AF :RHYTHM CONTROL

BY

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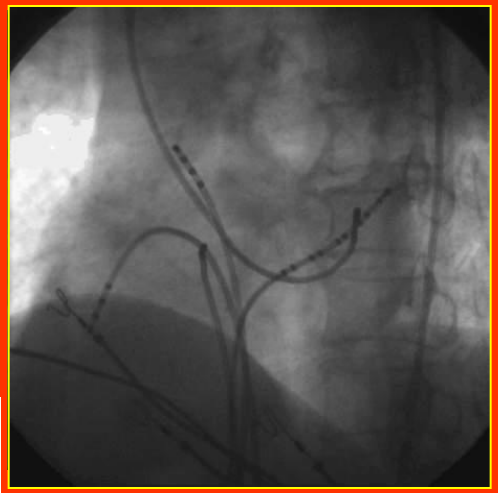
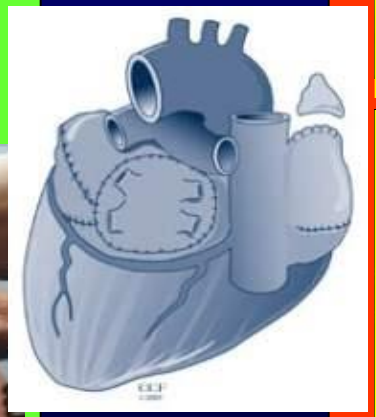
ASSISSTANT LECTURER

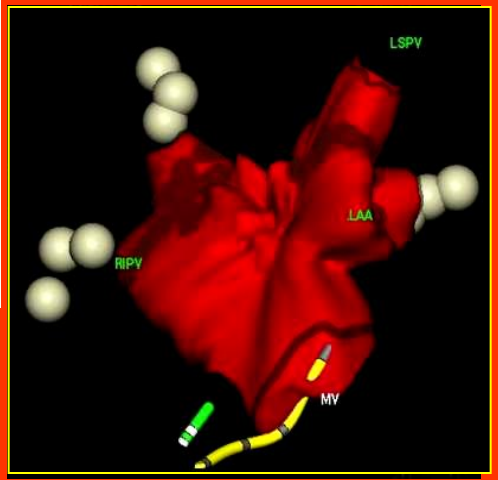
CARDIOLOGY DEPARTMENT

5-2014

Atrial Fibrillation
therapeutic Approach







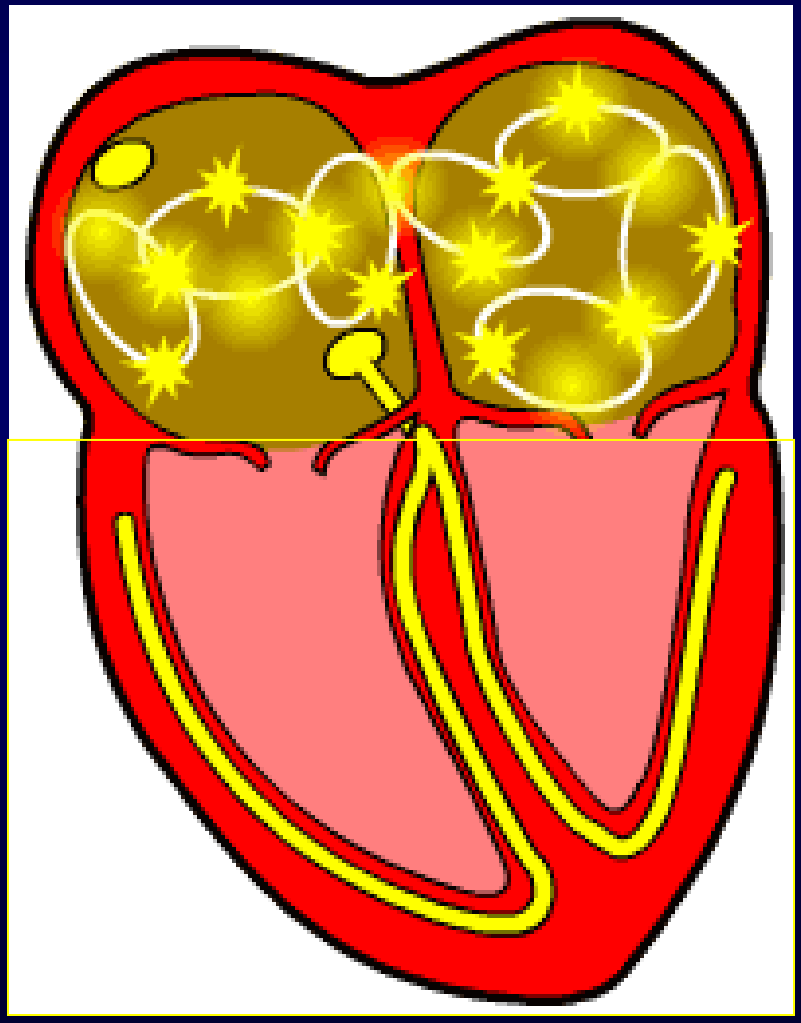
AGENDA

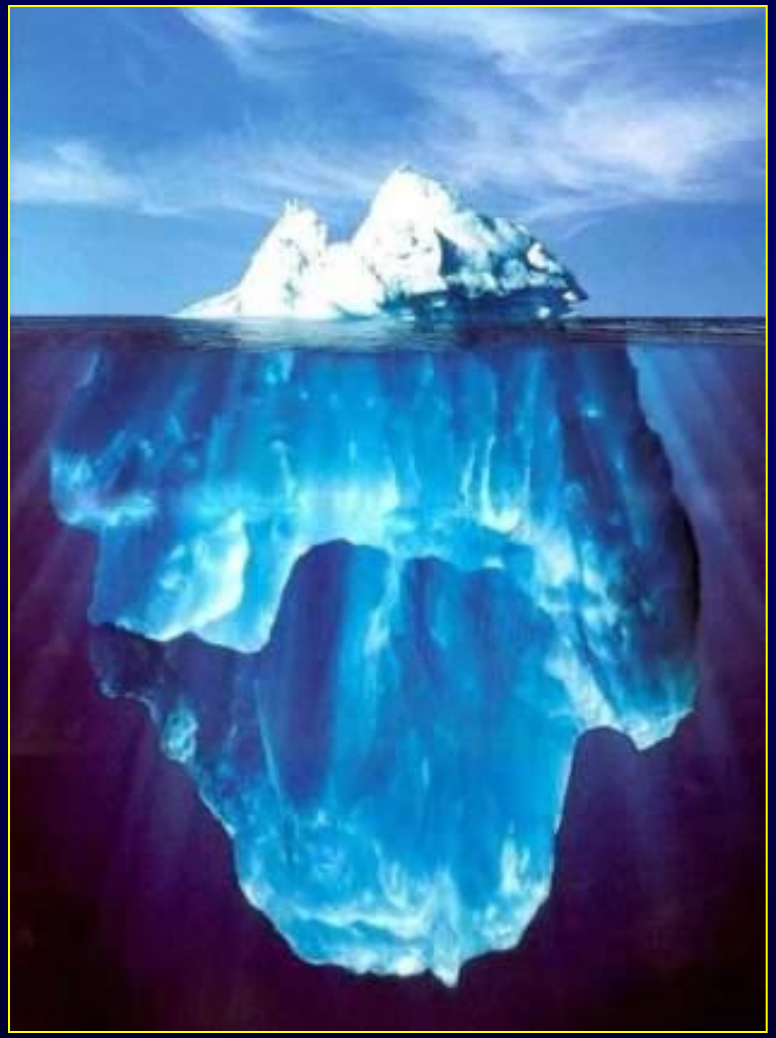
Rhythm Control

- Thromboembolism Prevention: Recommendations
- Direct-Current Cardioversion: Recommendations
- Pharmacological Cardioversion: Recommendations
- Antiarrhythmic Drugs to Maintain Sinus Rhythm: Recommendations
- Upstream Therapy: Recommendations
- AF Catheter Ablation to Maintain Sinus Rhythm: Recommendations
- Surgery Maze Procedures: Recommendations
- Rhythm control versus Rate control

Atrial Fibrillation

Therapeutic Approach





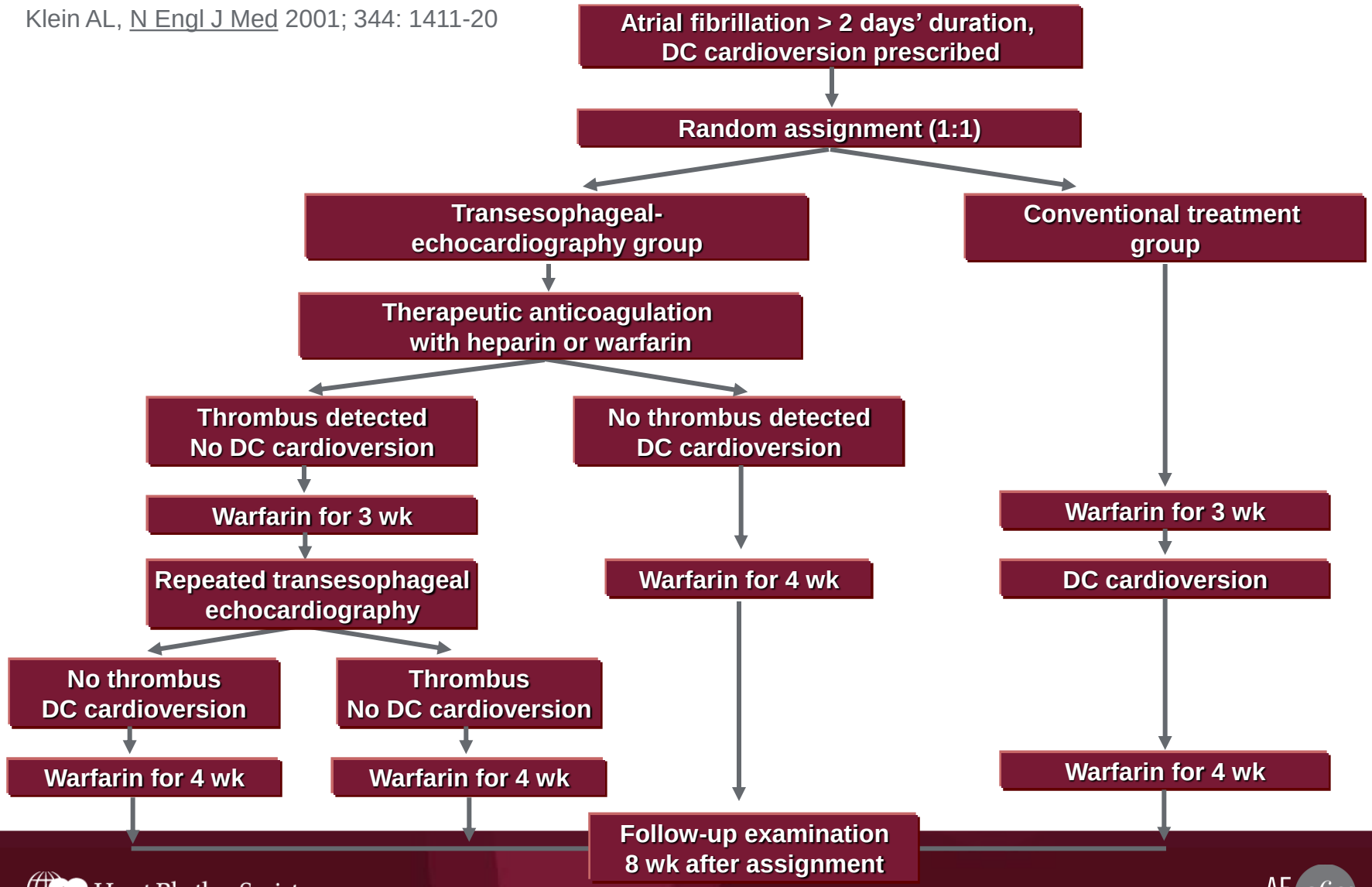
Recommendations	COR	LOE
Thromboembolism prevention		
With AF or atrial flutter for ≥48 h, or unknown duration, anticoagulate with warfa	I	B
With ediate cardi st 4 wk	I	C
With AF or atrial flutter <48 h and high stroke risk, IV heparin or LMWH, or factor Xa or direct thrombin inhibitor, is recommended before or immediately after cardioversion, followed by long-term anticoagulation	I	C
Following cardioversion of AF, long-term anticoagulation should be based	I	C
provided anticoagulation is achieved before TEE and maintained after cardioversion for at least 4 wk	a	B
With AF or atrial flutter ≥48 h, or unknown duration, anticoagulation with dabigatran, rivaroxaban, or apixaban is reasonable for ≥3 wk prior to and 4 wk after cardioversion	IIa	C
With AF or atrial flutter <48 h and low thromboembolic risk, IV heparin, LMWH, a new oral anticoagulant, or no antithrombotic may be considered for cardioversion	IIb	C

DURATION 48 H.

