ECG Challenge

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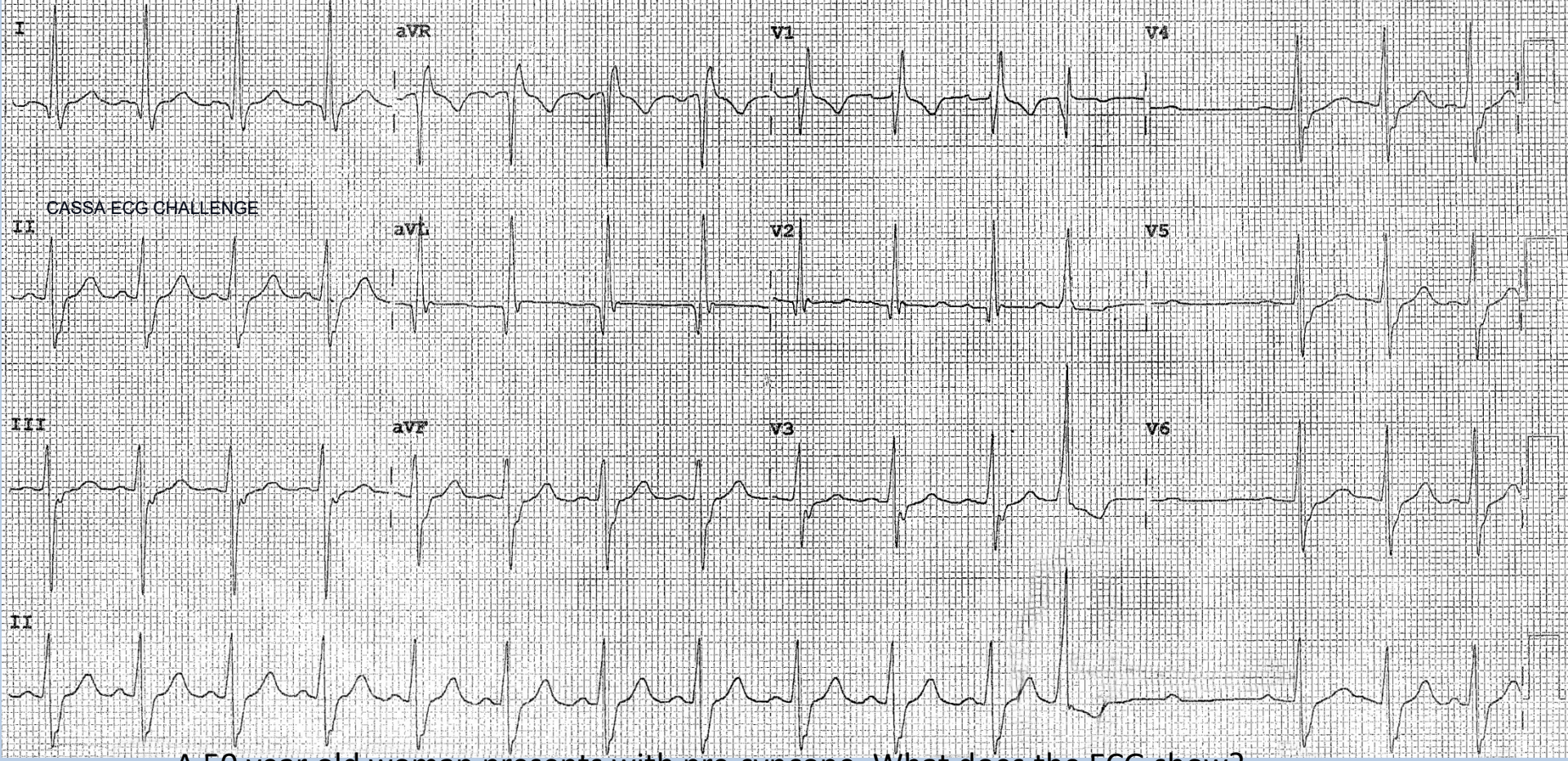
South Africa

CASSA
CARDIAC ARRHYTHMIA SOCIETY OF SOUTHERN AFRICA
A SPECIAL INTEREST GROUP OF SA HEART ASSOCIATION

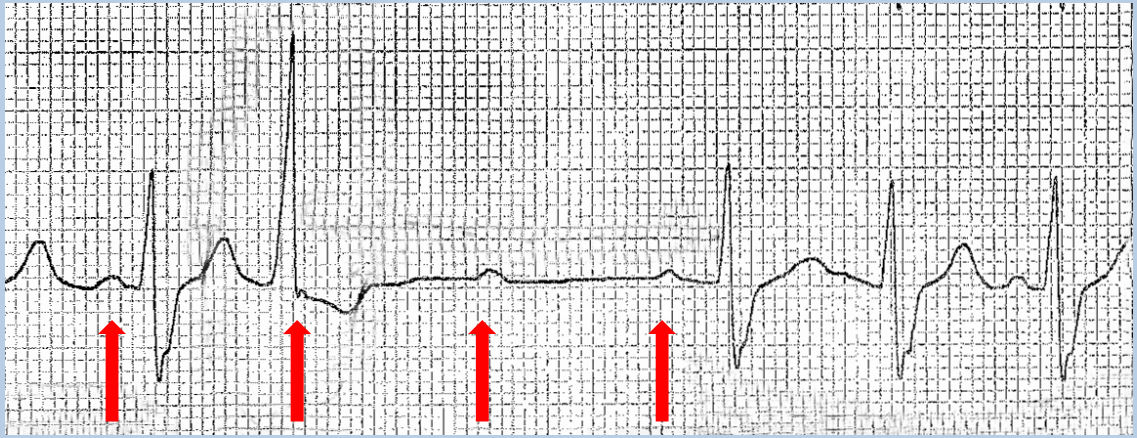
SPES BONA



A 50 year old woman presents with pre-syncope. What does the ECG show?

a. Sinus rhythm with bifascicular block with post PVC compensatory pause
b. Sinus rhythm with bifascicular block and paroxysmal AV block

Post PVC compensatory pause



Paroxysmal AV block

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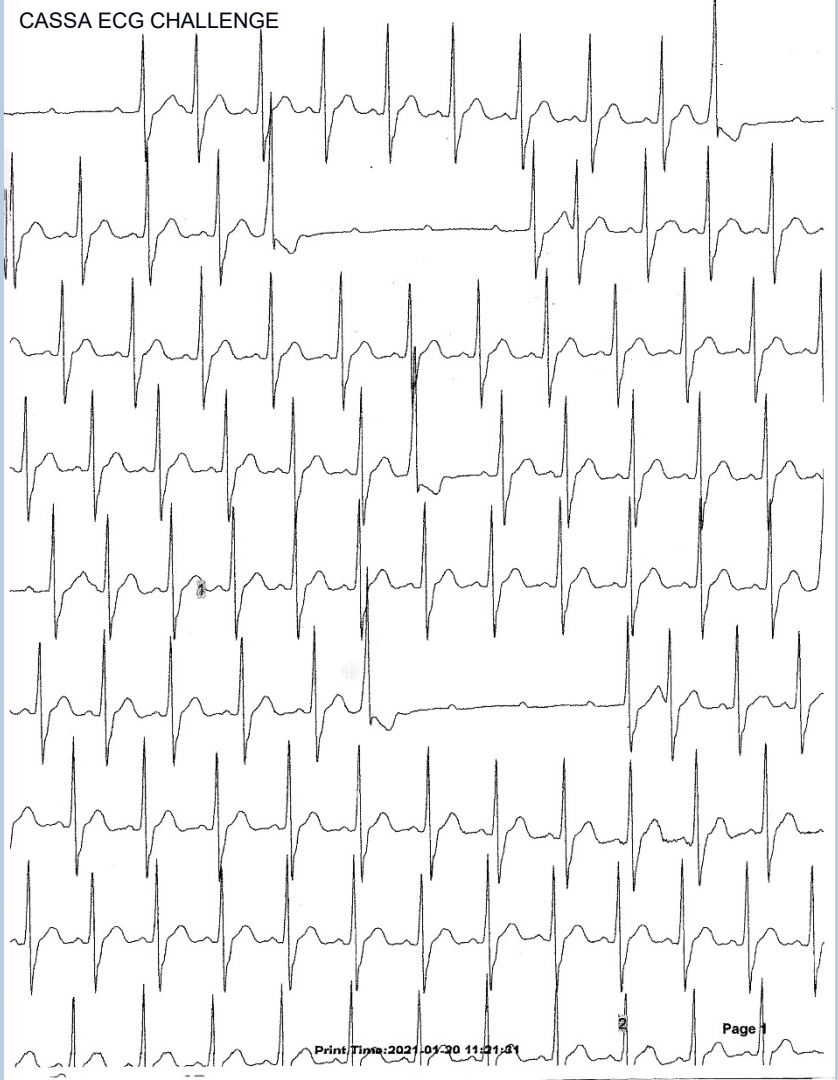

