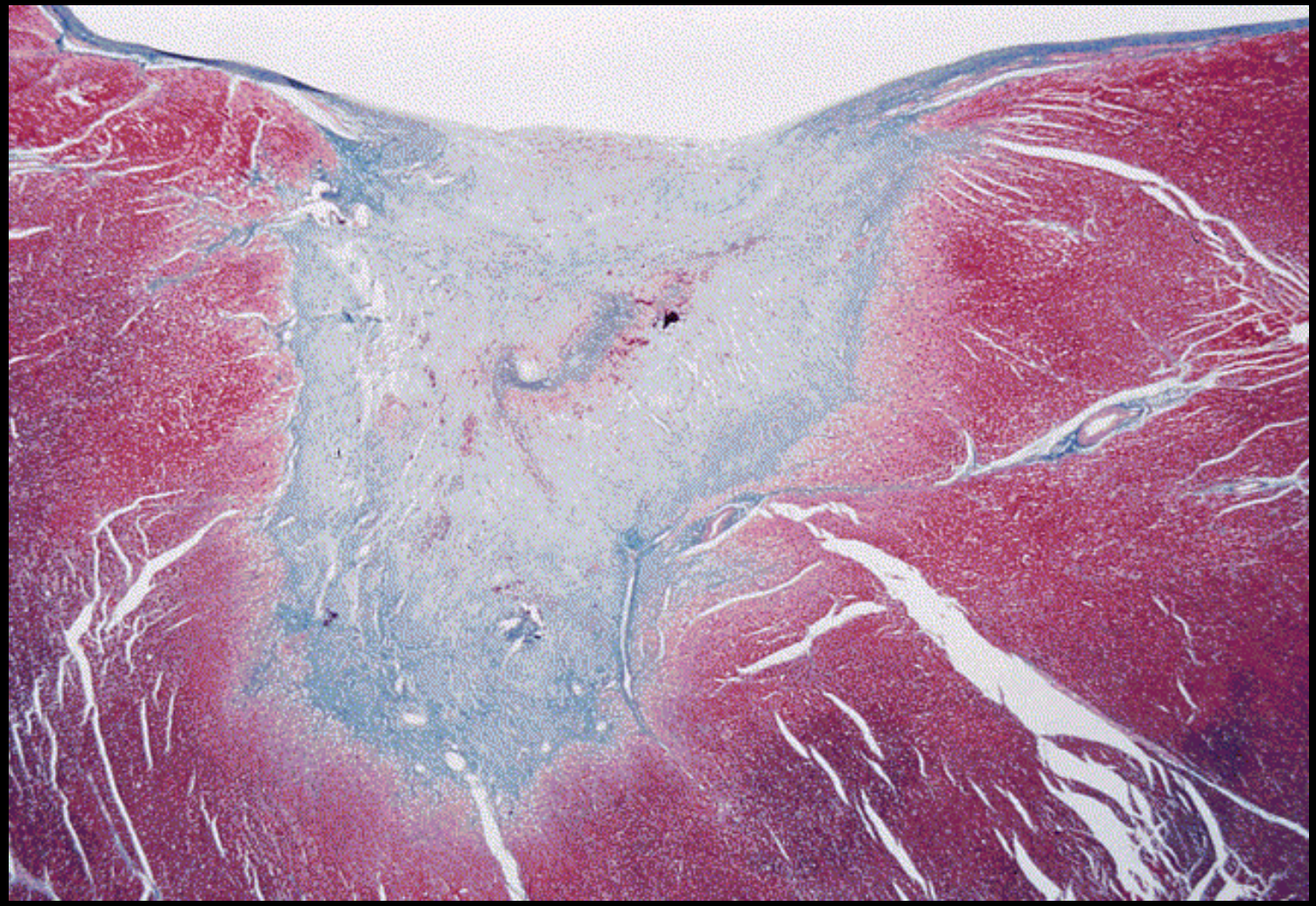
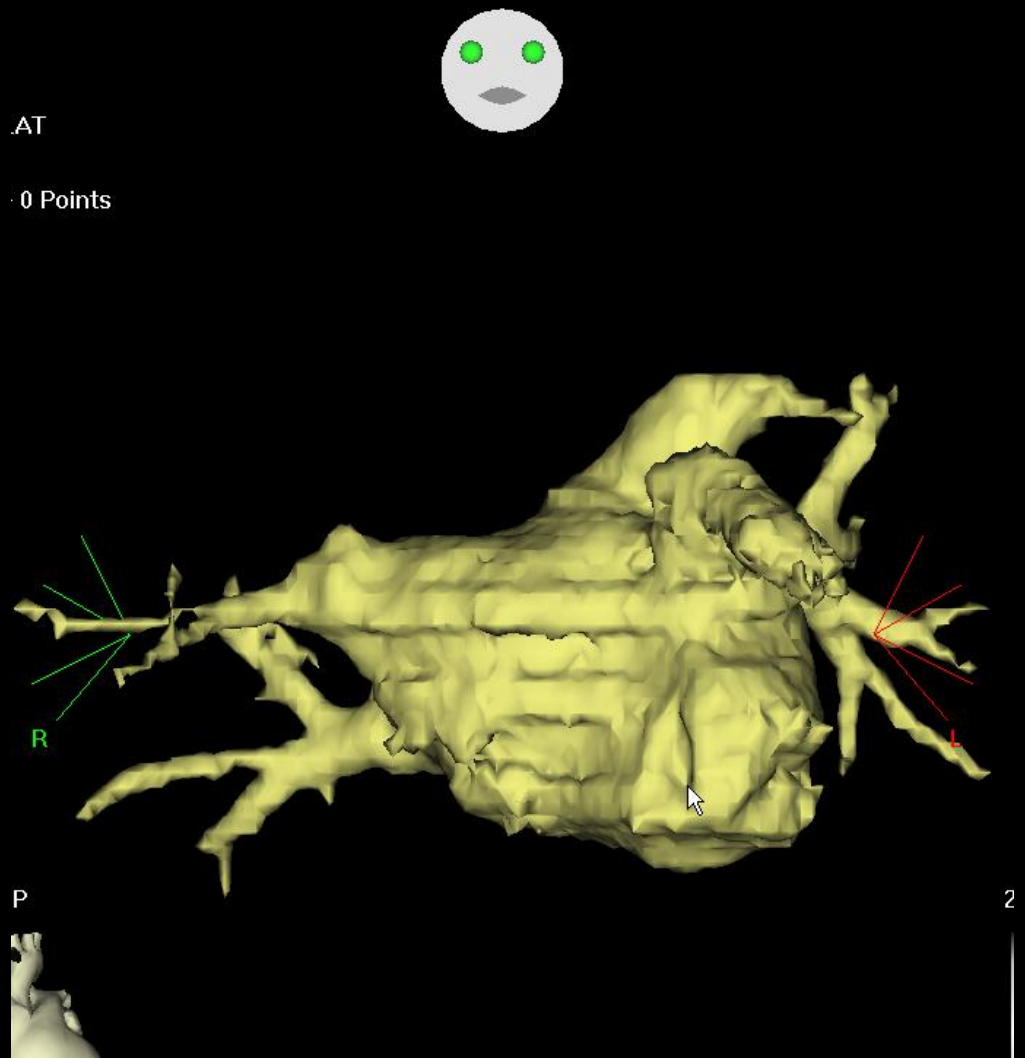
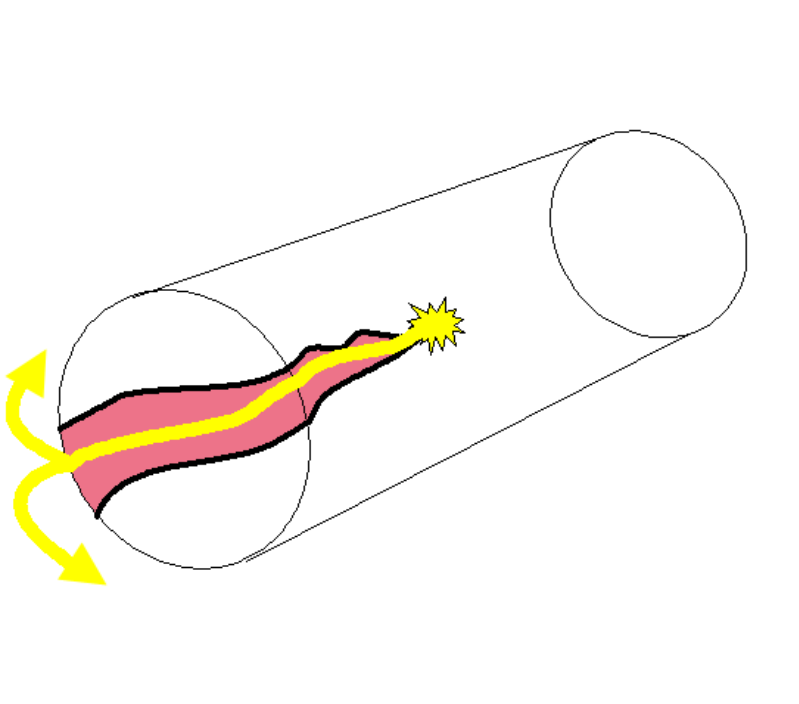
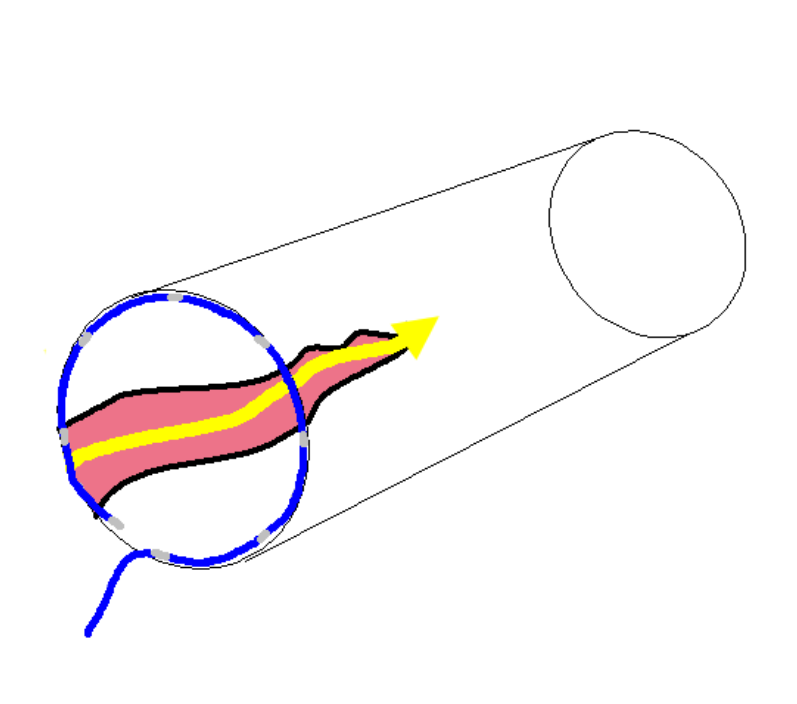


