Interactive Session
Cases – ECG's & Scenarios

South London Arrhythmia Nurse Forum
20th Oct 2021

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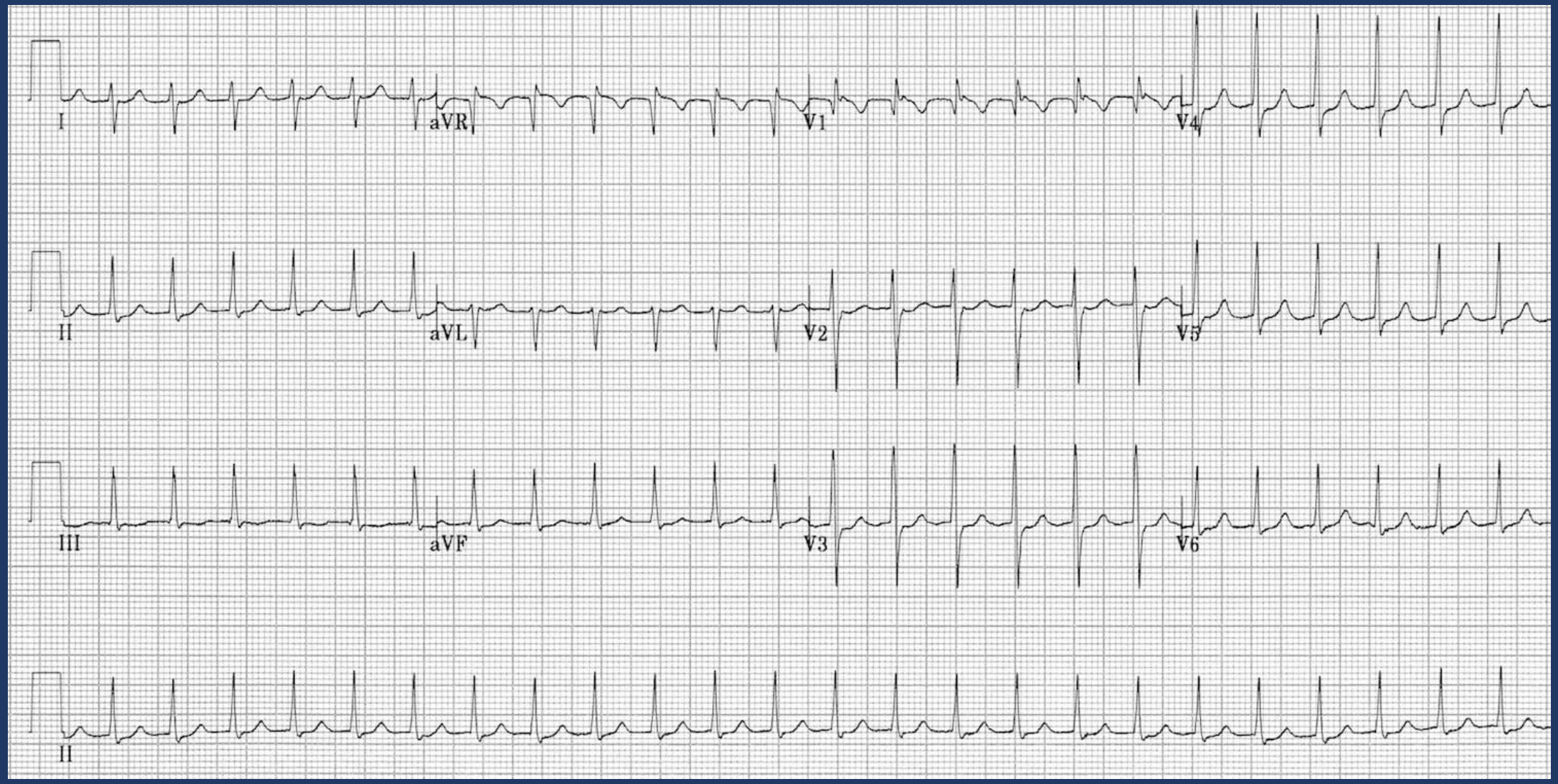
Disclosures

Nil Relevant

CASE 1 42F. Infrequent palp since teens. Rapid, sudden onset / offset. Increasing frequency despite BB. 3 recent admissions to hospital. ECG from this A&E visit. Pt stable with BP 134/60

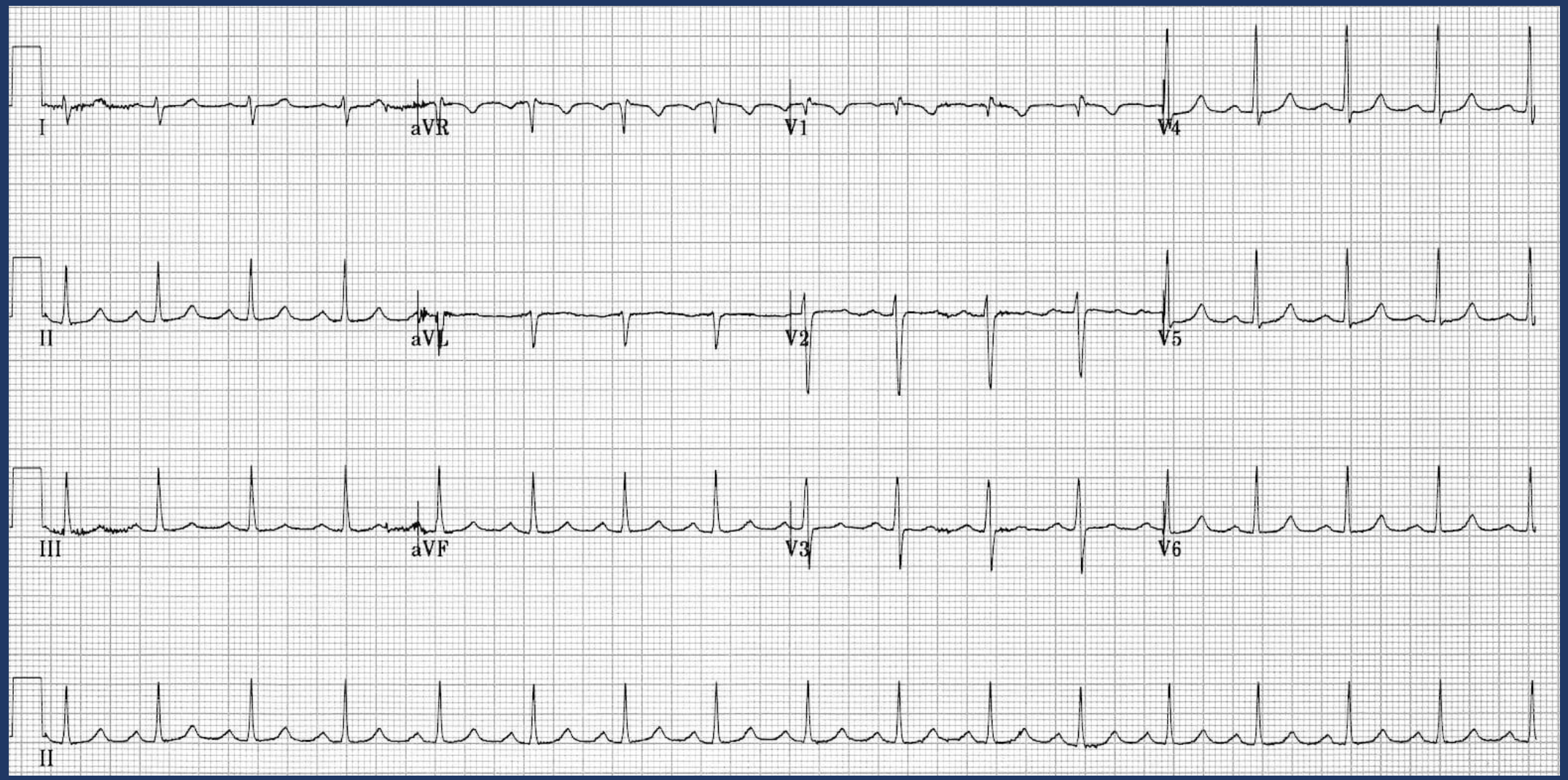


Question

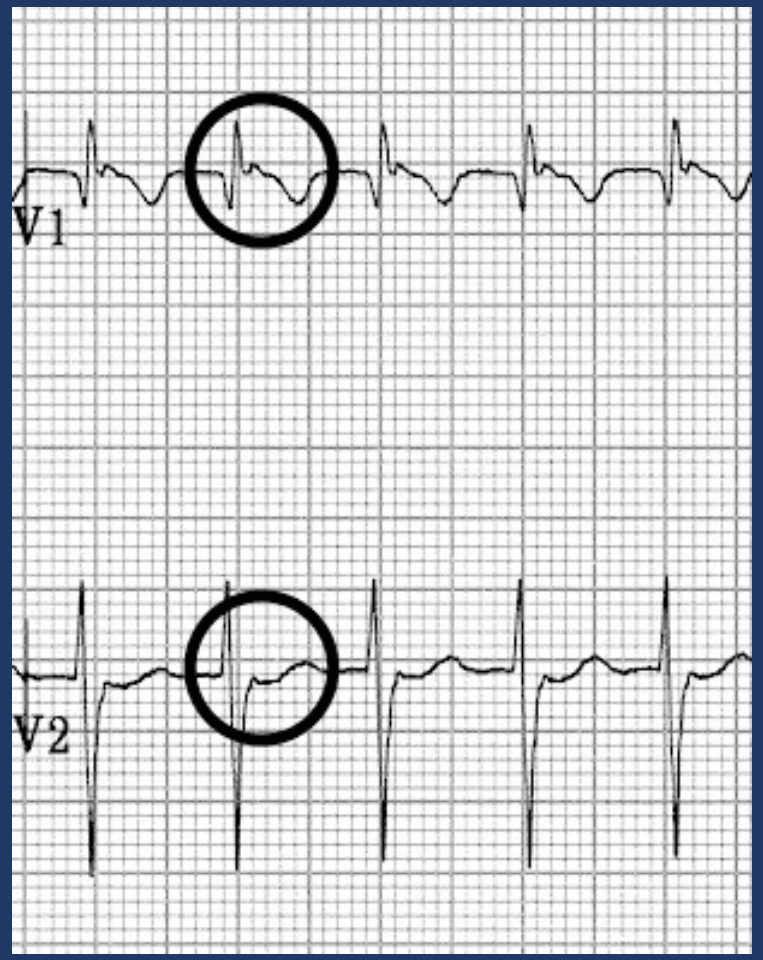
What is the most appropriate next management step?

A. Give amiodarone
B. Arrange sedation and DCCV
C. Attempt Valsalva
D. Give adenosine
E. Give verapamil

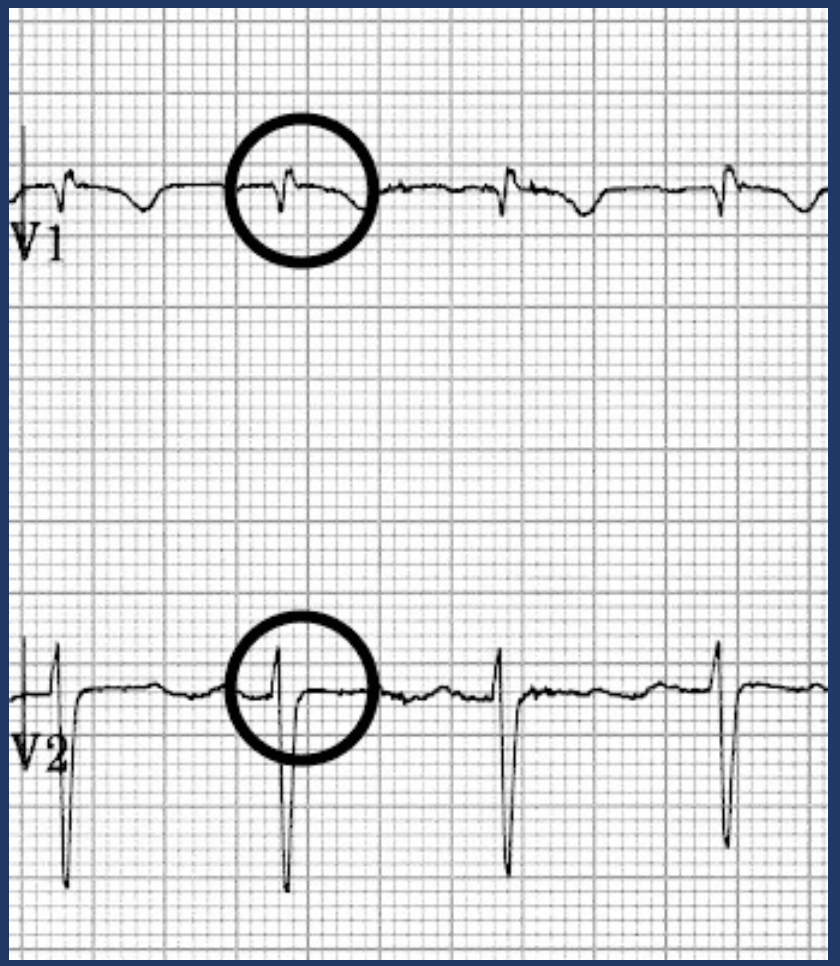
Patient spontaneously terminated into SR



What is being highlighted here?