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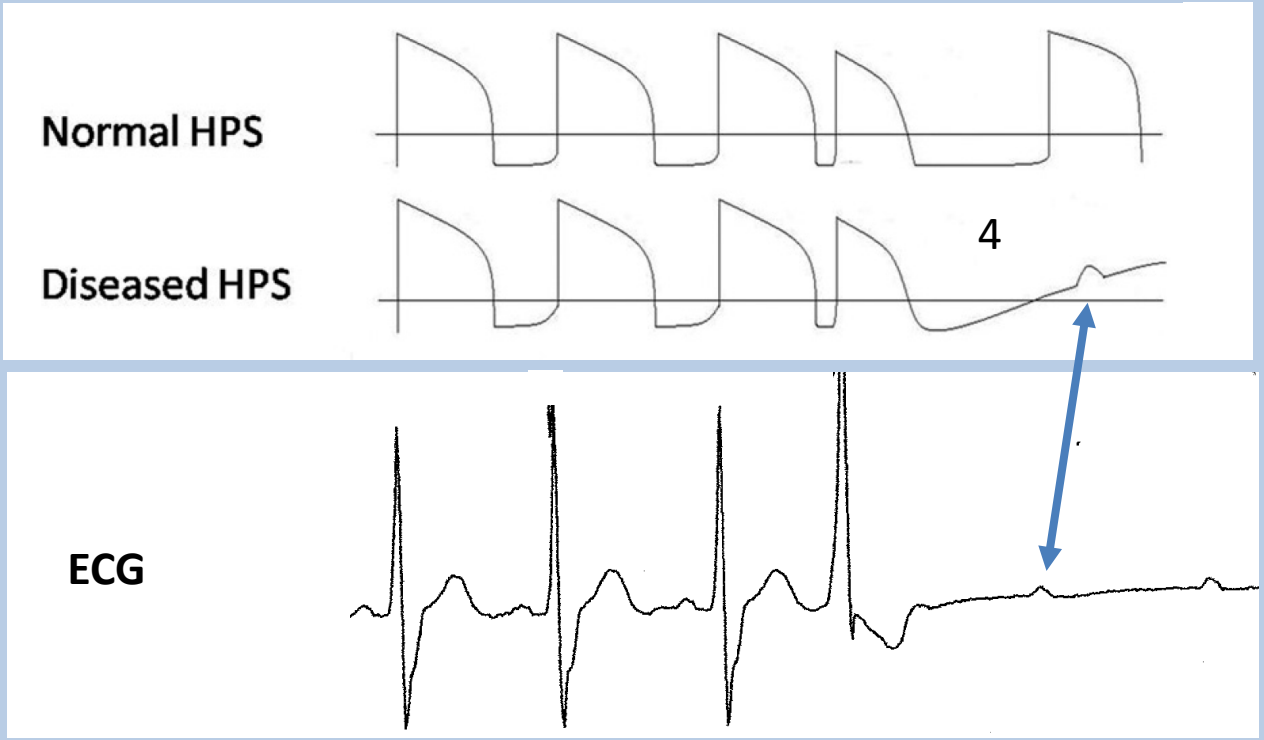
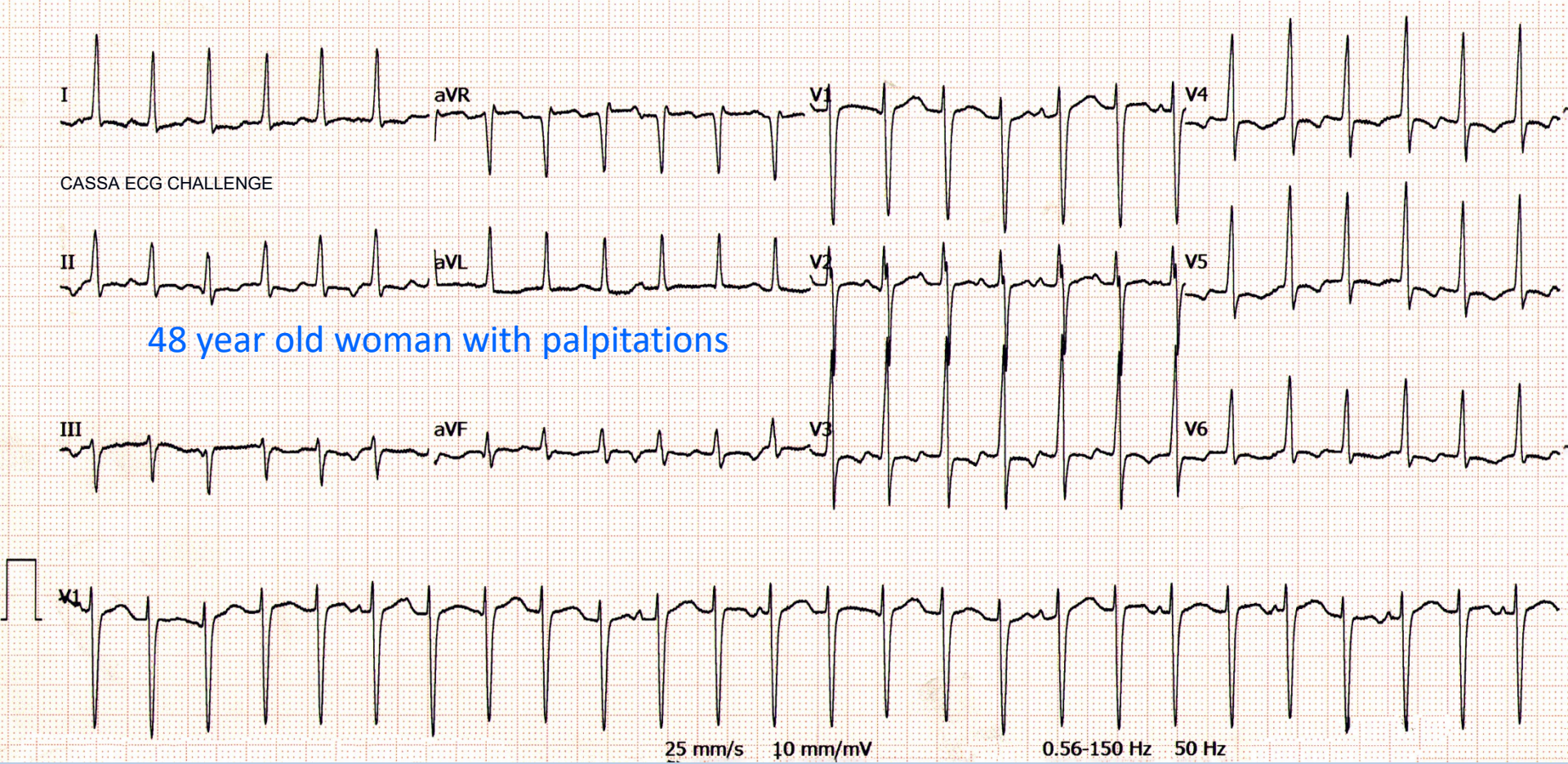


Paroxysmal phase 4 block

Disease of the HPS (infra-nodal block)

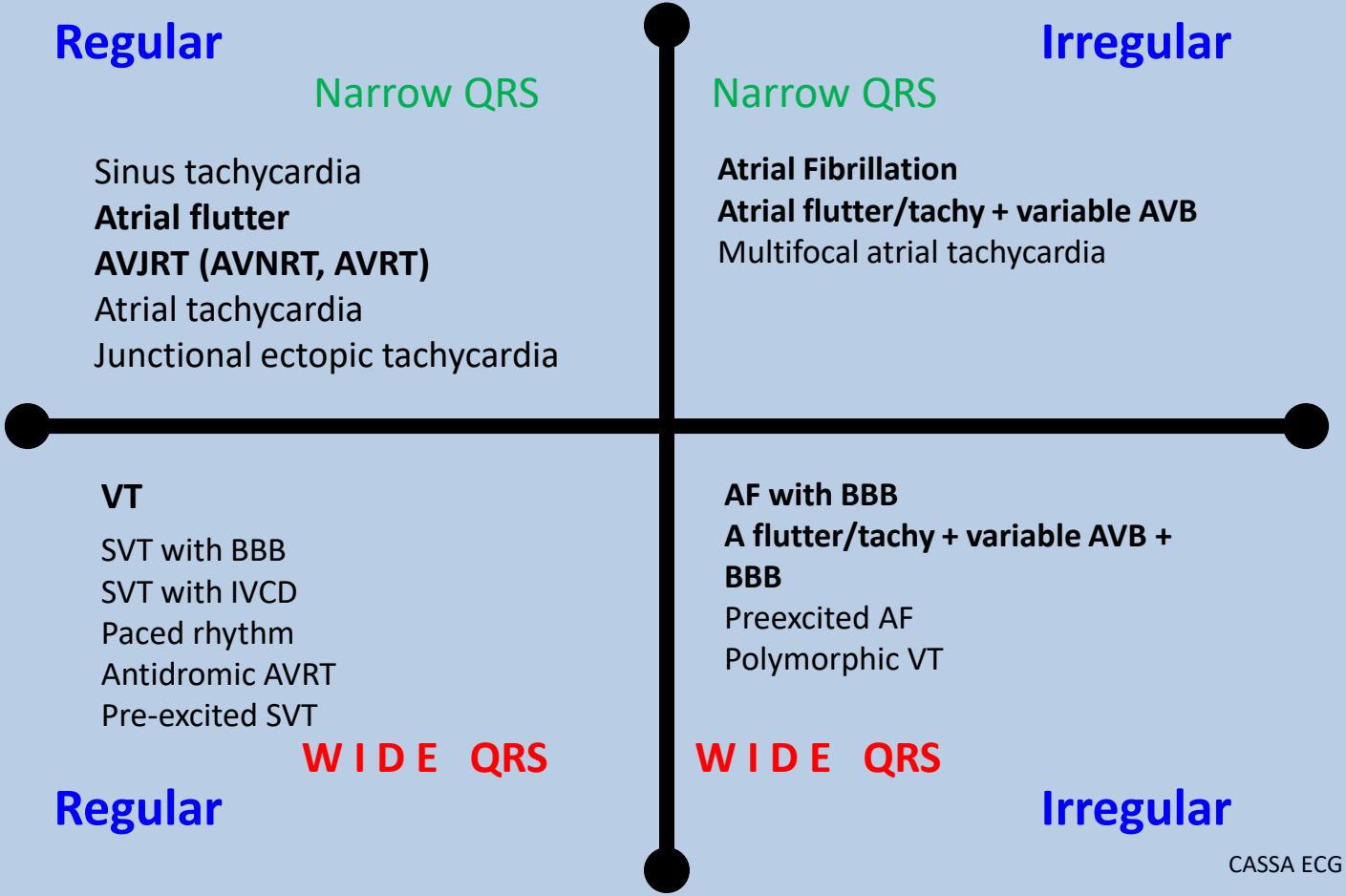
After a long pause (e.g. post PVC), fibres of the diseased His/bundles depolarize and become less or non-responsive to due to Na channel inhibition

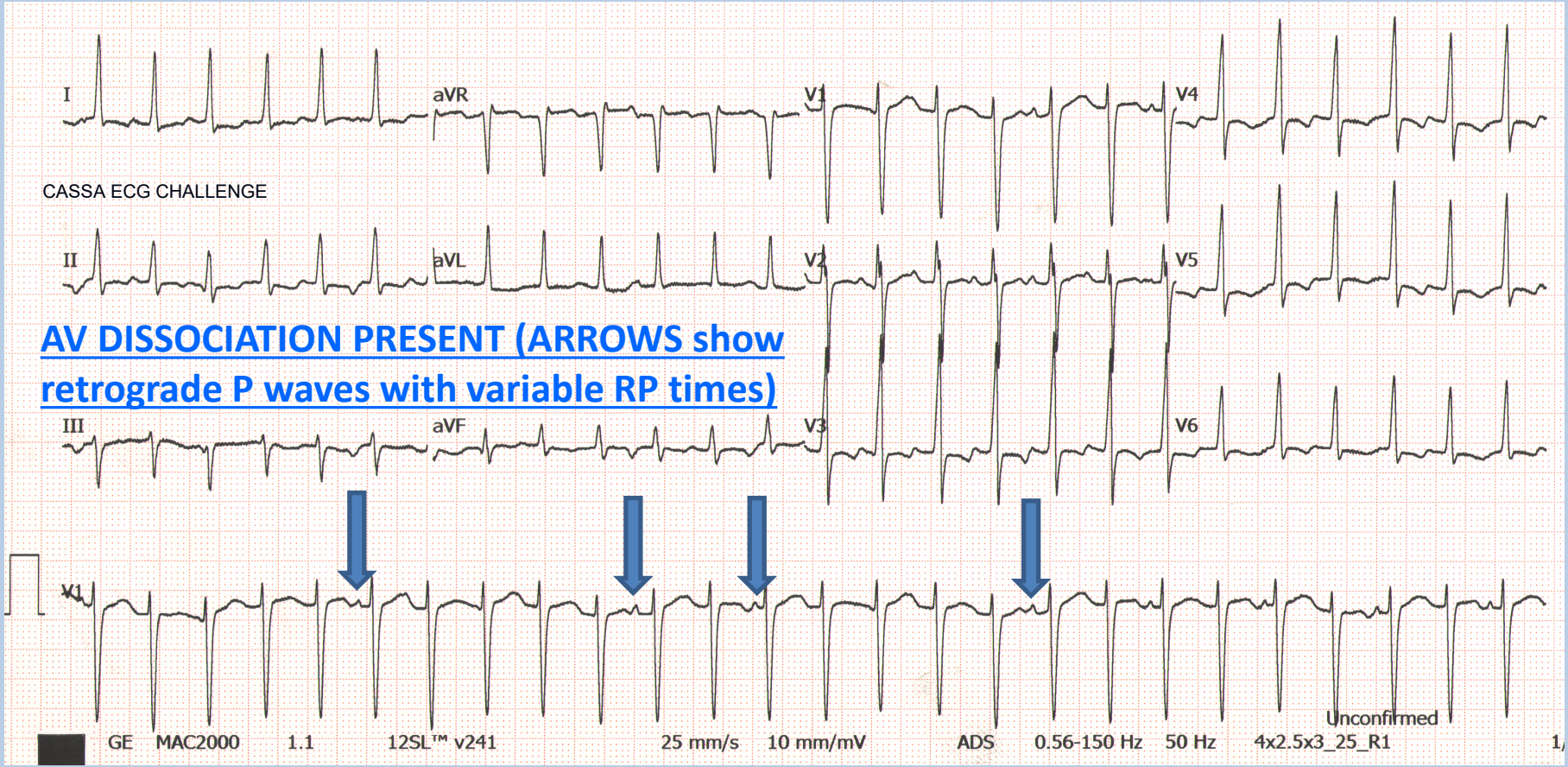


Which ONE of the following is the best ECG diagnosis?