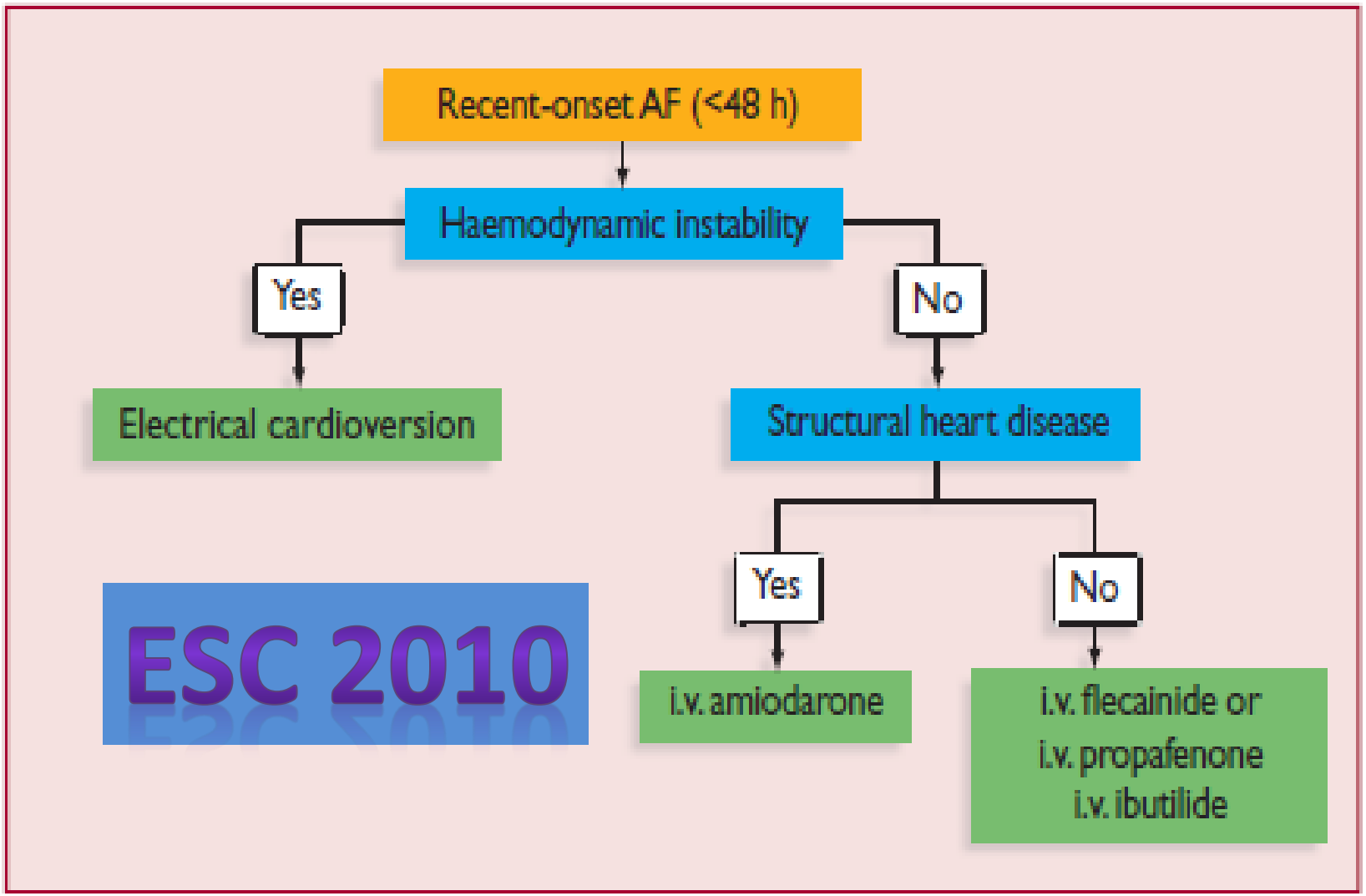
THROMEMBOLIC RISK

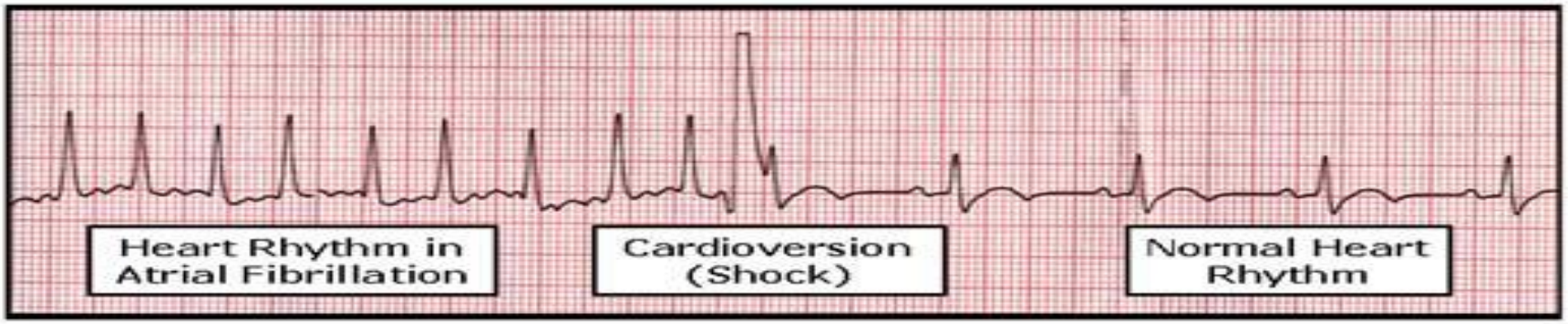
Prospective Companion of TEE-guided vs. Conventional-treatment Cardioversion of A. Fib

Klein AL, N Engl J Med 2001; 344: 1411-20




CARDIOVESION


Recent-onset AF (<48 h)
Haemodynamic instability
Yes
No
Electrical cardioversion
Structural heart disease
Yes
No
i.v. amiodarone
i.v. flecainide or
i.v. propafenone
i.v. ibutilide
ESC 2010


Heart Rhythm in Atrial Fibrillation
Cardioversion (Shock)
Normal Heart Rhythm

DCC

Direct-current cardioversion		
Cardioversion is recommended for AF or atrial flutter to restore sinus rhythm. If unsuccessful, repeat cardioversion attempts may be made	I	B
Cardioversion is recommended for AF or atrial flutter with RVR, that does not respond to pharmacological therapies	I	C
Cardioversion is recommended for AF or atrial flutter and pre-excitation with hemodynamic instability	I	C
It is reasonable to repeat cardioversions in persistent AF when sinus rhythm is maintained for a clinically m[illegible]ures	IIa	C

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Recommendations for direct current cardioversion

Recommendations	Class[a]	Level[b]	Ref.[c]
Immediate DCC is recommended when a rapid ventricular rate does not respond promptly to pharmacological measures in patients with AF and ongoing myocardial ischaemia, symptomatic hypotension, angina, or heart failure.	I	C	
Immediate DCC is recommended for patients with AF involving pre-excitation when rapid tachycardia or haemodynamic instability is present.	I	B	82
Elective DCC should be considered in order to initiate a long-term rhythm control management strategy for patients with AF.	IIa	B	46, 78, 83
Pre-treatment with amiodarone, flecainide, propafenone, ibutilide, or sotalol should be conside to enhance success of DCC prevent recurrent AF.			79–81
Repeated DCC may be cons in highly symptomatic patien refractory to other therapy.			
Pre-treatment with β-blockers, diltiazem or verapamil may be considered for rate control, although the efficacy of these agents in enhancing success of DCC or preventing early recurrence of AF is uncertain.	IIb	C	
DCC is contraindicated in patients with digitalis toxicity.	III	C	

Electrical cardioversion :

(also known as " direct-current" or DC cardioversion);

synchronized electrical shock is delivered through the chest wall to the heart through special electrodes or paddles that are applied to the skin of the chest and back.

Goal of DCC

- Is to disrupt the abnormal electrical circuit(s) in the heart.

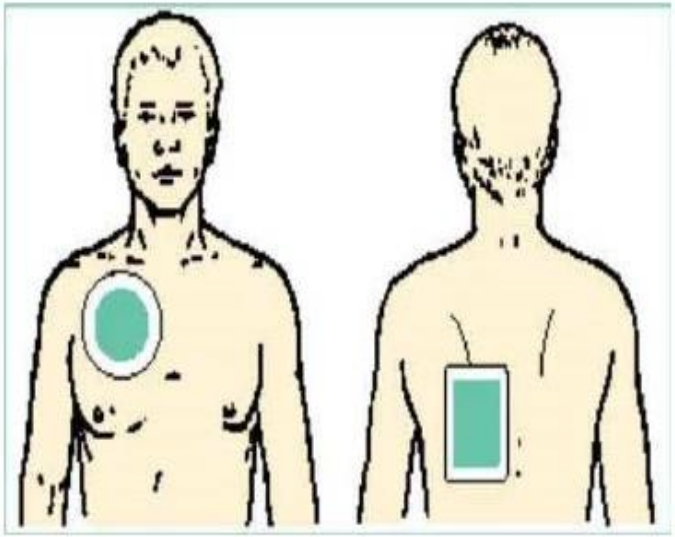
- To restore a normal heart beat .

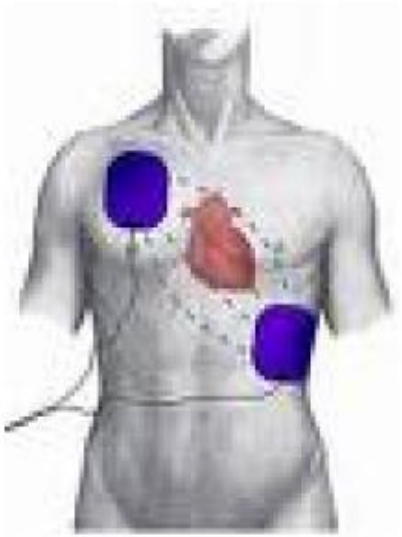
DC Cardioversion

- Efficacy dependent on
  - Paddle size and position
  - Transthoracic impedance
  - Energy Waveform
  - Underlying disease