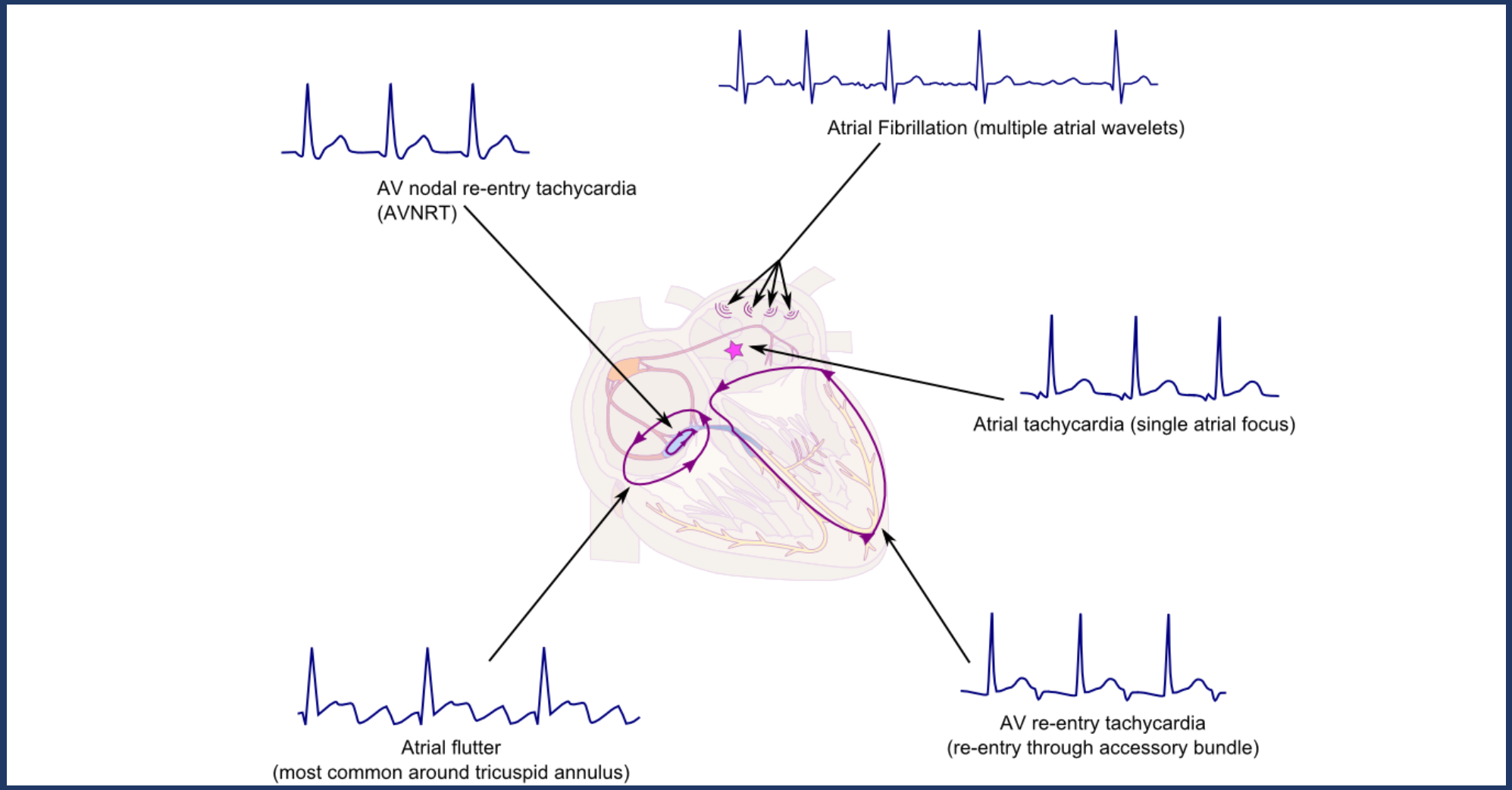
The Pseudo-r'



TACHYCARDIA

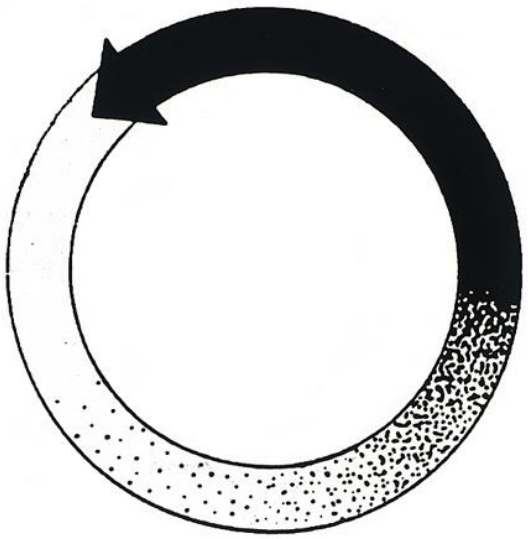
SINUS RHYTHM

SVT overview



Mechanisms

Re-entry



AVNRT, AVRT

Atrial Flutter

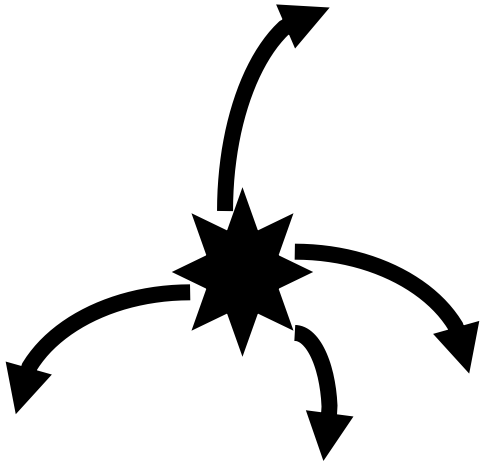
Atrial tachycardia

Ventricular tachycardia

Atrial fibrillation

Ventricular fibrillation

Automaticity



Atrial tachycardia

Ventricular tachycardia

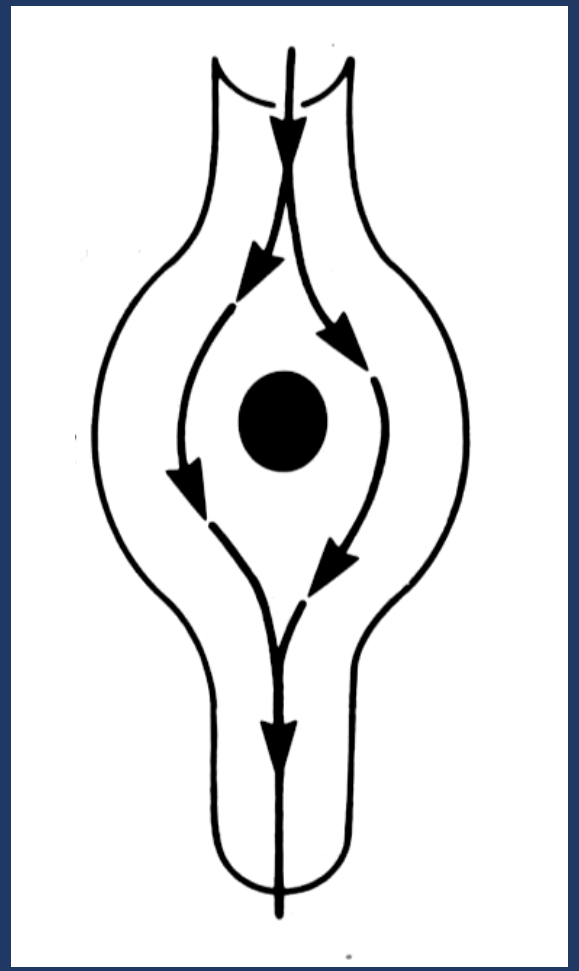
Requirements for re-entry in common types of SVT

