What's new in the management of Atrial Fibrillation

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HEART & VASCULAR CENTRE

Outline of presentation

1. What is AF
2. Diagnosis and management
3. Stroke prevention in AF
4. Rate or rhythm control strategy
5. AF ablation techniques- cryo versus RF

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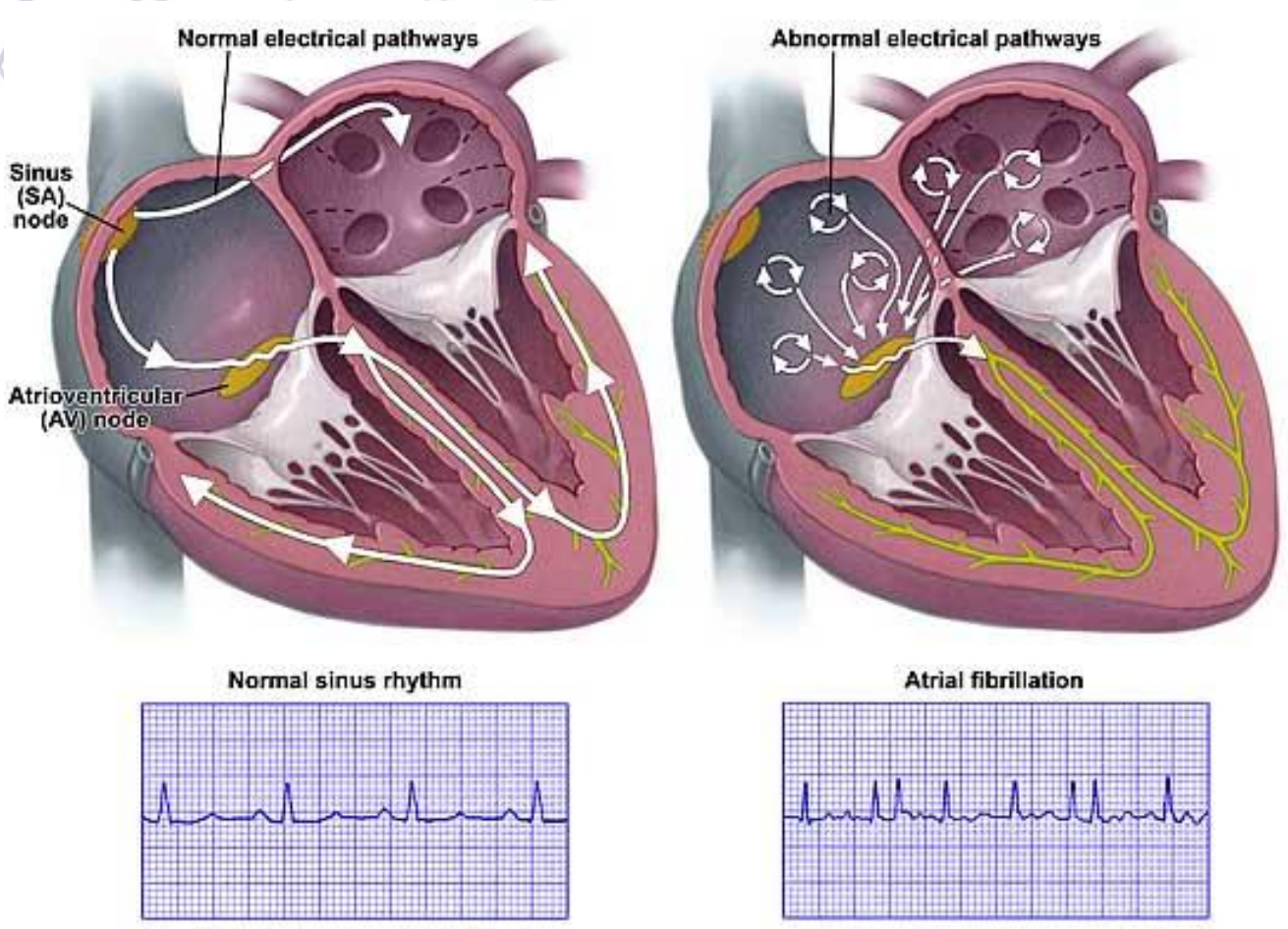
What is AF?



AF is an irregular heart rhythm due to chaotic, disorganized electrical activity in the atria (upper chambers of the heart)

AF- introduction

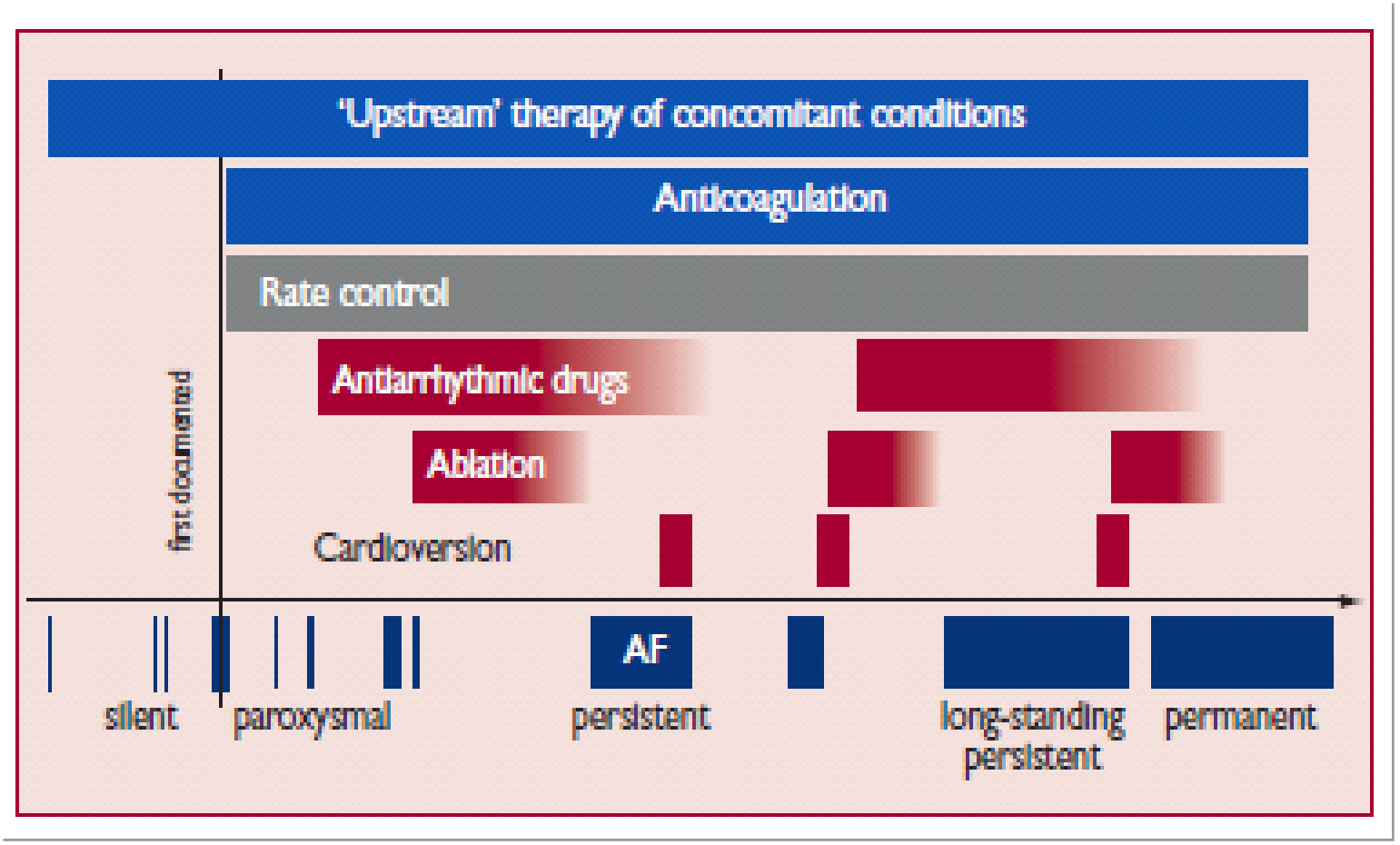
- Most common heart rhythm disorder in humans
- More common in older people
  - 6% of the population over age 65
  - 10% over age 80

- Affects 1-2% of the general population (ave. age 75 yrs)
  - Therefore ≈ 50,000 people in Singapore are likely to have AF
  - Some may not be aware that they have the problem (silent AF) but still be at increased risk of stroke

Cardiovascular morbidity and mortality associated with AF

Event	Association with AF
Death	Increased mortality, especially cardiovascular mortality due to sudden death, heart failure or stroke.
Stroke	20–30% of all strokes are due to AF. A growing number of patients with stroke are diagnosed with 'silent', paroxysmal AF.
Hospitalizations	10–40% of AF patients are hospitalized every year.
Quality of life	Quality of life is impaired in AF patients independent of other cardiovascular conditions.
Left ventricular dysfunction and heart failure	Left ventricular dysfunction is found in 20–30% of all AF patients. AF causes or aggravates LV dysfunction in many AF patients, while others have completely preserved LV function despite long-standing AF.
Cognitive decline and vascular dementia	Cognitive decline and vascular dementia can develop even in anticoagulated AF patients. Brain white matter lesions are more common in AF patients than in patients without AF.