British Heart Foundation

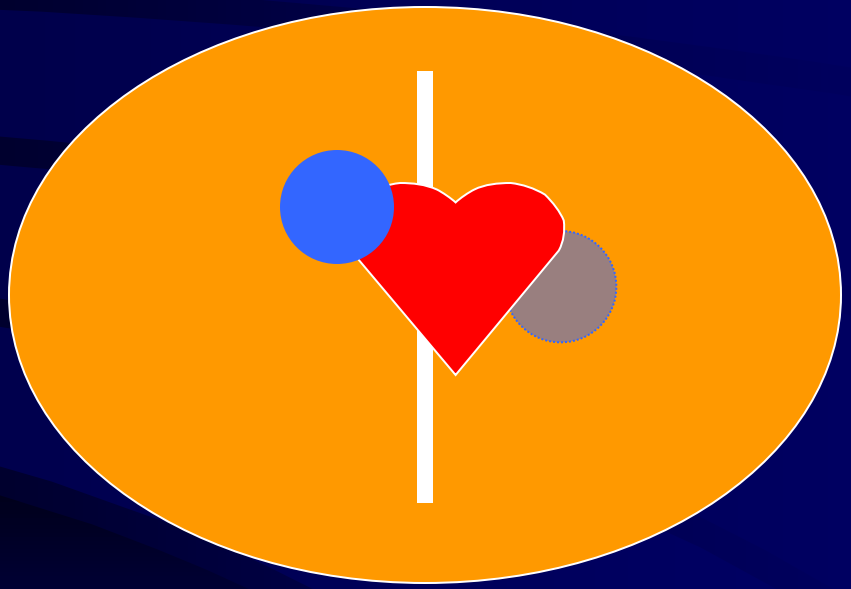
Paddle Position





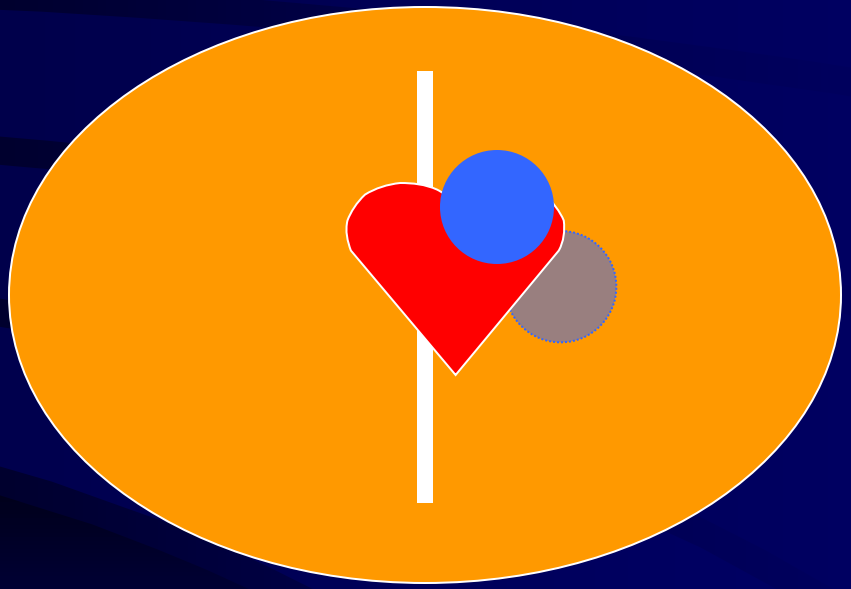
Paddle Position

- Anterior/Posterior #1



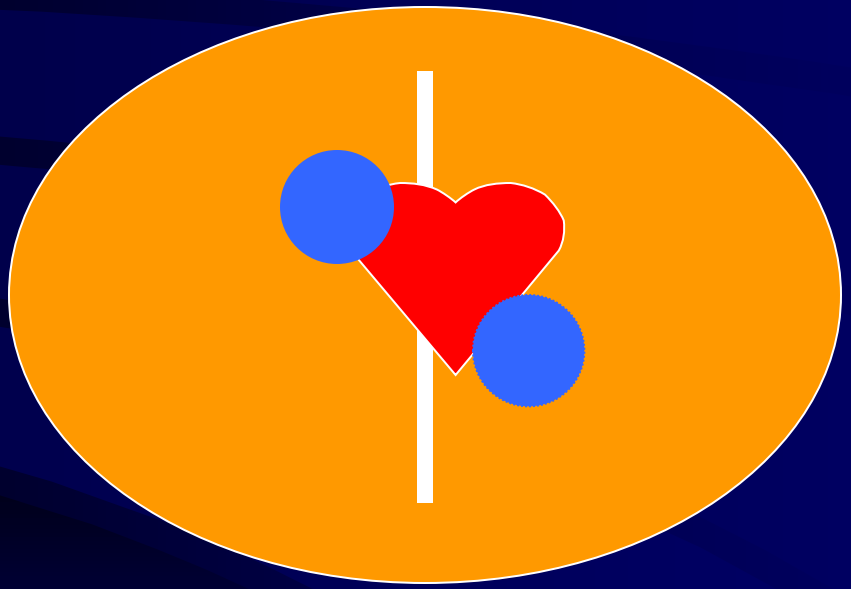
Paddle Position

- Anterior/Posterior #2



Paddle Position

- Anterior/Anterior

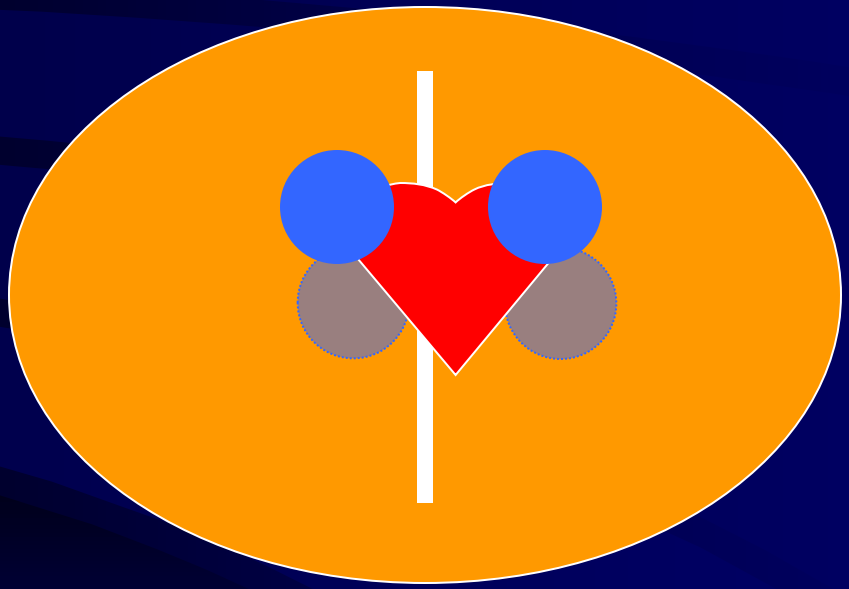


Transthoracic Impedance

- Lowered by putting pressure on the anterior paddle during cardioversion

Double External Cardioversion

- Double Shock



Complications

- **Thrombo-embolic events, (1-2%), post-cardioversion arrhythmias, and the risks of general anaesthesia.**
- **Skin burns** are a common complication.
- In patients with sinus node dysfunction, especially in elderly patients with structural heart disease**, prolonged sinus arrest without an adequate escape rhythm** may occur.
- **Dangerous arrhythmias, such as ventricular tachycardia and fibrillation,** may arise in the presence of hypokalaemia, digitalis intoxication, or improper synchronization.
- The patient may become **hypoxic or hypoventilate** from sedation,
- **Hypotension and pulmonary oedema** are rare.

Recurrence after cardioversion

Recurrences after DCC can be divided into three phases:

(1) Immediate recurrences, which occur within the first few minutes after DCC.

(2) Early recurrences, which occur during the first 5 days after DCC.

(3) Late recurrence, which occur thereafter.

Factors that predispose to AF recurrence are:

age, AF duration before cardioversion, number of previous recurrences, an increased LA size or reduced LA function, and the presence of coronary heart disease or pulmonary or mitral valve disease, Atrial ectopic beats with a long–short sequence, faster heart rates, and variations in atrial conduction increase the risk of AF recurrence.

Pre-treatment with antiarrhythmic drugs such as amiodarone, ibutilide, sotalol, flecainide, and propafenone increases the likelihood of restoration of sinus rhythm


PHARMACOLOGICAL
CRADIOVERSION

ACC 2014

Pharmacological cardioversion		
Flecainide, dofetilide, propafenone, and IV ibutilide are useful for cardioversion of AF or atrial flutter provided contraindications to the selected drug are absent	I	A
Amiodarone is reasonable for pharmacological cardioversion of AF	IIa	A
Propafenone or flecainide ("pill-in-the-pocket") to terminate AF out of hospital is reasonable once observed to be safe in a monitored setting	IIa	B
Dofetilide should not be initiated out of hospital	III: Harm	B

Recommendations for pharmacological cardioversion

Recommendations	Class[a]	Level[b]	Ref.[c]
When pharmacological cardioversion is preferred and there is no structural heart disease, i.v. flecainide or propafenone is recommended for cardioversion of recent-onset AF.	I	A	71–73
In patients with recent-onset AF and structural heart disease, i.v. amiodarone is recommended.	I	A	74–76
In selected patients with recent-onset AF and no significant structural heart disease, a single high oral dose of f (the 'pill-i should be treatmen previous environm	IIa	B	67
In patients with recent-onset AF, structural heart disease, but without hypotension or manifest congestive heart failure, ibutilide may be considered. Serum electrolytes and the QTc interval must be within the normal range, and the patients must be closely monitored during and for 4 h after the infusion because of risk of proarrhythmia.	IIb	A	71, 77
Digoxin (LoE A), verapamil, sotalol, metoprolol (LoE B), other β-blocking agents and ajmaline (LoE C) are ineffective in converting recent-onset AF to sinus rhythm and are not recommended.	III	A B C	

Drug	Usual Doses	Exclude/Use with Caution	Major Pharmacokinetic Drug Interactions
Vaughan Williams Class IA			
Disopyramide	• Immediate release: 100–200 mg once every 6 h • Extended releas… mg once every …	• HF • Prolonged QT interval drugs	• Metabolized by *CYP3A4*: caution with inhibitors (e.g., …iltiazem, …e, macrolide …protease inhibitors, grapefruit juice) and inducers (e.g., rifampin, phenobarbital, phenytoin)
Quinidine	•		antipsychotics; ↓efficacy of codeine • Inhibits P-glycoprotein: ↑digoxin concentration

QT INTERVAL

DRUG INTERACTION

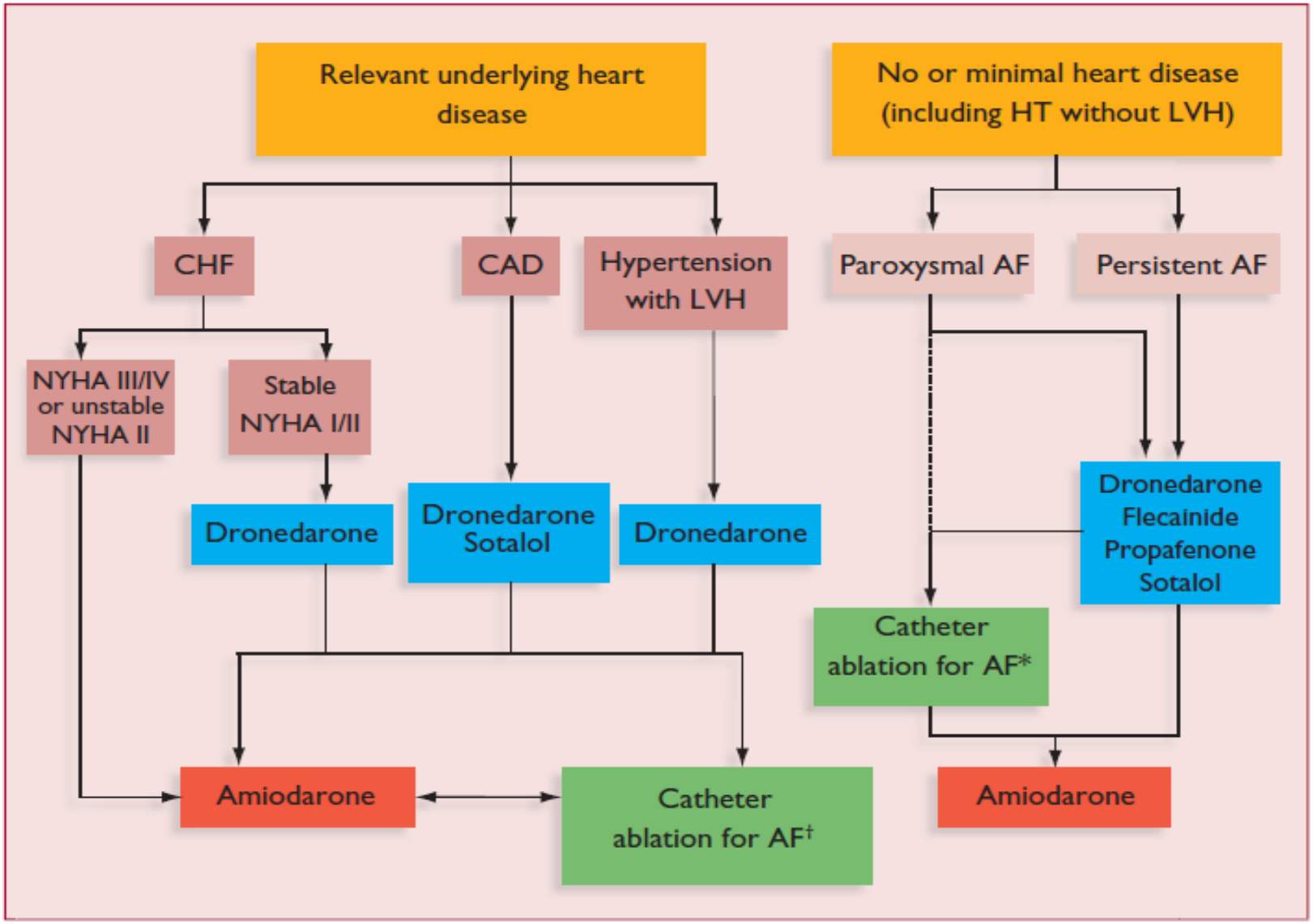
Vaughan Williams Class IC			
Flecainide	• 50–200 mg once every 12 h	• Sinus or AV node dysfunction • HF • CAD • Atrial flutter • Infranodal conduction disease • Brugada syndrome • Renal or liver disease	• Metabolized by *CYP2D6* (inhibitors include quinidine, fluoxetine, tricyclics; also genetically absent in 7%–10% of population) and renal excretion (dual impairment can ↑↑plasma concentration)
Propafenone	• Immediate release: 150–300 mg once every 8 h • Extended release: 225–425 mg once every 12 h	• Sinus or AV node dysfunction • HF • CAD • Liver disease • Asthma	• Metabolized by *CYP2D6* (inhibitors include quinidine, fluoxetine, tricyclics; also genetically absent in 7%–10% of population)—poor metabolizers have ↑beta blockade Inhibits P-glycoprotein: ↑digoxin concentration • Inhibits *CYP2C9*: ↑warfarin concentration (↑INR 25%)