Atrial myocardium

Slow AV node pathway

AV node

Ventricular myocardium



Atrial myocardium

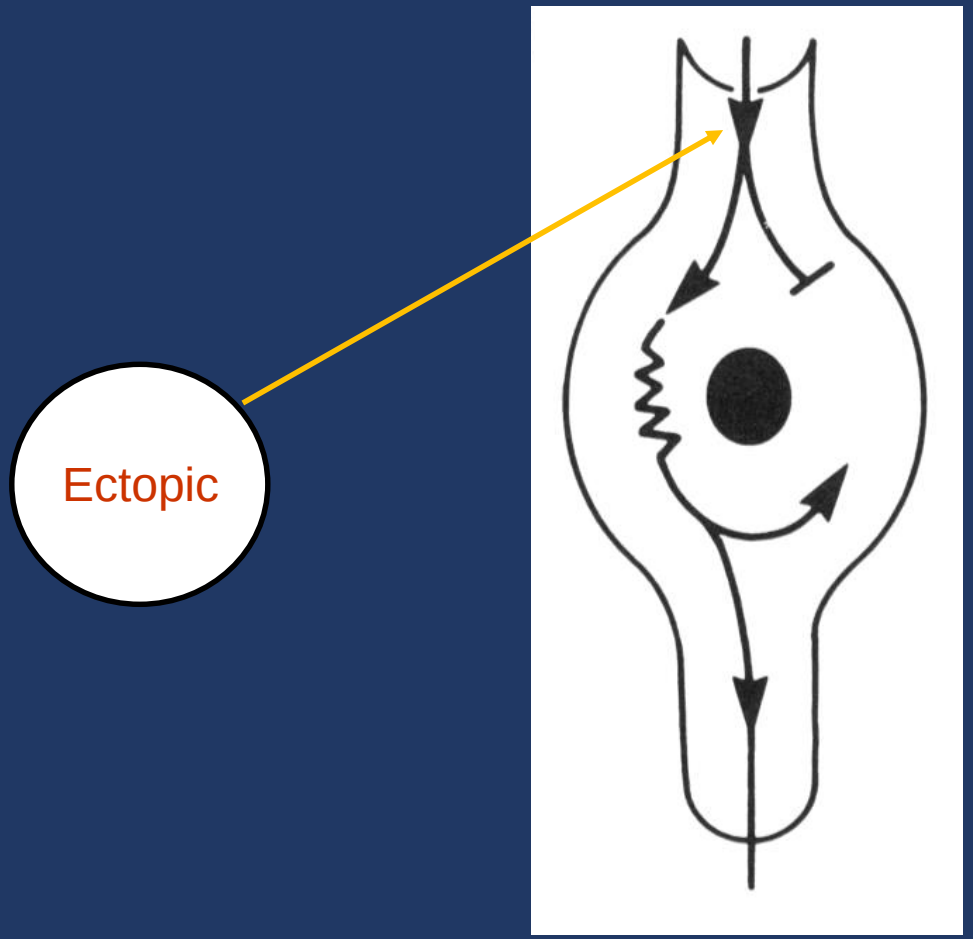
Fast AV node pathway

Accessory pathway

Ventricular myocardium

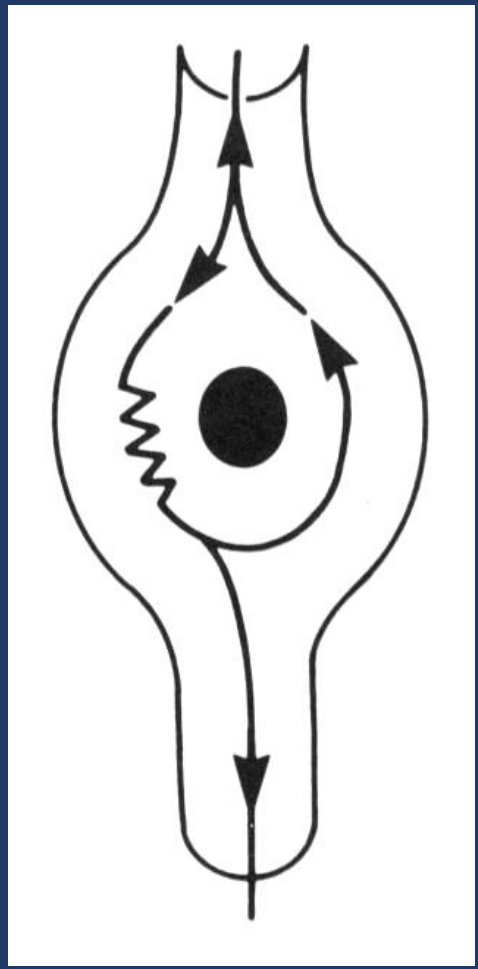
1. Two separate pathways

Requirements for re-entry



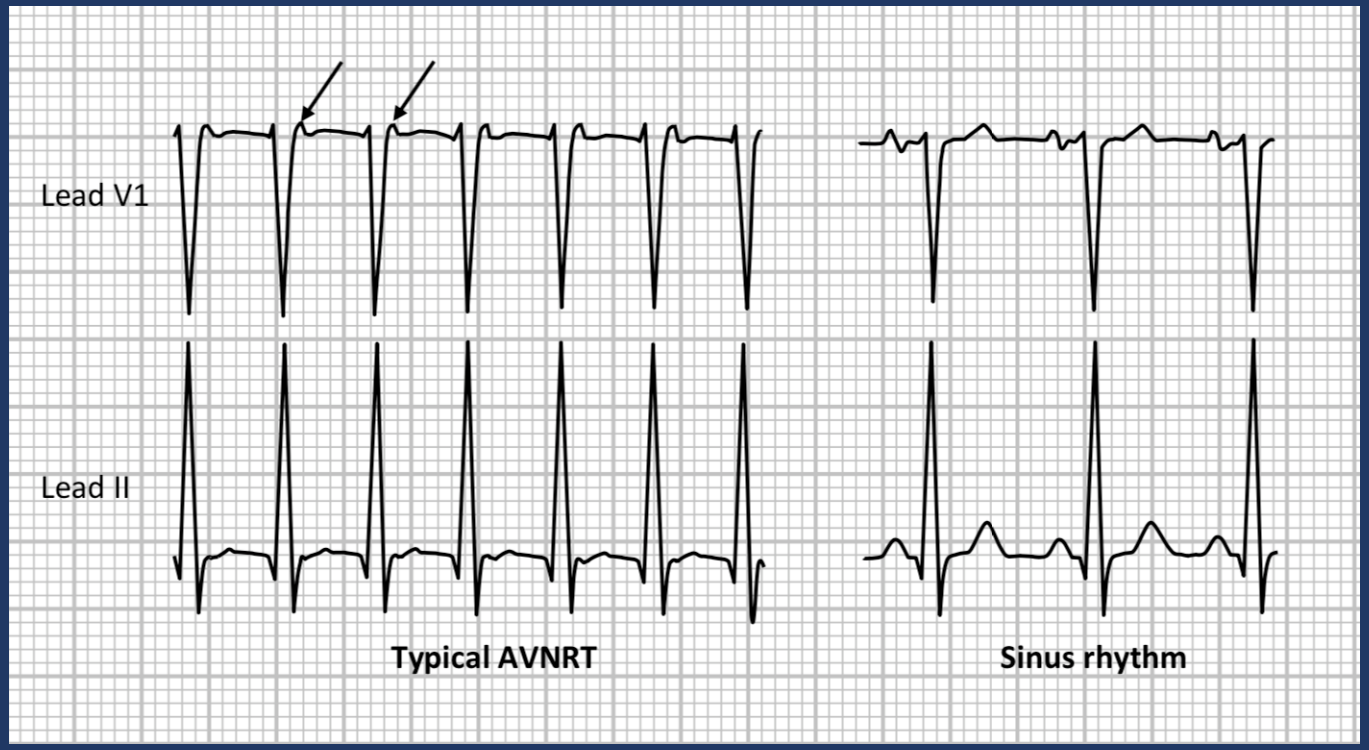
2. Unidirectional block

Requirement for re-entry



3. Slow conduction allowing recovery of blocked pathway and re-entry

Atrioventricular Nodal Re-entry Tachycardia

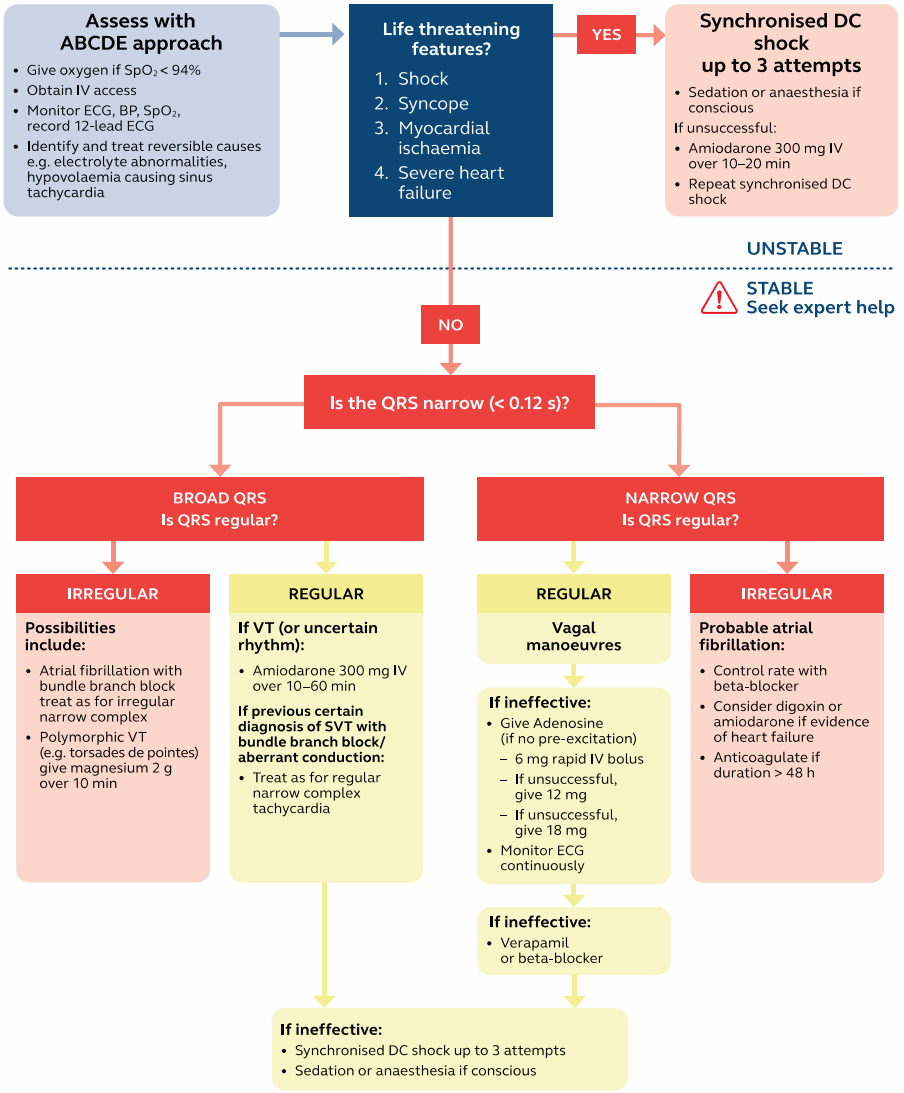


- Commonest cause of regular NCT
- F > M
- Presents - young adulthood / middle age
- Average HR 170bpm (140-250)
- Repeated episodes (paroxysms) of tachycardia
- Usually triggered by ectopic(s)
- Sudden onset/offset
- Lasts - few seconds to many hours
- May be terminated by vagal maneuvers + adenosine.

Resuscitation Council UK

GUIDELINES 2021

Adult tachycardia



Which drug(s) are recommended by the ESC for chronic therapy in AVNRT?

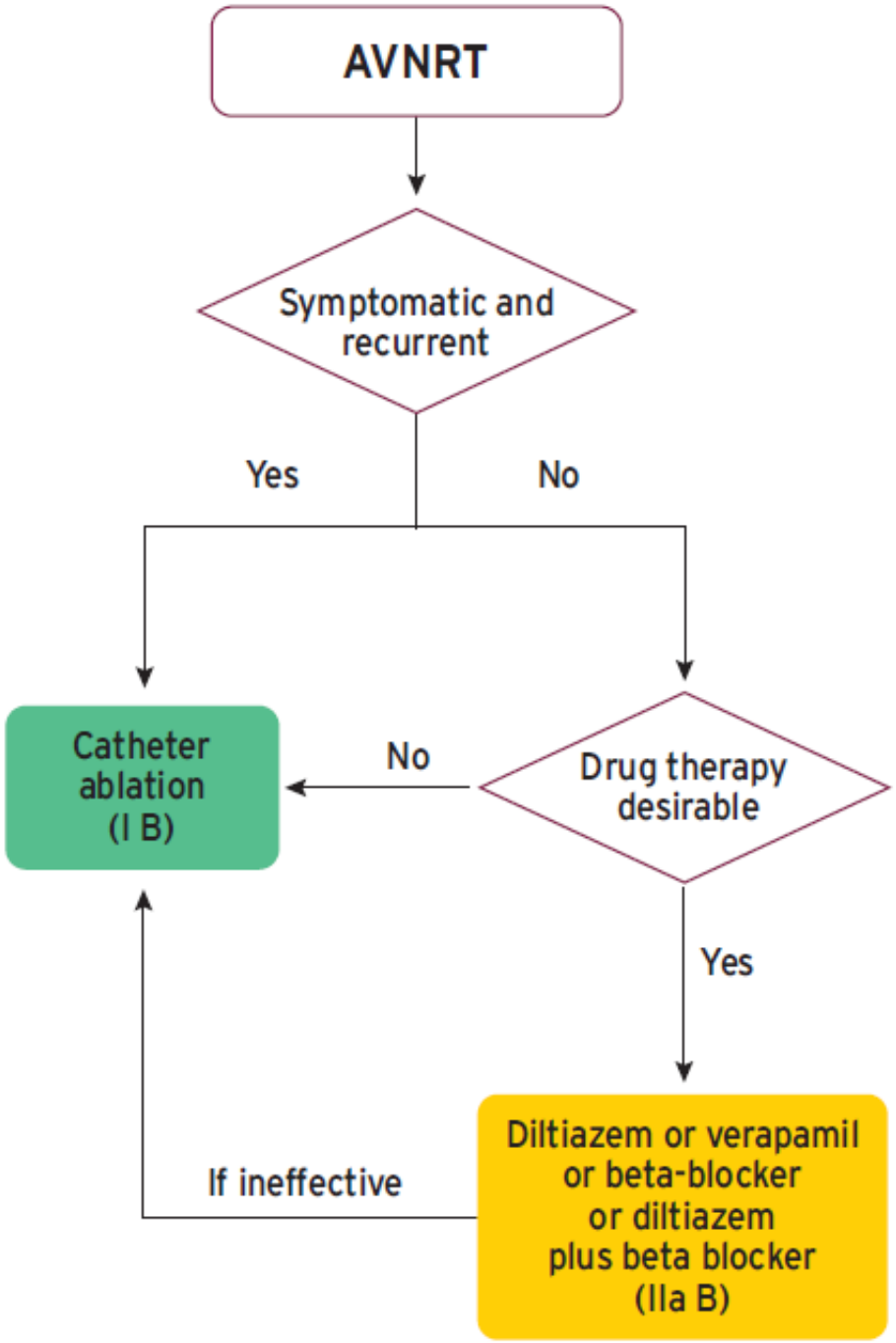
1. Sotalol

2. Amiodarone

3. Beta-blockers & Calcium Channel Blockers

4. Flecainide

5. Propafenone



Chronic therapy of AVNRT

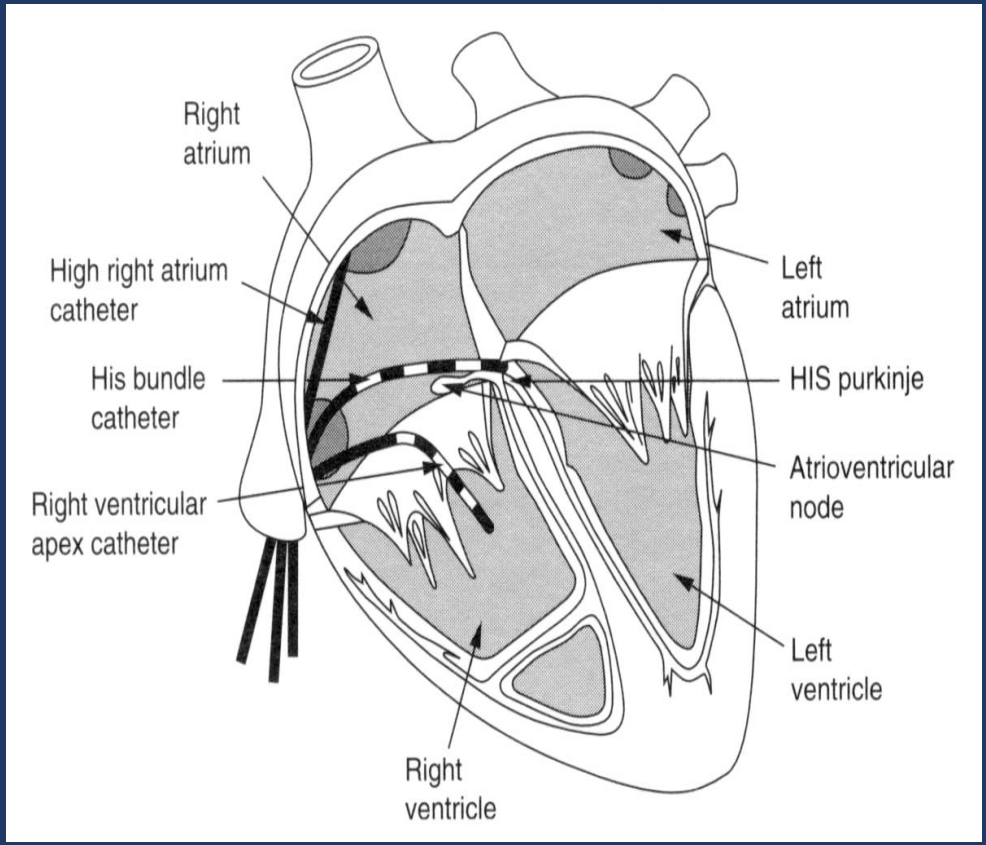
Changes in recommendations since 2003

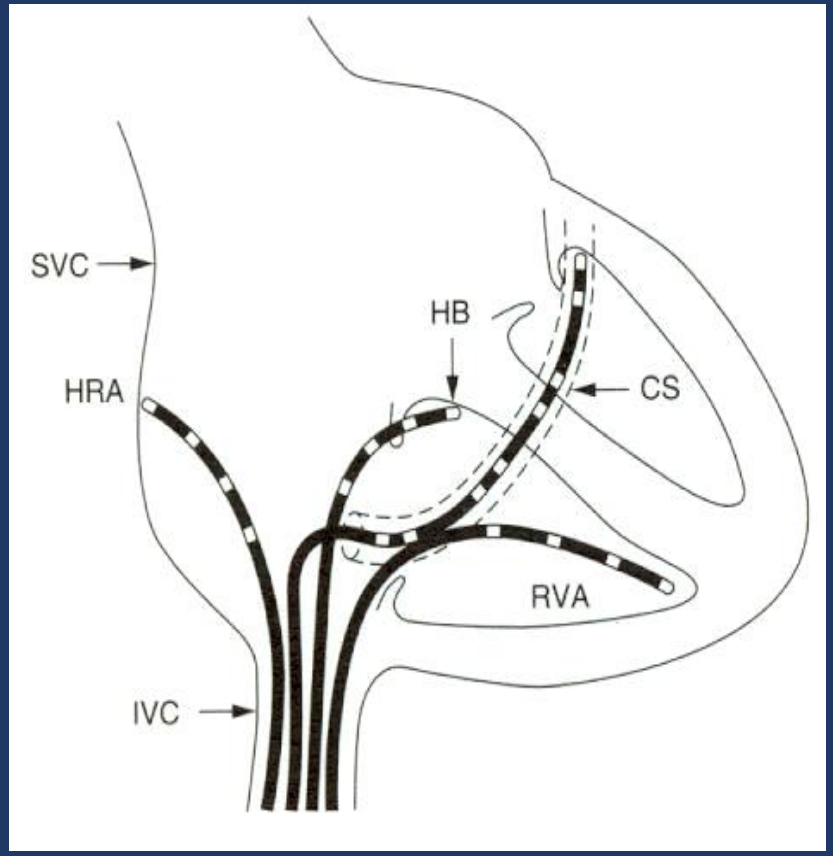
Chronic	**2003**	**2019**
Verapamil and diltiazem	I	IIa
Beta-blockers	I	IIa