Natural history of AF



It's easier to treat AF in the early stages than when advanced.

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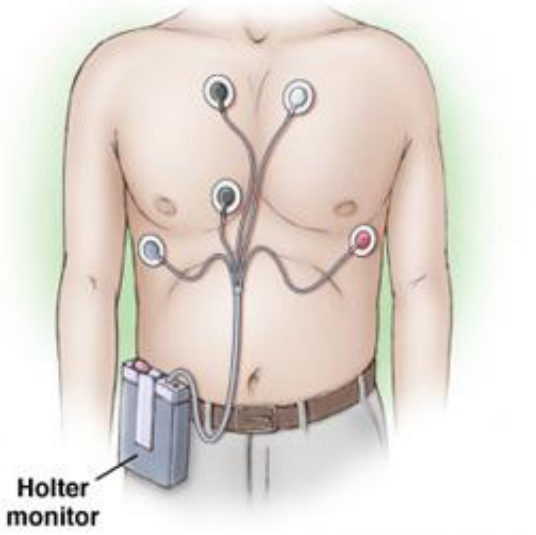
What tests are used to diagnose AF?

ECG (electrocardiogram)

- ❑ Provides information on electrical activity of the heart at the moment
- ❑ Also gives other information on the general heart condition
- ❑ Simple to do and easily available
- ❑ But, may not pick up heart rhythm problem if patient feels *normal* at time of test

Cardiac monitors for AF detection



Holter monitor

- ❑Continuously records electrical activity of the heart for 24-48 hrs
- ❑Patient performs usual activity and returns monitor after 24-48hrs for data to be downloaded
- ❑Useful, but may not pick up anything abnormal during recording period

Cardiac event recorder

- ❑ E.g. Alivecor (Kardia device)
- ❑ Records heart rhythm when activated by patient
- ❑ Can be used over longer periods of time (few months) or purchased by patient
- ❑ ECG traces can be transmitted by email to doctor

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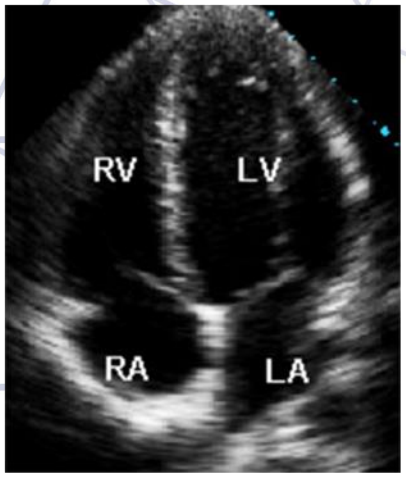
Other useful cardiac tests



Echocardiogram

- ❑Ultrasound examination of the heart
- ❑Provides information on heart size and function
- ❑Safe, non-invasive test

Exercise treadmill test

- ❑ Gives info on abnormal heart rhythms during exercise
- ❑ Also some info on presence of coronary artery disease
- ❑ Needs to be performed and interpreted by specialist

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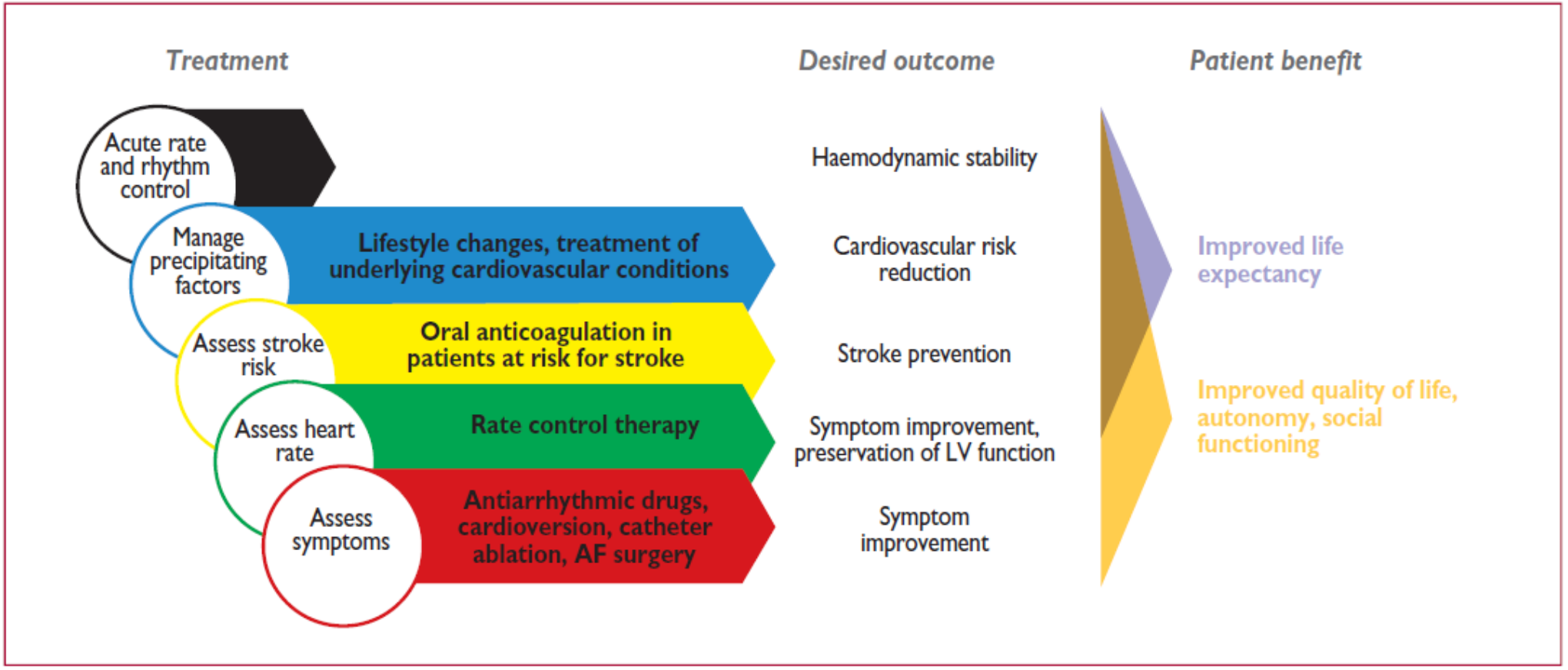
Acute and chronic management of AF



AF = atrial fibrillation; LV = left ventricular.

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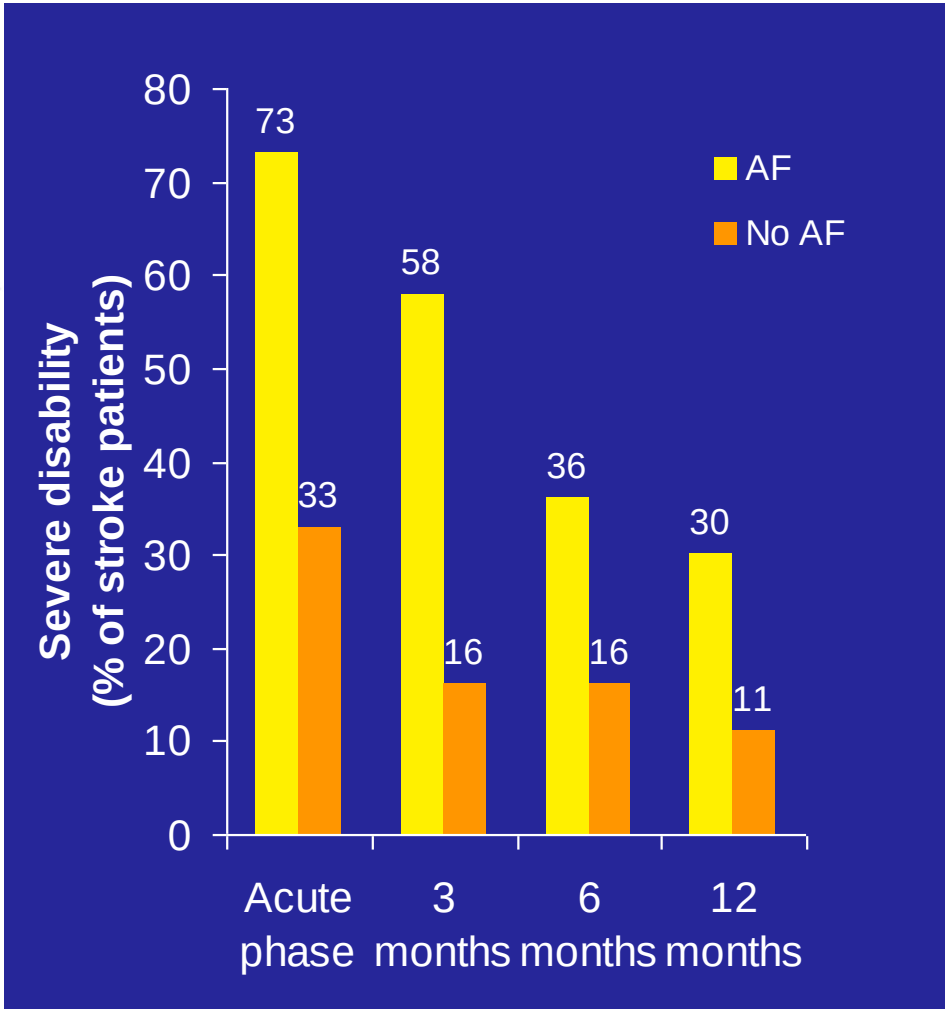
AF and stroke