Atrial fibrillation originates in the left atrium

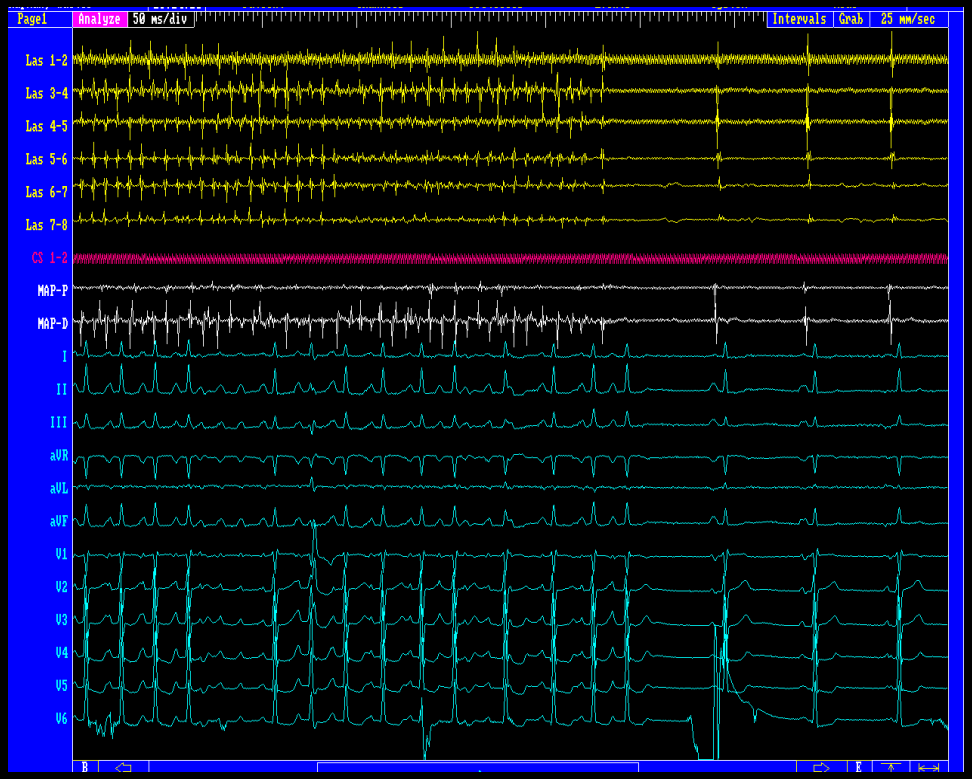


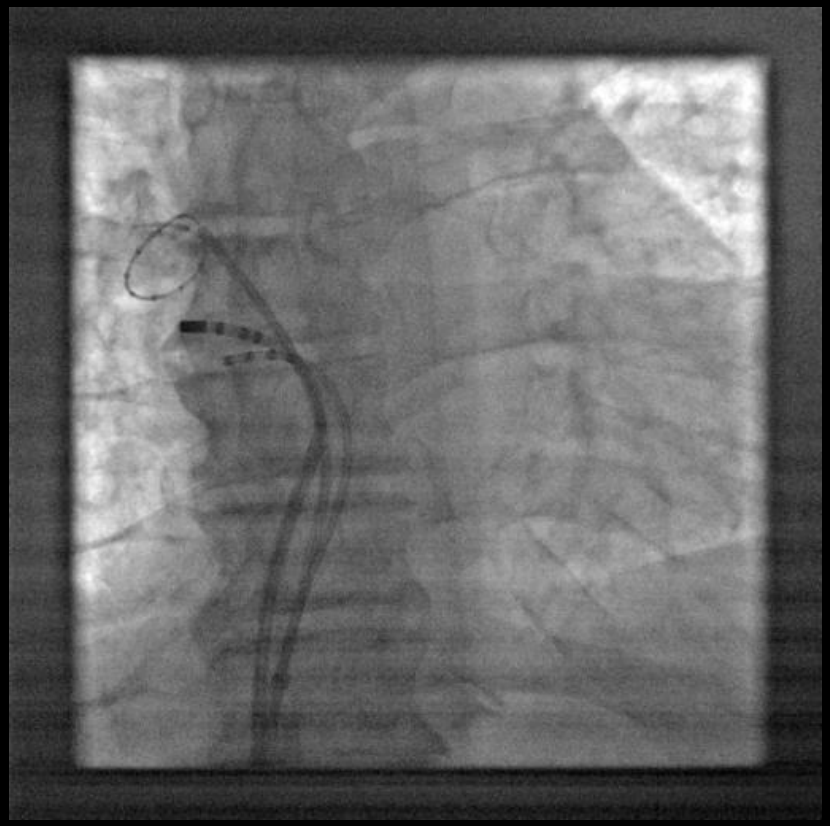
Mechanisms for AF





Target PV trigger

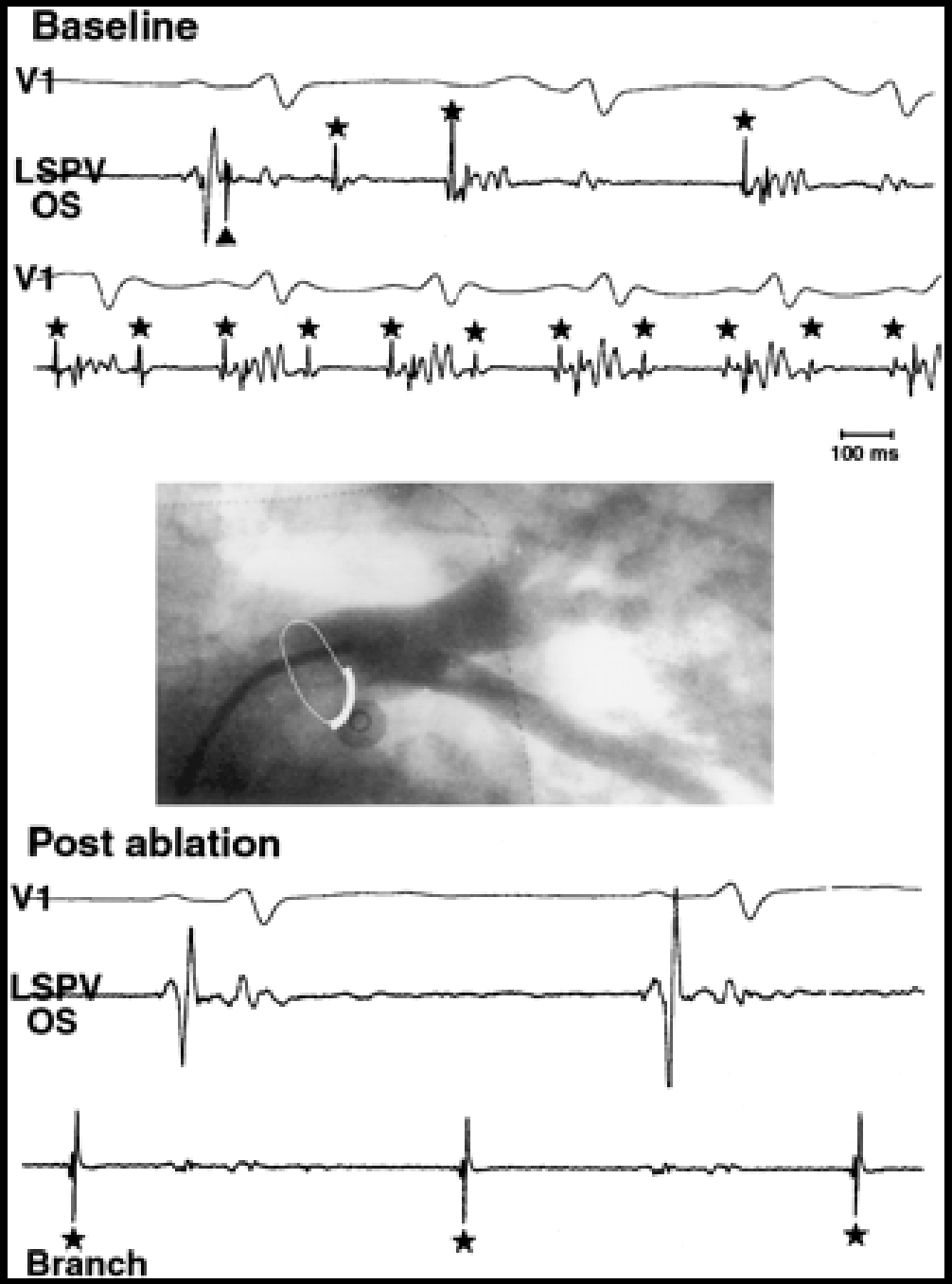




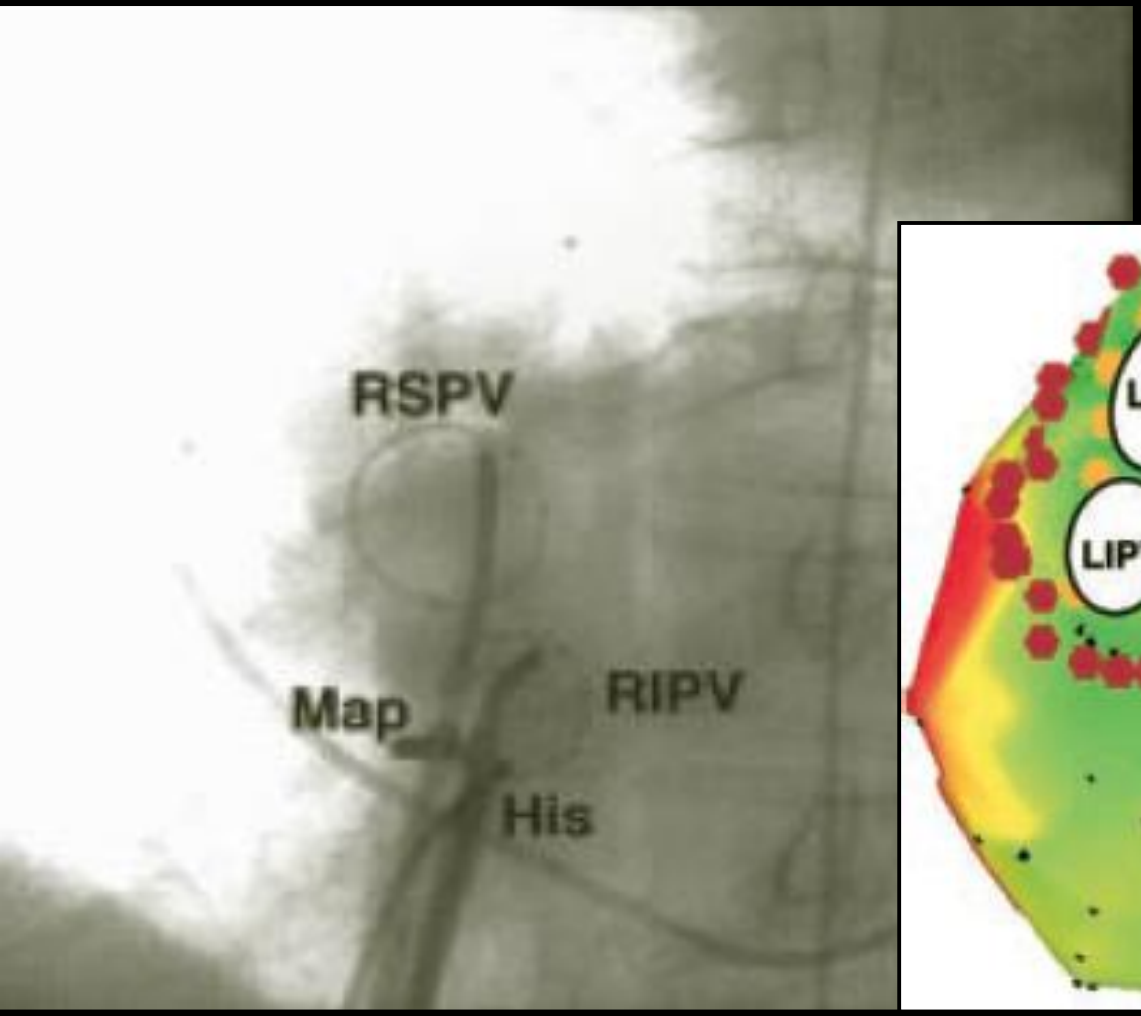
LIMITED BY:

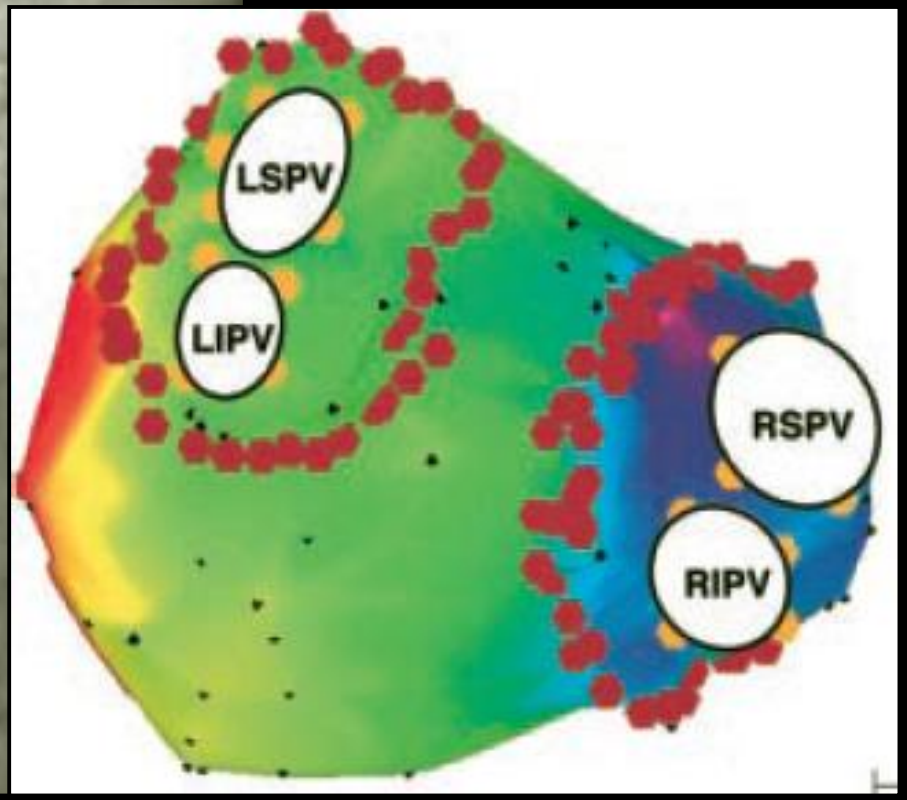
- Absence of spontaneous ectopy
- Multiple triggers