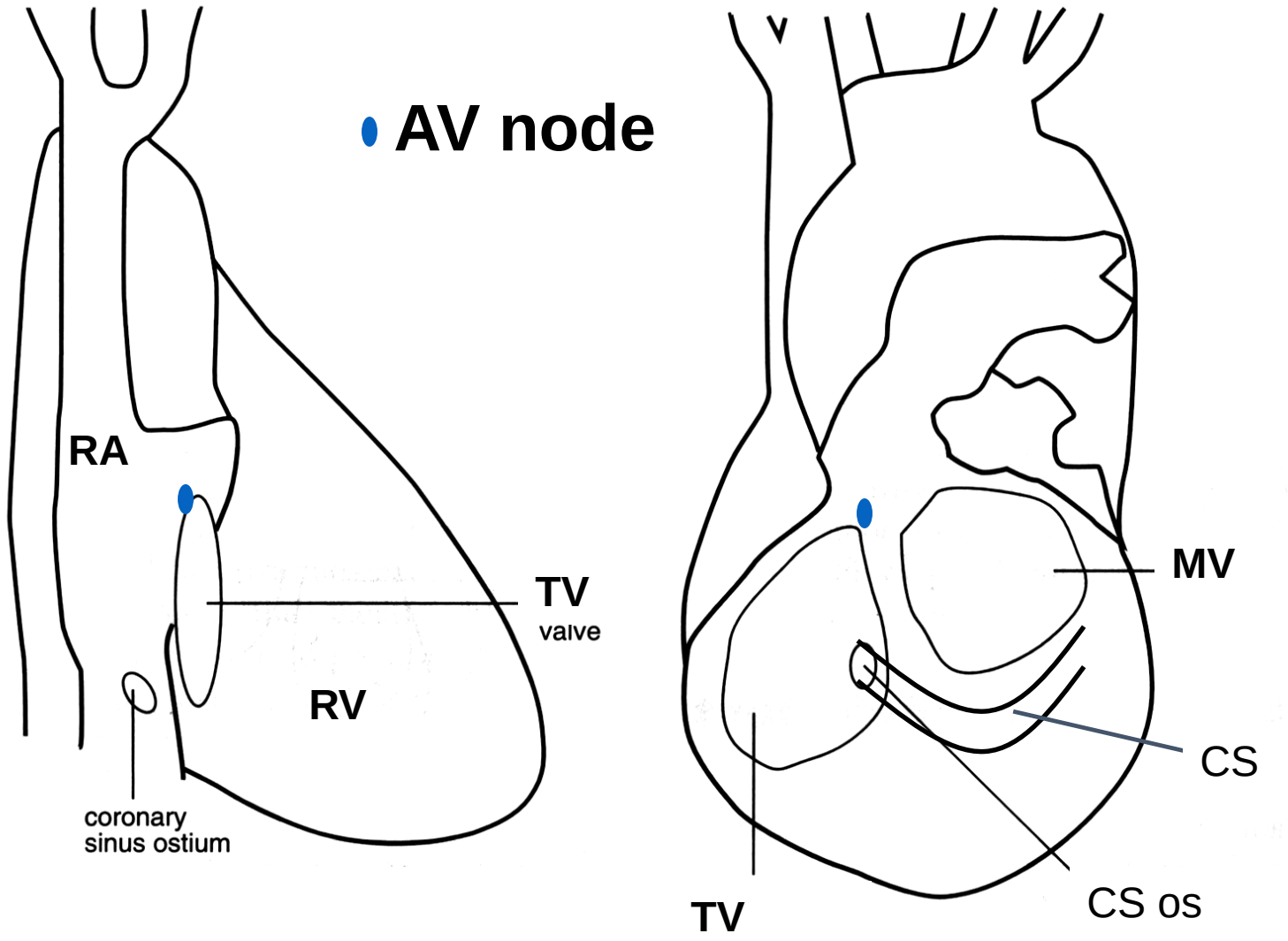
Amiodarone, sotalol, flecainide, propafenone, and the 'pill-in-the pocket' approach are not mentioned in the 2019 Guidelines

ESC SVT Guidelines 2019

EP Catheters and anatomy

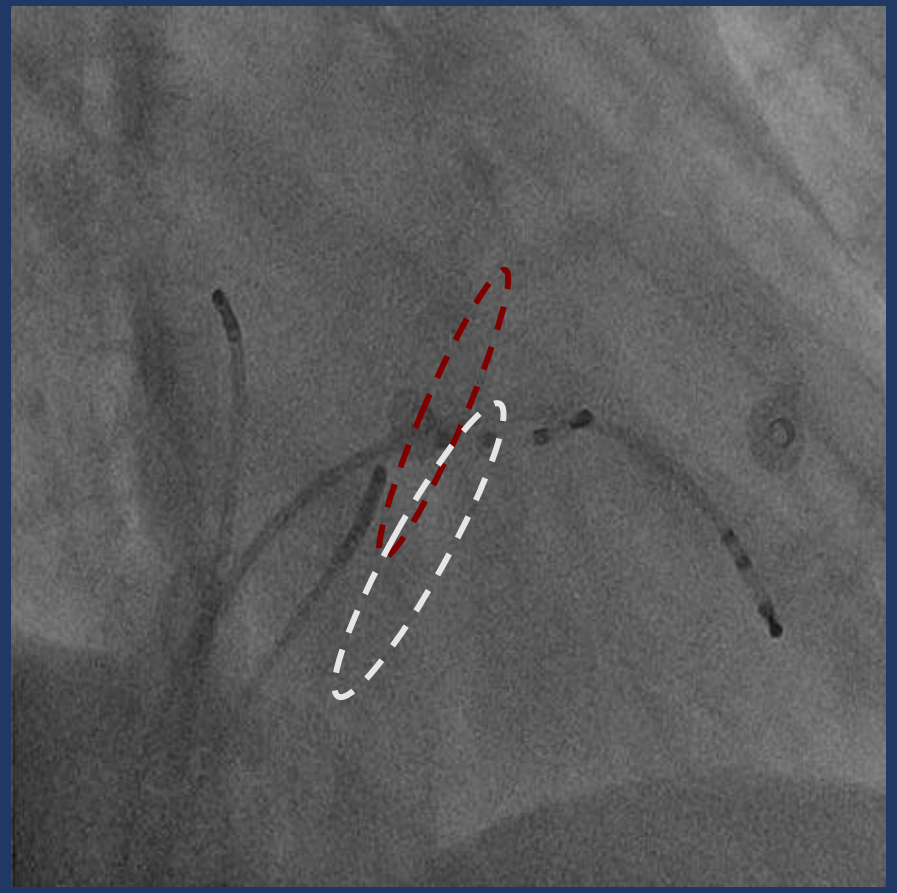


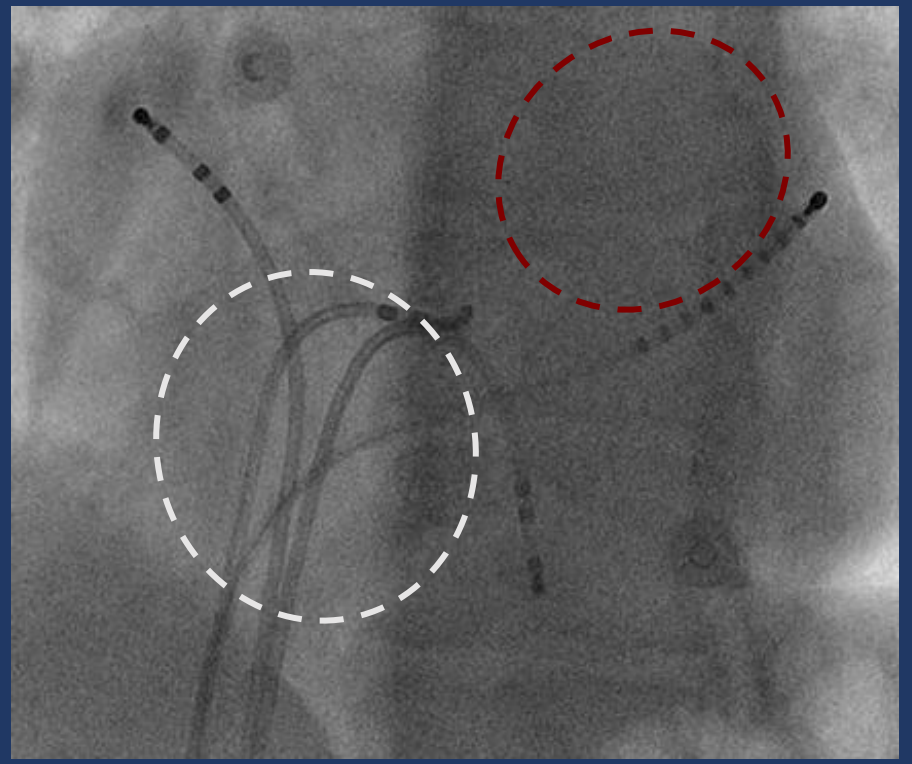




RAO LAO

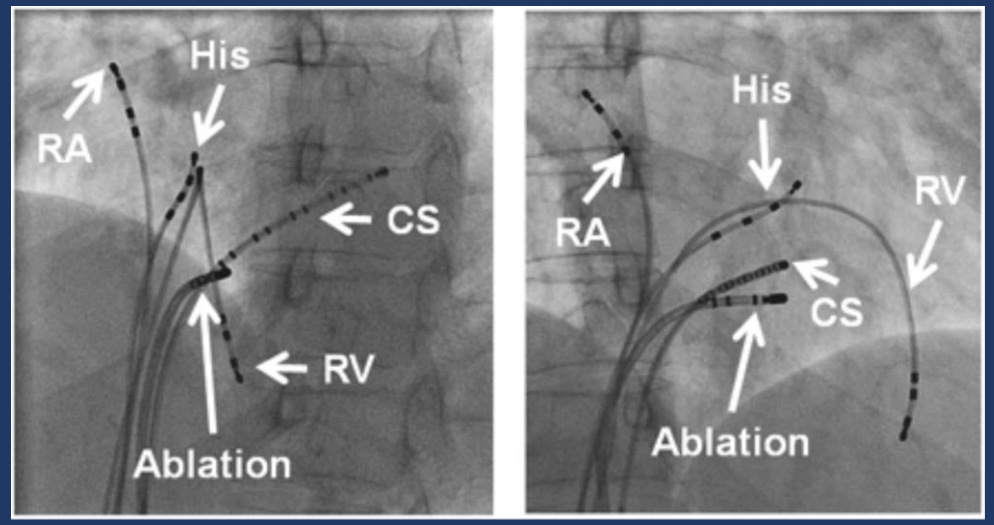
4 wire EPS

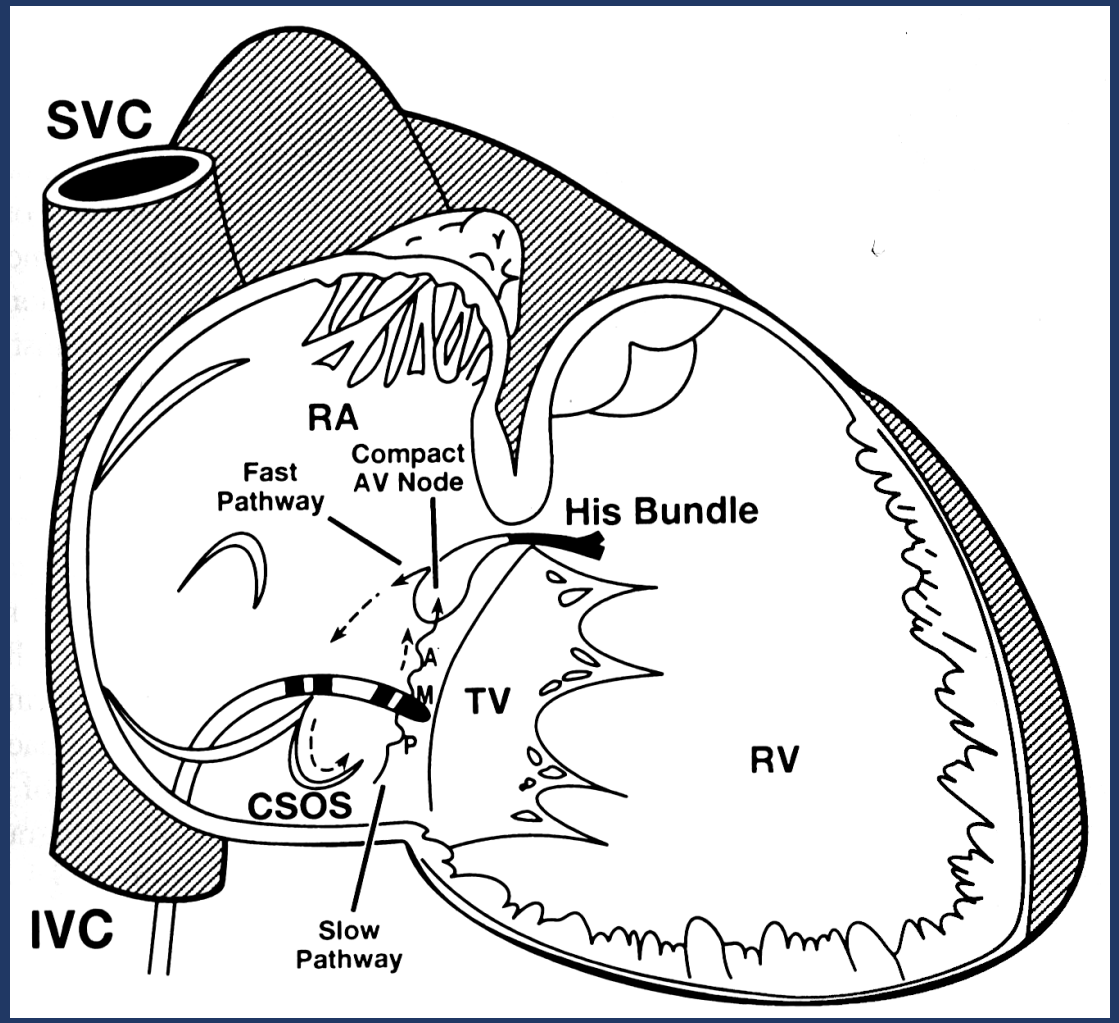




Catheter ablation for AVNRT

- Please refer to EP
- Under LA
- 1-2 hours
- During SR – locate and burn SP
- 95% cure rate
- 1% risk of AV block





Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomised controlled trial

Andrew Appelboam, Adam Reuben, Clifford Mann, James Gagg, Paul Ewings, Andrew Barton, Trudie Lobban, Mark Dayer, Jane Vickery, Jonathan Benger, on behalf of the REVERT trial collaborators

Lancet 2015; 386: 1747–53
Published Online
August 25, 2015
http://dx.doi.org/10.1016/S0140-6736(15)61485-4

Summary

Background The Valsalva manoeuvre is an internationally recommended treatment for supraventricular tachycardia, but cardioversion is rare in practice (5–20%), necessitating the use of other treatments including adenosine, which patients often find unpleasant. We assessed whether a postural modification to the Valsalva manoeuvre could improve its effectiveness.