- A major independent risk factor for stroke ~ 15 % of all strokes.
  - 7% in patients aged 50-59
  - > 36% in patients >80 yrs
- Disability is greater after an AF - related stroke than after non-AF stroke[1]
- Mortality, including early (30-day) death, is higher with AF-related stroke than non-AF stroke (OR for AF vs No AF = 1.84)



1. **Go *et al*, 2001; 2. Wolf *et al*, 1991; 3. Wolf *et al*, 1987; 4. Singer *et al*, 2008; 5. Lin *et al*, 1996**

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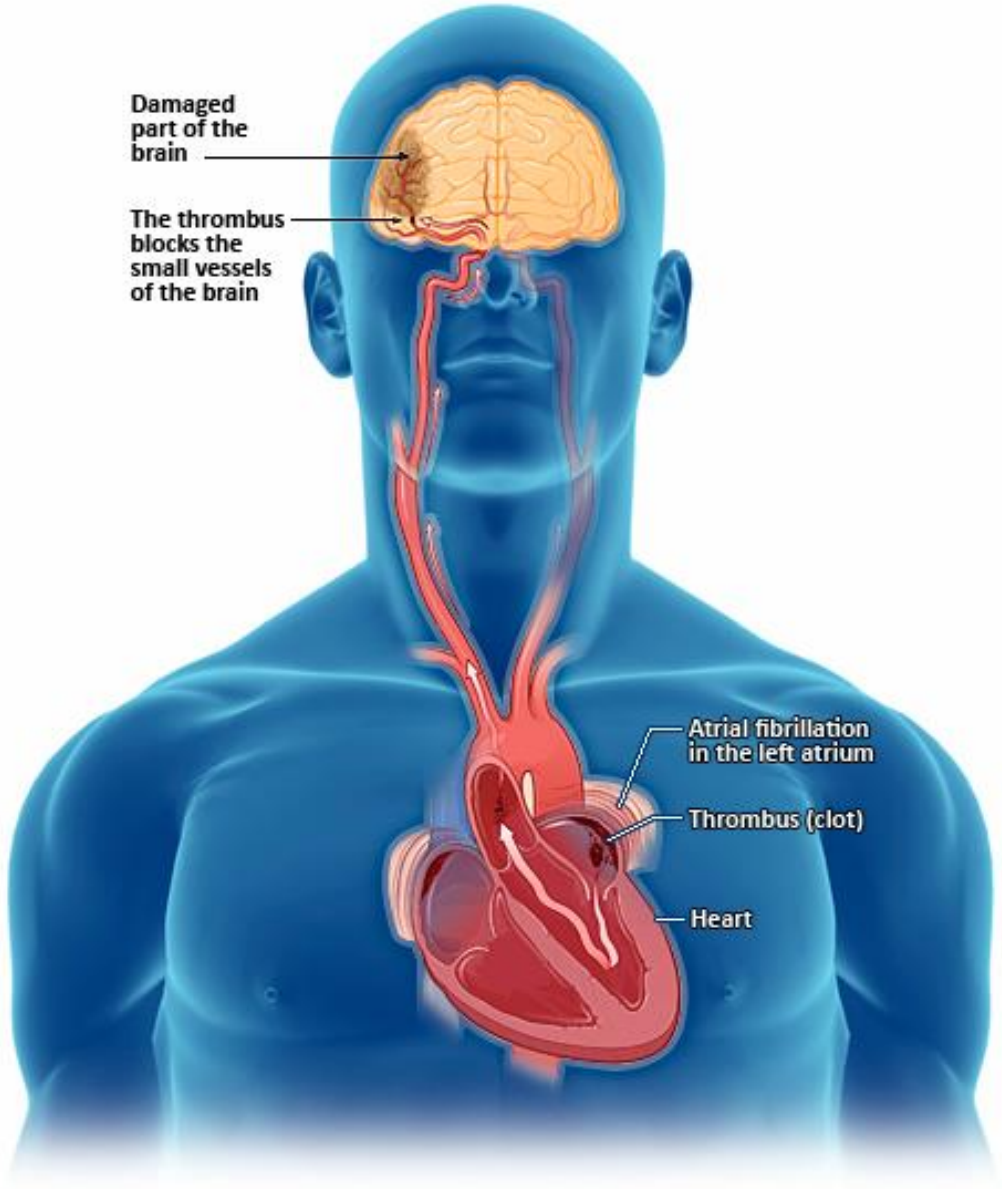
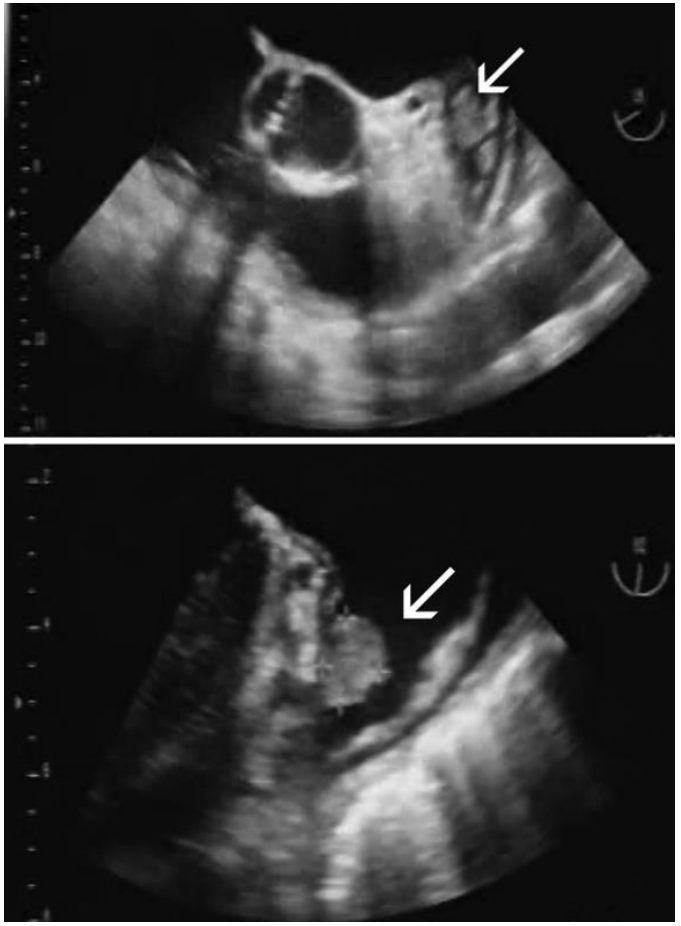
How does AF lead to a stroke?





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Risk of stroke with age and other risk factors

	Annual Stroke Rate %	
AGE Years	No other Risk Factors	One or More Additional Risk Factors
< 65	1.0	4.9
65-75	4.3	5.7
> 75	3.5	8.1