Focal AF: RFA to "disconnect" PV potential

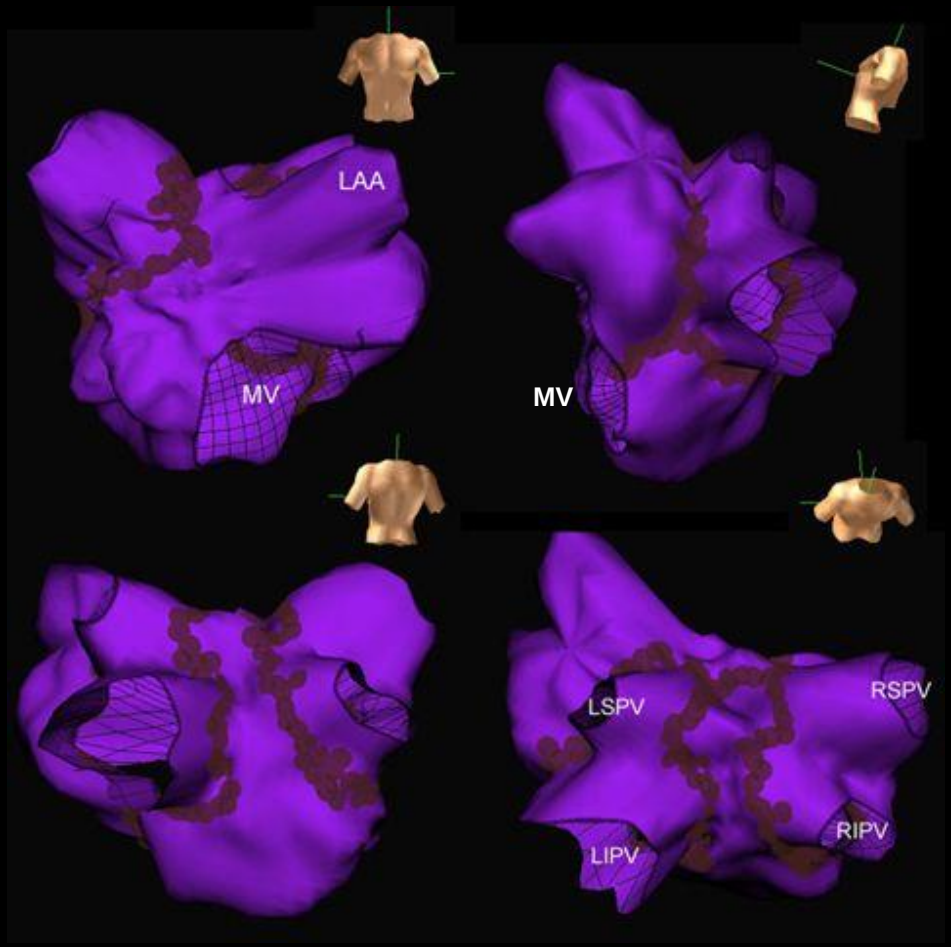


Continuous circular lesions

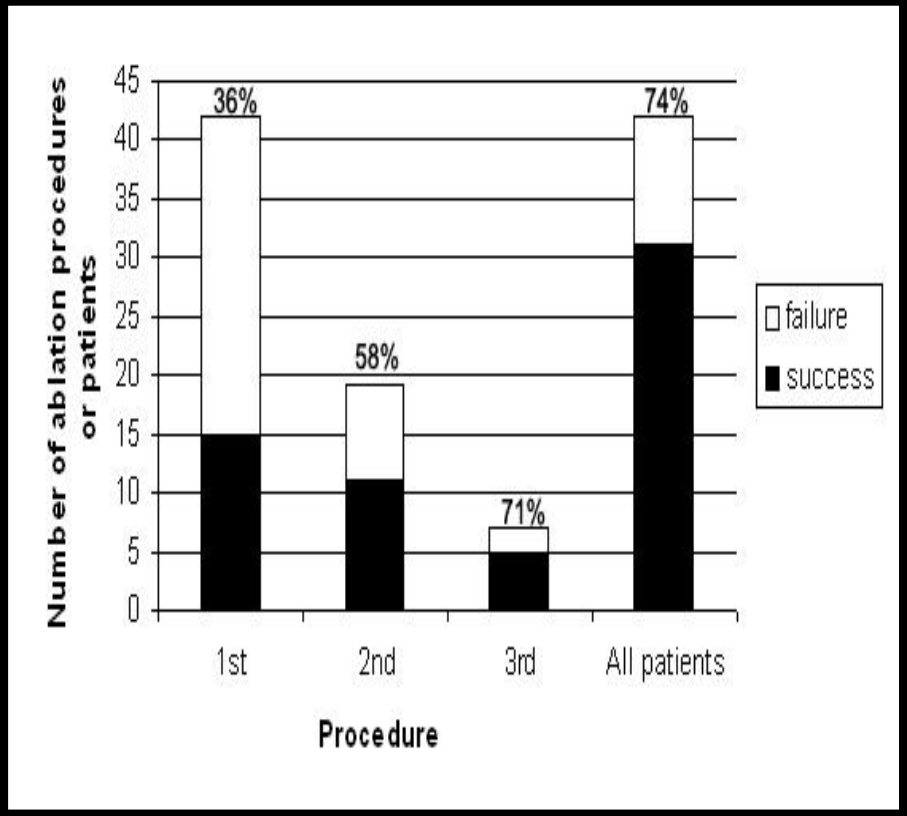




Catheter ablation in permanent AF



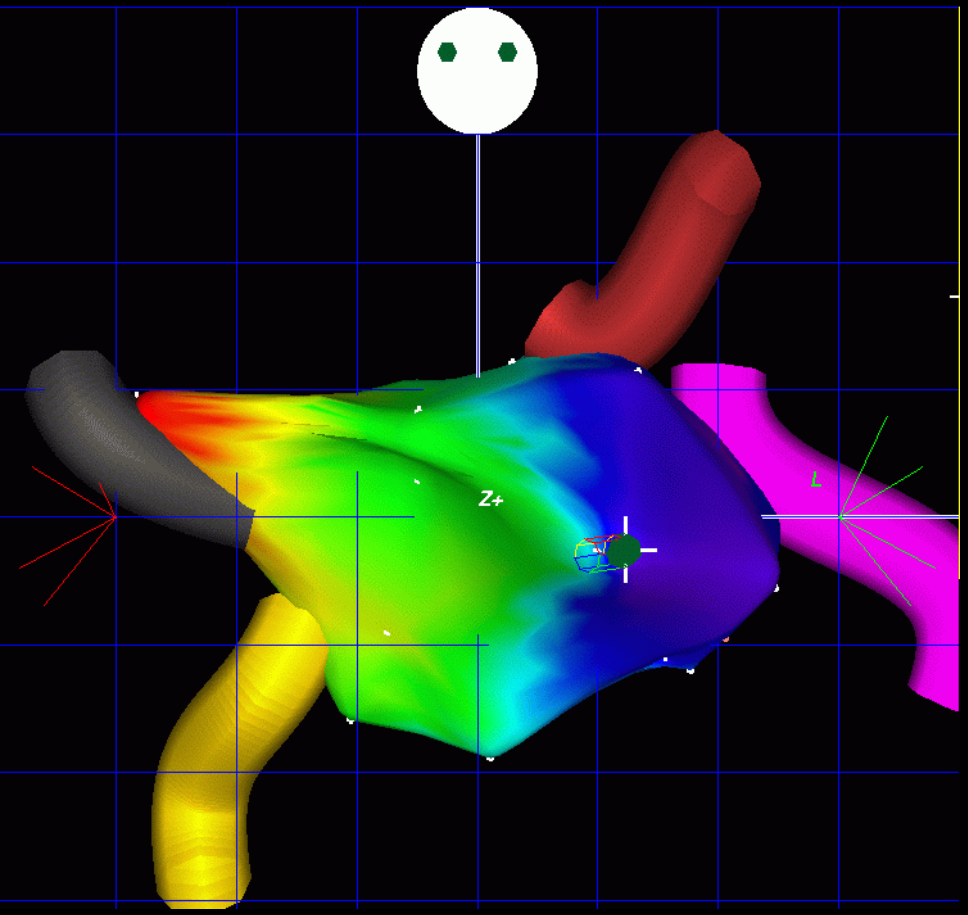