Interpretation In patients with supraventricular tachycardia, a modified Valsalva manoeuvre with leg elevation and supine positioning at the end of the strain should be considered as a routine first treatment, and can be taught to patients.

Adenosine

LEARNING POINTS

- Usually given initially as a 6mg bolus.
- If ineffective then 12mg and up to 18mg in larger patients can be used safely. Always follow with a rapid 10ml flush of saline.
- You should warn the patient of the transient side effects of the drug. These include chest discomfort, flushing and sweating.
- Contra-indicated in patients with severe asthma?? patients who have had a cardiac transplant and those taking dipyridamole.
- Monitor patients continuously and make sure full resuscitation equipment is available.

"Adenosine is contraindicated in asthmatics"

PROBABLY NOT TRUE[1,2]

At worst, only relative (e.g. avoid in active bronchospasm)

'USE WITH CAUTION'

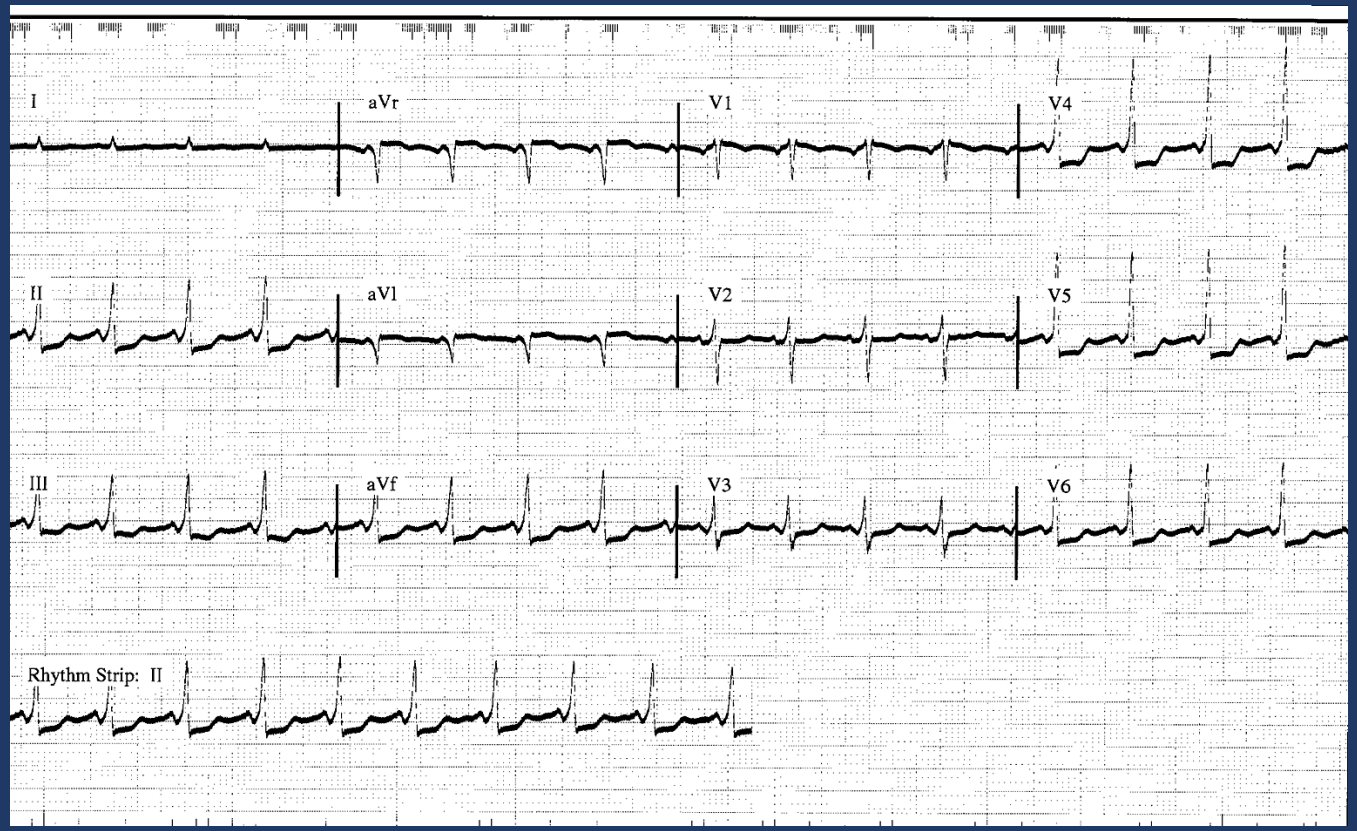
(well, you'll do that anyway?…
"oops, it's gone in already…ooh, it's worked… ah, it's worn off, and NOTHING BAD HAPPENED!")

The alternative(s) may leave your patient in symptomatic arrhythmia for much longer, or involve unnecessary risk/hassle/side-effects

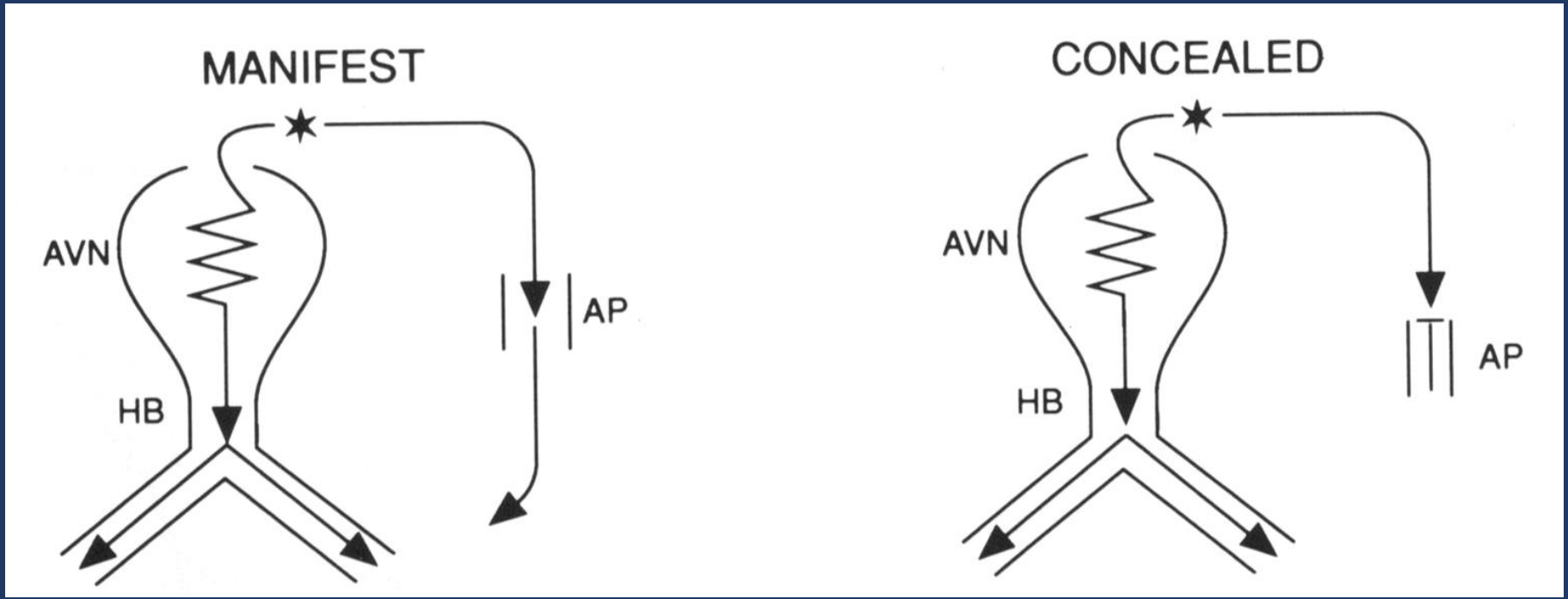
1.Terry & Lumsden Emerg Med J 2001;18:61
2. Burki *et al* Respiratory Research 2006, 7:139

Atrioventricular Re-entry Tachycardia (AVRT)

- 20-30% of SVTs (accessory pathway)
- Resting ECG = normal (50-70%) or WPW!
- Presents ≈ 10yrs earlier than AVNRT
- Onset age 25 (0->90!)
- More common in men under 30
- Tends to be faster than AVNRT
- Usually triggered by ectopic(s)
- Sudden onset/offset
- P waves may be seen in ST segment



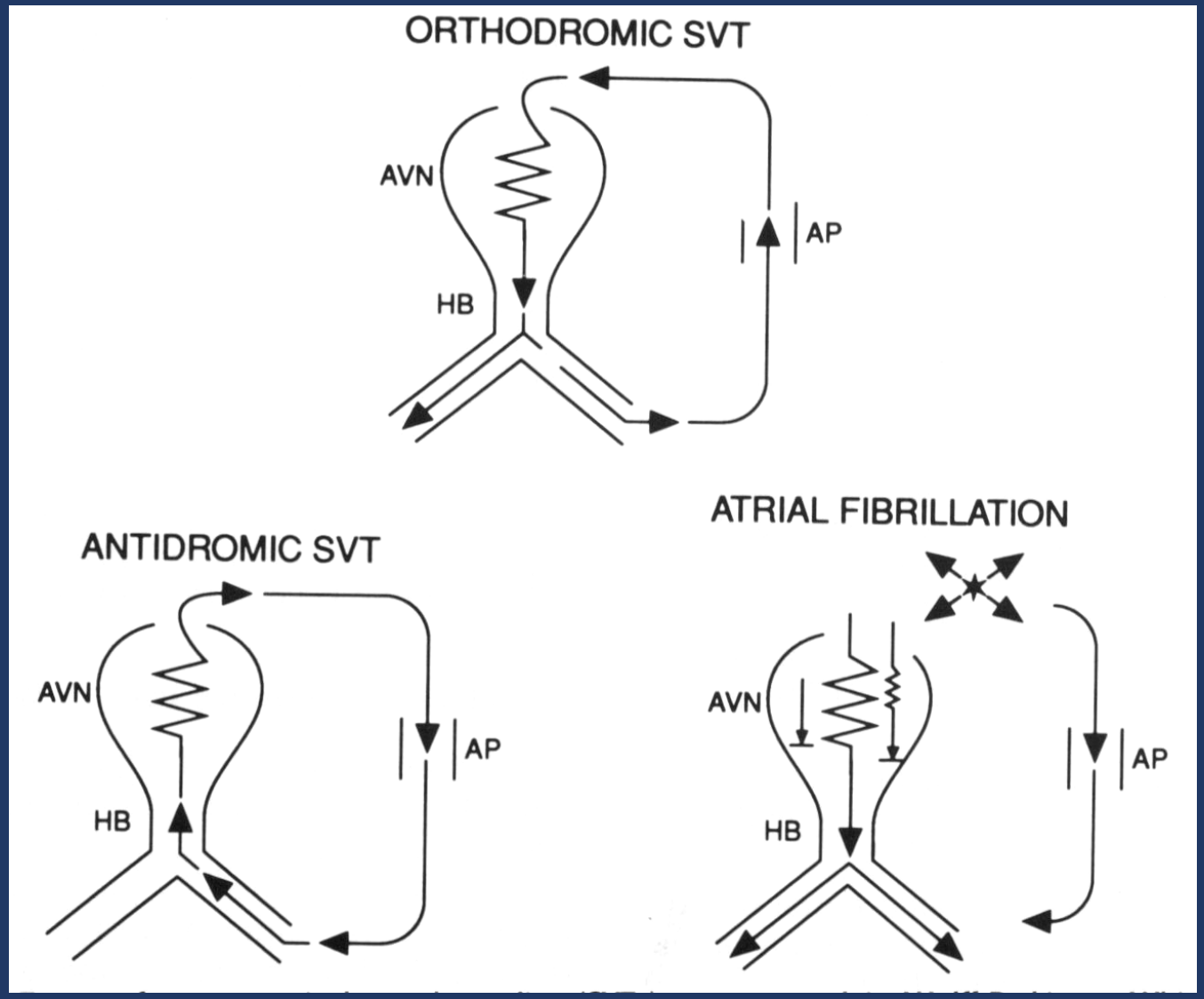
Accessory pathways may be manifest or concealed



75%
(5% anterograde only)

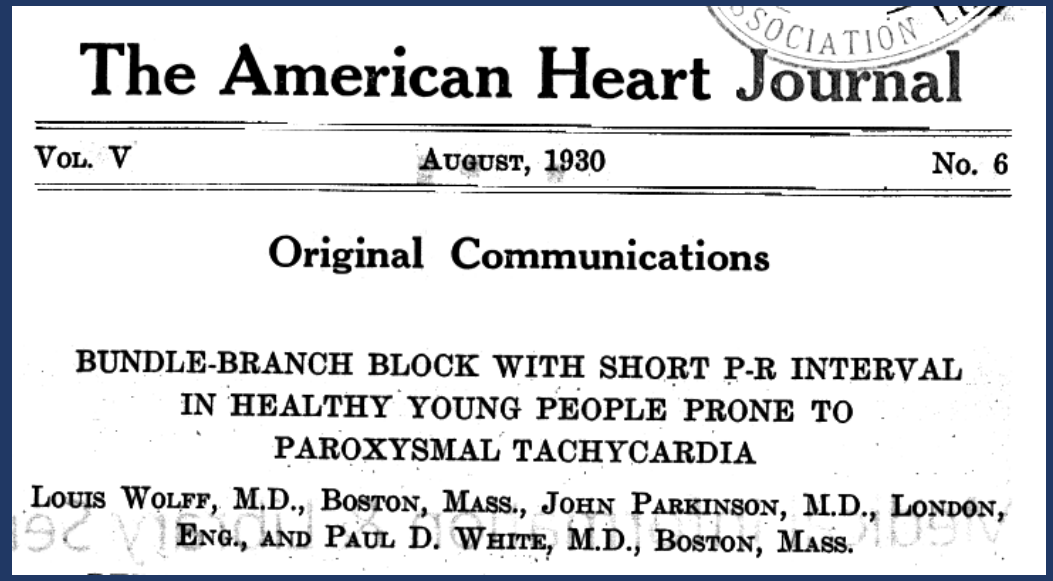
25%

Mechanisms of tachycardia in accessory pathways mediated AVRT



Wolff Parkinson White

- WPW syndrome (VP and symptomatic SVT)
- Debate if asymptomatic (VP only), but
  - up to 50% of those having WPW-arrest never had clinical presentation with SVT prior!
  - non-invasive markers of risk are not sufficiently clear-cut
- EP study for risk stratification to all adults with WPW ECG
- 2015 AHA and 2019 ESC guidelines appear to agree
- Ablation recommended if inducible tachycardia or dangerous pathway (short antegrade refractory period)
- Please refer!