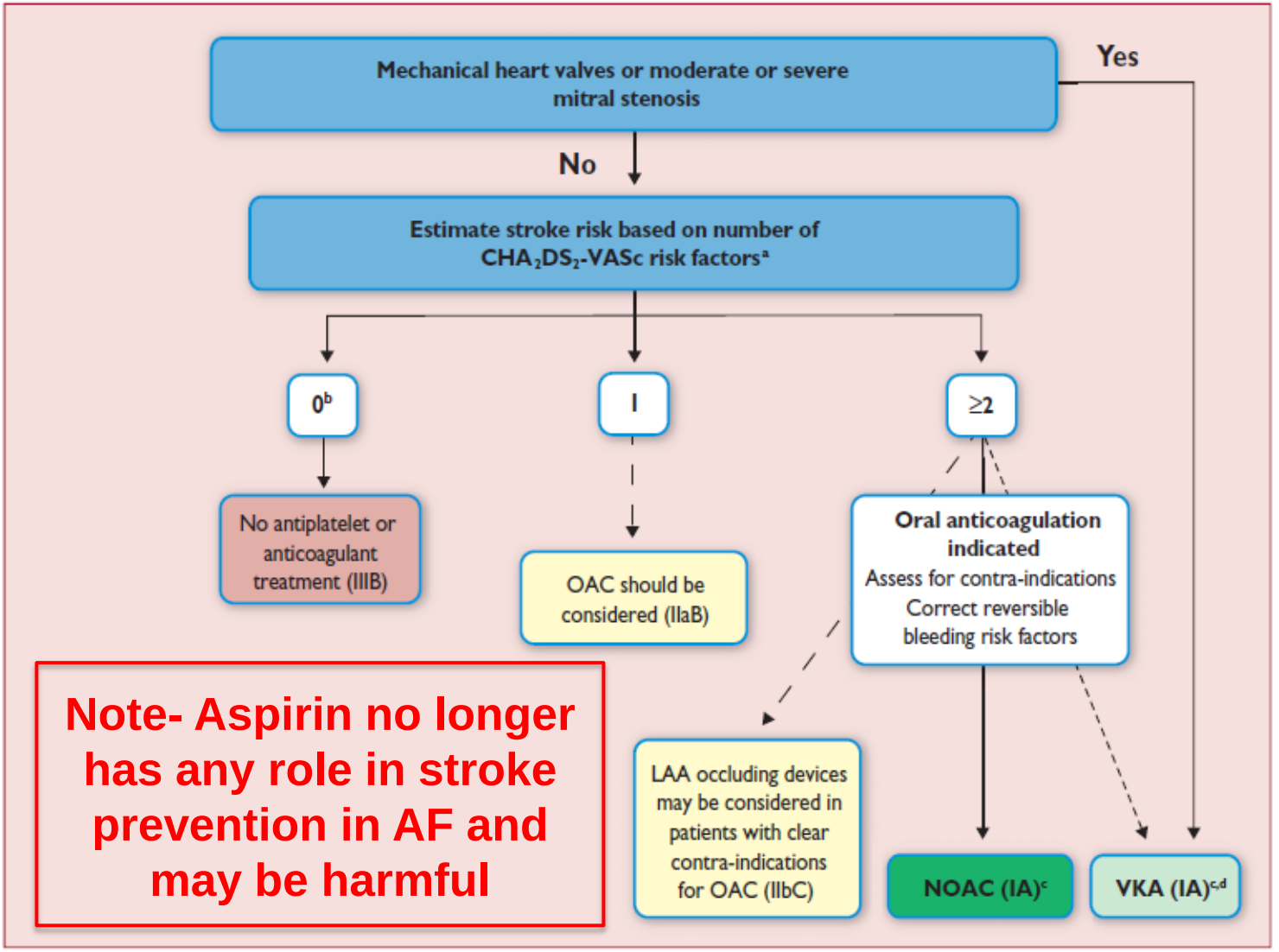
Stroke risk factors: hypertension, diabetes, prior stroke or TIA
Arch Intern Med 1994;154:1449–1457

CHA_2DS_2-VASc risk score

CHA_2DS_2-VASc risk factor	Points
Congestive heart failure Signs/symptoms of heart failure or objective evidence of reduced left-ventricular ejection fraction	+1
Hypertension Resting blood pressure >140/90 mmHg on at least two occasions or current antihypertensive treatment	+1
Age 75 years or older	+2
Diabetes mellitus Fasting glucose >125 mg/dL (7 mmol/L) or treatment with oral hypoglycaemic agent and/or insulin	+1
Previous stroke, transient ischaemic attack, or thromboembolism	+2
Vascular disease Previous myocardial infarction, peripheral artery disease, or aortic plaque	+1
Age 65–74 years	+1
Sex category (female)	+1

CHA_2DS_2-VASc = Congestive Heart failure, hypertension, Age ≥75 (doubled), Diabetes, Stroke (doubled), Vascular disease, Age 65–74, and Sex (female).

Stroke prevention in AF



AF = atrial fibrillation; LAA = left atrial appendage; NOAC = non-vitamin K antagonist oral anticoagulant; OAC = oral anticoagulation; VKA = vitamin K antagonist.

[a]Congestive heart failure, Hypertension, Age ≥75 years (2 points), Diabetes, prior Sstroke/TIA/embolus (2 points), Vascular disease, age 65–74 years, female Sex.

[b]Includes women without other stroke risk factors.

[c]IIaB for women with only one additional stroke risk factor.

[d]IB for patients with mechanical heart valves or mitral stenosis.

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Case 1

- 68 year old woman saw GP for a routine check-up
- Asymptomatic
- History of high blood pressure
- Suffered a “mini-stroke” 2 years ago

- GP noted increased BP (150/90mmHg) and felt heart rate was irregular

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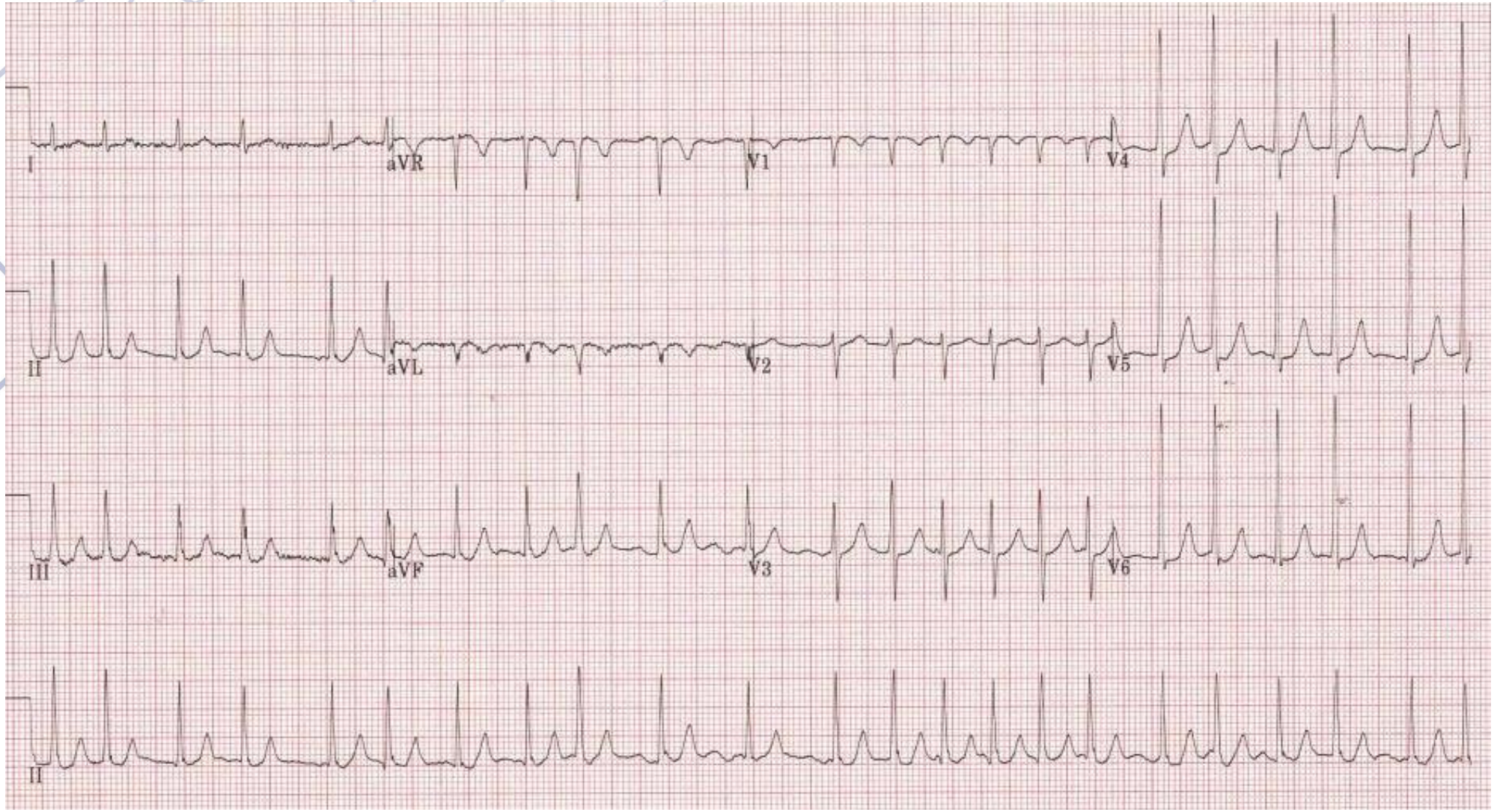
Case 1- 12-lead ECG