31/41(76%) in SR at 8.4 mths

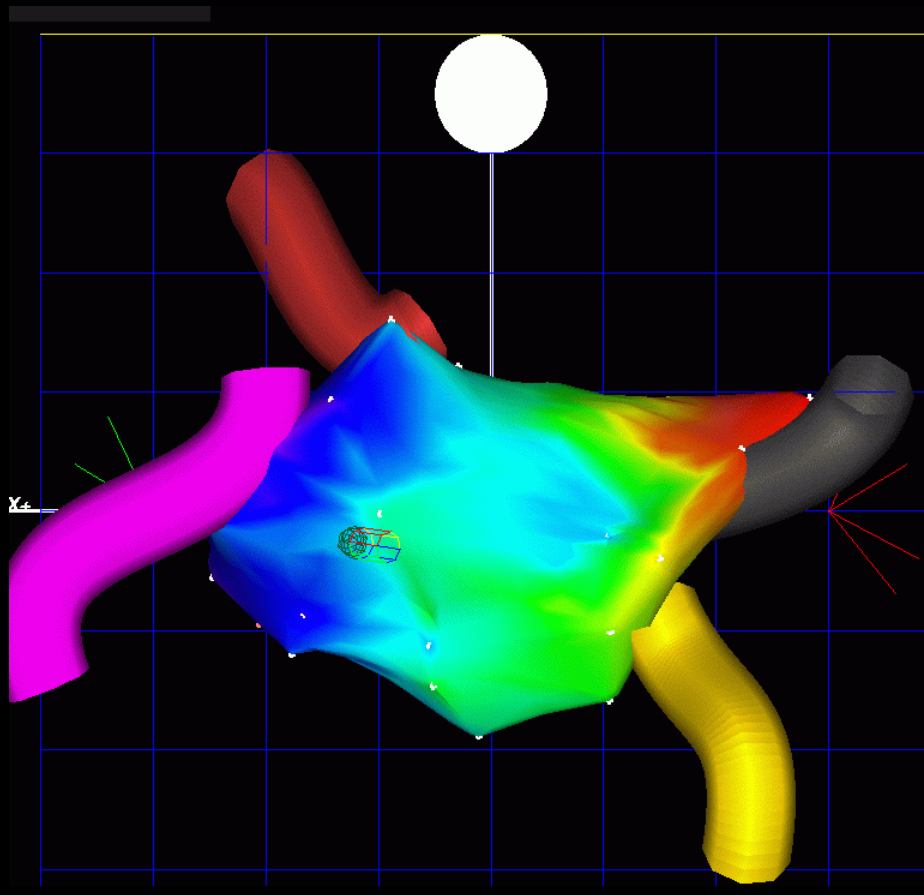


Earley et al. Heart 2005

The electroanatomical approach

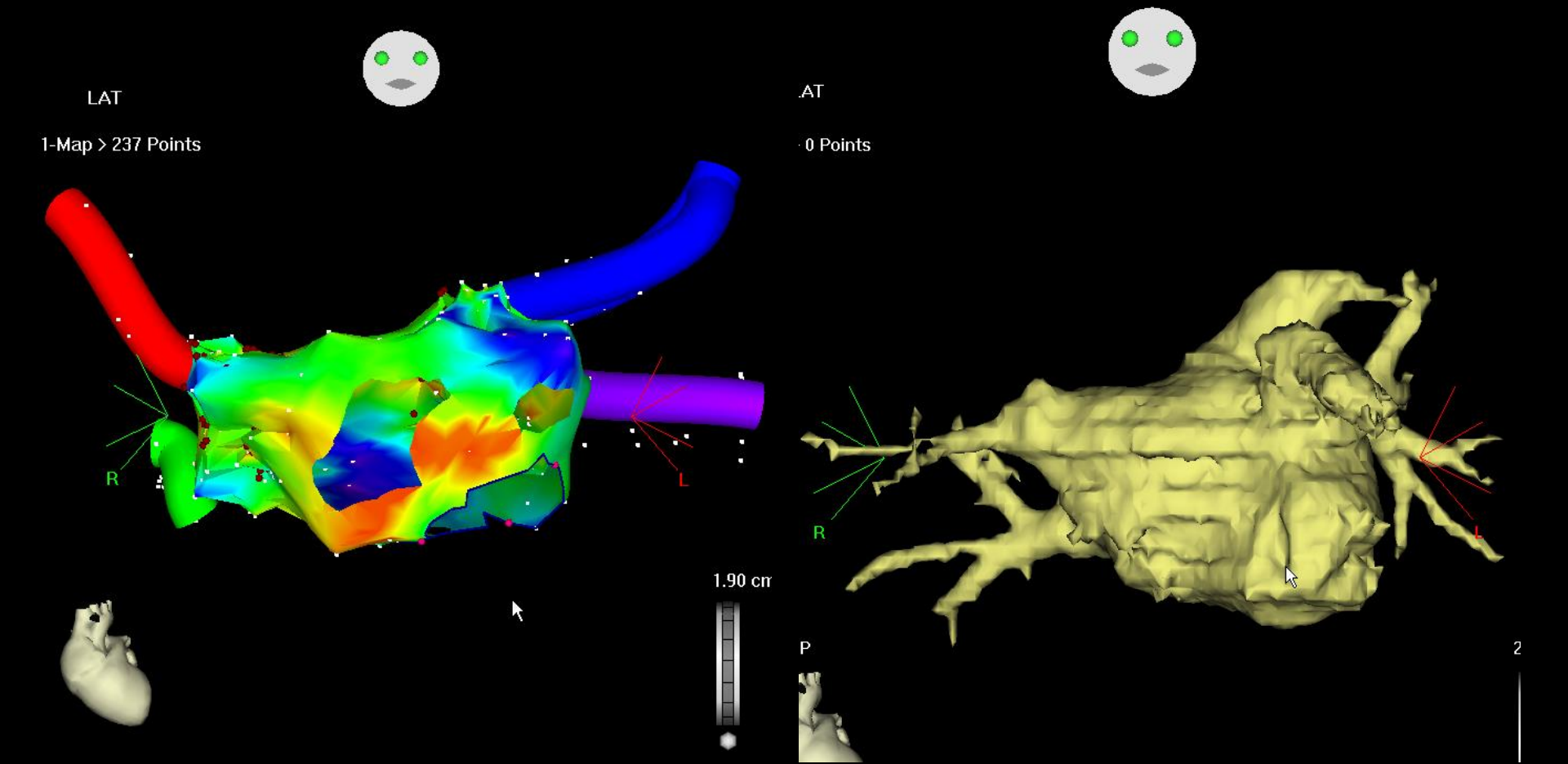
- The anatomy is very stylised
- Accurate lesion location is very dependent on experience