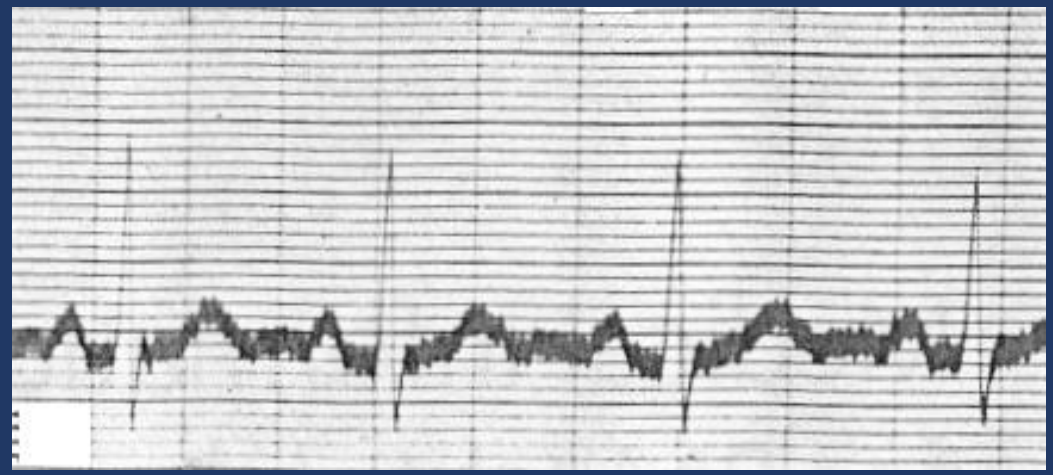
The American Heart Journal

VOL. V AUGUST, 1930 No. 6

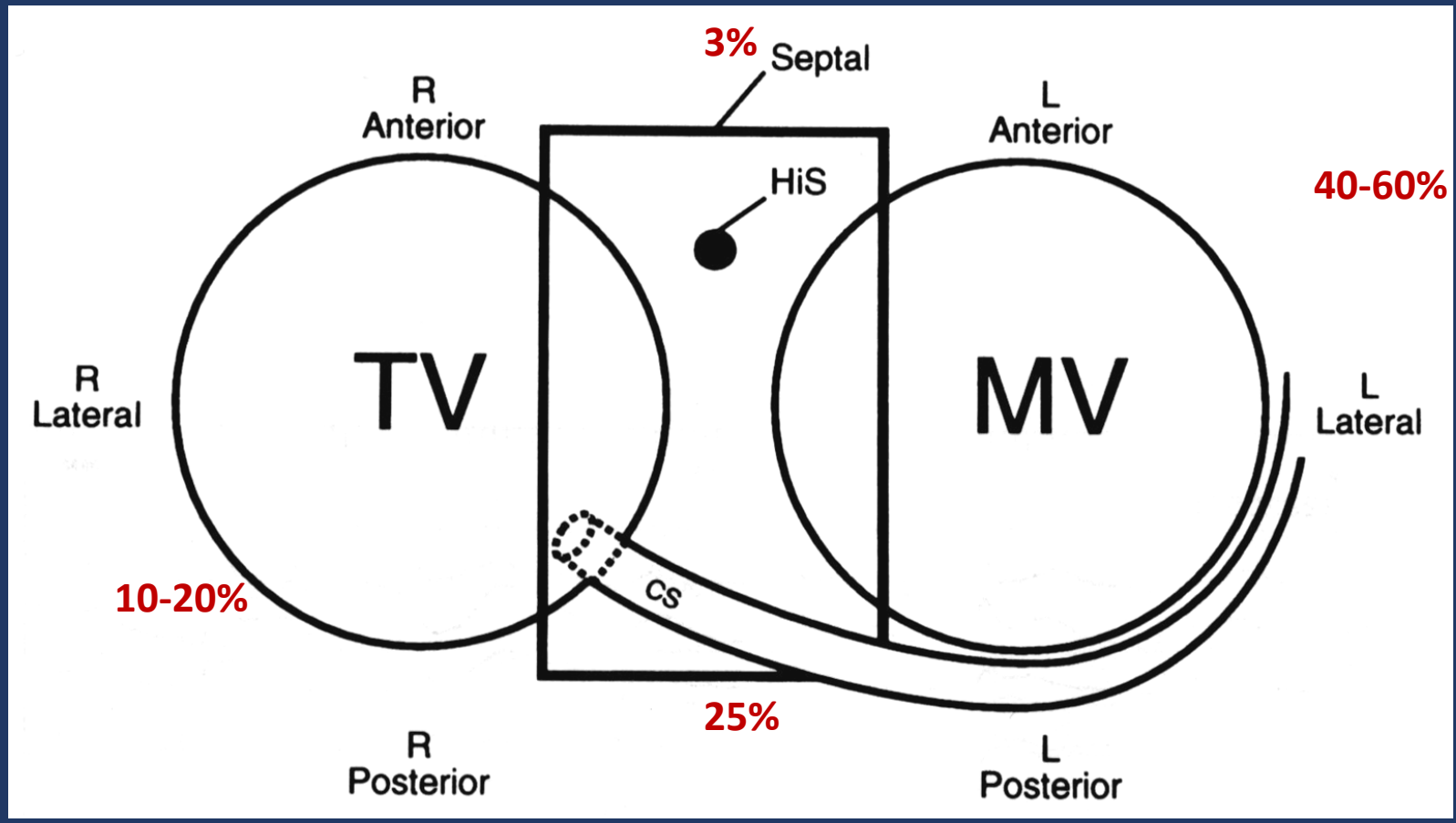
Original Communications

BUNDLE-BRANCH BLOCK WITH SHORT P-R INTERVAL IN HEALTHY YOUNG PEOPLE PRONE TO PAROXYSMAL TACHYCARDIA

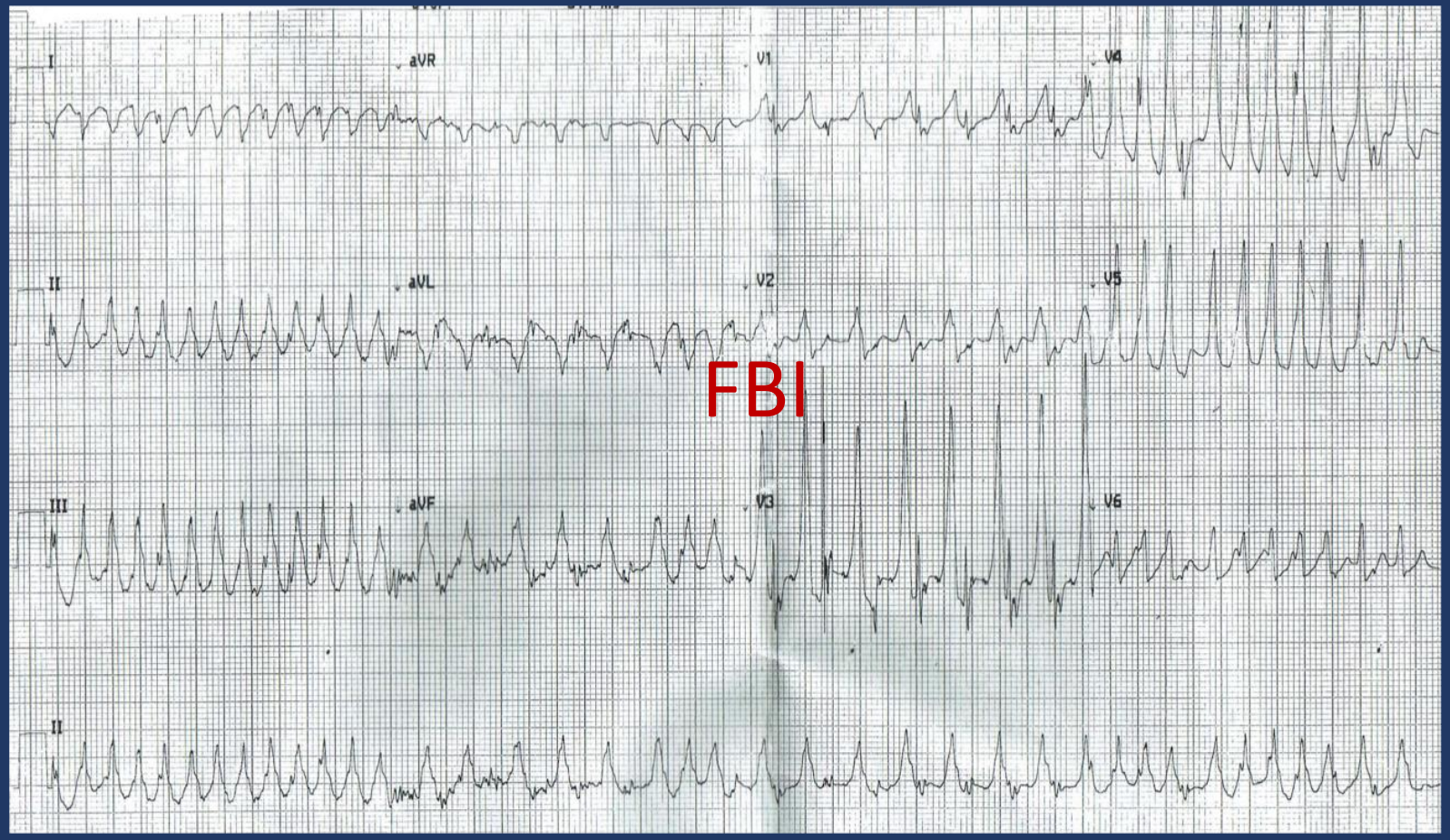
LOUIS WOLFF, M.D., BOSTON, MASS., JOHN PARKINSON, M.D., LONDON, ENG., AND PAUL D. WHITE, M.D., BOSTON, MASS.



Locations of Accessory Pathways



Pre-excited AF



Pre-excited atrial fibrillation

Medical emergency

Do not give AV nodal blockers

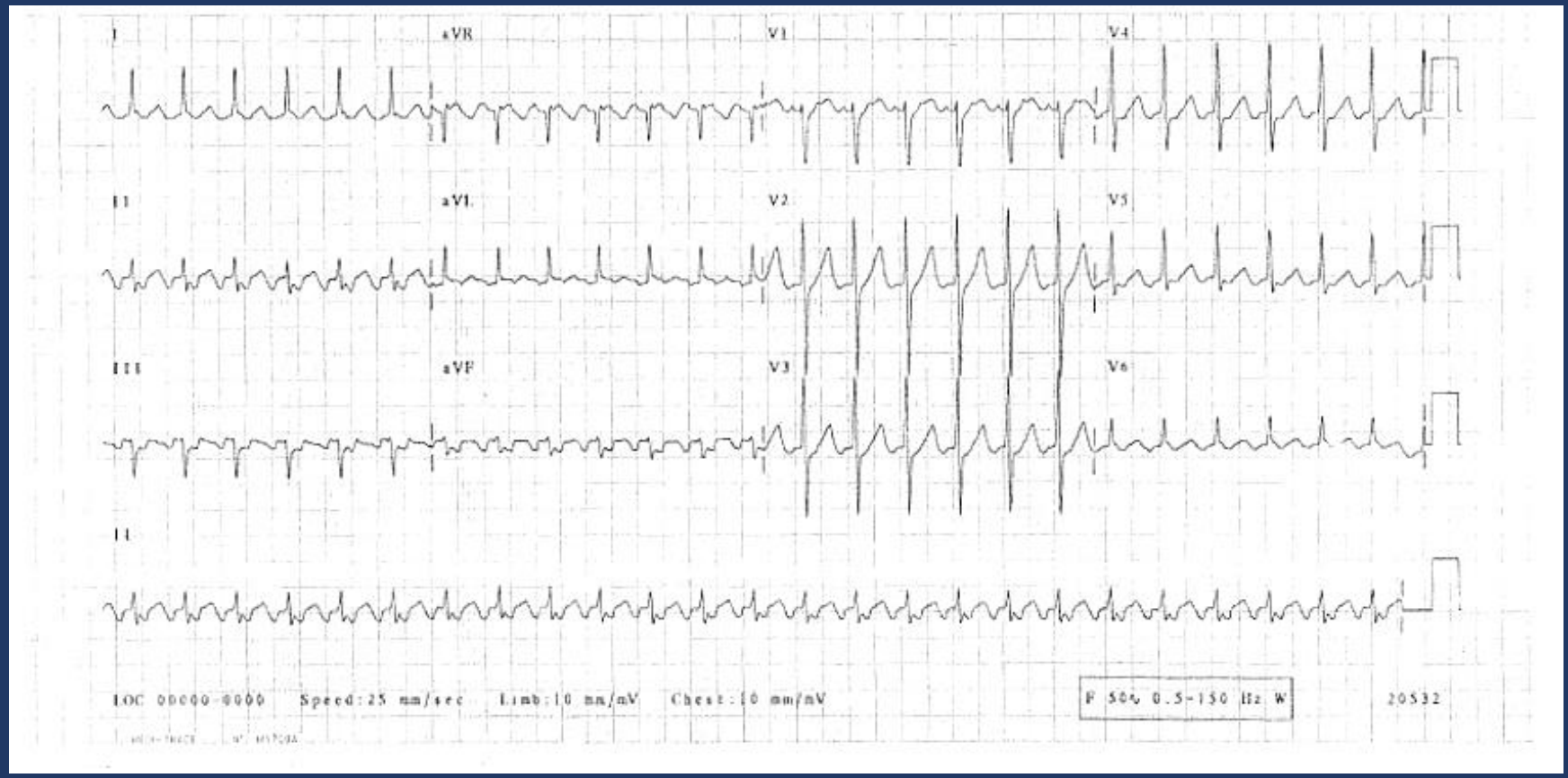
may de-stabilise – more dyssynchrony with AP/ventricular vs. AVN/His-Purkinje conduction