a. AV nodal re-entrant tachycardia
b. Atrial tachycardia
c. Junctional ectopic tachycardia
d. Other

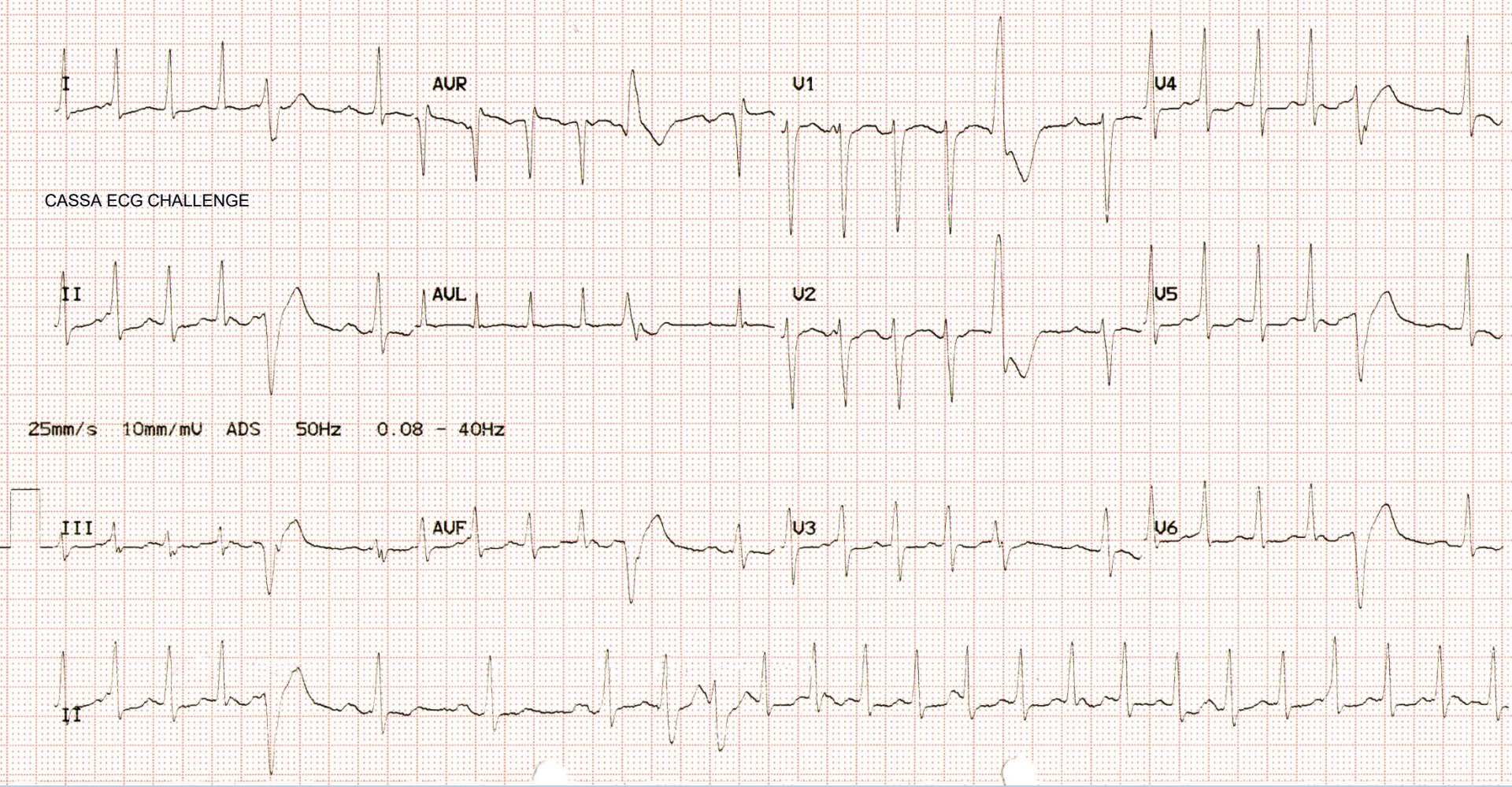
TACHYARRHYTHMIAS



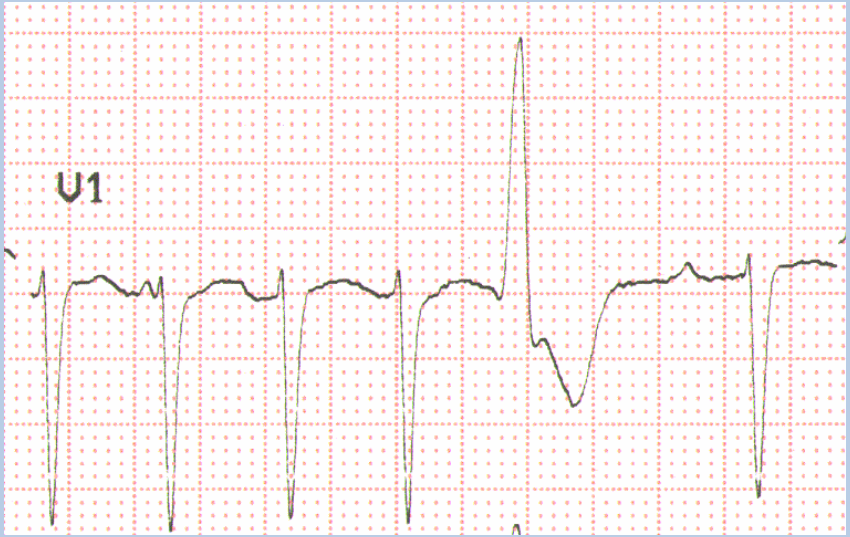


Differential diagnoses:

- JET
- AVNRT with VA block
- Nodofascicular/nodoventricular tachycardia (VT)



Initiation and termination of tachycardia



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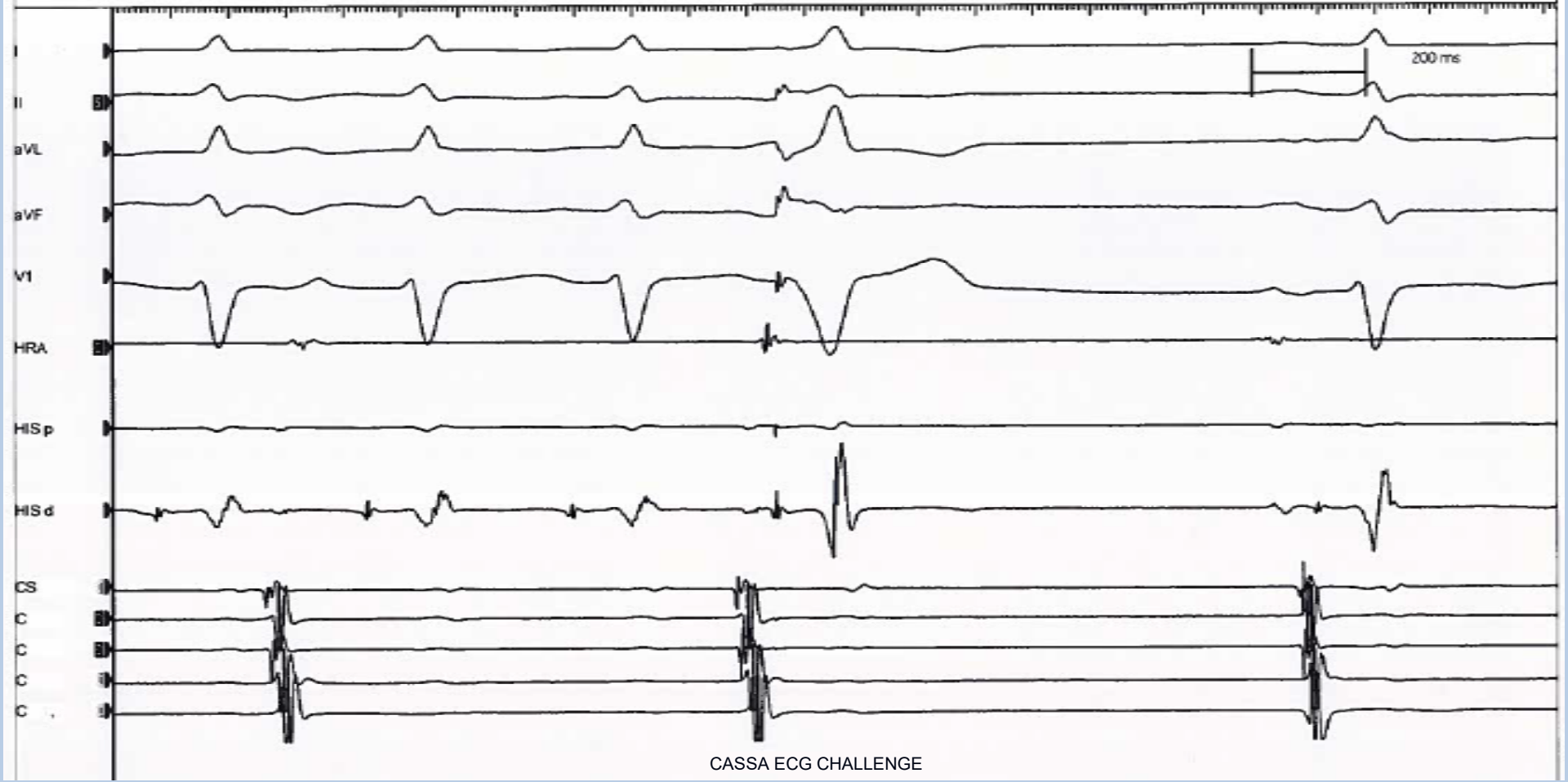
<u>Termination of tachycardia</u>

Terminates with a PVC (unlikely to be a JET)

PVC coincides with His refractoriness (fused PVC) excludes AVNRT

<u>Initiation of tachycardia</u>

1:2 response (unlikely to be a JET)