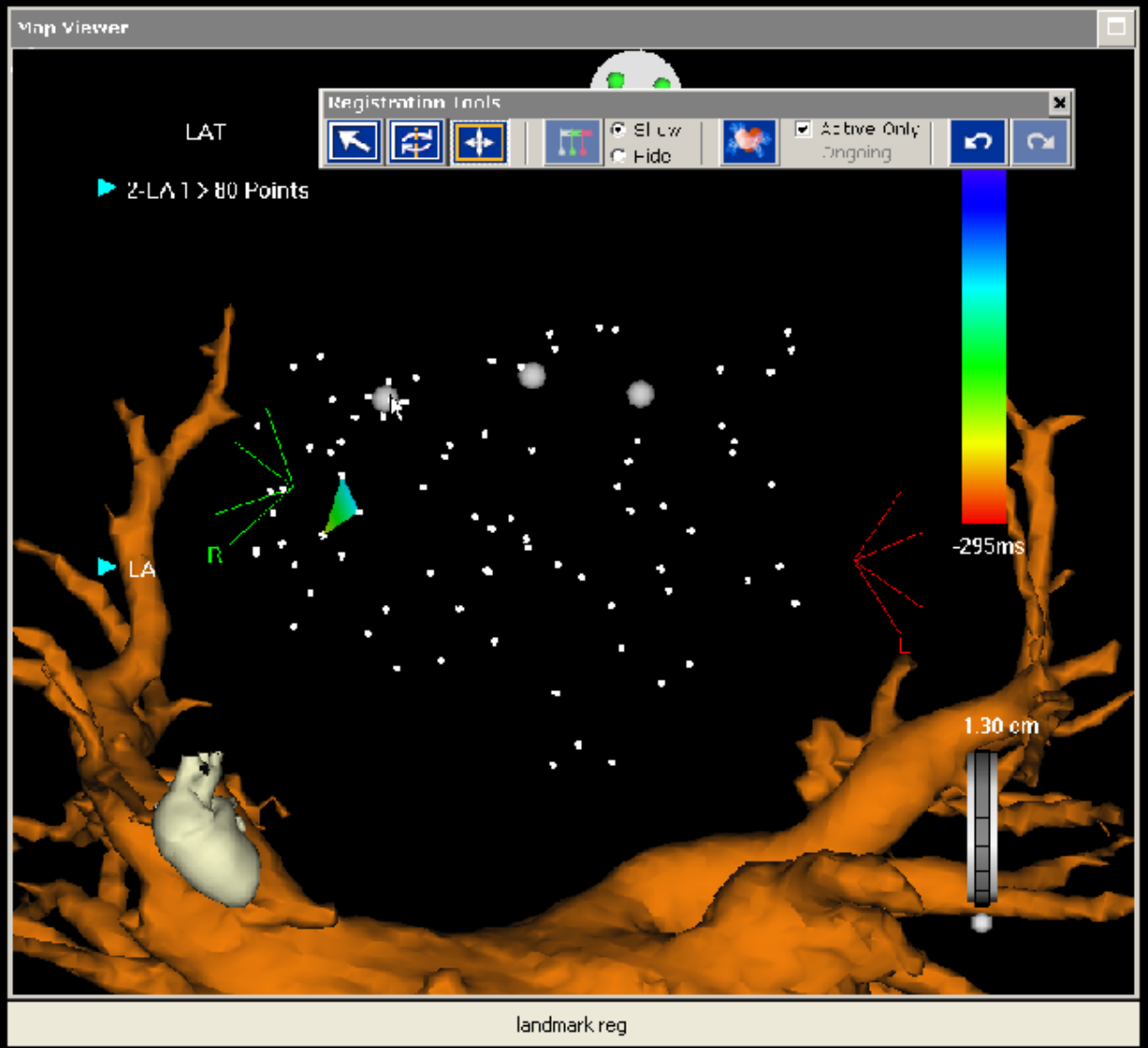


CT integration

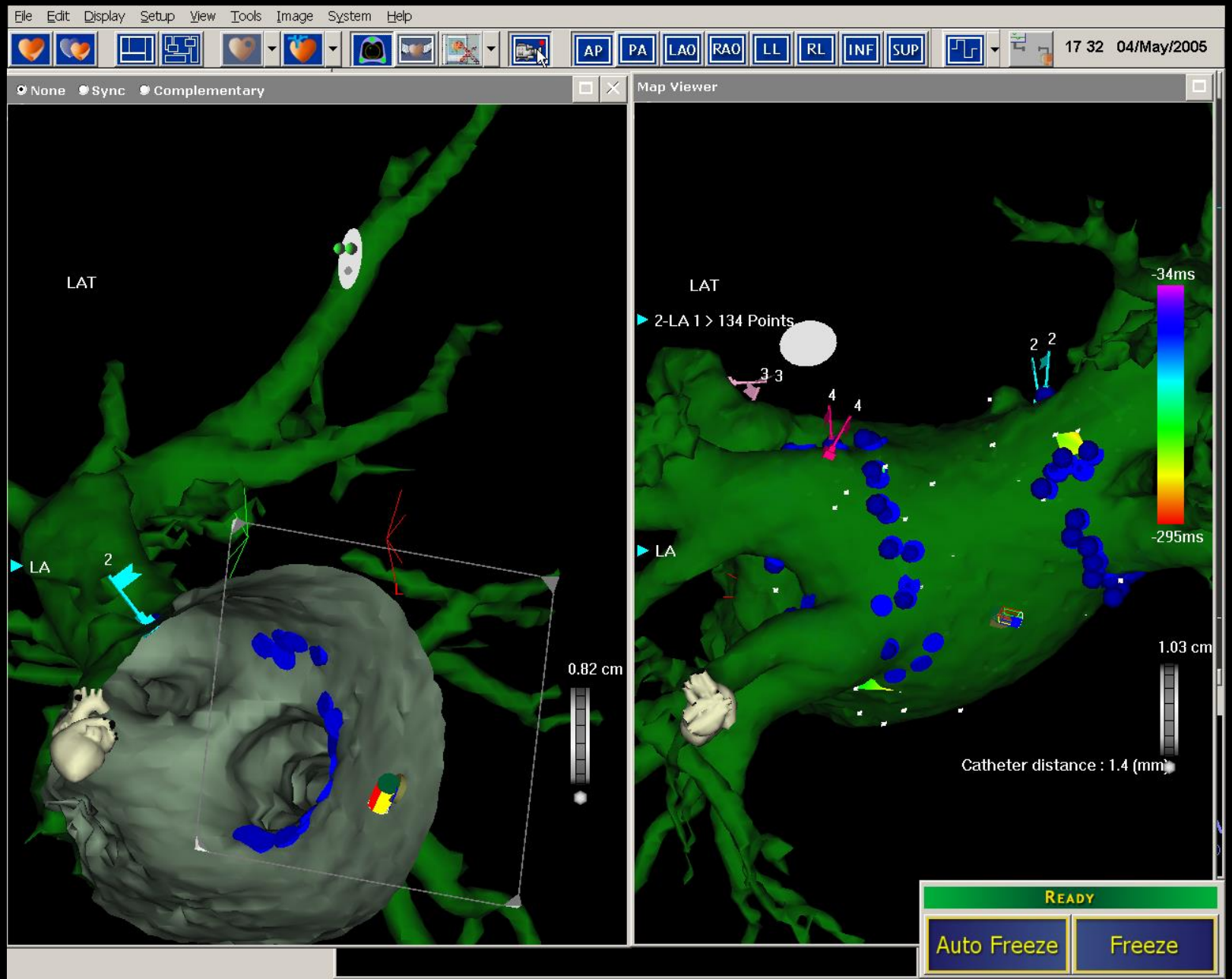
- True 3-dimensional anatomy with catheter localisation