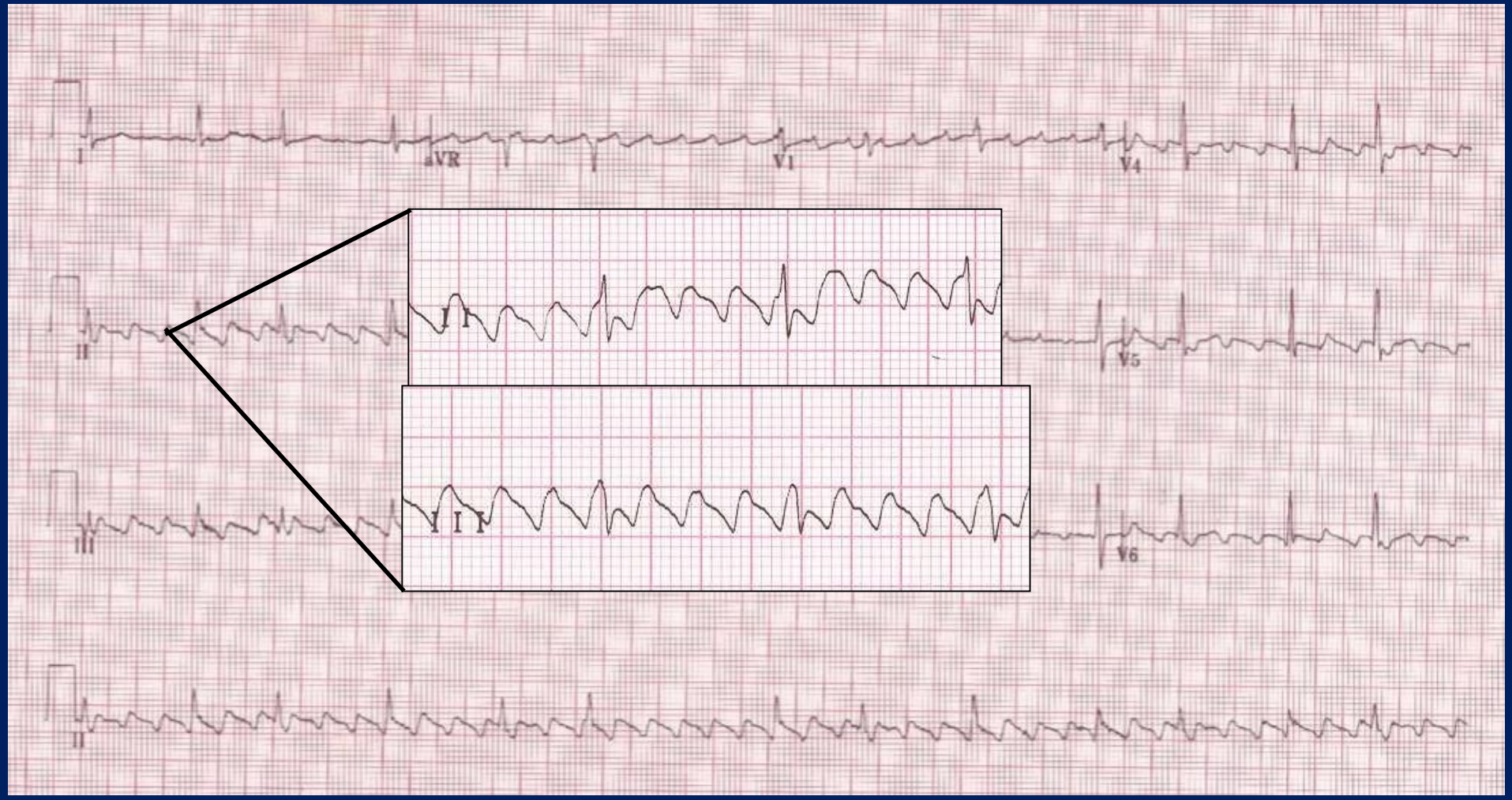
i.e., avoid verapamil / beta-blockers / digoxin

- Fast atrial activity preferentially conducts down accessory pathway
- Irregular rhythm, fast broad complex tachycardia with delta waves
- Can degenerate into VF – small risk of cardiac arrest / sudden death
- If haemodynamically unstable: **sedate/GA + DCCV**
- If 'stable'/recurrent: consider iv **flecainide** (or amiodarone)
- **Regardless: in-patient transfer** to EP for catheter ablation

CASE 2

- 72F, palpitations for 3 months. Lasts for a few hours.
- PMHx – Hypertension and previous episode of PAF 2 years ago.
- On warfarin, bisoprolol and losartan.
- Last episode called ambulance as continued for over 3 hrs. ECG in A&E… BP 150/70



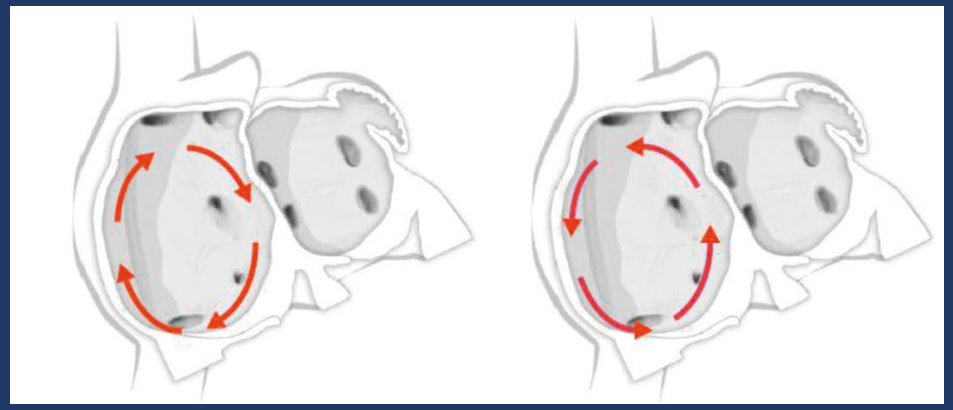

I
aVR
V1
V4
II
V5
III
V6
II

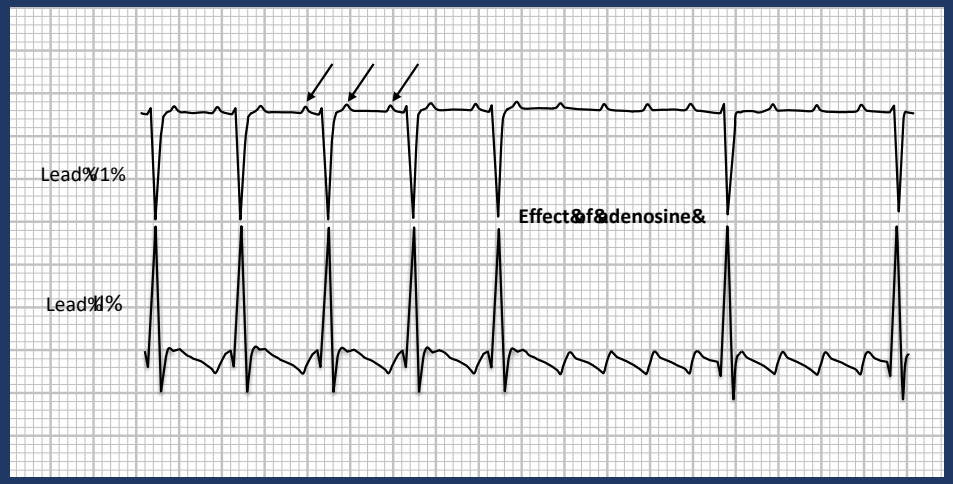
Question

What is the most appropriate next management step?

A. Give amiodarone
B. Arrange sedation and DCCV
C. Give further beta-blockers
D. Give adenosine
E. Give verapamil

Atrial Flutter

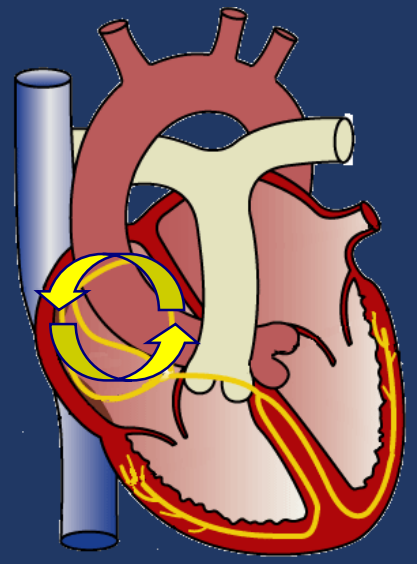




- Macro re-entry circuit within the RA
- Often sudden onset/offset
- P waves present - characteristic “saw tooth” appearance - slow downstroke/rapid upstroke II/III/aVF (*typical* flutter)
- Flutter (‘F’) waves at 200-350bpm (positive in V1)
- Can have regular ventricular response (classically 150bpm with 2:1 AV block / atrial rate 300 bpm)
- V rate determined by number of flutter waves conducted through AVN
- Rarely you can get 1:1 conduction leading to rapid V rates
- Response to adenosine: AV block and unmasks flutter waves
- Has a thromboembolic risk similar to AF (and often co-exists)

Management of Atrial Flutter - General Principles

- Haemodynamically compromised – DCCV
- If stable then rate/rhythm control or DCCV
- Rate control often difficult (b-blocker + another agent)
- Anticoagulate as per CHA2DS2-VASc score akin to AF
- Hard to manage medically as recurrence rates are high
- Easy (relatively) to ablate - curative in over 90- 95%
- Refer all typical flutter patients to an electrophysiologist