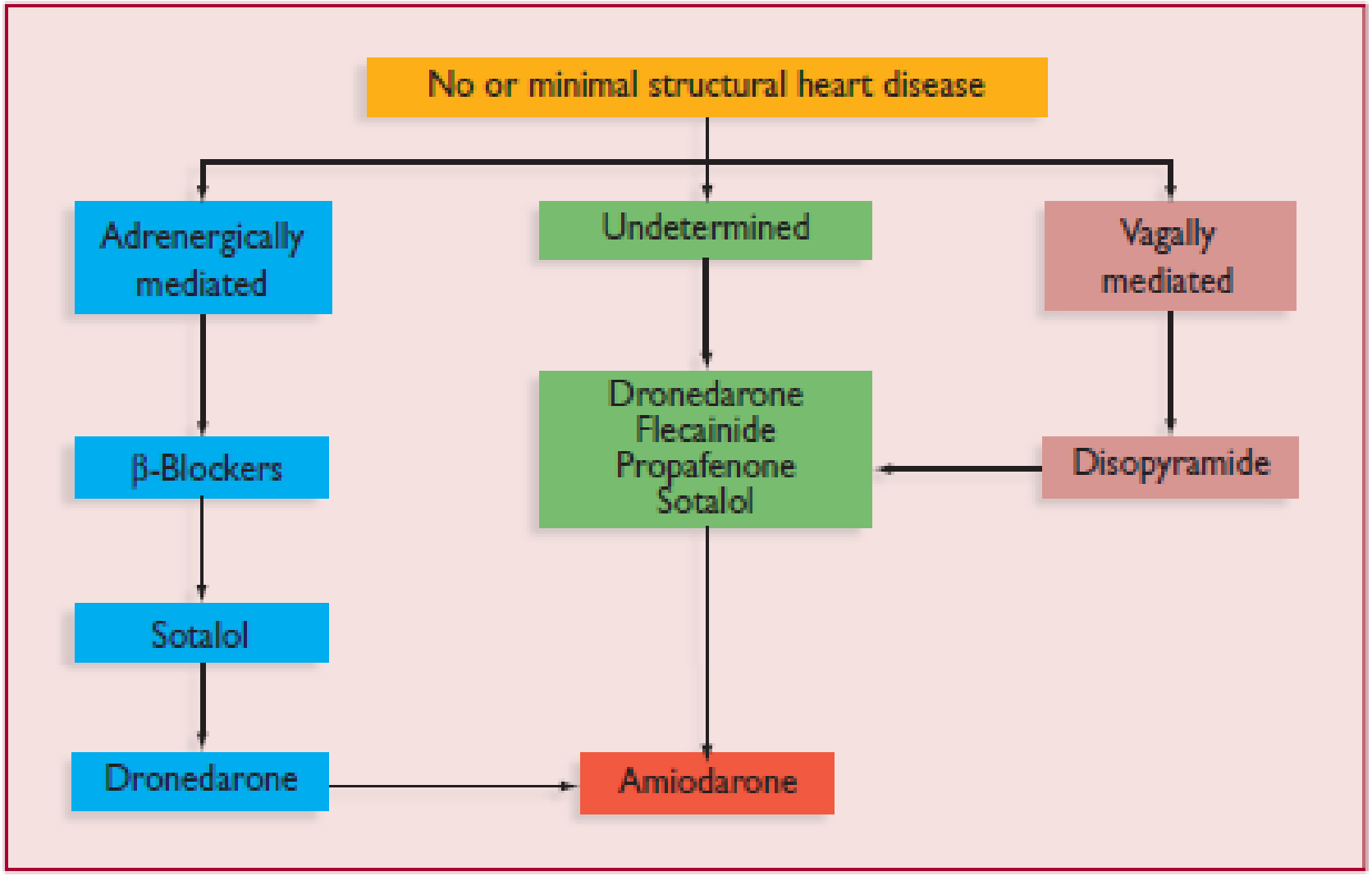
HF-CAD

Vaughan Williams Class III			
Amiodarone	• Oral: 400–600 mg daily in divided doses for 2-4 wk; 24 h, consider decreasing dose to 0.25 mg/min	• Sinus or AV node dysfunction	• Inhibits most CYPs to cause drug interaction: ↑concentrations 00%),
Dofetilide	• 125–500 mcg once every 12 h	• Prolonged QT interval • Renal disease • Hypokalemia • Diuretic therapy • Avoid other QT interval prolonging drugs	• Metabolized by *CYP3A*: verapamil, HCTZ, cimetidine, ketoconazole, trimethoprim, prochlorperazine, and megestrol are contraindicated; discontinue amiodarone at least 3 mo before initiation
Dronedarone	• 400 mg once every 12 h	• Bradycardia • HF • Long-standing persistent AF/flutter • Liver disease • Prolonged QT interval	• Metabolized by *CYP3A*: caution with inhibitors (e.g., verapamil, diltiazem, ketoconazole, macrolide antibiotics, protease inhibitors, grapefruit juice) and inducers (e.g., rifampin, phenobarbital, phenytoin) • Inhibits *CYP3A*, *CYP2D6*, P-glycoprotein: ↑concentrations of some statins, sirolimus, tacrolimus, beta blockers, digoxin
Sotalol	• 40–160 mg once every 12 h	• Prolon l • Renal • Hypokalemia • Diuretic therapy • Avoid other QT interval prolonging drugs • Sinus or AV nodal dysfunction • HF • Asthma	• None (renal excretion)

THYROID, LIVER, LUNG

HF


Relevant underlying heart disease
No or minimal heart disease (including HT without LVH)
CHF
CAD
Hypertension with LVH
Paroxysmal AF
Persistent AF
NYHA III/IV or unstable NYHA II
Stable NYHA I/II
Dronedarone
Dronedarone Sotalol
Dronedarone
Dronedarone Flecainide Propafenone Sotalol
Catheter ablation for AF*
Amiodarone
Catheter ablation for AF†
Amiodarone


No or minimal structural heart disease
Adrenergically mediated
Undetermined
Vagally mediated
β-Blockers
Dronedarone
Flecainide
Propafenone
Sotalol
Disopyramide
Sotalol
Dronedarone
Amiodarone


UPSTREAM THERAPY

Upstream therapy to prevent or delay myocardial remodelling associated with hypertension, heart failure, or inflammation (e.g. after cardiac surgery) may prevent the development of new AF (primary prevention) or, once established, its rate of recurrence or progression to permanent AF (secondary prevention).

Recommendations for primary prevention of AF with 'upstream' therapy

Recommendations	Class[a]	Level[b]	Ref.[c]
ACEIs and ARBs should be considered for prevention of new-onset AF in patients with heart failure and reduced ejection fraction.	IIa	A	145–149
ACEIs and ARBs should be considered for prevention of new-onset AF in patients particularly wi hypertrophy.	IIa	B	147, 150, 151
Statins should prevention of new-onset AF after coronary artery bypass grafting, isolated or in combination with valvular interventions.	IIa	B	161, 162
Statins may be considered for prevention of new-onset AF in patients with underlying heart disease, particularly heart failure.	IIb	B	164, 165
Upstream therapies with ACEIs, ARBs, and statins are not recommended for primary prevention of AF in patients without cardiovascular disease.	III	C	

ESC 2010

Upstream Therapy: Recommendations

Class IIa

1. An ACE inhibitor or angiotensin-receptor blocker (ARB) is reasonable for primary prevention of new-onset AF in patients with HF with reduced LVEF. *(Level of Evidence: B)*

Class IIb

1. Therapy with an ACE inhibitor or ARB may be considered for primary prevention of new-onset AF in the setting of hypertension *(Level of Evidence: B)*

2. Statin therapy may be reasonable for primary prevention of new-onset AF after coronary artery surgery. *(Level of Evidence: A)*

Class III: No Benefit

1. Therapy with an ACE inhibitor, ARB, or statin is not beneficial for primary prevention of AF in patients without cardiovascular disease .*(Level of Evidence: B)*