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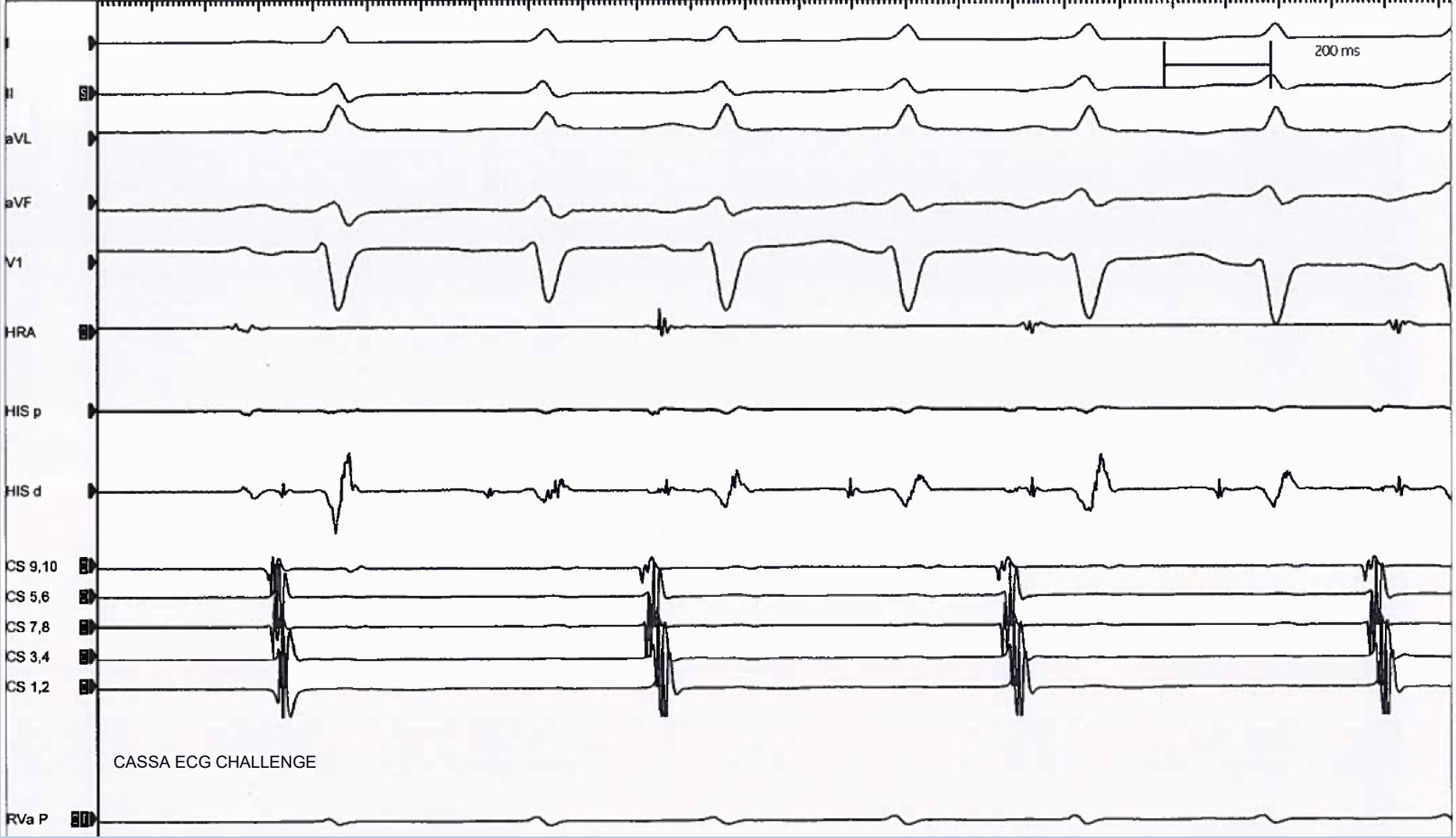
I
II
aVL
aVF
V1
HRA
HIS p
HIS d
CS 9,10
CS 5,6
CS 7,8
CS 3,4
CS 1,2
200 ms
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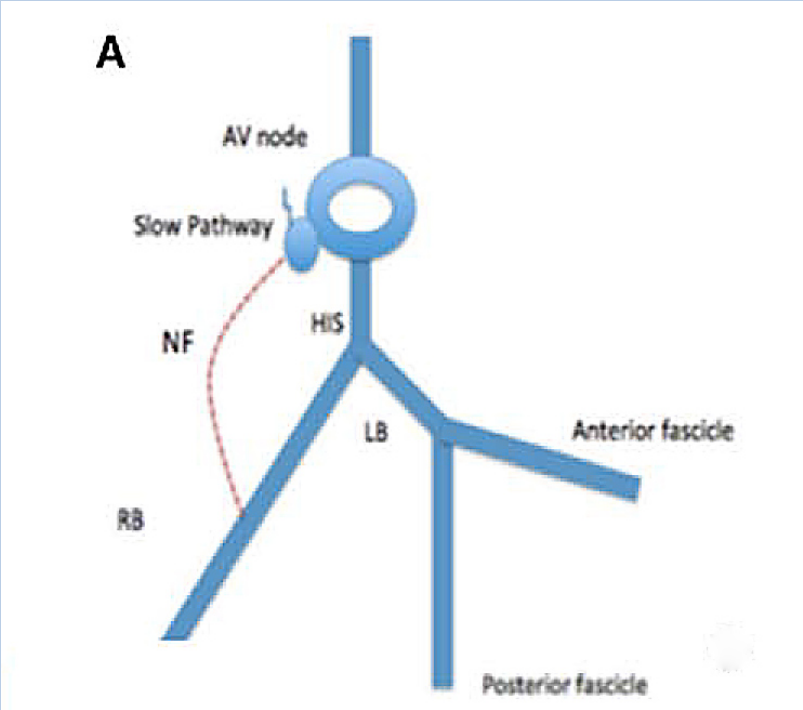
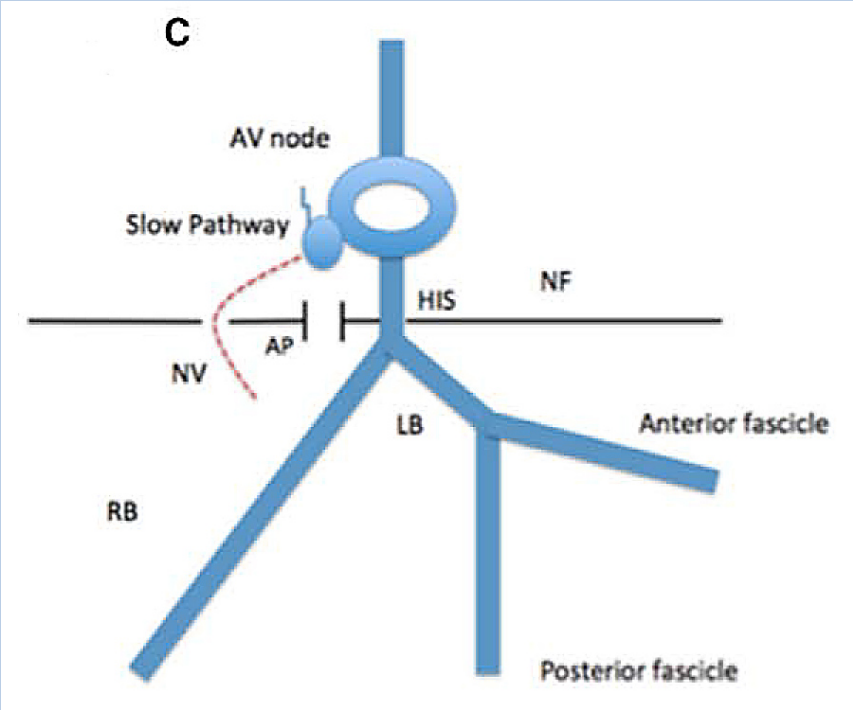
RVa P