Management - Atrial Flutter

Rate Control

Beta-blocker

Diltiazem

Verapamil

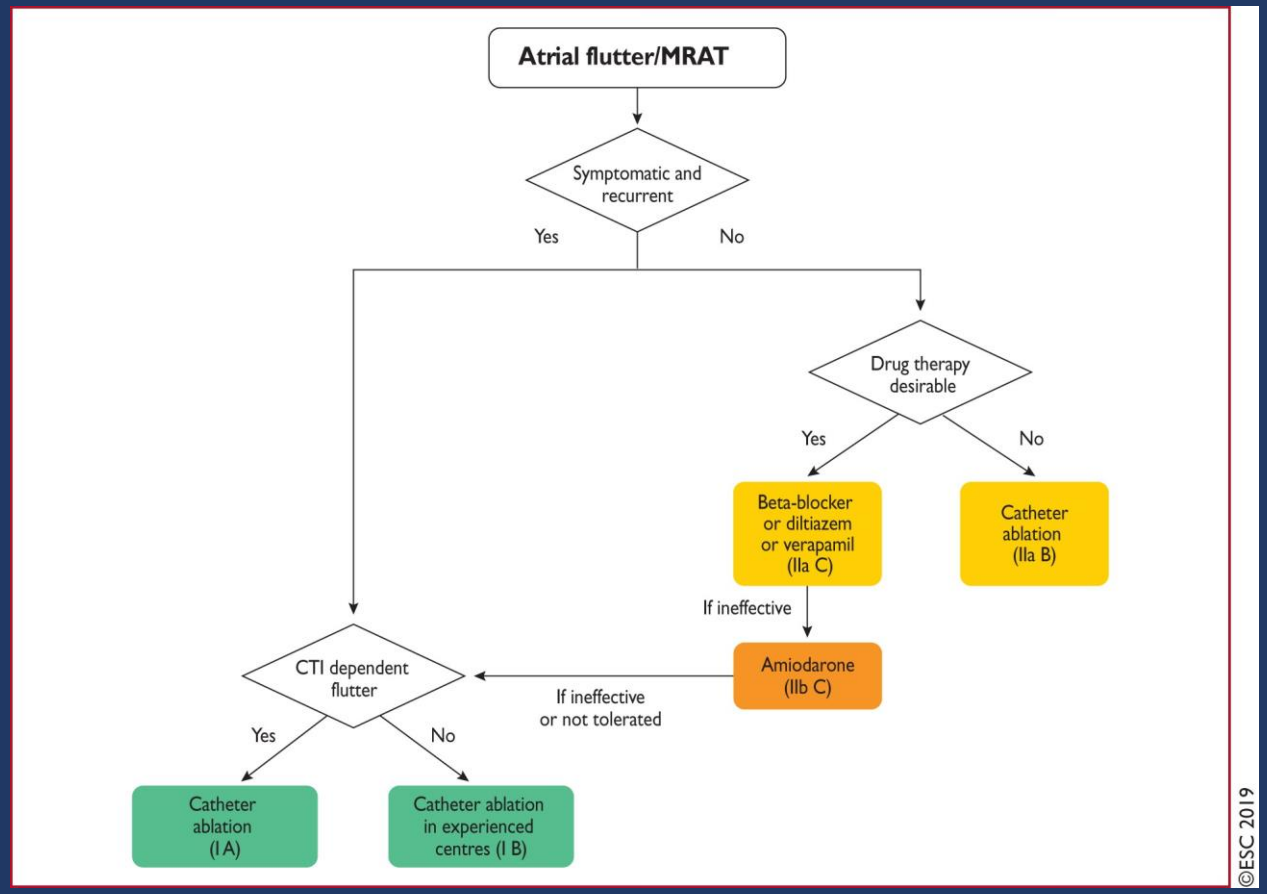
Digoxin

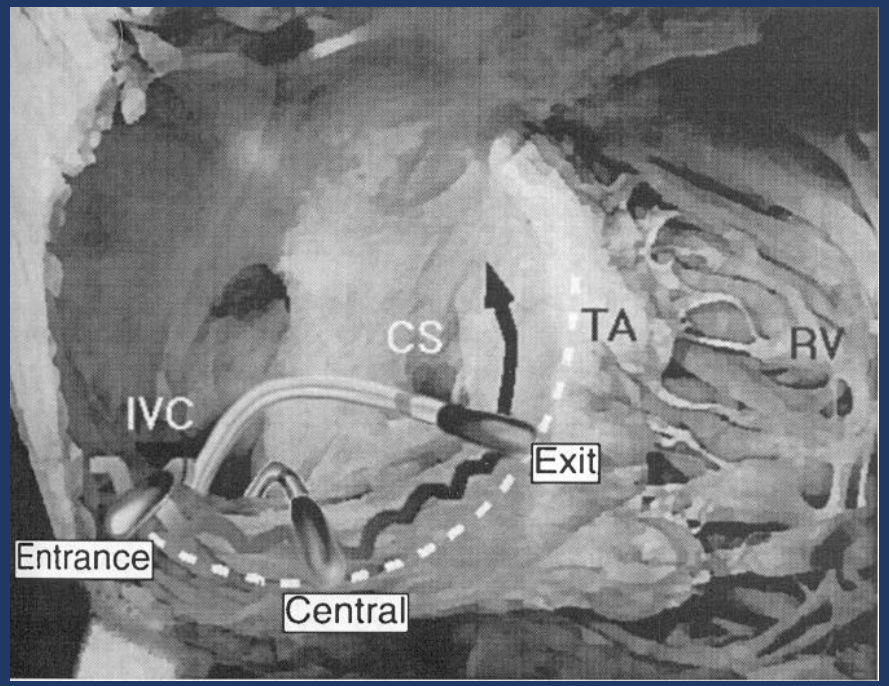
Amiodarone

Rhythm Control

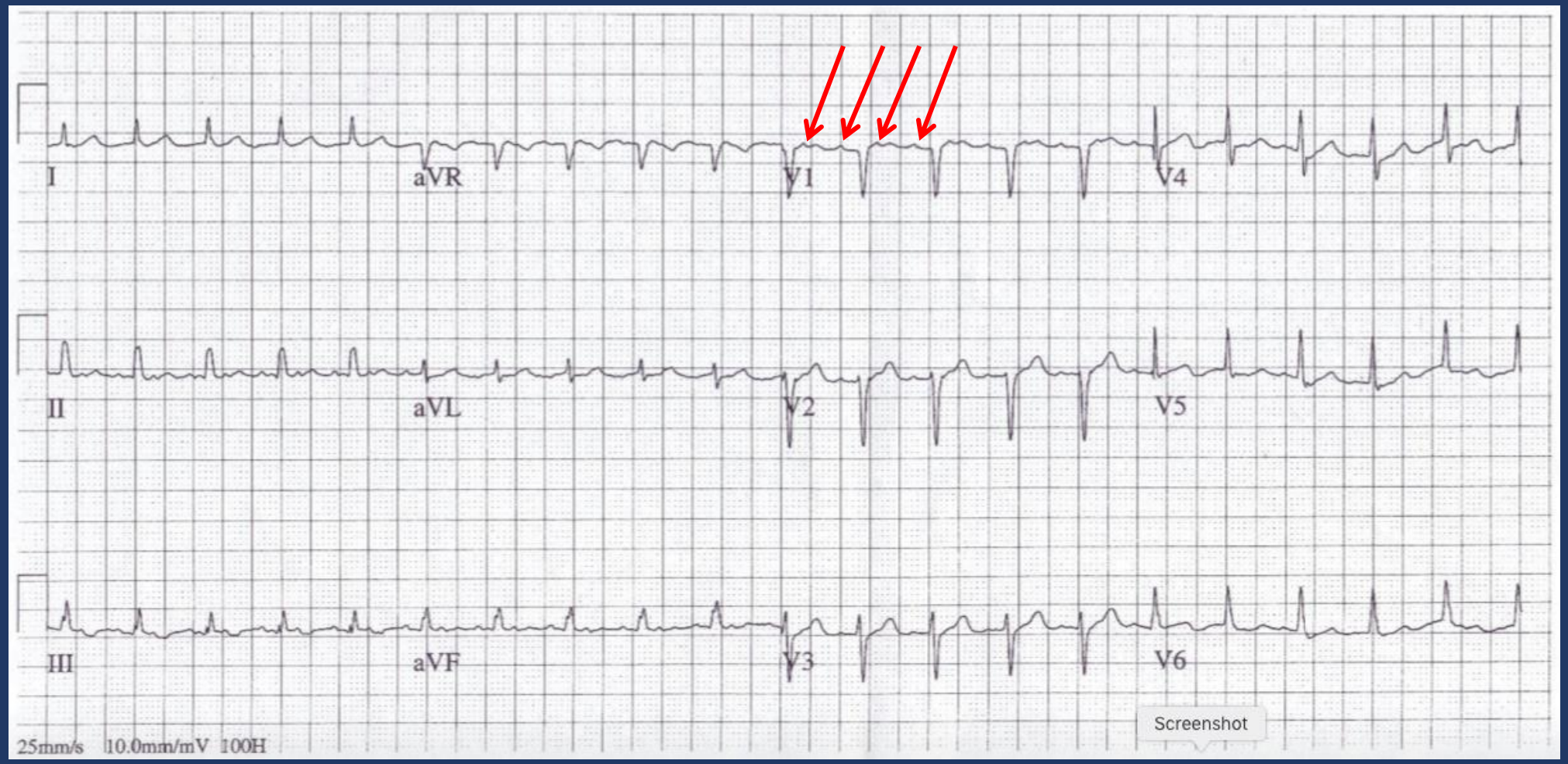
- Chemical vs. electrical
- Class IC drugs e.g. flecainide can be useful BUT caution 1:1 conduction
- Amiodarone may have a role but should be restricted to cases of HF or significant structural heart disease.
- DCCV electively but anticoagulation requires consideration
- < 48 hours – nil needed
- > 48 hours – TOE guided + anticoagulation OR 4 weeks anticoagulation first

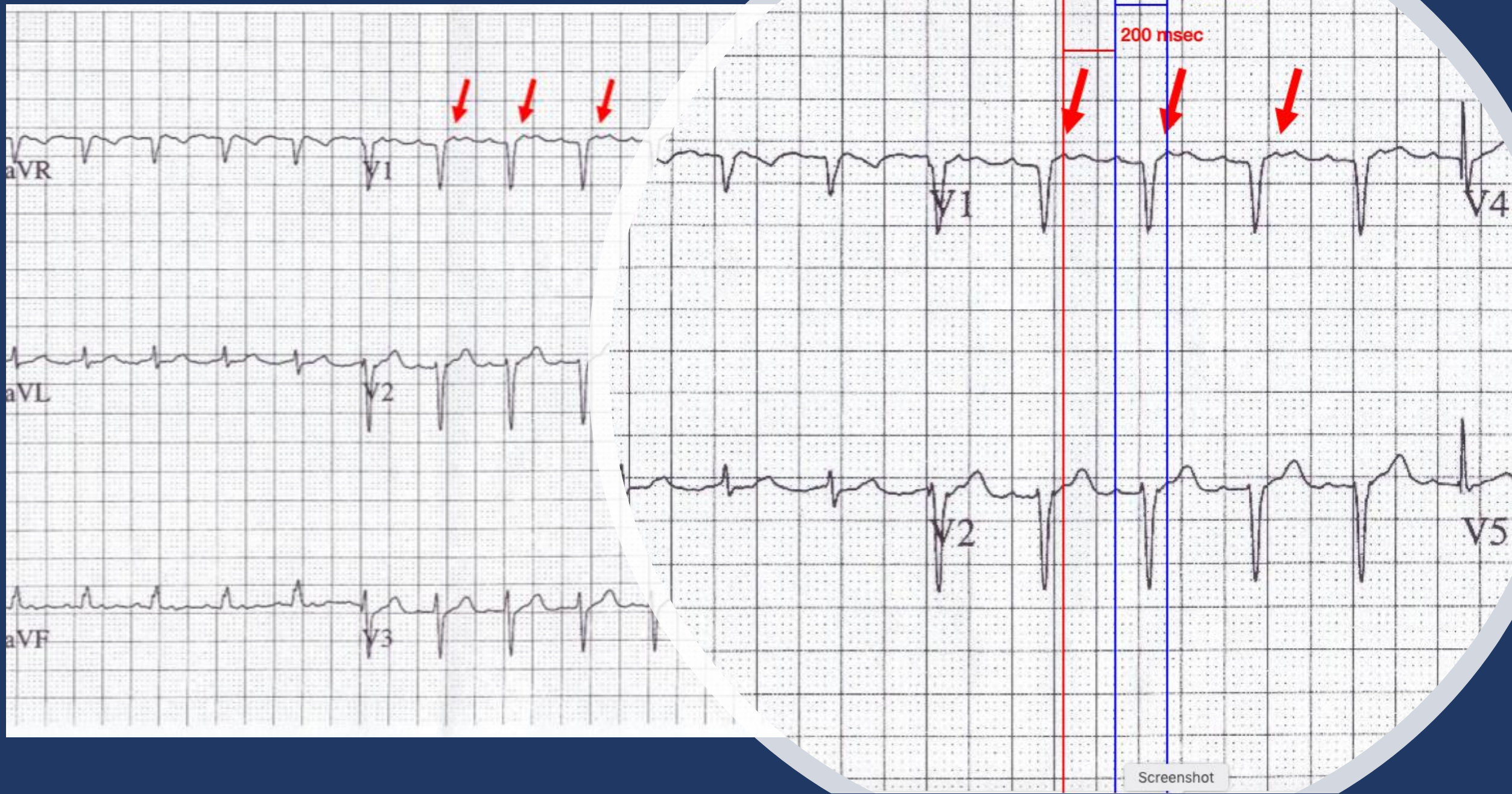
ESC 2019 SVT Guidelines - Management of Atrial Flutter





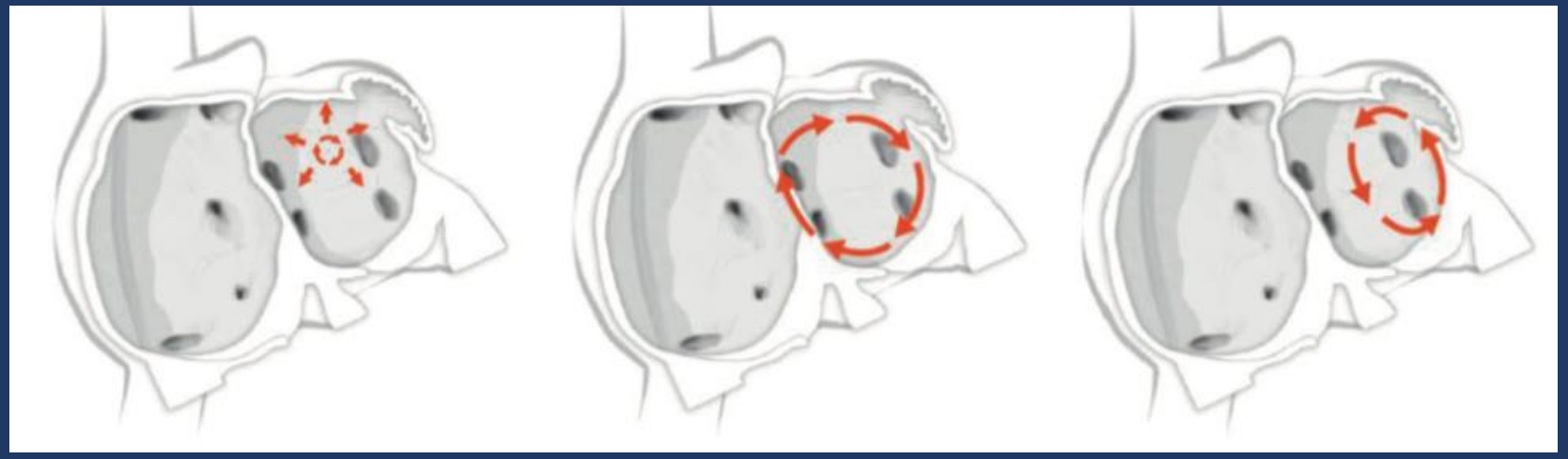
CASE 3 67 M. Persistent AF ablation 2 years ago. PVI & LA roof and inferior line. On NOAC and bisoprolol. Recent treatment for chest infection with ECG reported as sinus tachycardia. Now more SOB. You bring the patient in for an ECG….




aVR
V1
aVL
V2
aVF
V3
200 msec
200 msec
V1
V4
V2
V5
Screenshot

Atrial Tachycardia Post AF ablation

- These tachycardias can occur in up to 50% of patients
- Problematic for patients
- Because tachycardias often incessant and lead to a rapid ventricular response
- Most originate in the LA
- Can sometimes lead to impaired LV systolic function
- Rhythm control is often difficult with AADs - inevitably requires redo catheter ablation



Localised re-entry

Perimitral atrial flutter

Roof-dependent atrial flutter