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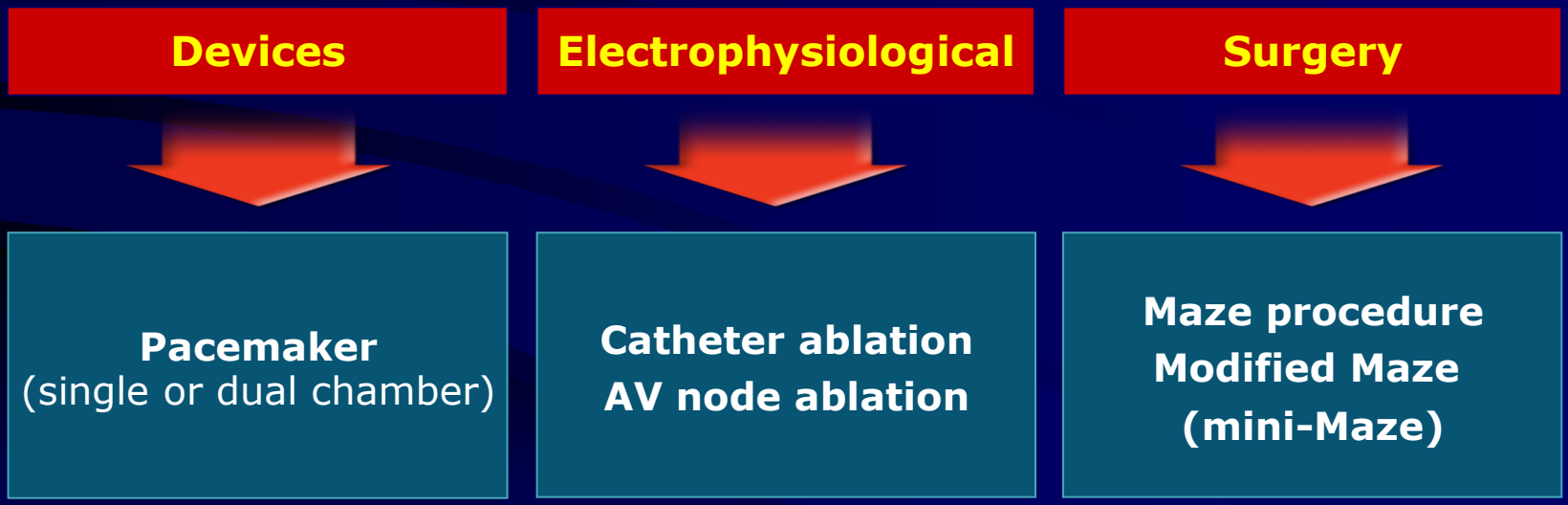
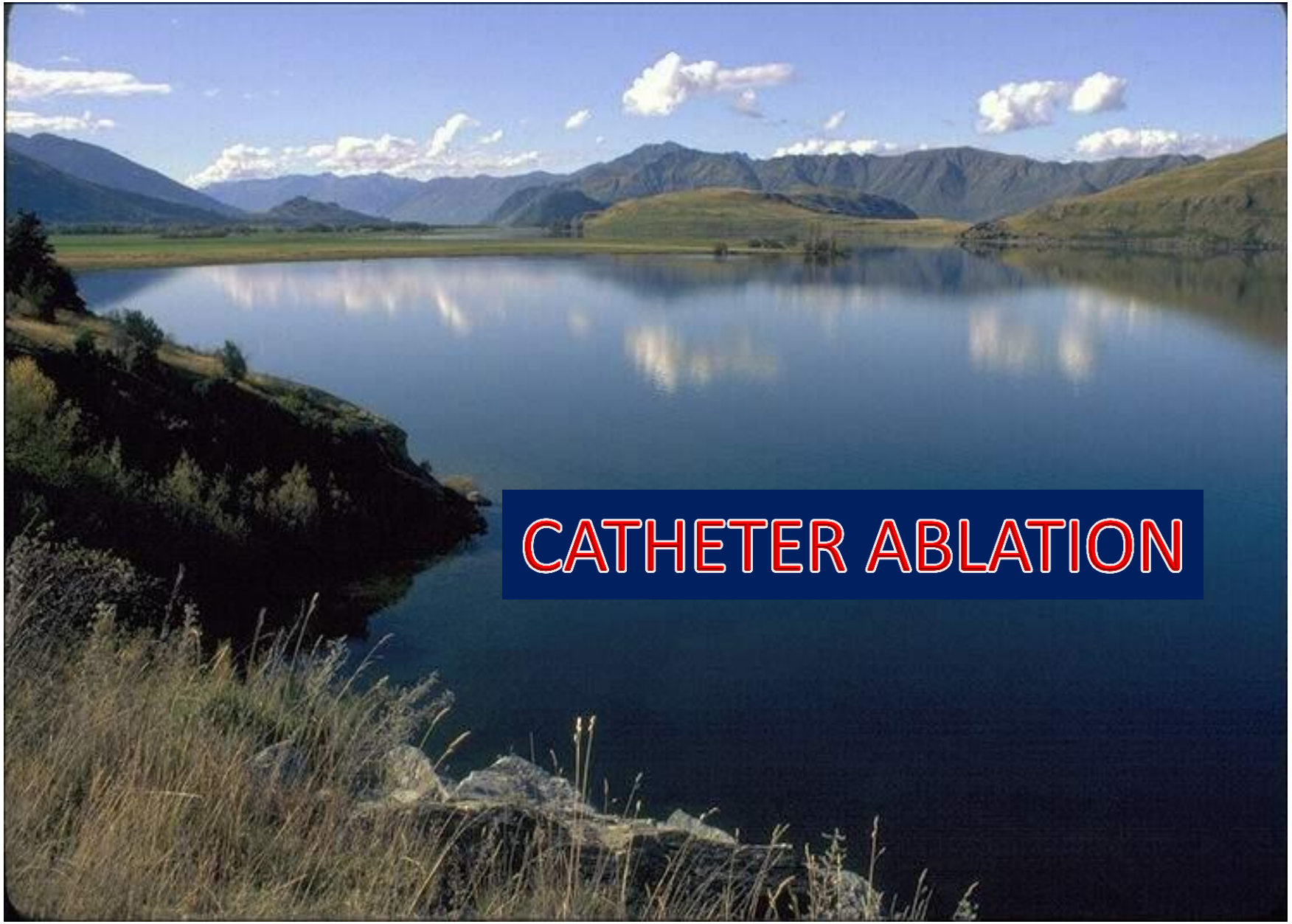
Non-Pharmacological Treatment Options for AFib



ACC/AHA/ESC 2006 Guidelines for the Management of Patients With Atrial Fibrillation
J Am Coll Cardiol (2006) 48: 854


CATHETER ABLATION

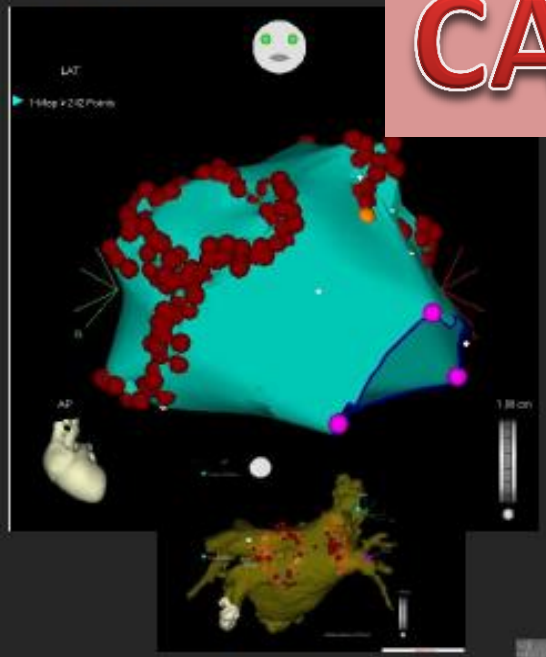
Atrial Fibrillation Ablation Plymouth

Percutaneous

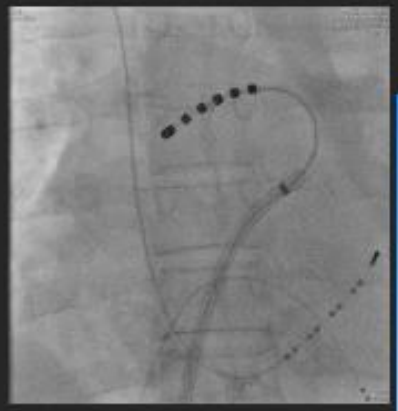
Intra-operative

CATHETER ABLATION

CARTO

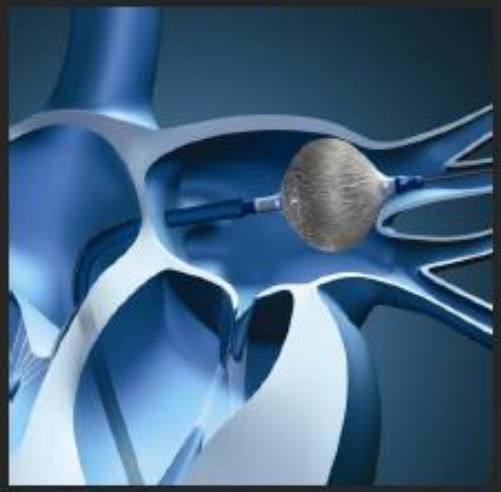


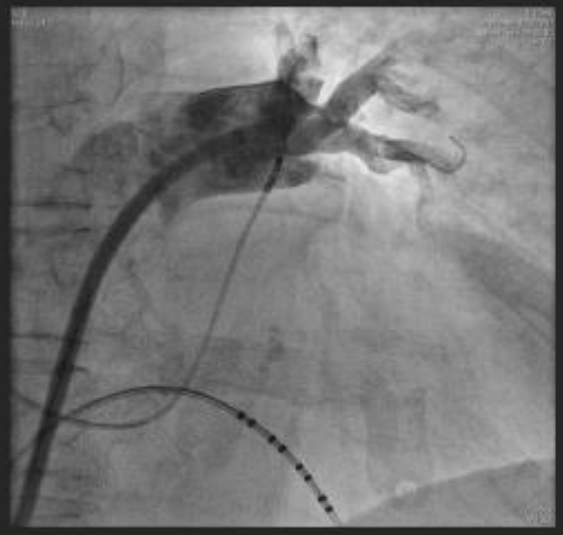
CARTOMERGE



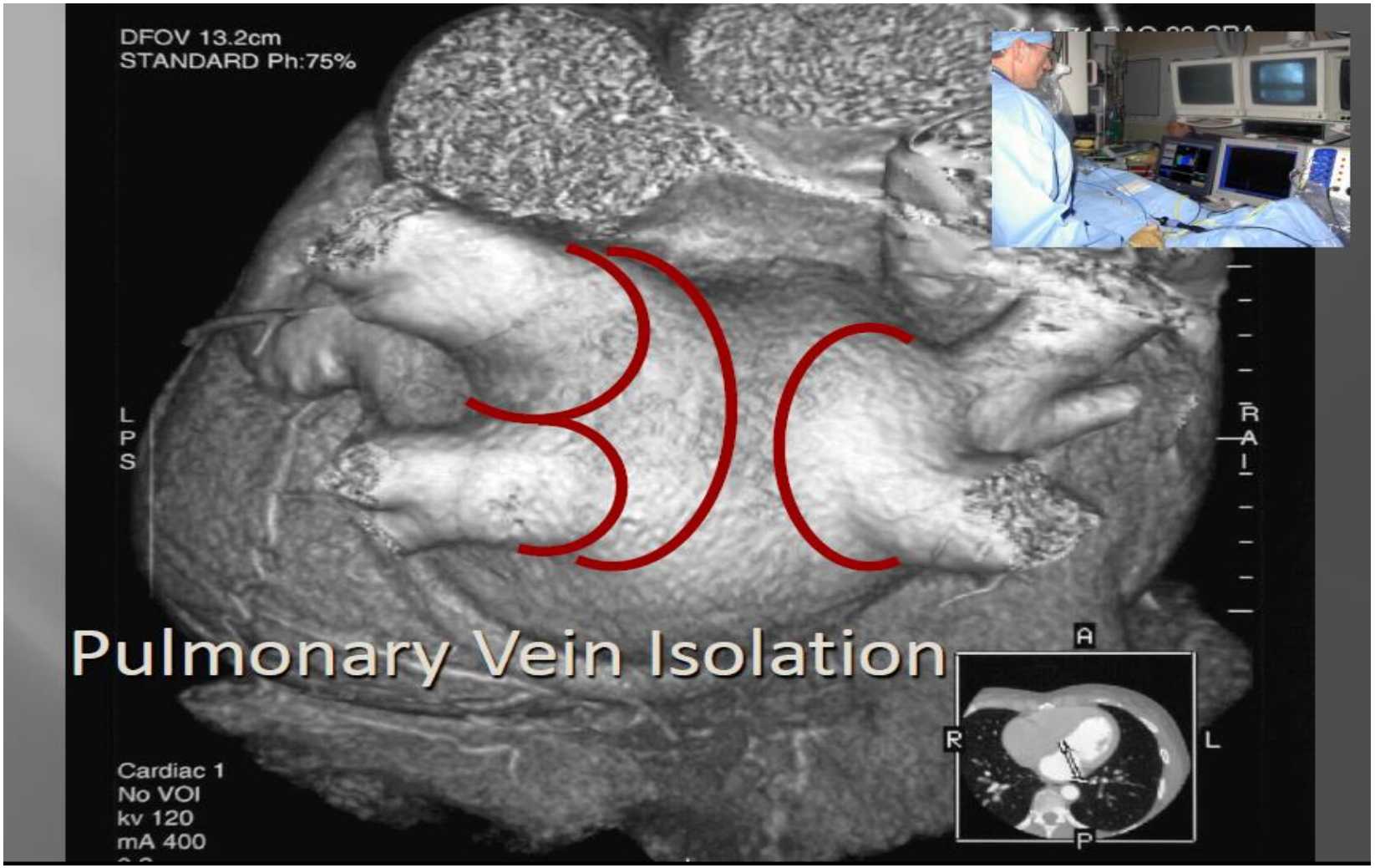
T-VAC™

Arctic Front®





Selective venography


DFOV 13.2cm
STANDARD Ph:75%
L
P
S
R
A
I
Pulmonary Vein Isolation
A
R
L
P
Cardiac 1
No VOI
kv 120
mA 400

AF Catheter Ablation to Maintain Sinus Rhythm: Recommendations

Class I

1. AF catheter ablation is useful for symptomatic paroxysmal AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication when a rhythm control strategy is desired (155-161). *(Level of Evidence: A)*

2. Prior to consideration of AF catheter ablation, assessment of the procedural risks and outcomes relevant to the individual patient is recommended. *(Level of Evidence: C)*

Class III: Harm

1. AF catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and following the procedure. *(Level of Evidence: C)*

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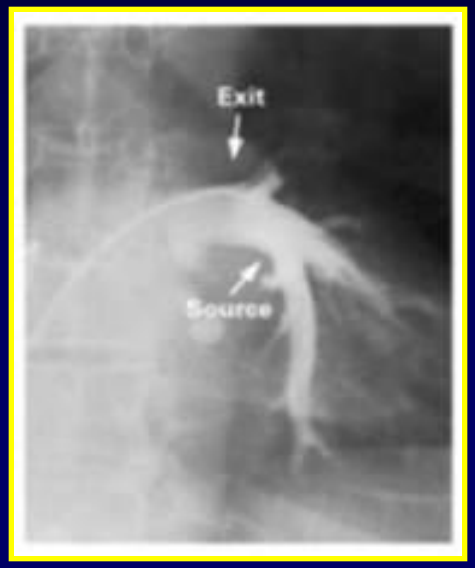
Class IIa