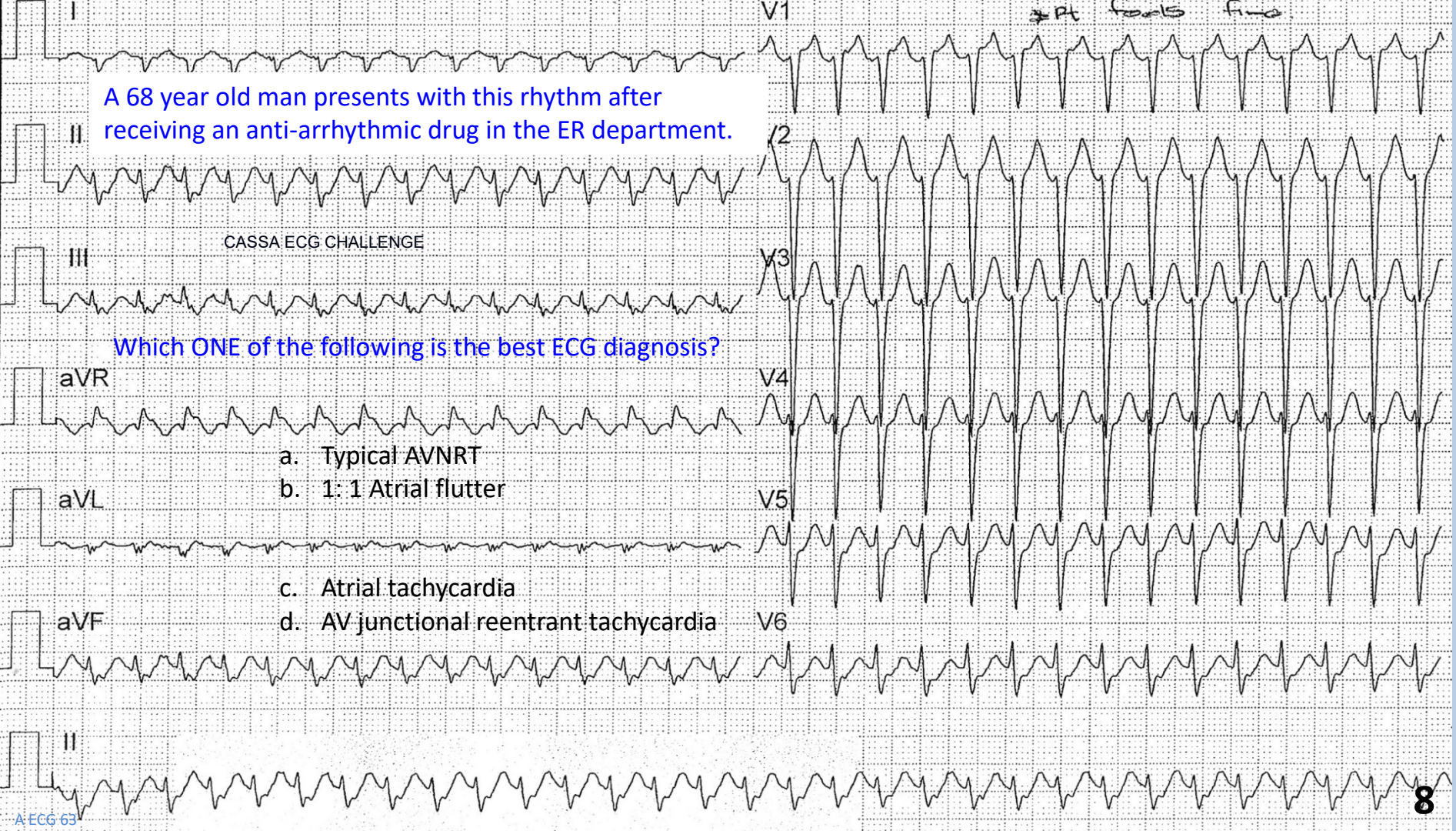
Nodofascicular pathway



Nodoventricular pathway



Hoffmayer et al., Circ EP, 2015

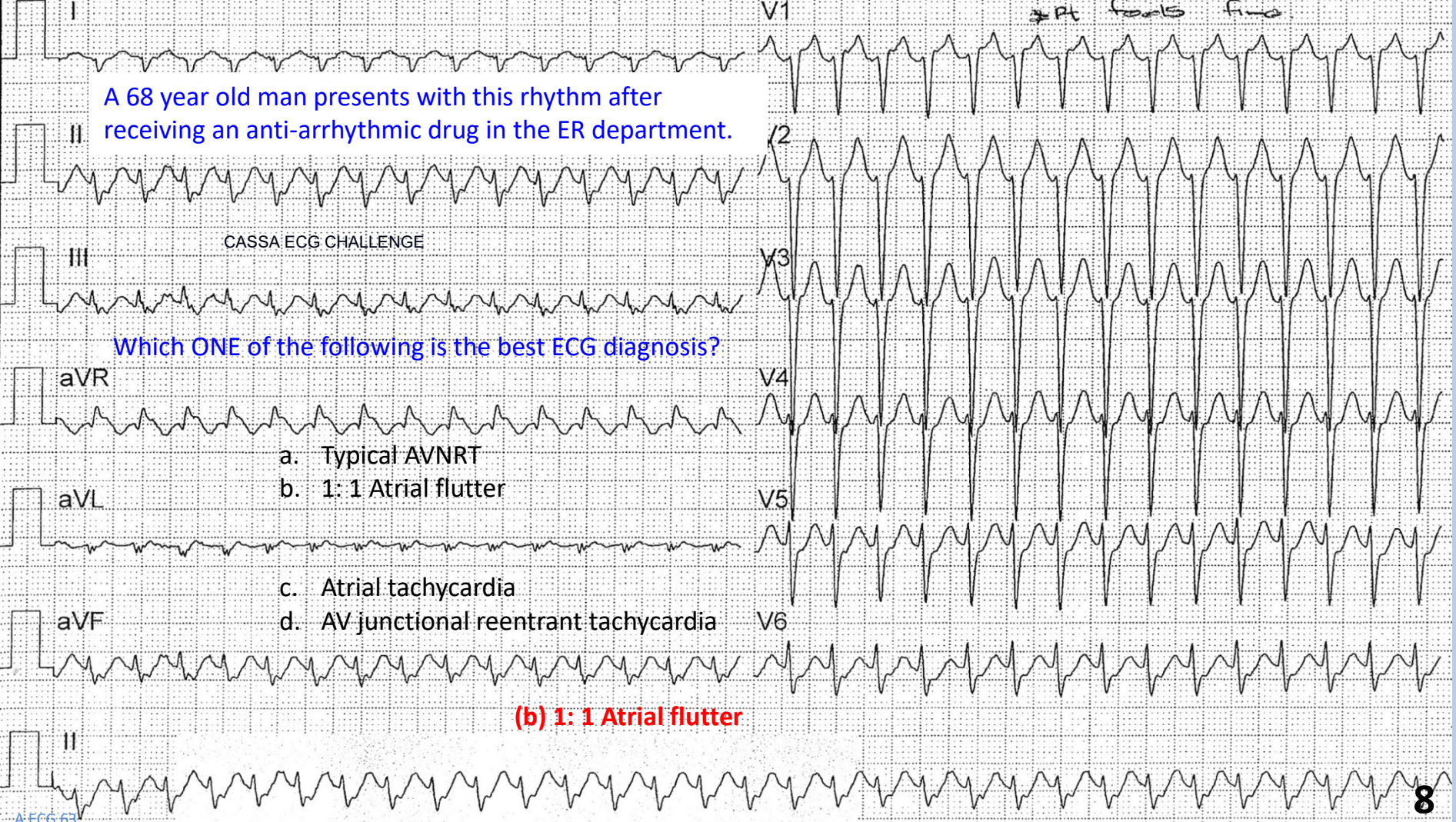


A 68 year old man presents with this rhythm after receiving an anti-arrhythmic drug in the ER department.

CASSA ECG CHALLENGE

Which ONE of the following is the best ECG diagnosis?

a. Typical AVNRT
b. 1: 1 Atrial flutter
c. Atrial tachycardia
d. AV junctional reentrant tachycardia



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CASSA ECG CHALLENGE

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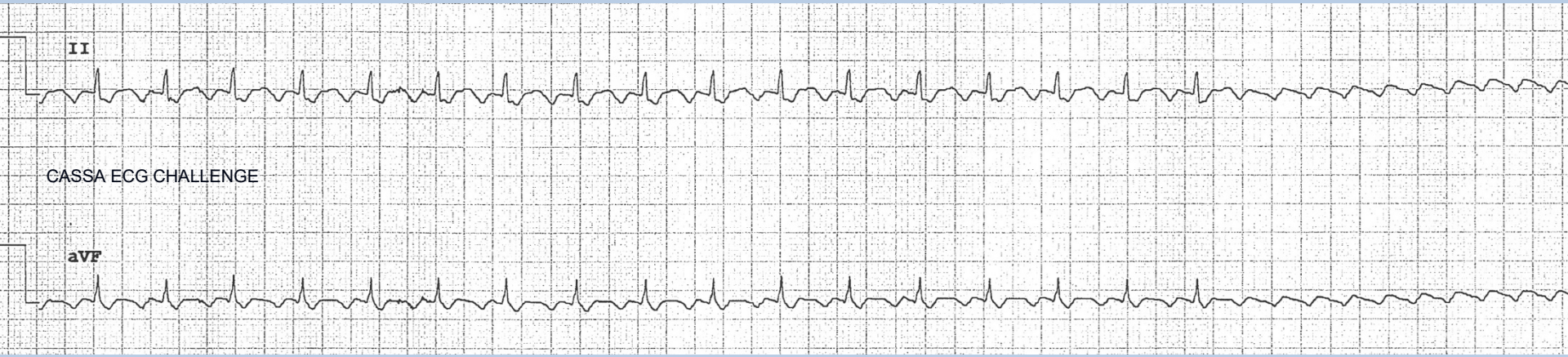
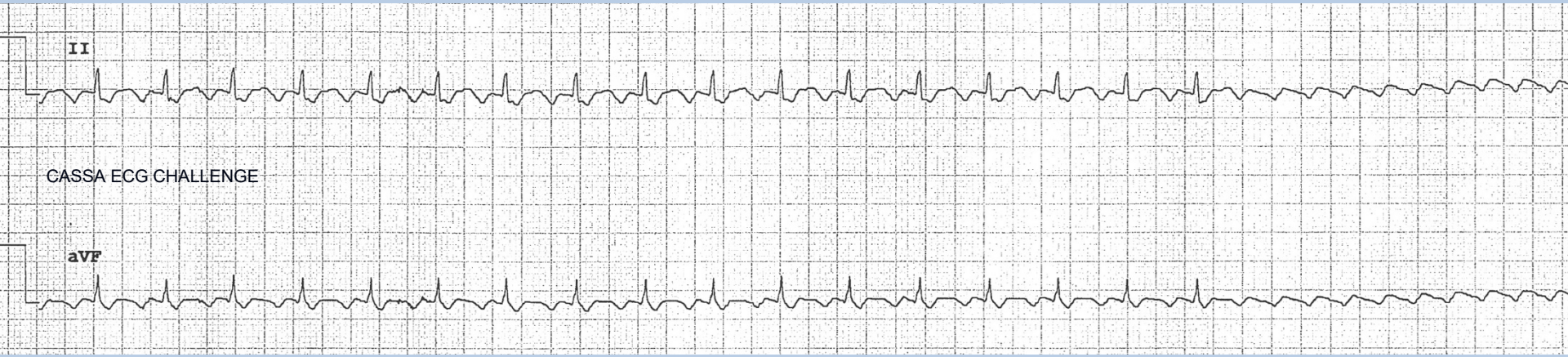
(b) 1: 1 Atrial flutter



You find the rhythm strip of the presenting arrhythmia with carotid sinus massage. What is the diagnosis?

What anti-arrhythmic drug did the patient most likely receive?

- Disopyramide
- Flecainide
- Amiodarone
- Sotalol



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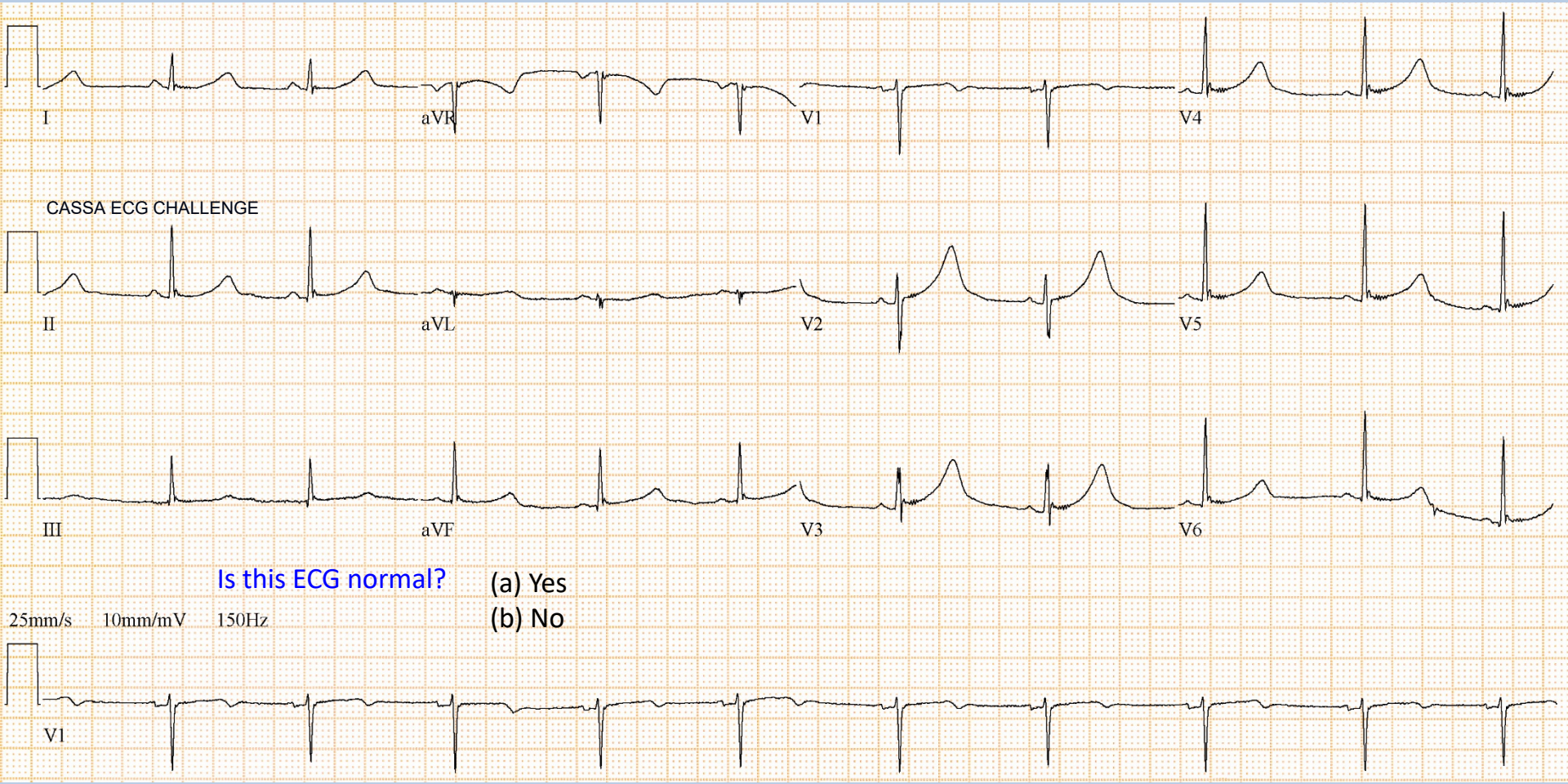
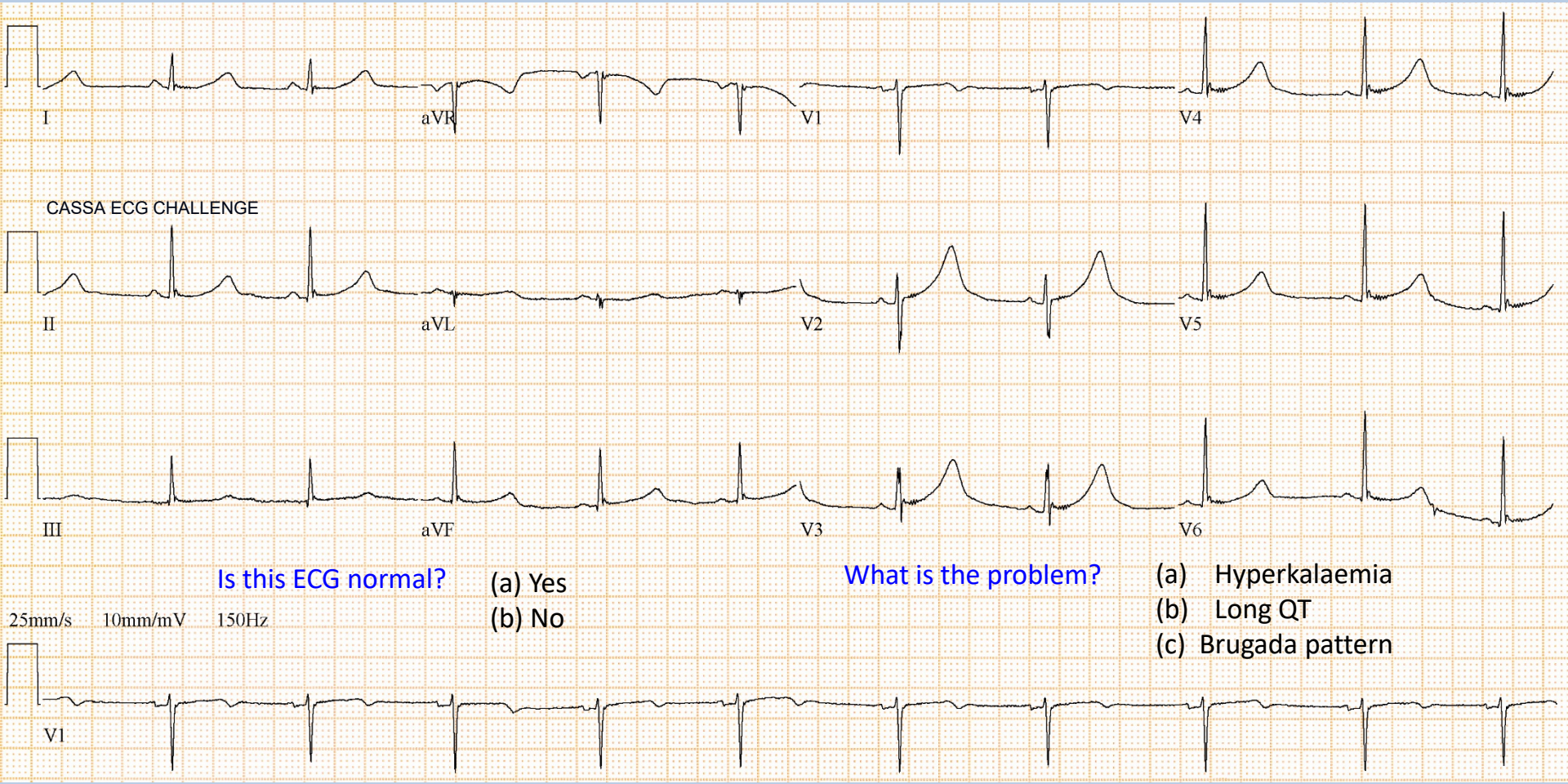
Flecainide (Tambocor)