Diagnosis- AF with fast ventricular rate

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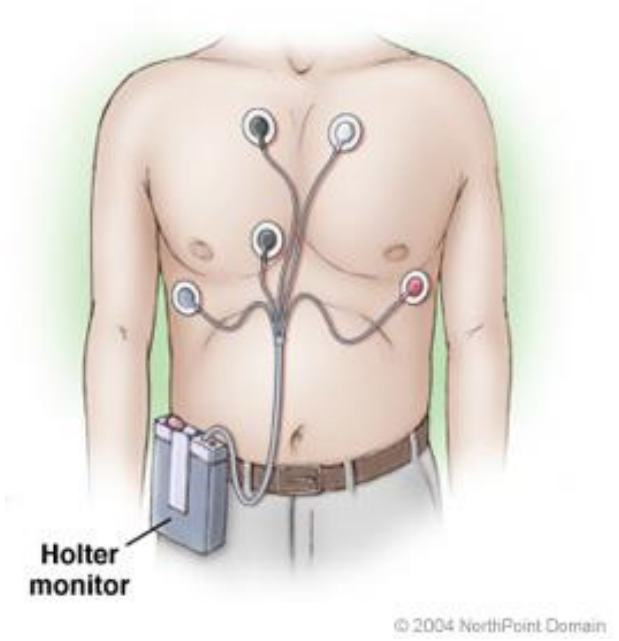
Case 1 – investigations

Blood tests

- Checked kidney function, thyroid function, full blood count



24 hour Holter monitor

- To detect whether AF is persistent or paroxysmal
- Assess heart rate range and control

Echocardiogram

- Slightly dilated LA
- Normal LV function and valves

Case 1 - treatment

- CHA_2DS_2VASc score- 5 (Age, Female, HT, TIA-2)
  - Very high risk of stroke
- Started on appropriate medical treatment
  - BP and AF rate control (ACEIn and beta-blocker)
  - Oral anticoagulation with novel anticoagulant
  - Regular follow up to monitor BP and AF progression

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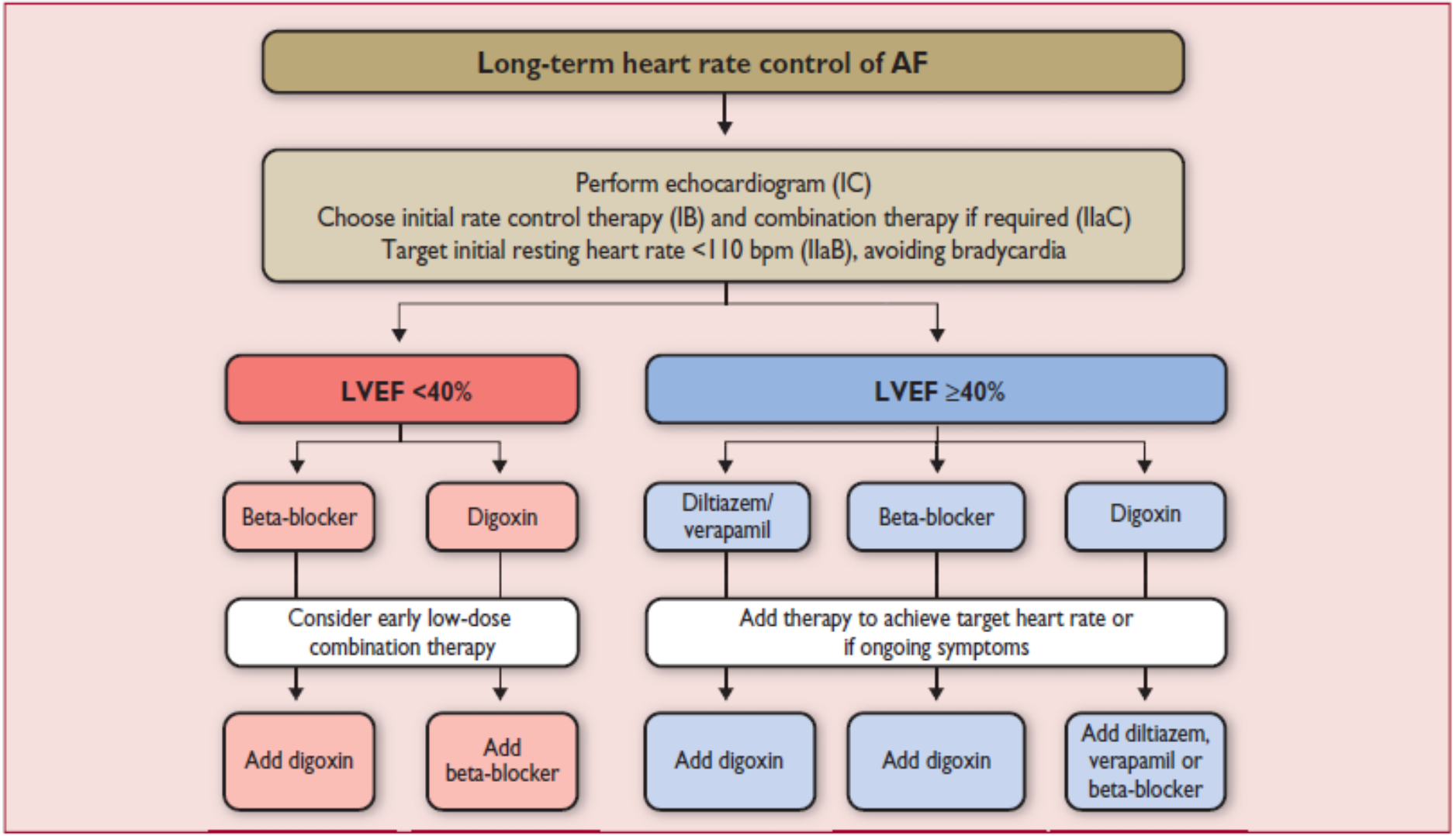
Rate control in patients with AF



See Table 15 for medication dosage. Digitoxin is a suitable alternative to digoxin, where available.
AF = atrial fibrillation; bpm = beats per minute; LVEF = left ventricular ejection fraction.

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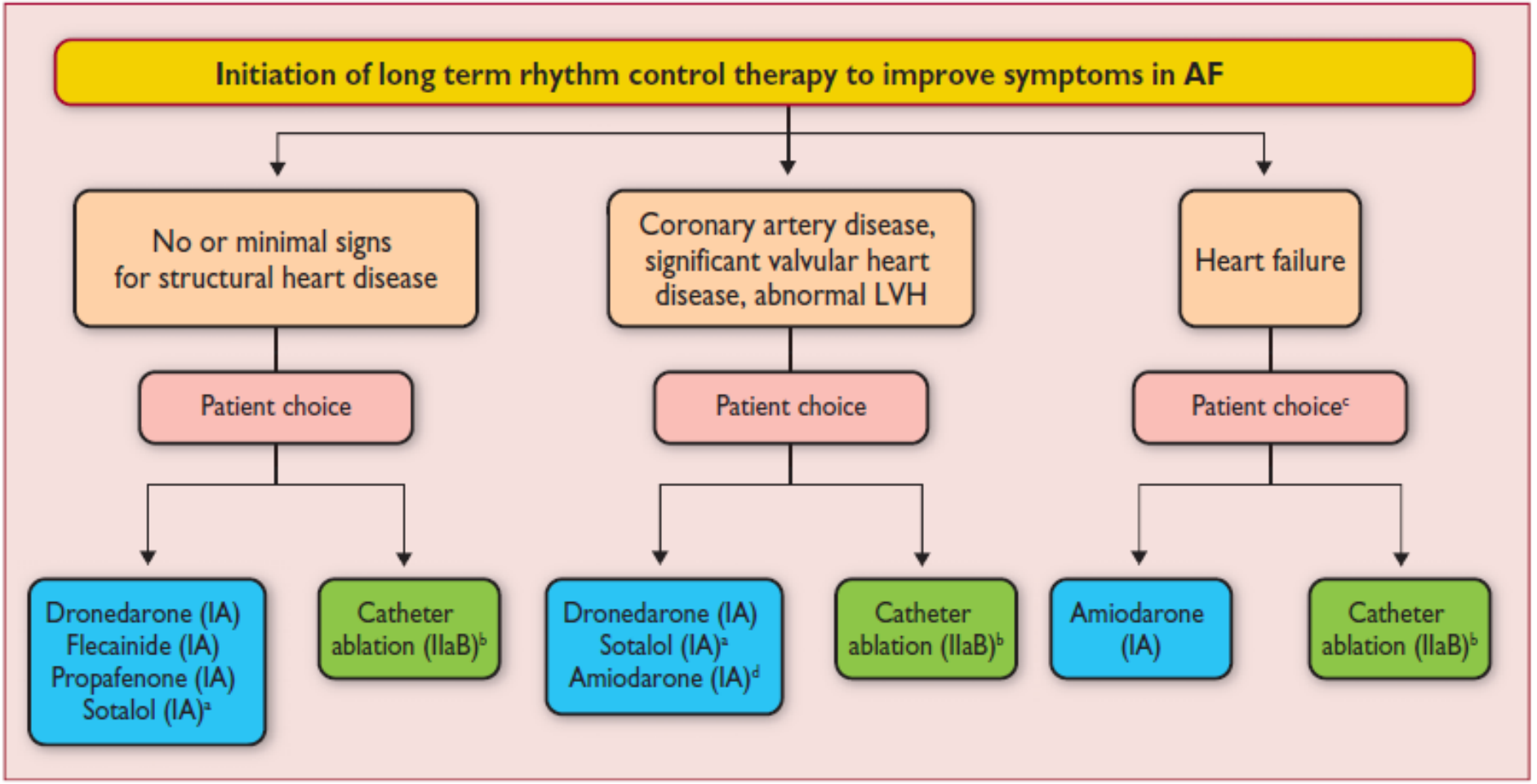
Rhythm control in patients with AF



AF = atrial fibrillation; HF = heart failure; LVH = left ventricular hypertrophy;

[a]Sotalol requires careful evaluation of proarrhythmic risk.