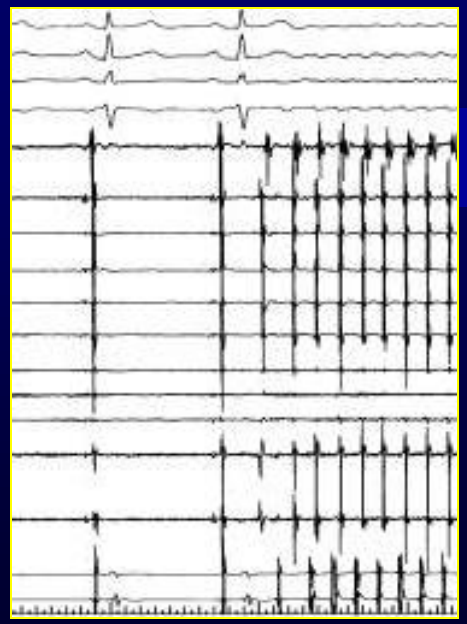
1. **AF catheter ablation is reasonable for selected patients with symptomatic persistent AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication . *(Level of Evidence: A)***
2. **In patients with recurrent symptomatic paroxysmal AF, catheter ablation is a reasonable initial rhythm control strategy prior to therapeutic trials of antiarrhythmic drug therapy, after weighing risks and outcomes of drug and ablation therapy. *(Level of Evidence: B)***

Class IIb

1. **AF catheter ablation may be considered for symptomatic long-standing (>12 months) persistent AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication, when a rhythm control strategy is desired *(Level of Evidence: B)***
2. **AF catheter ablation may be considered prior to initiation of antiarrhythmic drug therapy with a class I or III antiarrhythmic medication for symptomatic persistent AF, when a rhythm control strategy is desired. *(Level of Evidence: C)***

Operative Mechanisms





microcircuits of reentry

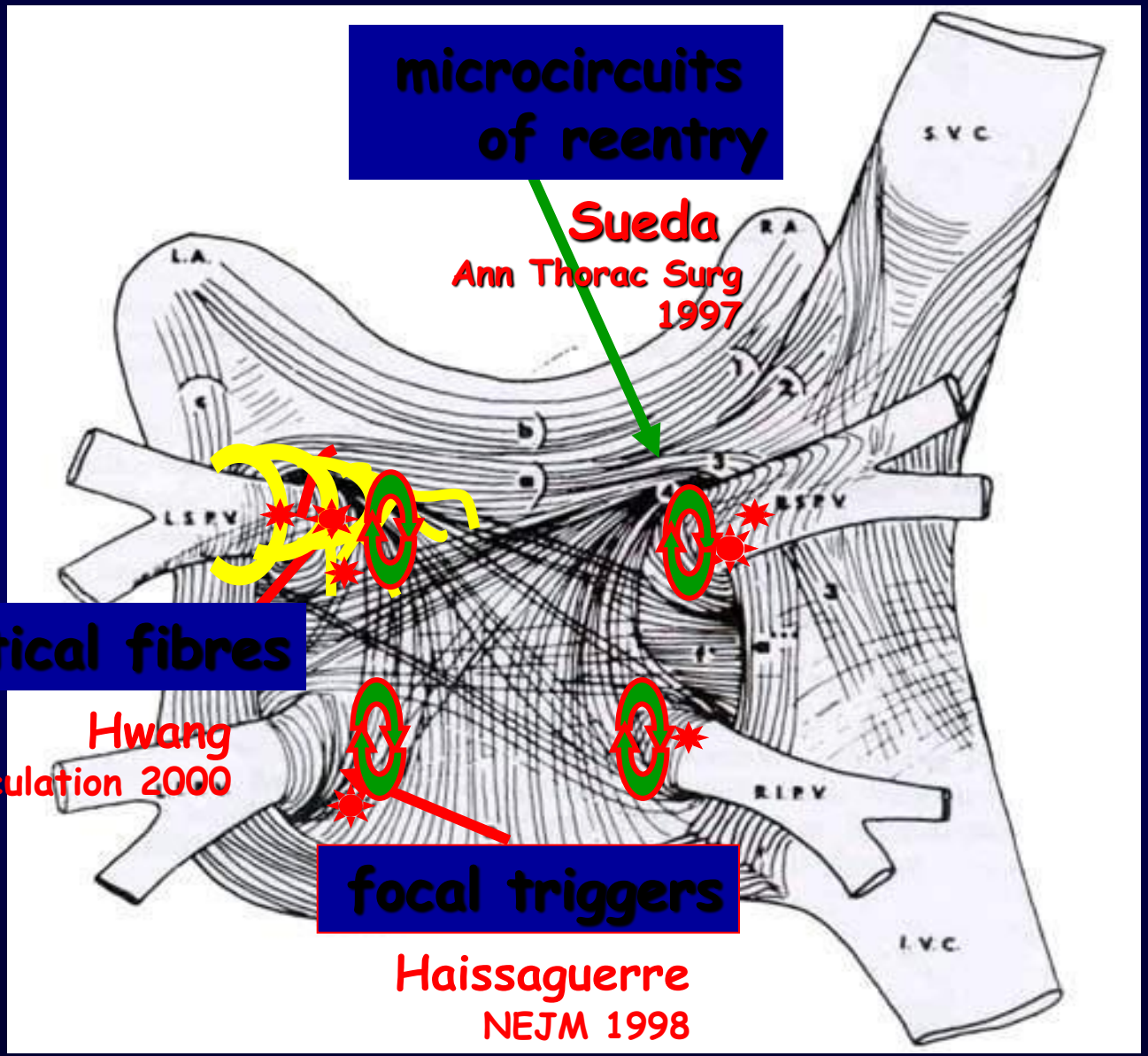
Sueda
Ann Thorac Surg
1997

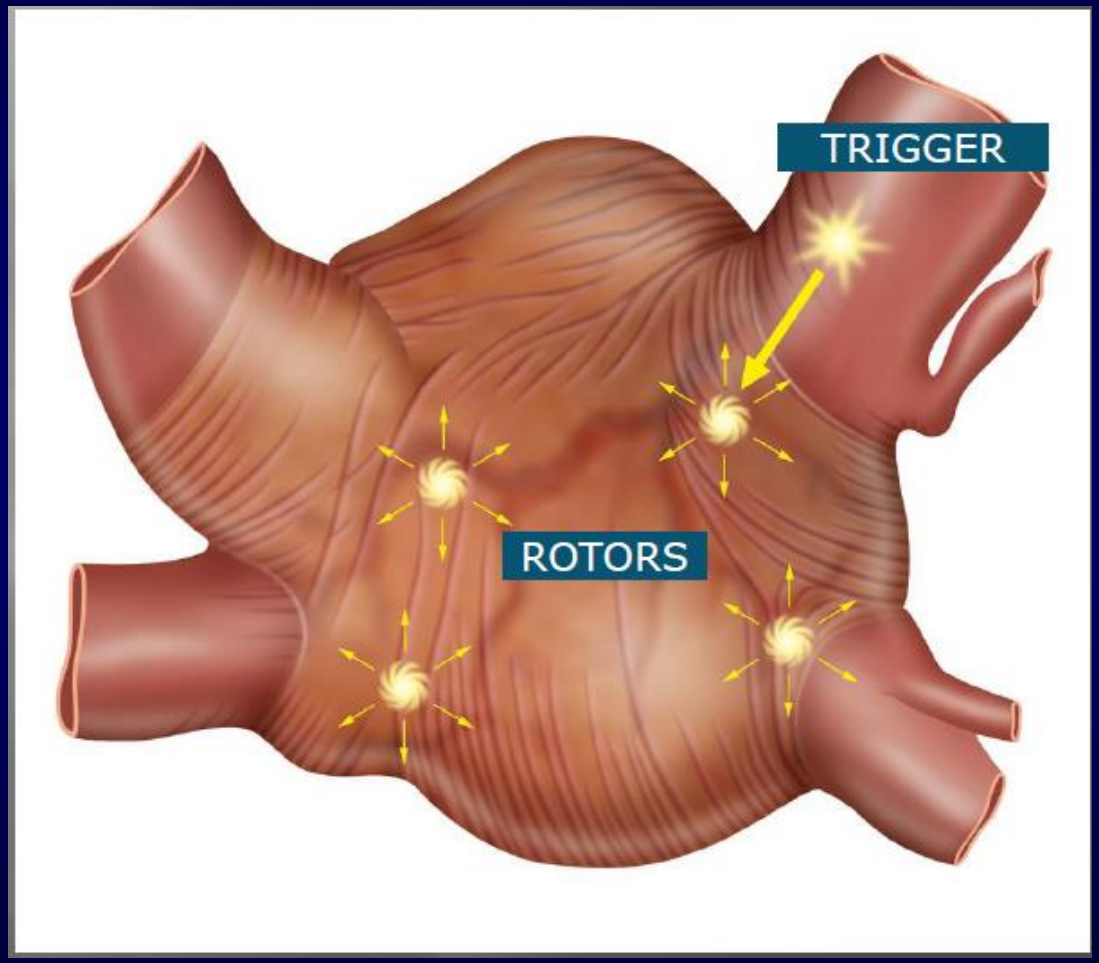
critical fibres

Hwang
Circulation 2000

focal triggers

Haissaguerre
NEJM 1998




TRIGGER
ROTORS

Pre-ablation assessment

Prior to an ablation procedure all patients should undergo a **12-lead ECG and/or Holter** recording to demonstrate the nature of the arrhythmia, and a **transthoracic echocardiogram** to identify/ exclude underlying structural heart disease. Additional imaging studies, e.g. **MRI or CT**, demonstrate individual three-dimensional geometry and provide some quantification of atrial fibrosis. To lower the risk of thrombo-embolic events during any LA ablation procedure, an **LA thrombus** (usually within the LAA) should be excluded. **Appropriate anticoagulation** should be employed to 'bridge' the time (≤48 h is recommended) between exclusion of LAA thrombus by TOE and the procedure itself.

Technique

- Linear pulmonary vein isolation and circumferential pulmonary vein ablation
- Right atrial flutter ablation CTI
- Atrial tissue generating complex fractionated atrial electrograms (CFAEs) has been ablated
- radiofrequency ablation of ganglionic plexi as an add-on to PV isolation

Follow-up considerations

Anticoagulation. Initially post-ablation, LMWH or i.v. UFH should be used as a bridge to resumption of systemic anticoagulation, which should be continued for a minimum of **3 months** although some centres do not interrupt anticoagulation for the ablation procedure.

Thereafter, the individual **stroke risk** of the patient should determine whether oral anticoagulation should be continued.

Discontinuation of warfarin therapy post-ablation is generally not recommended in patients at risk for stroke .

Monitoring for atrial fibrillation recurrences

An initial follow-up visit at 3 months, with 6 monthly intervals thereafter for at least 2Y.