I
aVR
V1
V4
CASSA ECG CHALLENGE
II
aVL
V2
V5
III
aVF
V3
V6
Is this ECG normal?
(a) Yes
(b) No
25mm/s
10mm/mV
150Hz
V1

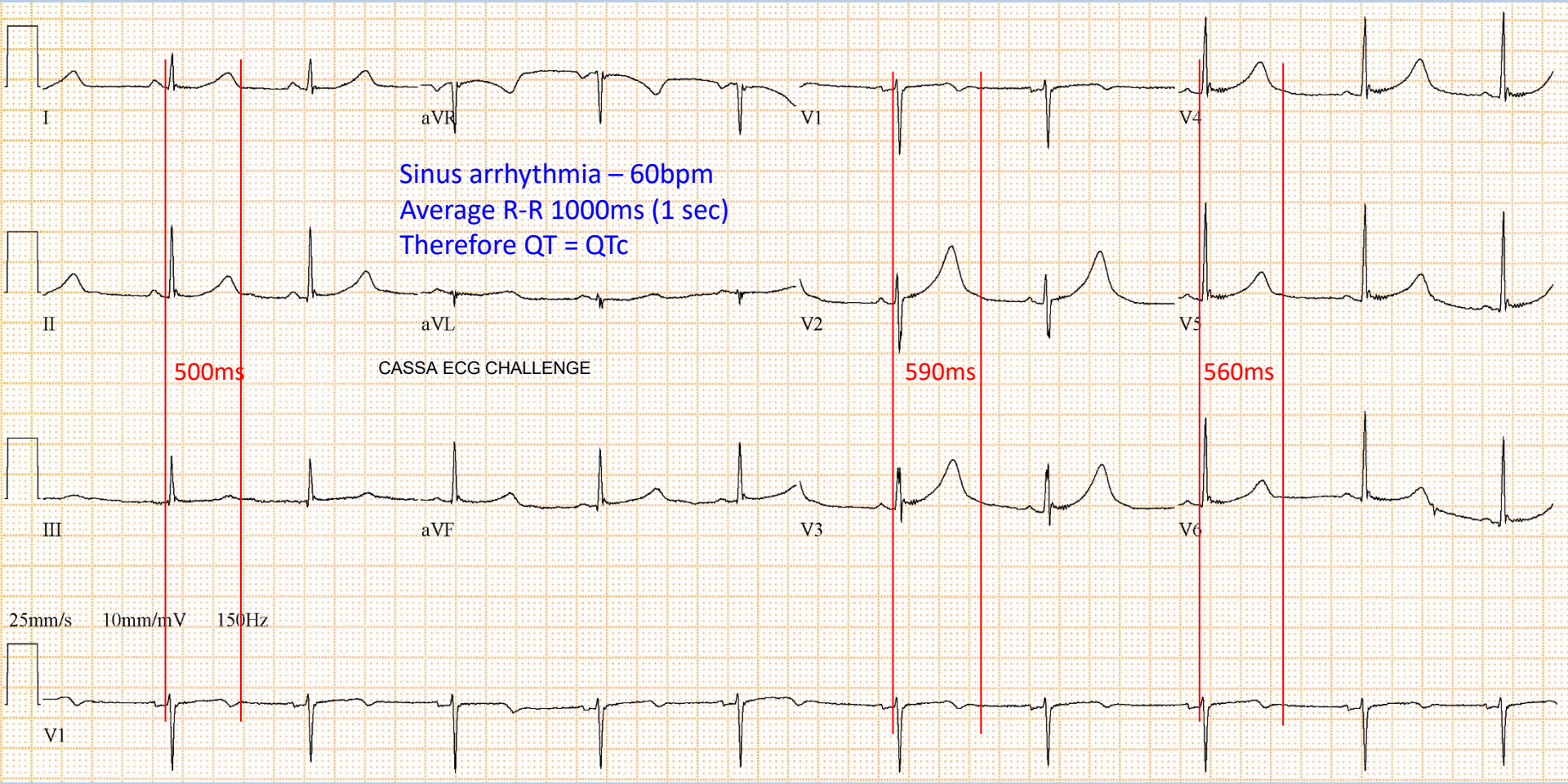


Is this ECG normal?

(a) Yes
(b) No

What is the problem?

(a) Hyperkalaemia
(b) Long QT
(c) Brugada pattern


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
25mm/s
10mm/mV
150Hz
Sinus arrhythmia – 60bpm
Average R-R 1000ms (1 sec)
Therefore QT = QTc
500ms
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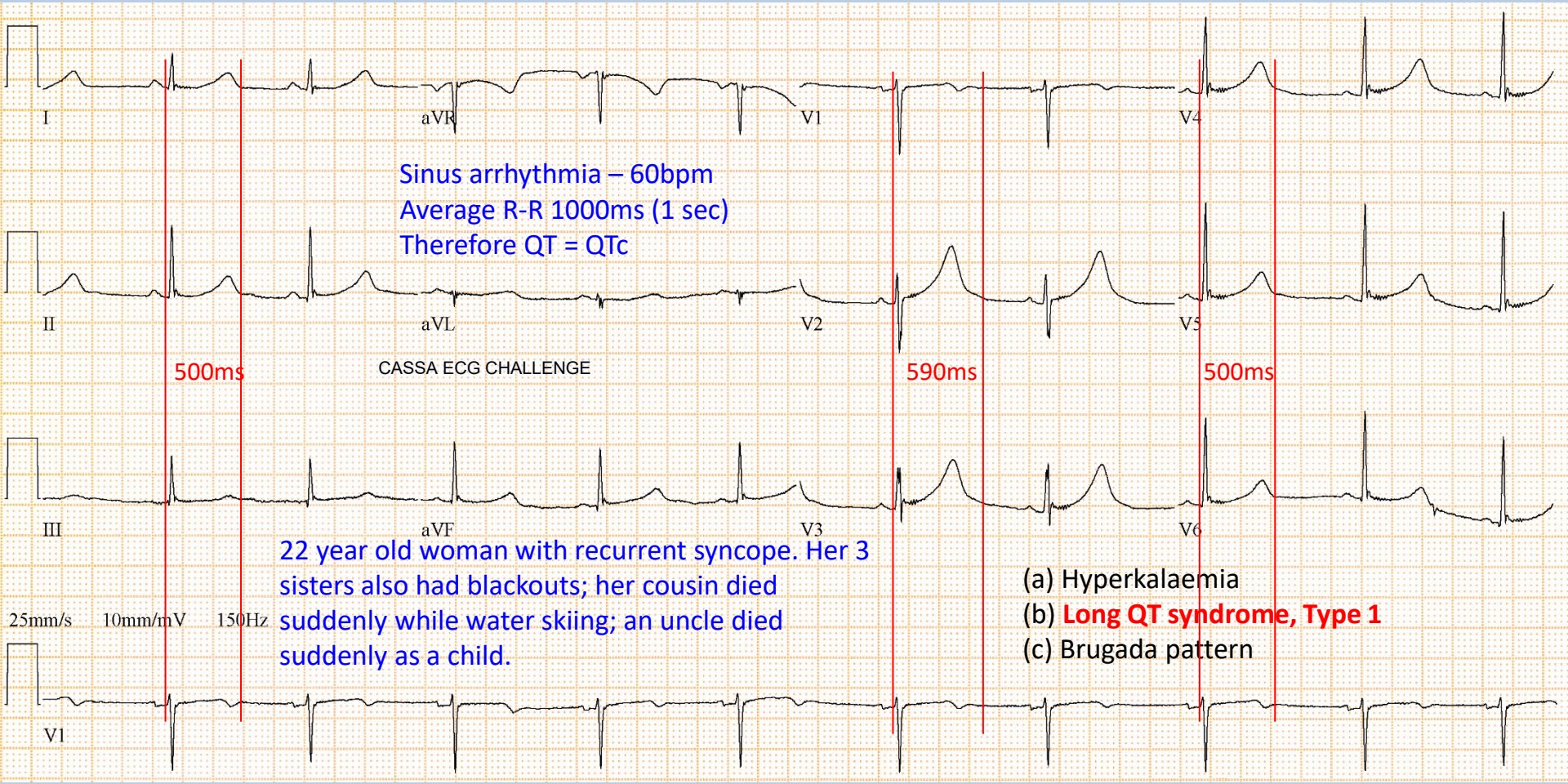
590ms
560ms