[b]Catheter ablation should isolate pulmonary veins and can be performed using radiofrequency or cryoballoon catheters.

[c]Catheter ablation as a first-line therapy is usually reserved for heart failure patients with tachycardiomyopathy.

[d]Amiodarone is a second-choice therapy in many patients because of its extracardiac side-effects.

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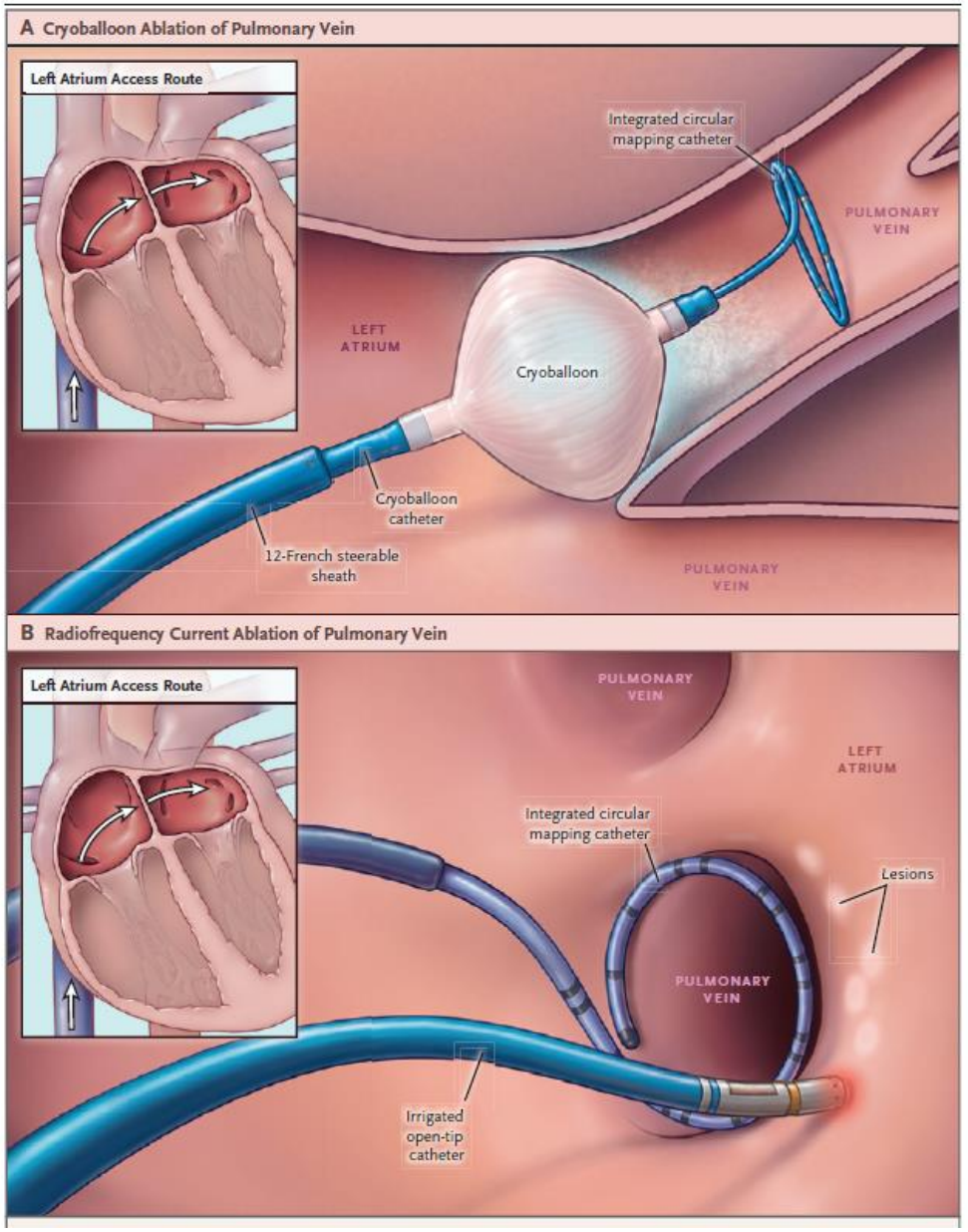
Catheter ablation methods



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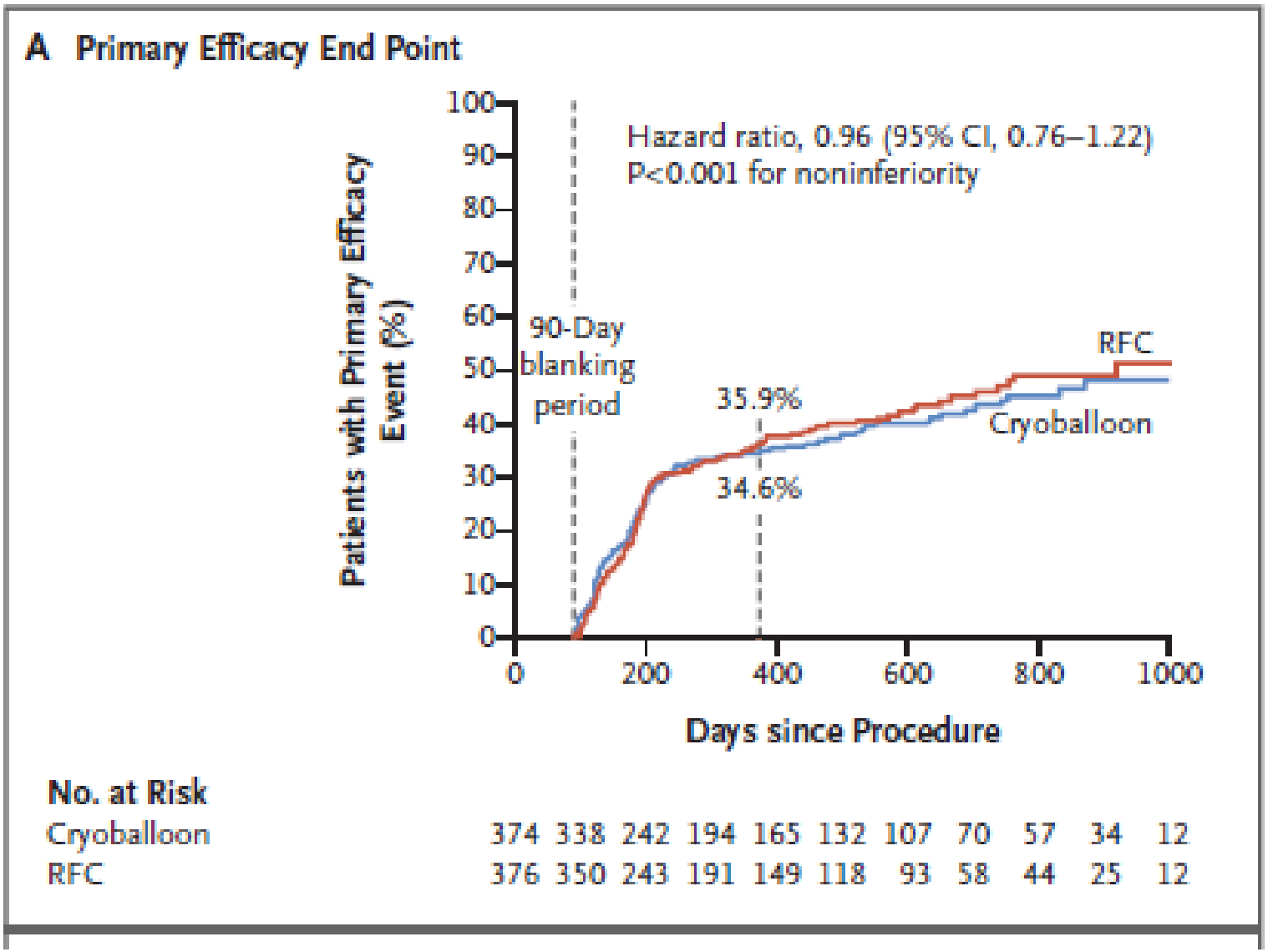
Cryoballoon or Radiofrequency Ablation for Paroxysmal Atrial Fibrillation

Karl-Heinz Kuck, M.D., Josep Brugada, M.D., Alexander Fürnkranz, M.D., Andreas Metzner, M.D., Feifan Ouyang, M.D., K.R. Julian Chun, M.D., Arif Elvan, M.D., Ph.D, Thomas Arentz, M.D., Kurt Bestehorn, M.D., Stuart J. Pocock, Ph.D., Jean-Paul Albenque, M.D., Ph.D., and Claudio Tondo, M.D., Ph.D., for the FIRE AND ICE Investigators*

N Engl J Med 2016;374:2235-45.