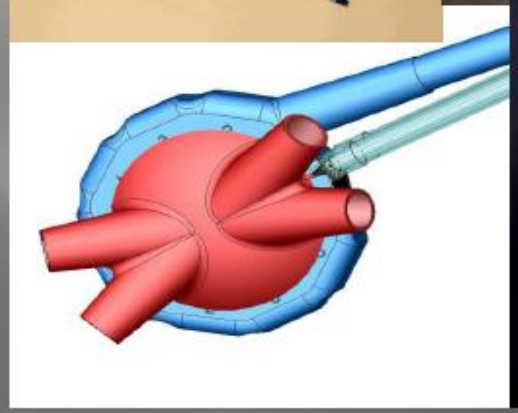
Table 17 Complications of AF catheter ablation

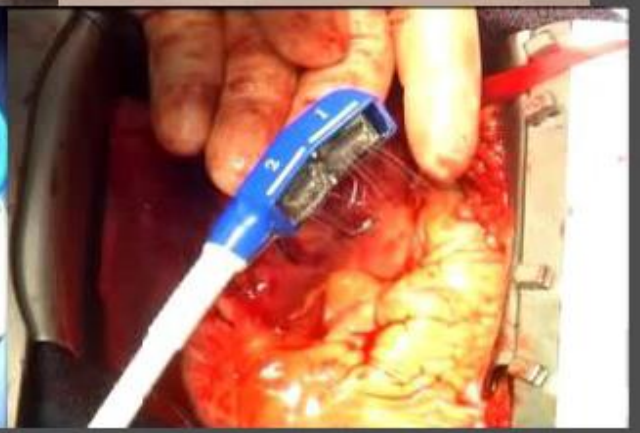
Type	Typical symptoms	Incidence	Treatment options and outcome	How to reduce risks
Thrombo-embolism TIA Stroke	Neurological deficit relating to the site of embolus	0.93% 0.2% (0.6%) 0.3% (0.28%)	Consider lysis therapy	Use irrigated tip catheter Monitor ACT every 30 min and adjust using i.v. heparin bolus
PV stenosis/occlusion	Cough, shortness of breath on exertion, resistant pneumonia, haemoptysis	Depending on the ablation site with regards to the PV ostium Up to 10% for focal PV ablation. <5% for segmental PV isolation	PV dilatation/recanalization eventually requiring stent implantation Frequent in-stent re-stenosis	Avoid intra-PV ablation and solid-tip ablation
Atrio-oesophageal fistula formation	Unexplained fever, dysphagia, seizure	<1%	Immediate surgical correction	Avoid excessive energy delivery at sites neighbouring the posterior LA wall
Tamponade Immediate Late (days after procedure)	Hypotension cardiac arrest	0.8% Up to 6% of all procedures Unknown	Immediate pericardiocentesis	Avoid direct mechanical trauma during trans-septal puncture Avoid pop formation Avoid excessive contact force
Phrenic nerve injury (mostly right-sided)	Diaphragmatic paralysis causing shortness of breath on exertion or dyspnoea at rest	Can be transient	Wait	Identify phrenic nerve location in relation to PV ostia by stimulation manoeuvre Avoid stretching the PV ostium (mostly when using balloon catheters
Perioesophageal injury	Intes (bloa			nknown
Arteriovenous fistula	Pain			areful puncture technique
Aneurysm formation	Pain		Thrombin injection	areful puncture technique
Radiation injury	Pain and reddening at radiated site	Occurs late in follow-up Acute radiation injury very rare	Treat as burn injury	Avoid excessive radiation exposure and employ ALARA concept Use 3D mapping technology Use low frame rate pulsed fluoroscopy Optimal adjustment of fluoroscopy exposure rates
Mitral valve injury	Entrapment of catheters Extensive scarring after excessive ablation on valvular tissue	Very uncommon	Gentle catheter retraction while sheath is advanced into the ventricle Surgical removal	Recognition of the anatomic relationship of the LA/LV anatomy in 3D Monitor signals while manipulating catheters
Acute coronary injury	Chest pain ST elevation Hypotension	Very rare 1/356 patients in single case report	Standard percutaneous therapy for acute coronary occlusion	Avoid excessive energy application close to the coronary arteries Avoid intracoronary sinus ablation when possible
Air embolism	Acute ischaemia Hypotension Atrioventricular block Cardiac arrest		Aspiration of air in long sheaths Watch and wait Pacing Perform CPR if needed	Careful aspiration of all indwelling sheaths Constant positive pressure on trans-septal sheaths
Haematoma at puncture site	Pain Swelling Discolouration	Frequent	Compression, in rare cases surgical treatment Sheath removal after normalization of ACT	Careful compression Sheath removal after normalization of ACT
Death overall		0.7%		

COMPLICTIONS

SURGICAL ATRIAL FIBRILLATION - HIGH INTENSITY FOCUSED ULTRASOUND

- UltraCinch
- UltraWand





Surgery Maze Procedures: Recommendations

Class IIa

1. **An AF surgical ablation procedure is reasonable for selected patients with AF undergoing cardiac surgery for other indications.** ***(Level of Evidence: C)***

ACC 2014

Surgical ablation

- ✓ AF is an independent risk factor for poor outcome after cardiac surgery and is associated with higher perioperative mortality, particularly in patients with LVEF of .40%.
- ✓ Preoperative AF is a marker for increased surgical risk of mitral repair, and predicts late adverse cardiac events and stroke.

Surgical incisions

'Cut-and-sew' techniques are used to **isolate the PVs, extending to the mitral annulus, right and LAAs, and coronary sinus.** The technique is known as the **'maze procedure'**

Freedom from AF is **75–95% up to 15 years** after the procedure.

In patients with mitral valve disease, valve surgery alone is unsuccessful in reducing recurrent AF or stroke, but a concomitant maze procedure produces similar outcomes compared with patients in sinus rhythm and has favourable effects on restoration of effective LA contraction.

The procedure is complex, with risk of mortality and significant complications, and consequently has been sparsely adopted.

Surgical PV isolation is effective in restoring sinus rhythm in permanent AF associated with mitral valve disease.

Recommendations for surgical ablation of AF

Recommendations	Class[a]	Level[b]	Ref.[c]
Surgical ablation of AF should be considered in patients with symptomatic AF undergoing cardiac surgery.	IIa	A	139,
Surgical ablation of AF may be performed in patients with asymptomatic AF undergoing cardiac surgery if feasible with minimal risk.	IIb	C	
Minimally invasive surgical ablation of AF without concomitant cardiac surgery is feasible and may be performed in patients with symptomatic AF after failure of catheter ablation.	IIb	C	

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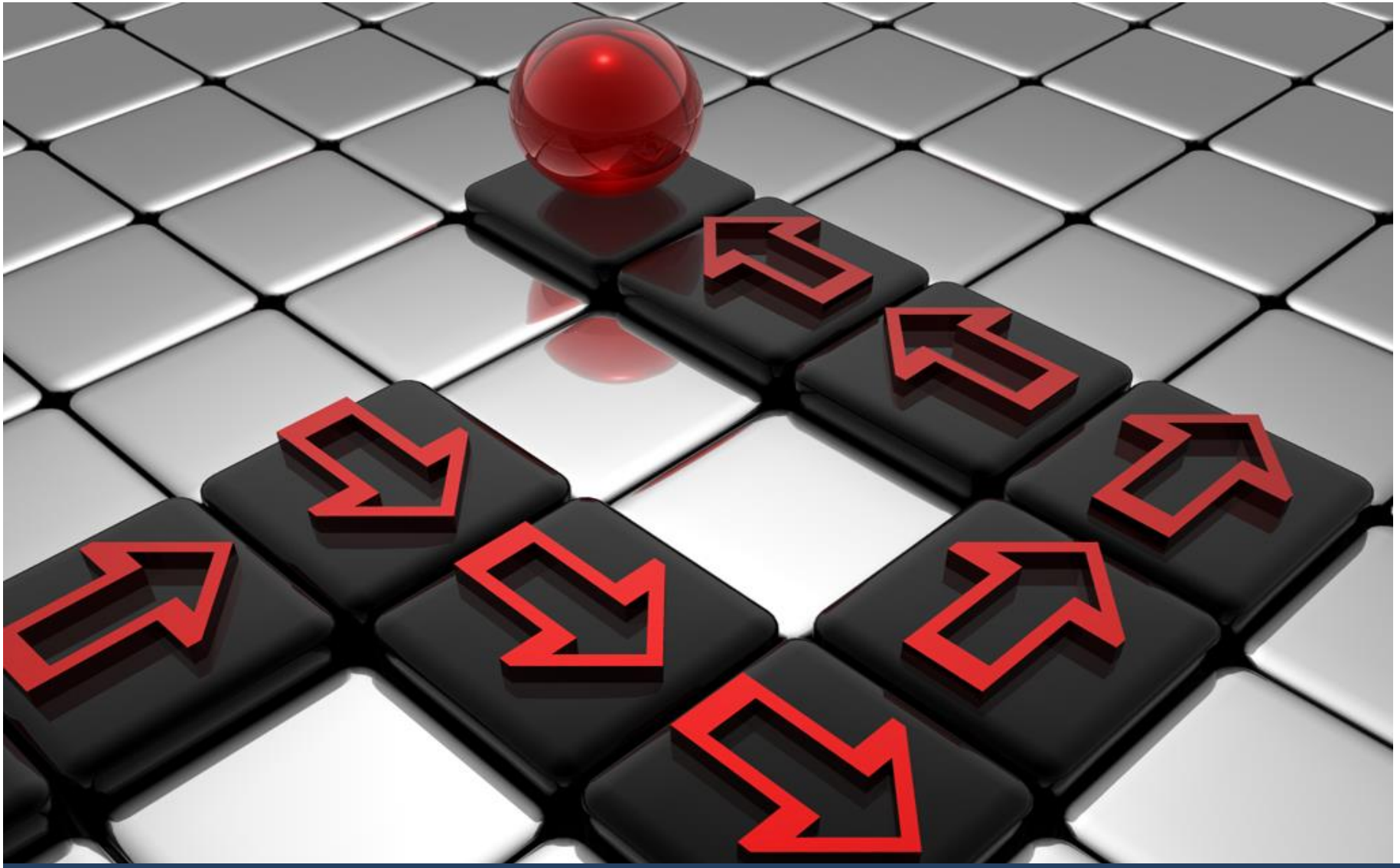


RHYTHM VS RATE CONTROL

Table 13 General characteristics of rhythm control and rate control trials in patients with AF[86–92]

Trial	Ref	Patients (*n*)	Mean age (years)	Mean follow-up (years)	Inclusion criteria	Primary outcome parameter	Patients reaching primary outcome (*n*)		
							Rate control	Rhythm control	*P*
PIAF (2000)	92	252	61.0	1.0	Persistent AF (7–360 days)	Symptomatic improvement	76/125 (60.8%)	70/127 (55.1%)	0.32
AFFIRM (2002)	86	4060	69.7	3.5	Paroxysmal AF or persistent AF, age ≥65 years, or risk of stroke or death	All-cause mortality	310/2027 (25.9%)	356/2033 (26.7%)	0.08
RACE (2002)	87	522	68.0	2.3	Persistent AF or flutter for <1 years and 1–2 cardioversions over 2 years and oral anticoagulation	Composite: cardiovascular death, CHF, severe bleeding, pacemaker implantation, thrombo-embolic events, severe adverse effects of antiarrhythmic drugs	44/256 (17.2%)	60/266 (22.6%)	0.11
STAF (2003)	88	200	66.0	1.6	Persistent AF (>4 weeks and <2 years), LA size >45 mm, CHF NYHA II–IV, LVEF <45%	Composite: overall mortality, cerebrovascular complications, CPR, embolic events	10/100 (10.0%)	9/100 (9.0%)	0.99
HOT CAFÉ (2004)	89	205	60.8	1.7	First clinically overt persistent AF (≥7 days and <2 years), age 50–75 years	Composite: death, thrombo-embolic events; intracranial/major haemorrhage	1/101 (1.0%)	4/104 (3.9%)	>0.71
AF-CHF (2008)	90	1376	66	3.1	LVEF ≤35%, symptoms of CHF, history of AF (≥6 h or DCC <last 6 months)	Cardiovascular death	175/1376 (25%)	182/1376 (27%)	0.59
J-RHYTHM (2009)	91	823	64.7	1.6	Paroxysmal AF	Composite of total mortality, symptomatic cerebral infarction, systemic embolism, major bleeding, hospitalization for heart failure, or physical/ psychological disability	89/405 (22.0%)	64/418 (15.3%)	0.012

Table 14 Comparison of adverse outcomes in rhythm control and rate control trials in patients with AF

Trial	Ref	Deaths from all causes (in rate/rhythm)	Deaths from cardiovascular causes	Deaths from non-cardiovascular causes	Stroke	Thrombo-embolic events	Bleeding
PIAF (2000)	92	4	1/1	1[a]	ND	ND	ND
AFFIRM (2002)	86	666 (310/356)	167/164	113/165	77/80	ND	107/96
RACE (2002)	87	36	18/18	ND	ND	14/21	12/9
STAF (2003)	88	12 (8/4)	8/3	0/1	1/5	ND	8/11
HOT CAFÉ (2004)	89	4 (1/3)	0/2	1/1	0/3	ND	5/8
AF-CHF (2008)	90	228/217	175/182	53/35	11/9	ND	ND