I
aVR
V1
V4
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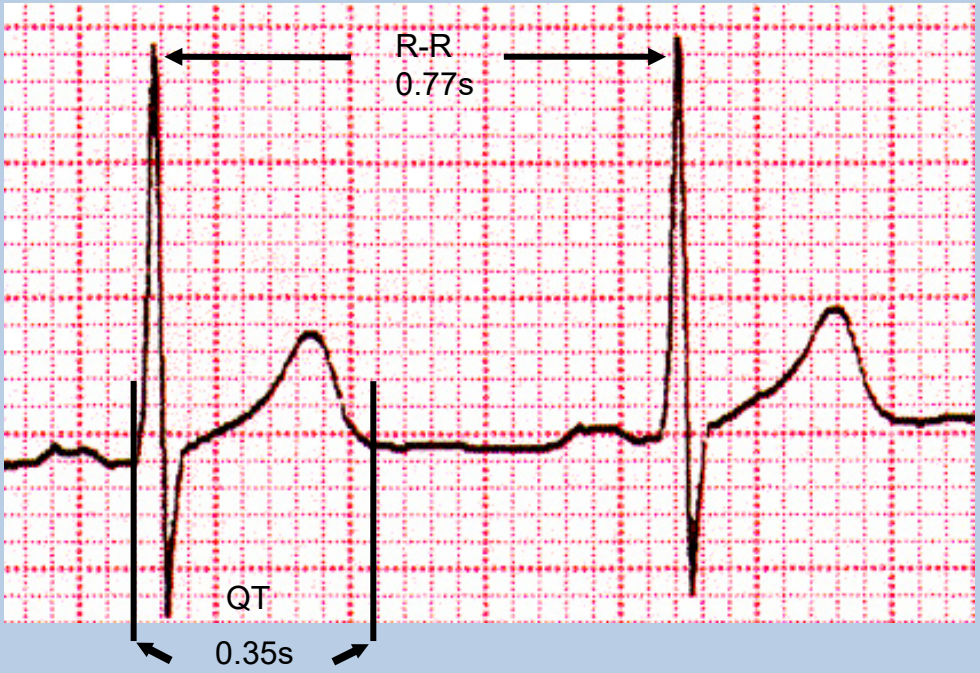
25mm/s
10mm/mV
150Hz
Sinus arrhythmia – 60bpm
Average R-R 1000ms (1 sec)
Therefore QT = QTc
500ms
CASSA ECG CHALLENGE
590ms
500ms
22 year old woman with recurrent syncope. Her 3 sisters also had blackouts; her cousin died suddenly while water skiing; an uncle died suddenly as a child.
(a) Hyperkalaemia
(b) Long QT syndrome, Type 1
(c) Brugada pattern

Q-T: beginning of QRS to end of T

Measure longest QT – usually V2 – V4

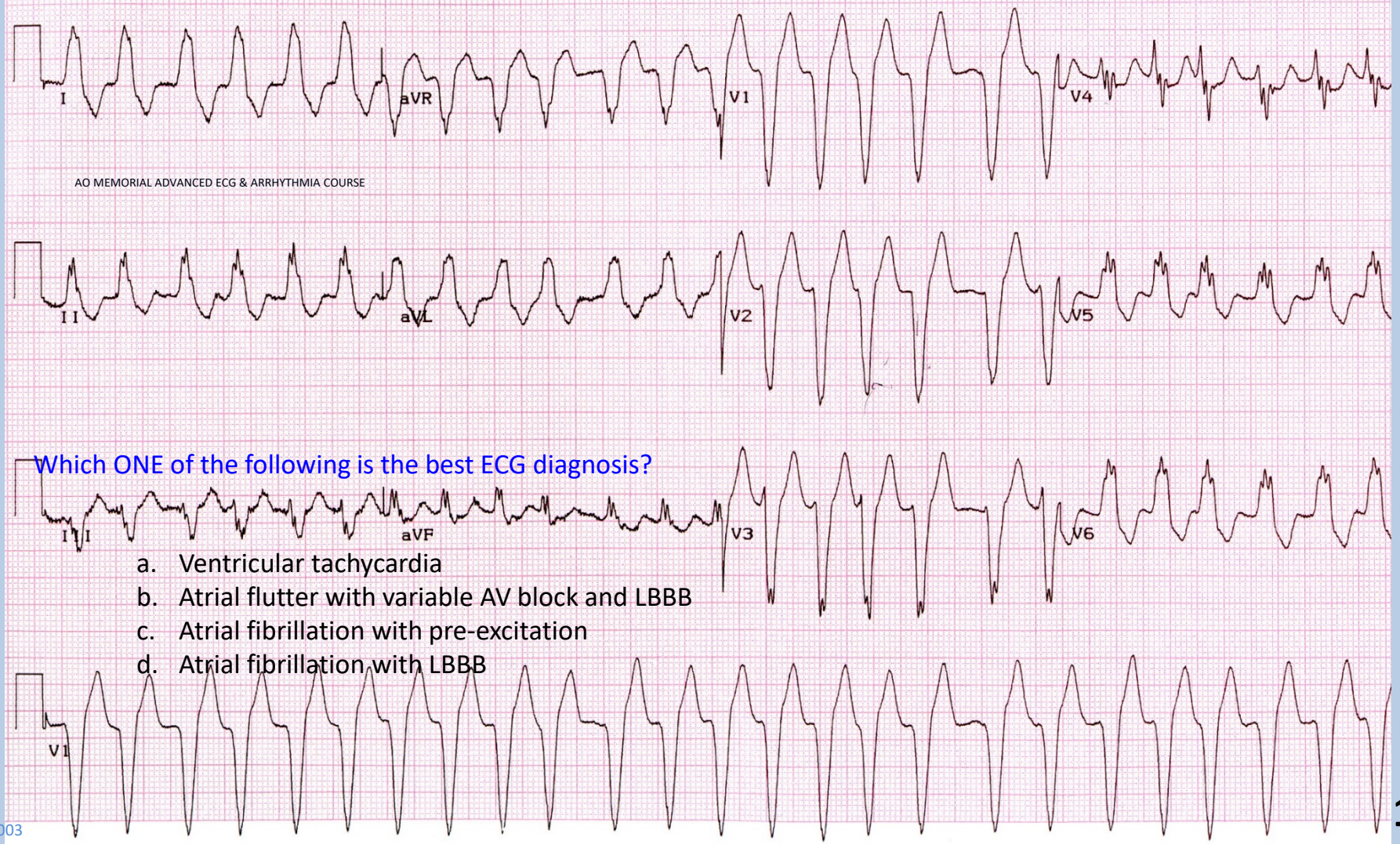


Bazett's formula:

$$QTc = \frac{Q\text{-}T}{\sqrt{R\text{-}R}}$$

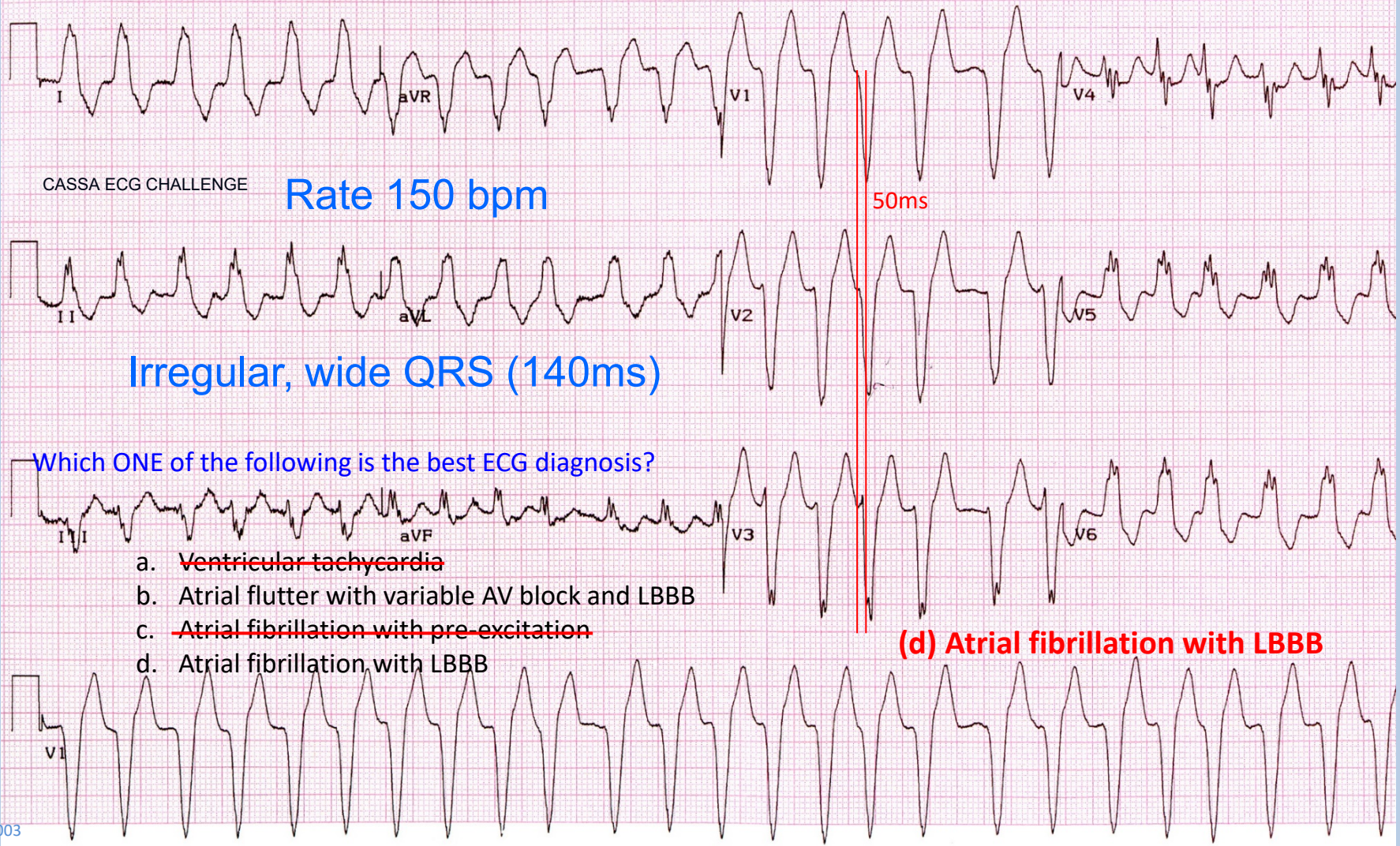
$$\frac{0.35}{\sqrt{0.77}} = 0.39$$

Normal QTc:
<= 0.44 (440ms) – males
<= 0.46 (460ms) - females



Which ONE of the following is the best ECG diagnosis?

a. Ventricular tachycardia
b. Atrial flutter with variable AV block and LBBB
c. Atrial fibrillation with pre-excitation
d. Atrial fibrillation with LBBB