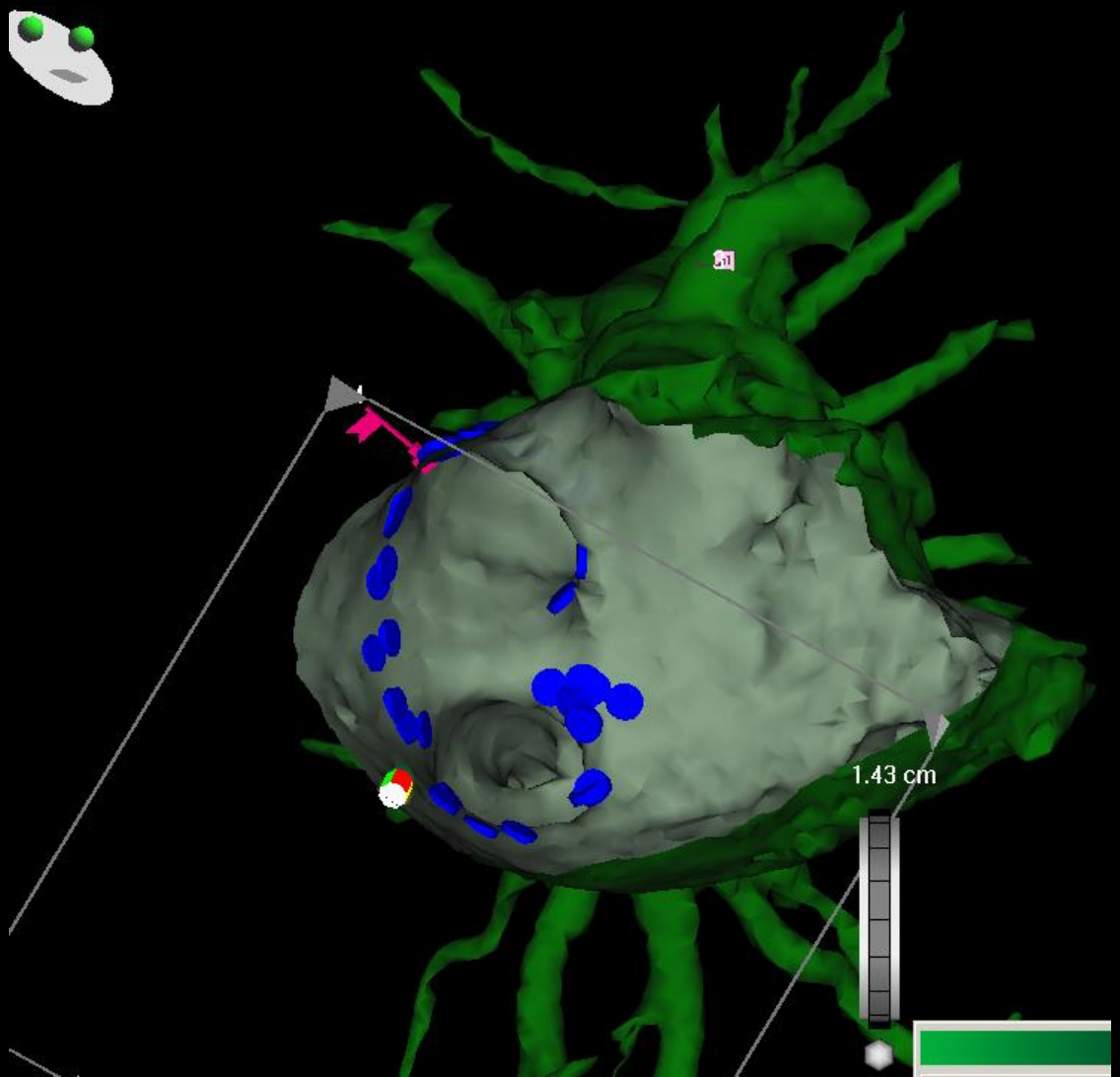
Creating 3 landmark pairs



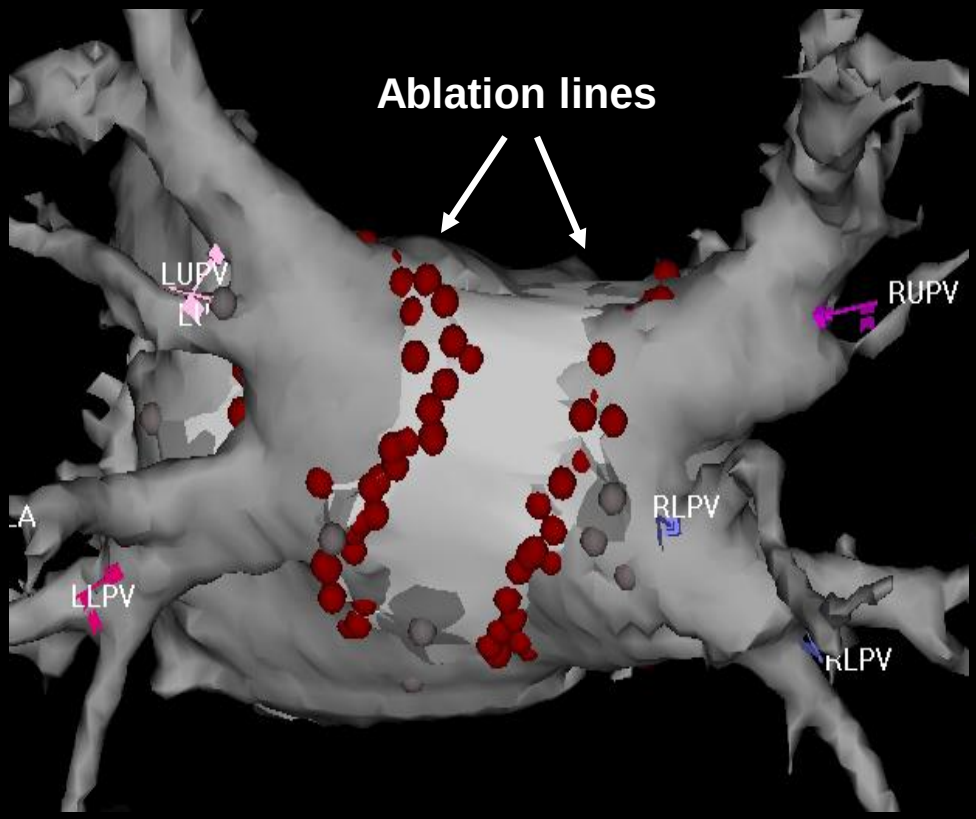
LPV locations of interest

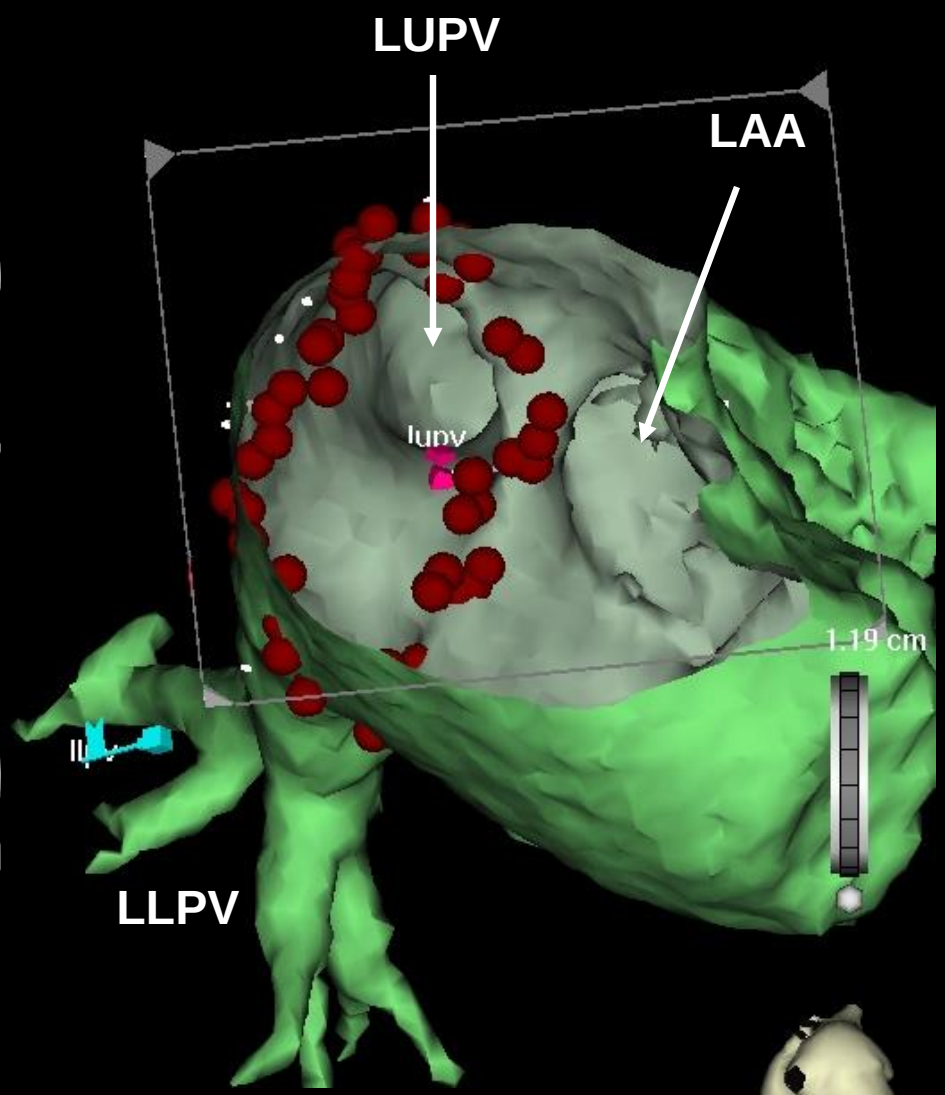


LPV internal view



Does this have a clinical effect?





Isolation of LPV's during AF

Practicalities of curative AF ablation

- Pre op - CT few weeks pre-op
- TOE on day
- ACT >300 during procedure
- Procedure time 2-3 hours PAF/ 3-4 hours Persistent
- Post-op echo
- Warfarin loading on night of procedure
  - Continues for 3 months if low risk
- Enoxaparin day after until INR>2

Case Control Study of 3-D mapping vs CT integration

- 105 patients
- 6 month follow up
- 7 day holter at 3 months
- Similar operator profile and experience

AF ablation results

	3D mapping (n = 52)	**CT integration** (n = 53)	**P value**
Patient characteristics			