Randomized TRIALS

- Paroxysmal Atrial Fibirllation 2 ***(PAF2)*** Eur Heart J '02
- Pharmacological Intervention in AF ***(PIAF)*** Lancet '00.
- Comparison of rate control and rhythm control in pts with AF ***(AFFIRM)*** NEJM '02.
- Randomized trial of rate-control versus rhythm CTR in PeAF: the Strategies of Treatment of AF ***(STAF)*** JACC '03.
- Effect of rate or rhythm control on QoL in PeAF: results from the Rate Control Versus Electrical Cardio-version Study ***(RACE)*** JACC' 04.
- How to treat C-AF ***(HOT-CAFÉ`)***

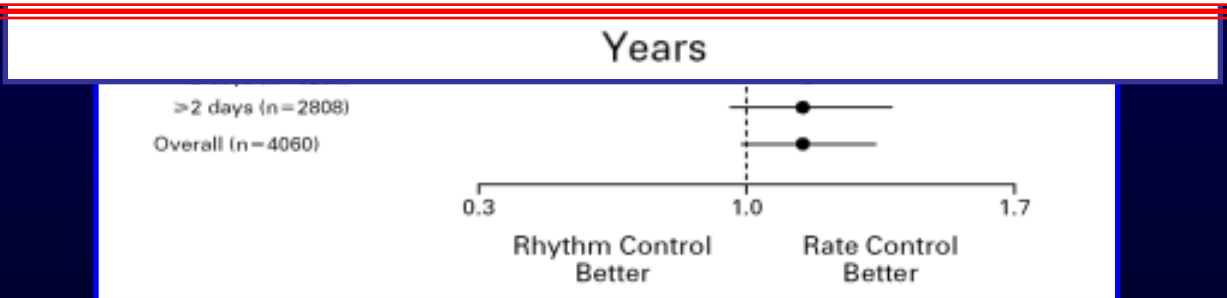
The original AFFIRM STUDY

The New England
Journal of Medicine

VOLUME 347 DECEMBER 5, 2002 NUMBER 23

A COMPARISON OF RATE CONTROL AND RHYTHM CONTROL IN PATIENTS WITH ATRIAL FIBRILLATION

THE ATRIAL FIBRILLATION FOLLOW-UP INVESTIGATION OF RHYTHM MANAGEMENT (AFFIRM) INVESTIGATORS*



One year later…

Relationships Between Sinus Rhythm, Treatment, and Survival … igation of

The association of SR but not AADs with improved survival may reflect the fact that currently available AADs are neither highly efficacious nor completely safe. One could

Implications

In patients with AF such as those enrolled in the AFFIRM Study, warfarin use improves survival. The presence of SR but not AAD use is associated with a lower risk of death. These results suggest that if an effective method for maintaining SR with fewer adverse effects were available, it might improve survival.

AFFIRM revisited…

Background … or stroke or death wit … ion-to-treat analysis. … d treatment as they cl …

Methods an … ine clinical variables, … ed with an increased … or transient ischemic … t variables, the prese … hmic drugs (AADs) … nt with the original intent … removed from the model.

Conclusions—W … a marker for other factors associ … model. Currently available AA … rhythmic effects of AADs are off … lverse effects were available, it m …

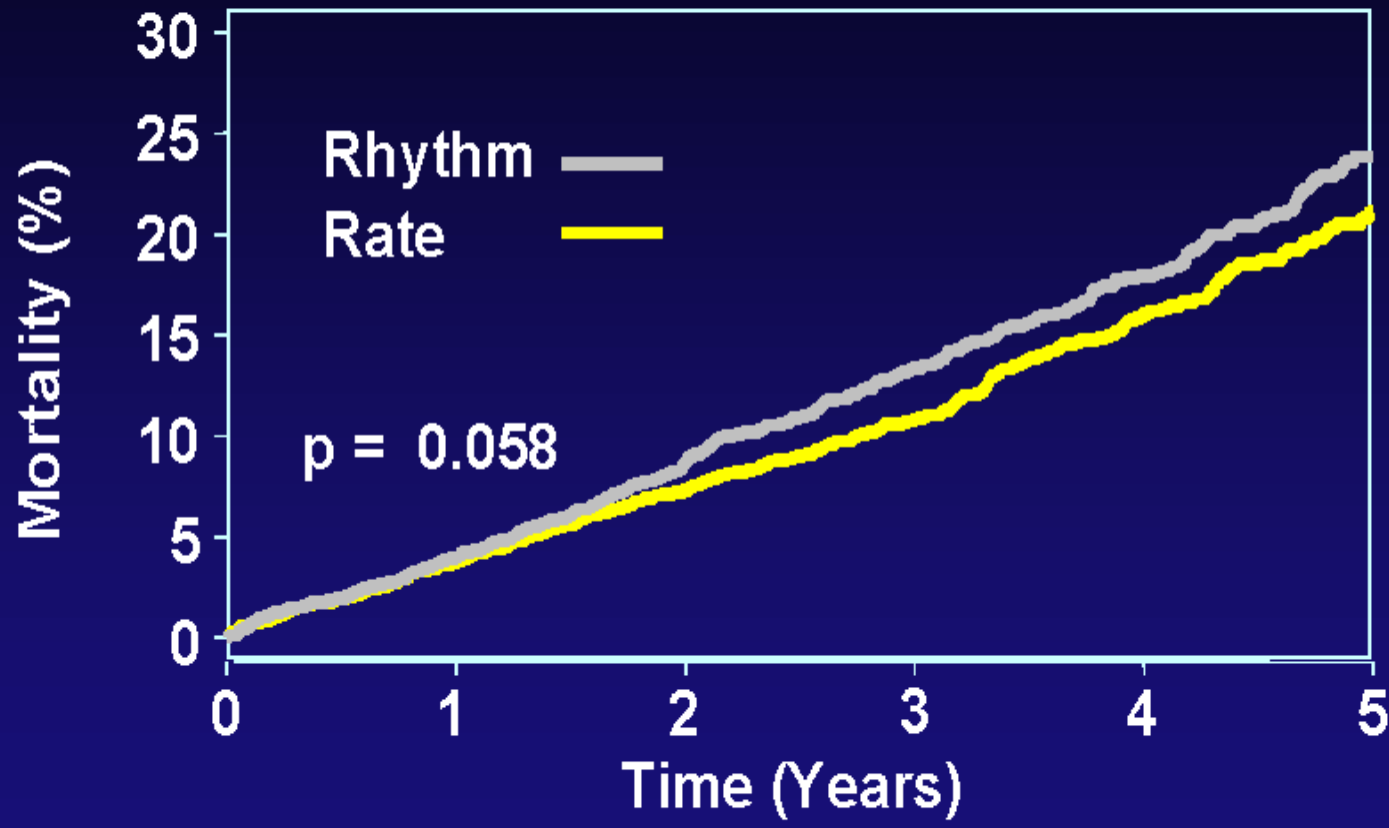
demographics were different from those in the AFFIRM Study. Most importantly, a requirement for high risk for stroke or death was not an entry criterion. Like our findings, these data require confirmation by … trolled clinical trials.

AFFIRM revisited…

Key Words: antiarrhythmia agents ■ anticoagulants ■ arrhythmia ■ fibrillation

AFFIRM
Atrial Fibrillation Follow-up Investigation of Rhythm Management

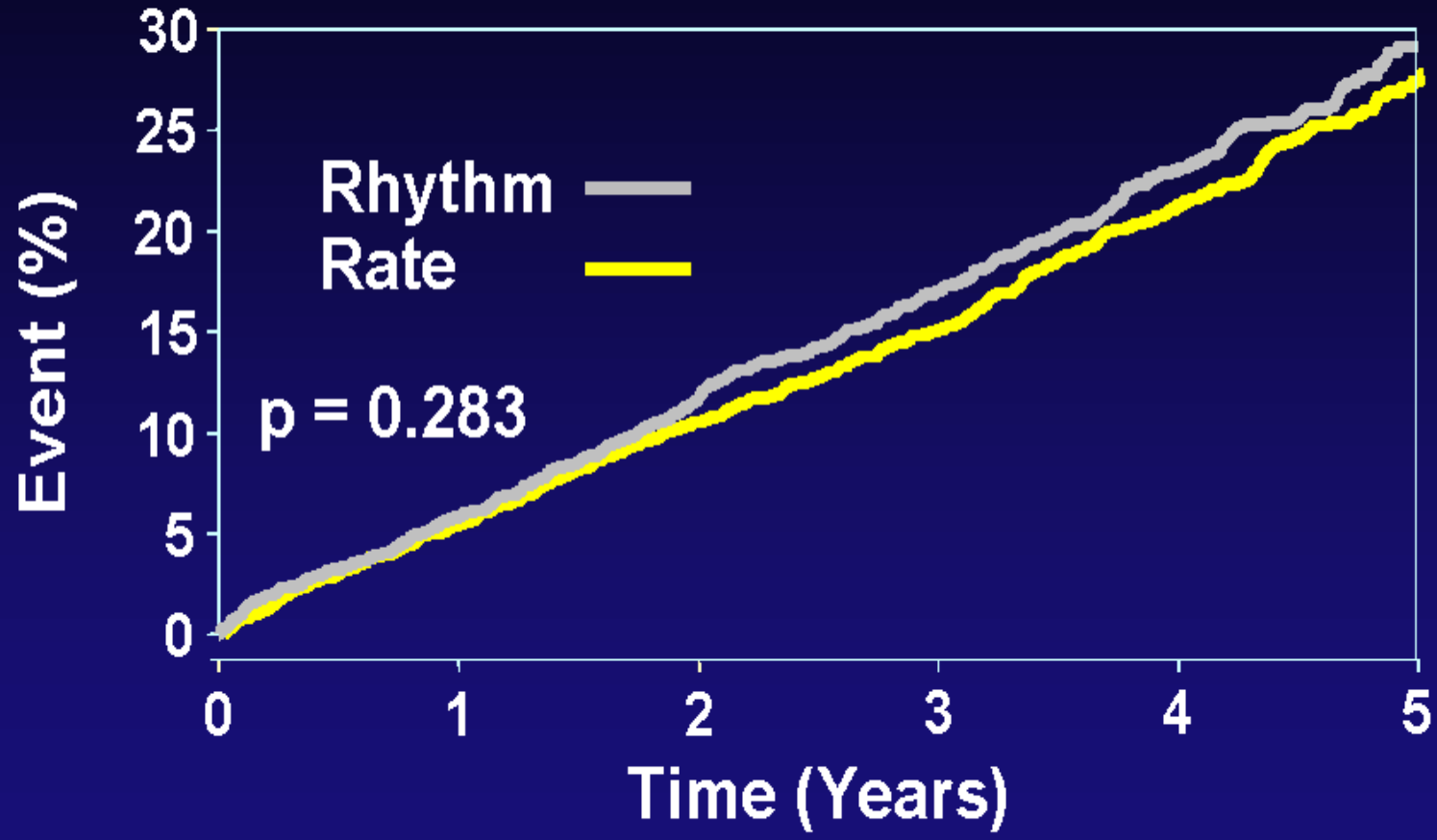
Primary Endpoint: All-Cause Mortality



Rhythm N:	2033	1932	1807	1316	780	255
Rate N:	2027	1925	1825	1328	774	236

AFFIRM
Atrial Fibrillation Follow-up Investigation of Rhythm Management

Secondary Endpoint- Death, Disabling Stroke or Anoxic Encephalopathy, Major Bleed, or Cardiac Arrest



Rhythm N:	2033	1895	1746	1259	719	231
Rate N:	2027	1889	1760	1264	722	208

Recommendations for rate and rhythm control of AF

Recommendations	Class[a]	Level[b]	Ref.[c]
Rate control should be the initial approach in elderly patients with AF and minor symptoms (EHRA score 1).	I	A	86–87, 90
Rate control should be continued throughout a rhythm control approach to ensure adequate control of the ventricular rate during rec	I	A	86
Rhythm c patients w score ≥2) control.	I	B	3, 46, 93–94, 96
Rhythm control in patients with AF and AF-related heart failure should be considered for improvement of symptoms.	IIa	B	93–94, 97
Rhythm control as an initial approach should be considered in young symptomatic patients in whom catheter ablation treatment has not been ruled out.	IIa	C	
Rhythm control should be considered in patients with AF secondary to a trigger or substrate that has been corrected (e.g. ischaemia, hyperthyroidism).	IIa	C	

ESC 2010


Thank
You!!