- First multi-centre randomized controlled trial comparing two different AF ablation techniques
- 762 patients with symptomatic paroxysmal AF randomized to catheter ablation with RF or cryoablation
- Follow up over 1.5 years
- Primary efficacy end-point: time to first recurrence of AF
- Primary safety end-point: composite of death, stroke, serious procedure related adverse events

Primary end point



- No significant differences in efficacy or complications between the two methods

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Benefits of using cryoballoon

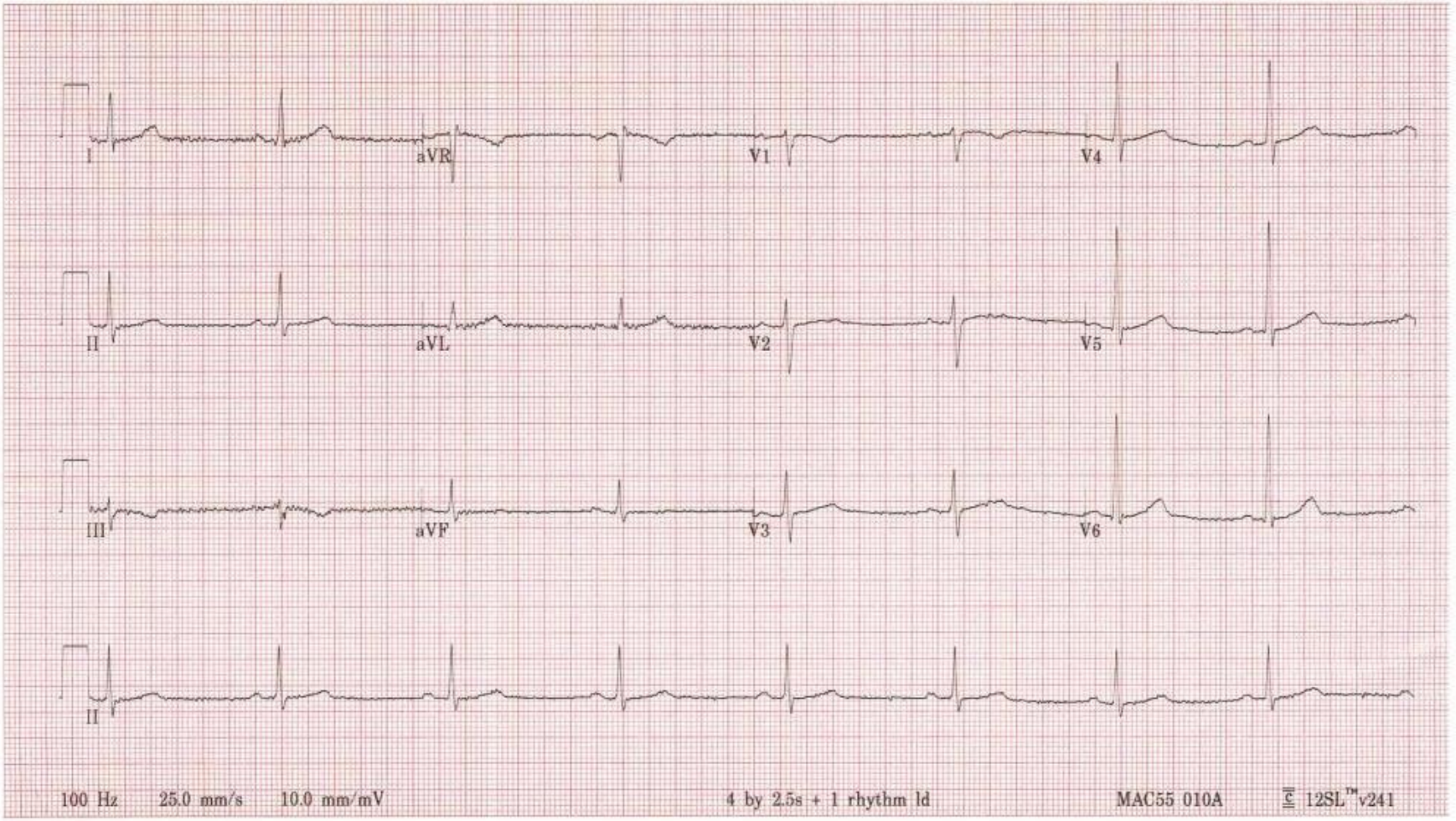
- Cryoadhesion improves contact and stability, minimizing the amount of fluoro used
- Preserves the extracellular matrix and endothelial integrity
- Decreases risk of thrombus formation
- Demonstrates well demarcated lesions
- Potentially shorter procedure with shorter learning curve for operators

Case 2

- 54 year old man presenting with palpitations during exercise
- Usually fit and well with no past medical history or cardiac risk factors
- Exercises regularly
- Felt heart rate increasingly remain high (>160bpm) even after more than 10 mins after exercising
- Episodes of pre-syncope

- Examination and blood tests (incl. TFTs) normal

Case 2- baseline cardiac tests



- Baseline echo normal
- 24 hour Holter monitor- sinus rhythm with infrequent atrial ectopics

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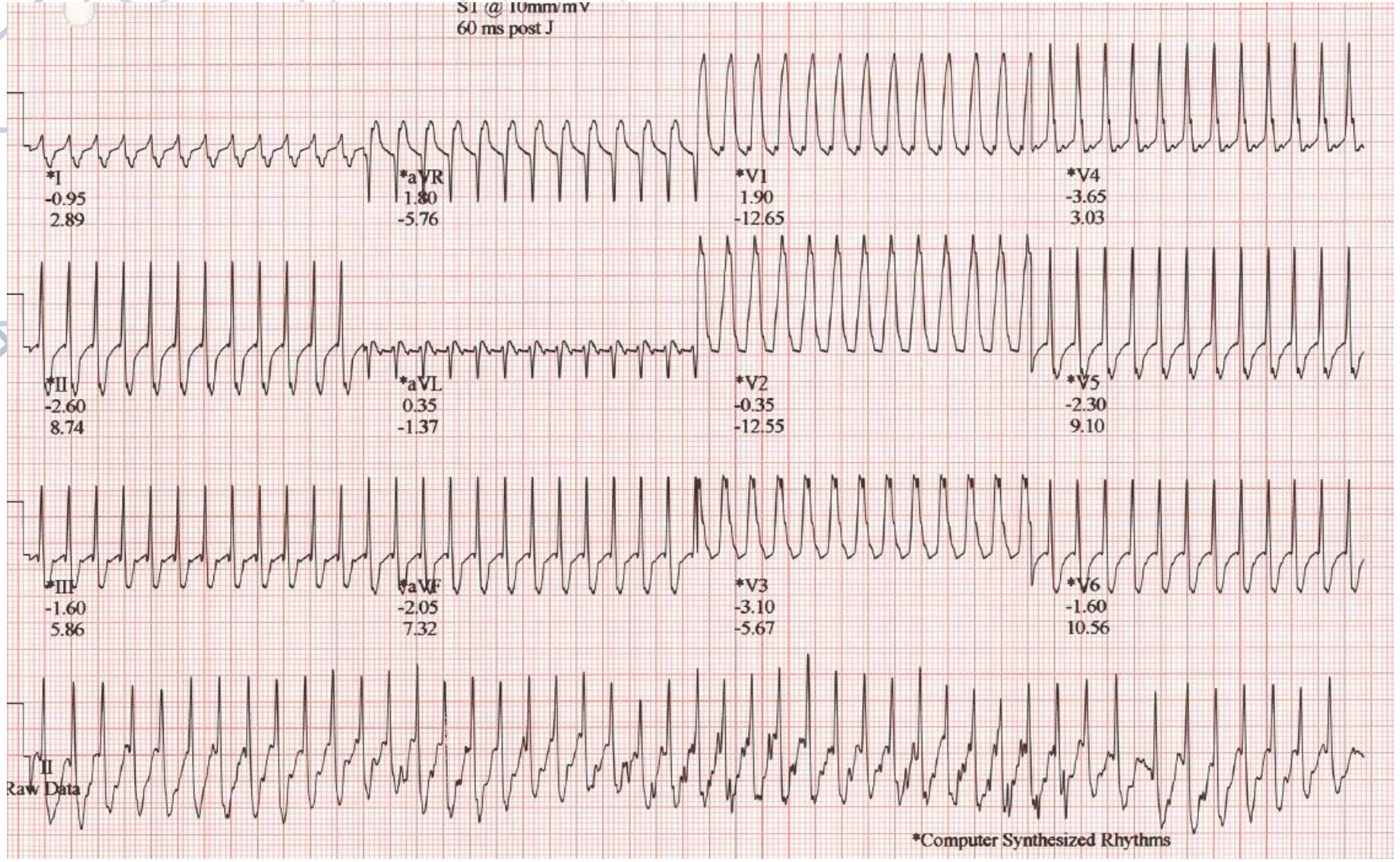
Case 2- treadmill test