Age (years)	54 ± 11	58 ± 9	NS
Paroxysmal/Permanent AF	23/29	25/28	NS
AF duration (years)	5.3 ± 5.5	6.7 ± 5.7	NS
Number of failed meds	2.8 ± 0.6	2.7 ± 1.1	NS
LA size (mm)	46 ± 6	44 ± 5	NS
LV end diastolic volumes	50 ± 3	52 ± 5	NS

Freedom from AT/AF

off medication at 6 month follow up

	3D mapping (n = 52)	CT integration (n = 53)	P value
Paroxysmal	71%	94%	0.17
Permanent	50%	73%	0.20
Overall	59%	82%	<0.05
Follow Up (weeks)	25 ± 11	25 ± 8	NS

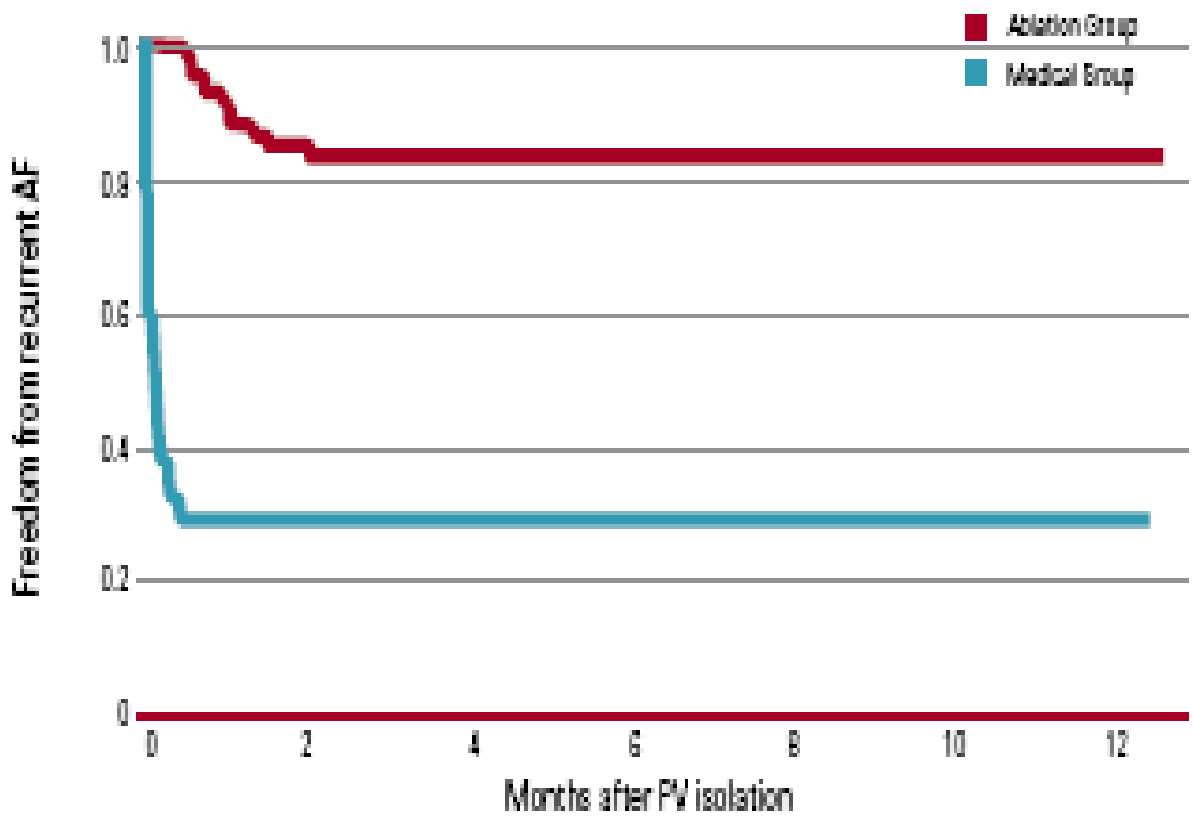
Complications of AF ablation

- 2% pericardial effusion/tamponade
- 3% Femoral haematoma
- <0.5% stroke/TIA
- <0.5% PV stenosis

Recurrence

- Usually occurs <3months (late recurrence is rare)
- May settle over a 3 to 6 month period
- Results in 28% to 40% of patients requiring redo

How does ablation compare to drugs?