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Rate 150 bpm

50ms

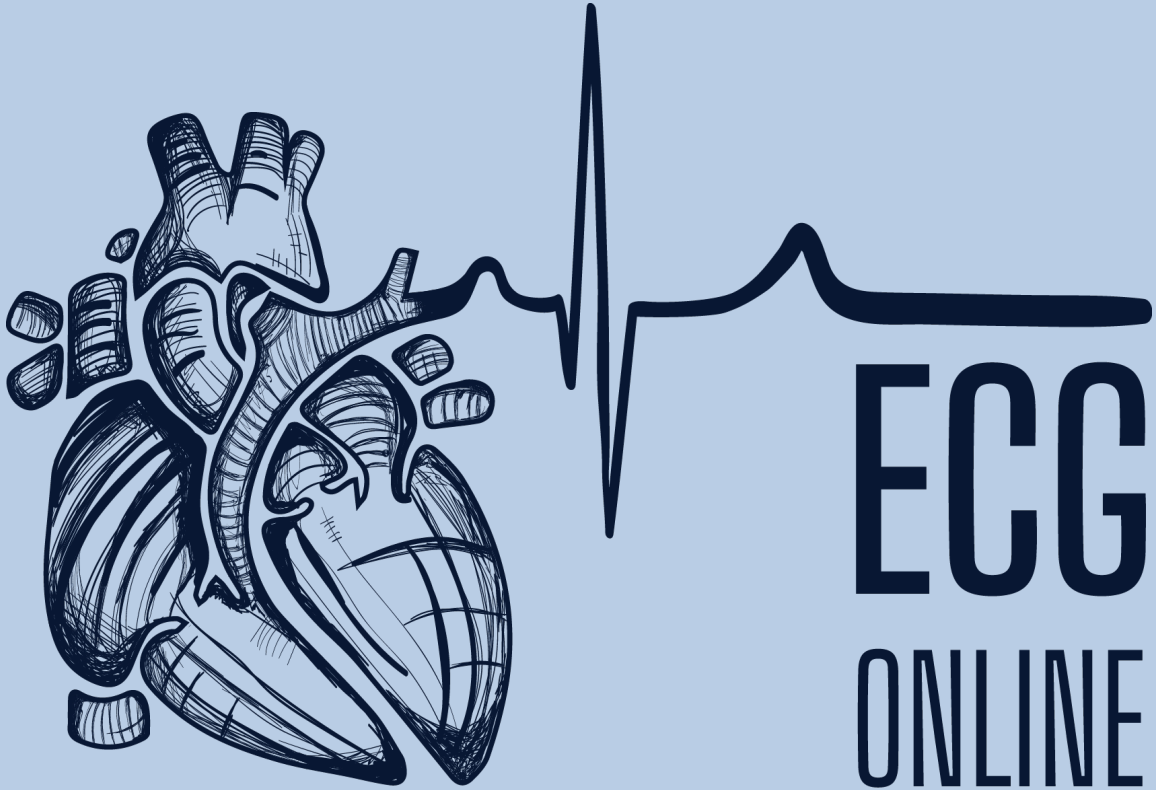
Irregular, wide QRS (140ms)

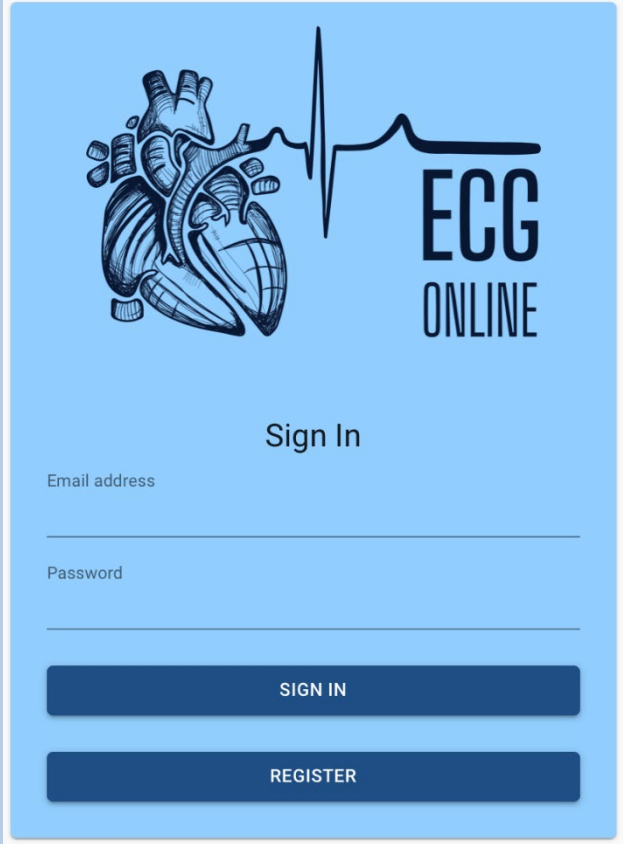
Which ONE of the following is the best ECG diagnosis?

a. ~~Ventricular tachycardia~~
b. Atrial flutter with variable AV block and LBBB
c. ~~Atrial fibrillation with pre-excitation~~
d. Atrial fibrillation with LBBB

(d) Atrial fibrillation with LBBB

- Free download
- You will find answers to a lot of your questions in this app
- The app has been redesigned and updated – new version to be released soon
- The new version will include searchable terms and clinical correlations





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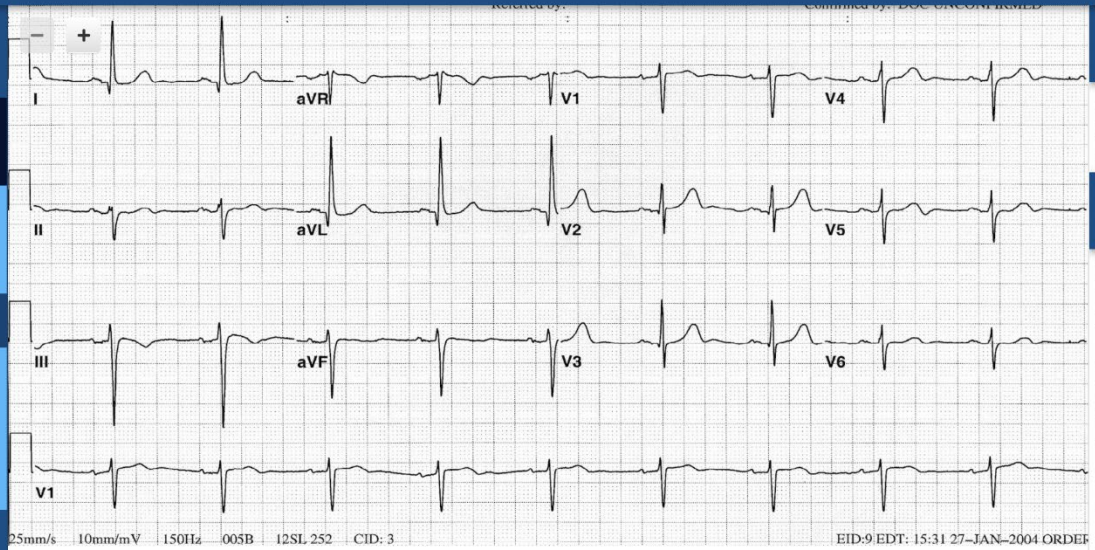
- Step 1 Rhythm analysis
- Step 2 Waveform analysis
- P wave
- PR interval
- QRS complex
- ST segment
- T wave
- QT interval
- Step 3 Conclusion



QRS width: 80 ms

QRS axis: -45 degrees

- [x] Normal morphology
- [ ] Complete RBBB
- [ ] Incomplete RBBB
- [ ] Complete LBBB
- [ ] Incomplete LBBB
- [ ] Atypical / bizarre wide QRS
- [ ] Delta waves
- [ ] J waves
- [ ] Epsilon waves
- [ ] Variable QRS morphology

- ( ) Normal axis
- ( ) Right axis deviation
- (•) Left axis deviation
- ( ) Extreme axis deviation

- [ ] Normal R wave progression
- [x] Poor R wave progression
- [ ] Dominant R in V1
- [ ] Increased left ventricular voltage
- [ ] Low QRS amplitude

- [ ] Pathological Q in inferior leads
- [ ] Pathological Q in anterior leads
- [ ] QS complexes in lateral leads
- [ ] Premature narrow complex
- [ ] Premature wide complex
- [ ] Narrow escape beat / rhythm
- [ ] Wide escape beat / rhythm
- [ ] Capture beat
- [ ] Fusion beat
- [ ] Electrical alternans

Clinical scenario

A 74 year old woman is admitted for elective knee replacement. Prior to the surgery an ECG is done and the Anaesthetist asks your opinion.

Summary of analysis

Regular
Narrow complex
Bradycardia with a ventricular rate of 54

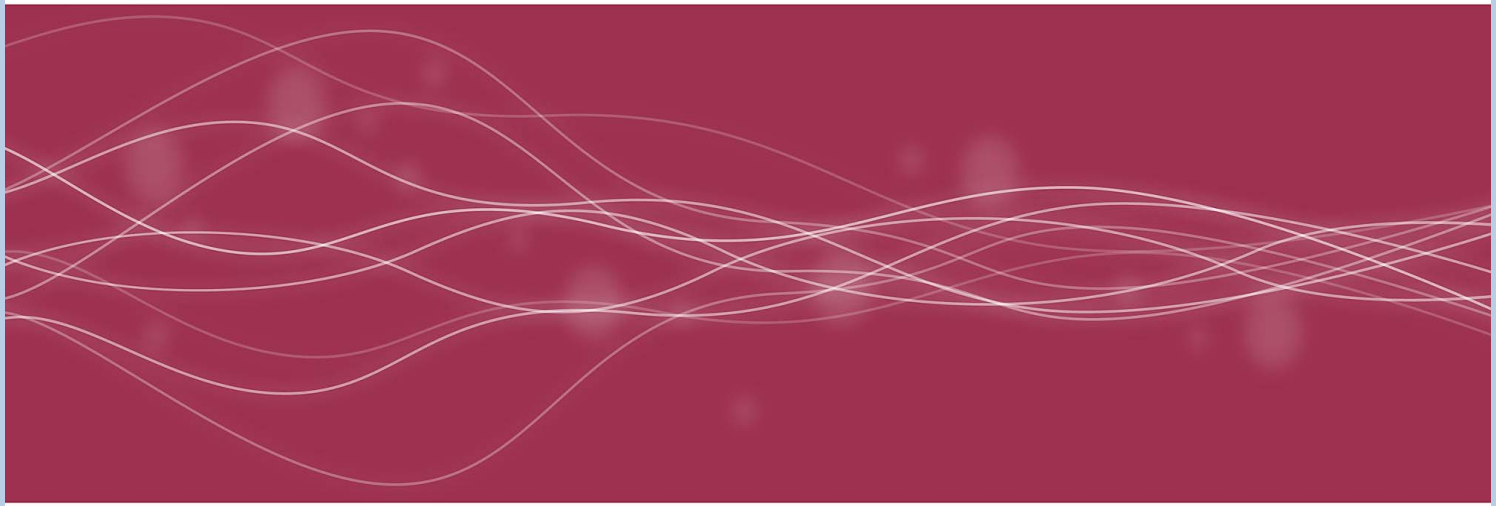
P wave upright in II / inverted in aVR
P wave before every QRS complex
QRS complex after every P wave
Normal P wave morphology

Constant PR interval measuring 160 ms
The PR interval is normal

QRS width 80 ms
Normal QRS morphology
QRS axis -45 degrees
Left axis deviation
Poor R wave progression

Sample ECG

The ECG Atlas of Cardiac Rhythms



Rob Scott Millar

To get the book, go to: http://www.ecgrhythmsatlas.com/