- 10 secs into recovery

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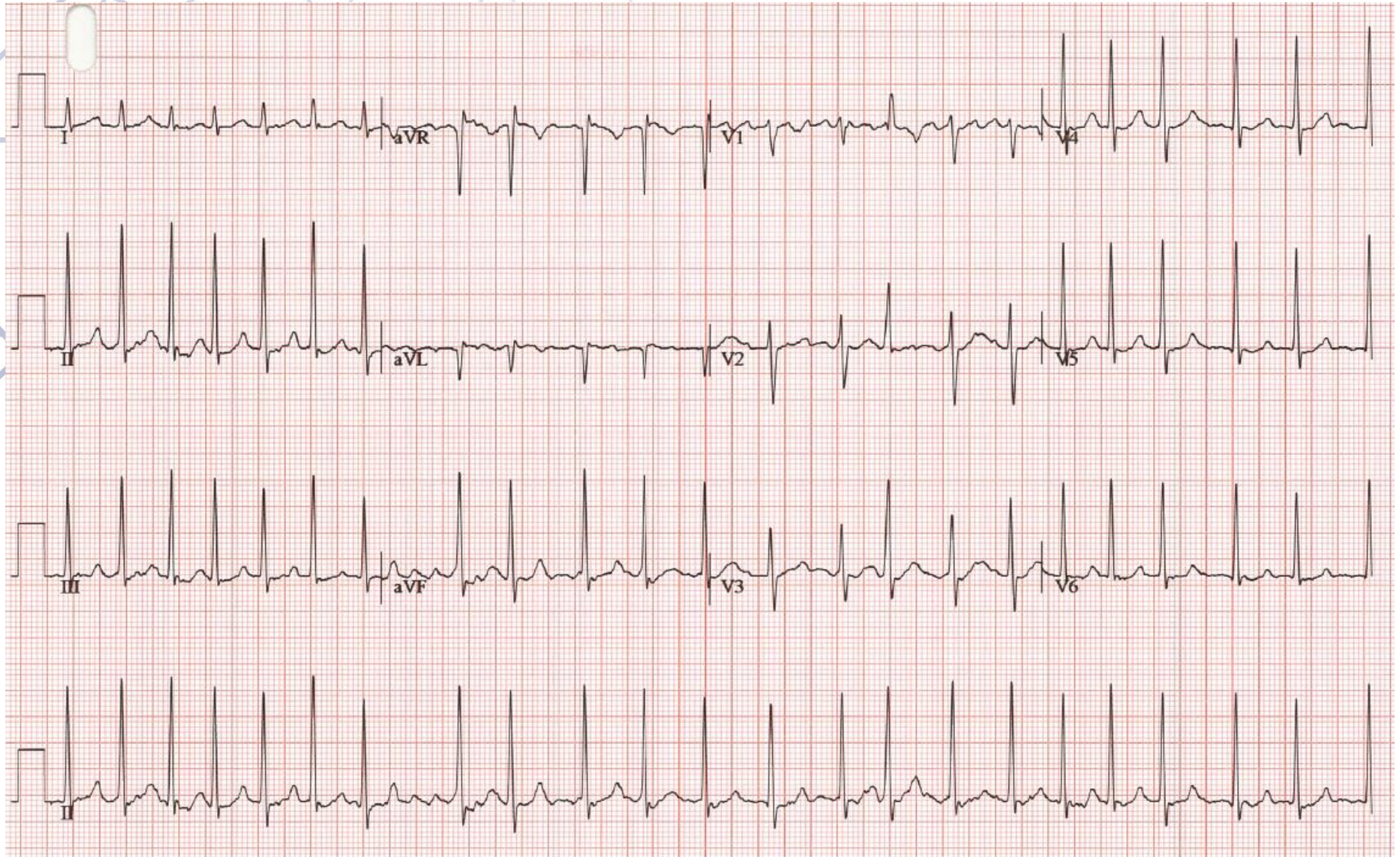
Case 2- treadmill test



- 5.5 mins into recovery

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Case 2 - management

•Tried on flecainide but continued to experience frequent symptoms

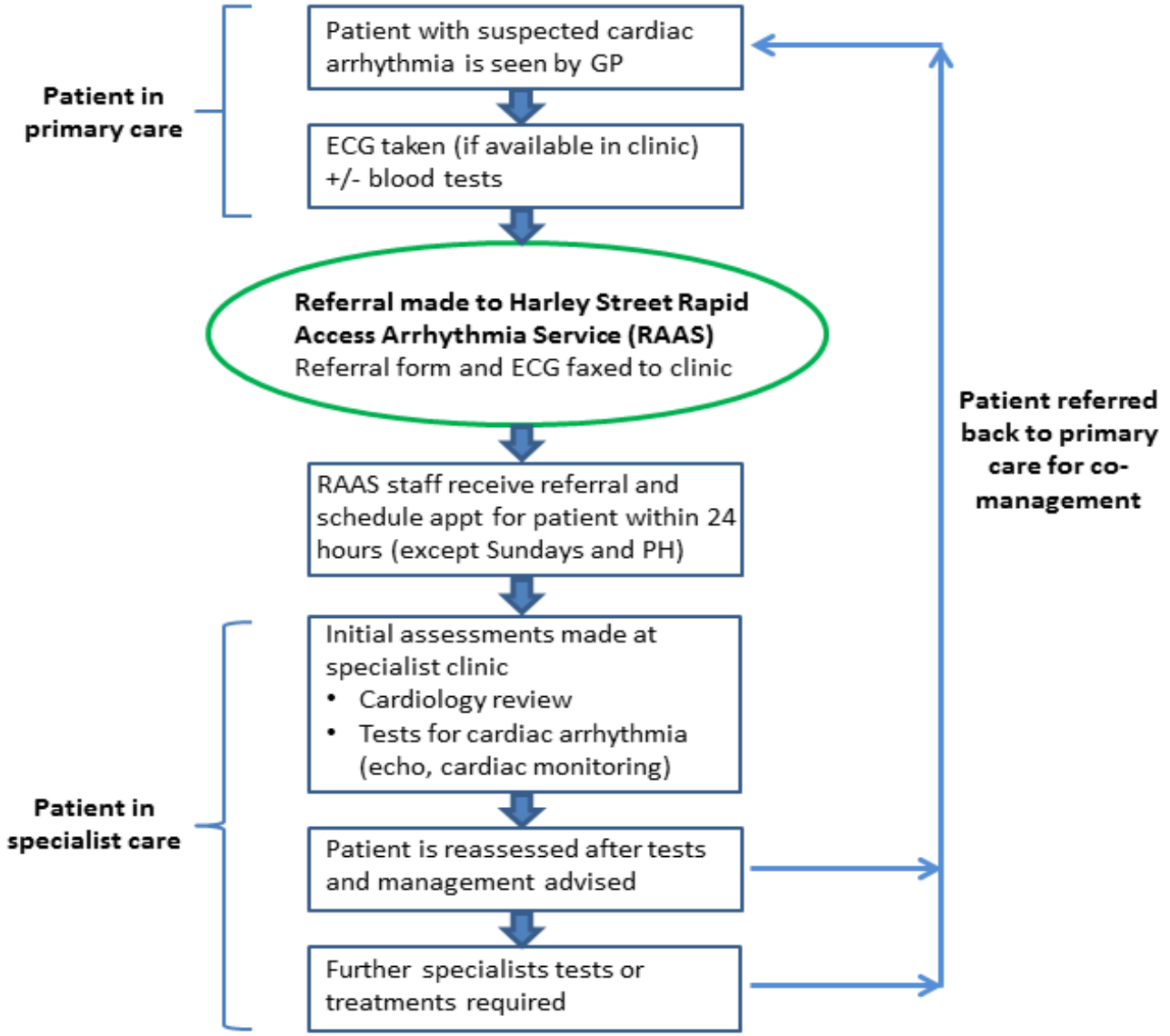
•Underwent catheter ablation using cryoballoon (first case in private sector in Singapore)

- Successful isolation of all 4 pulmonary veins
- At follow-up patient remains well and free from AF; no need for long term medication

Summary

- AF is increasing common in our ageing population
- Important to detect AF early to lower risk of stroke and provide more effective treatment
- Baseline tests to diagnose AF and assess risk
- Important decisions that need to be made:
  - Need for oral anticoagulation?
  - rate or rhythm control strategy?
  - If rhythm control is planned, would medication or catheter ablation be better?
  - What type of ablation strategy- RF or cryo?

Rapid access arrhythmia service



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Thank you for listening!

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