AFib-free survival in patients treated with catheter ablation compared to pharmacological therapy alone

Oral et al. [20]

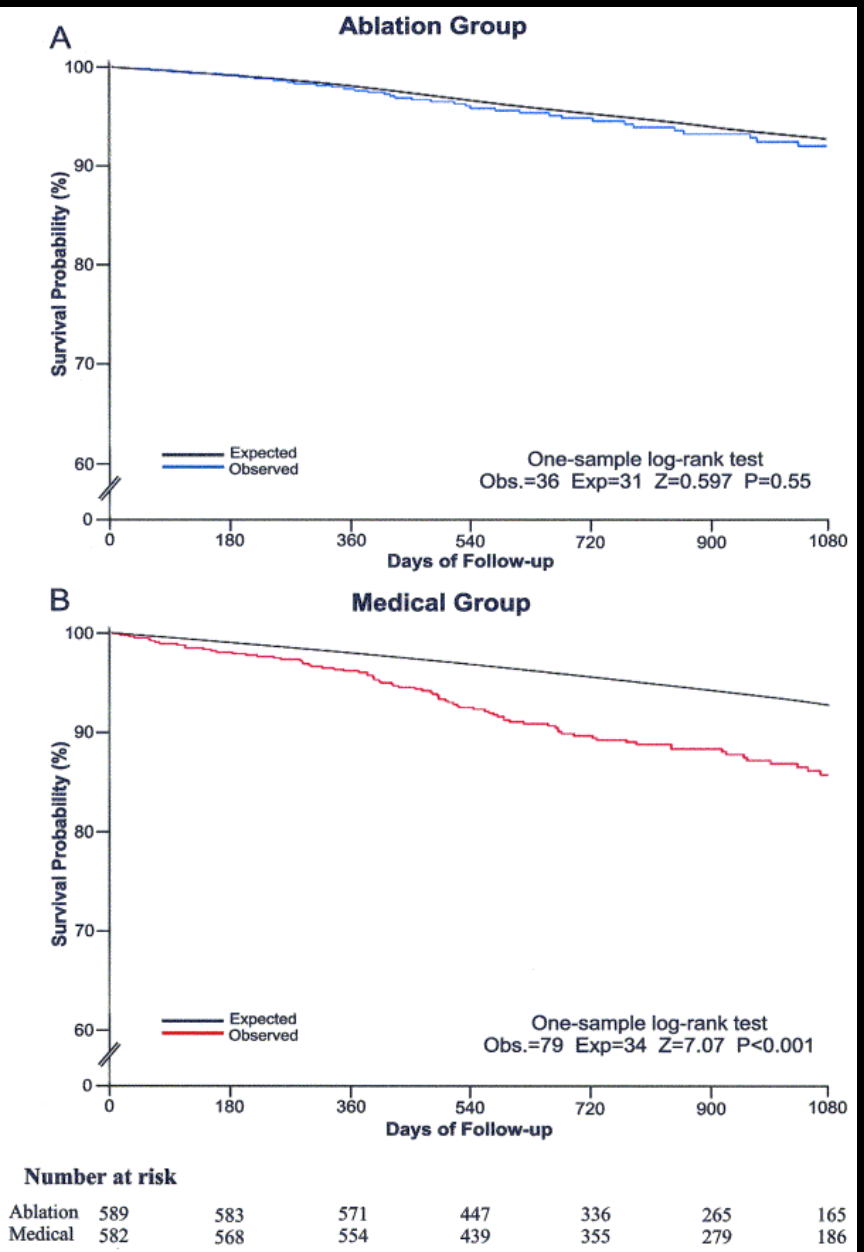
Ablation vs drugs

Controlled, randomized trials involving catheter ablation

Author	Type of AFib	Ablation group	Comparator	n	AFib-free at 1 year	
					Ablation	Comparator
Wazni et al. 2005[12]	symptomatic	PV isolation	AADs	70	87%	37%
Stabile et al. 2006[23]	drug-refractory	Ablation + AADs	AADs	137	56%	9%
Oral et al. 2006[24]	chronic	Ablation + amiodarone*	amiodarone*	147	74%	4%
Pappone et al. 2006[25]	paroxysmal	Circumferential PV ablation	AADs	198	84%	24%
Jais et al. 2006[26]	paroxysmal	Ostial PV isolation	AADs	112	75%	7%

* Amiodarone was given only for the first 3 months

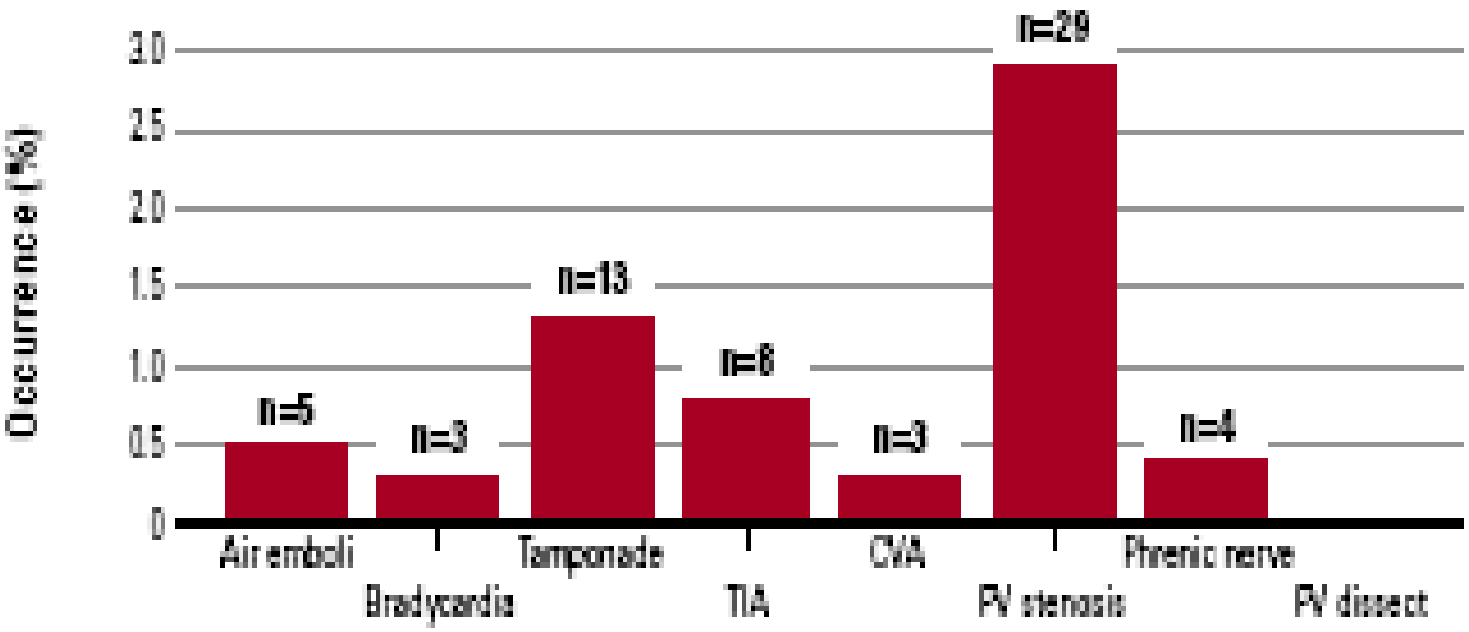
Does ablation improve prognosis?



	Ablation	Medical
	N=589	N=582
Death	38	83
Adverse events	54	117

Pappone et al circulation 2001

Complications of AF ablation



Major complications with pulmonary vein ablation in 1049 patients

adapted from Packer et al. [28]

AF ablation is good for your garden

AF ablation for heart failure

- **Patients with EF<45% and AF**
- **Randomised to medical therapy or med therapy and catheter ablation**
- **21 patients enrolled so far**
- **15 patients with at least 1 month FU**
  - **7 Catheter Ablation**
  - **8 Medical**

Preliminary results

- 2 pts recurrence after ablation awaiting redo
- 6pts improved >1 NYHA
- 5% EF after 1 month

Who should have AF ablation

- Symptomatic (incl heart failure?)
- Persistent AF for <5 years
- Prepared to go through multiple procedures
- Prepared for the risks

Limitations of AF ablation

- High volume does make a difference
- Redo’s are common
- Tarrif does not reflect cost
- Serious complications are increasingly rare but do occur
- Team work is critical

Conclusion

- AF is common
- Priorities for treatment now clearly defined
- Cure is now possible but at a cost
- The “lost tribe” of AF sufferers now have hope
- The epidemic may have a solution

www.londonafcentre.com