

ECG Interpretation

Dr. Binoy Skaria

binoySkaria@hotmail.com

binoy.skaria@heartofengland.nhs.uk

13/07/15



Acknowledgement

Medtronic, Google images & Elsevier for slides

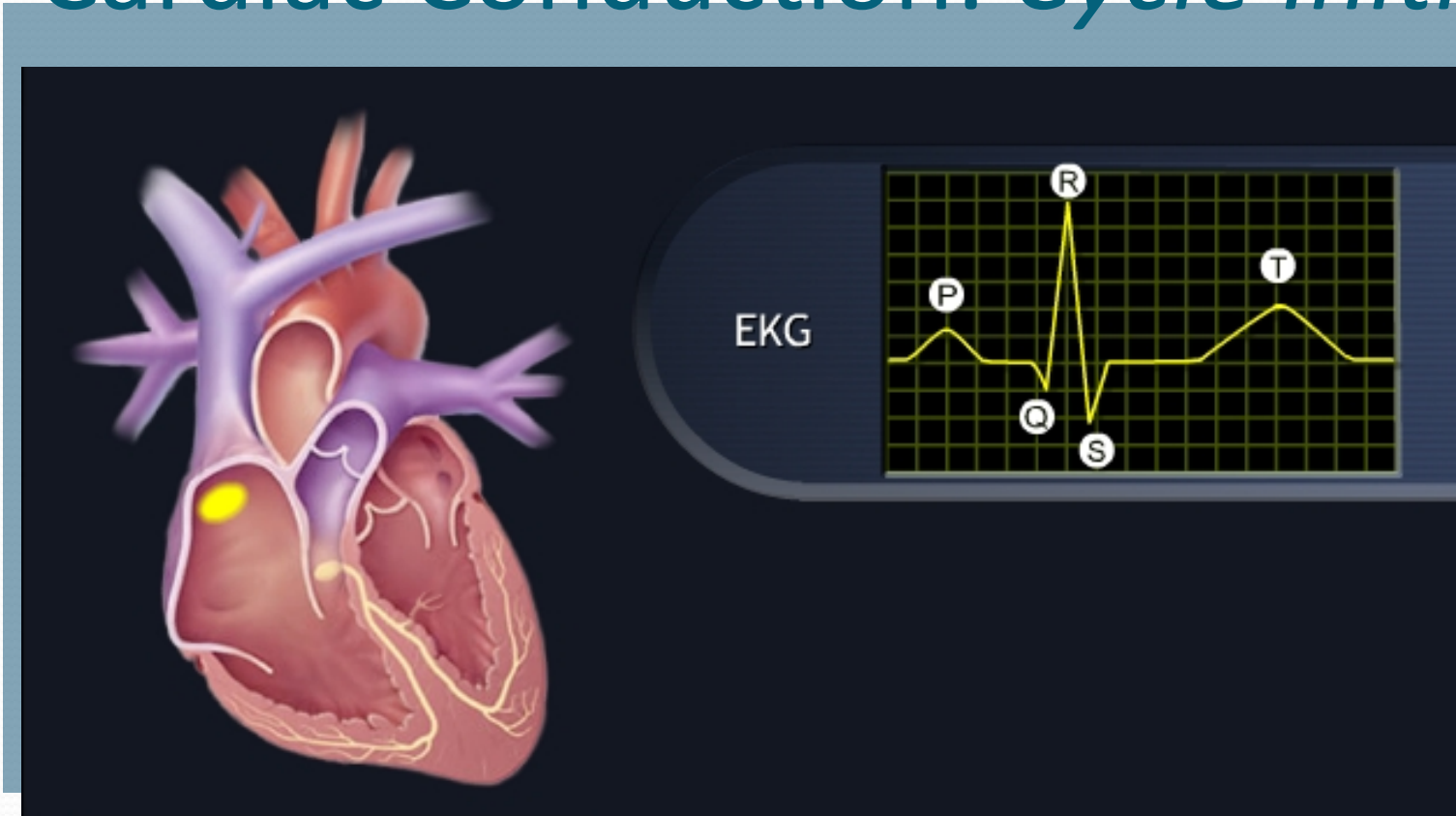
Natalie Ryan, Events Manager, HEFT- for organising the event and inviting me to speak



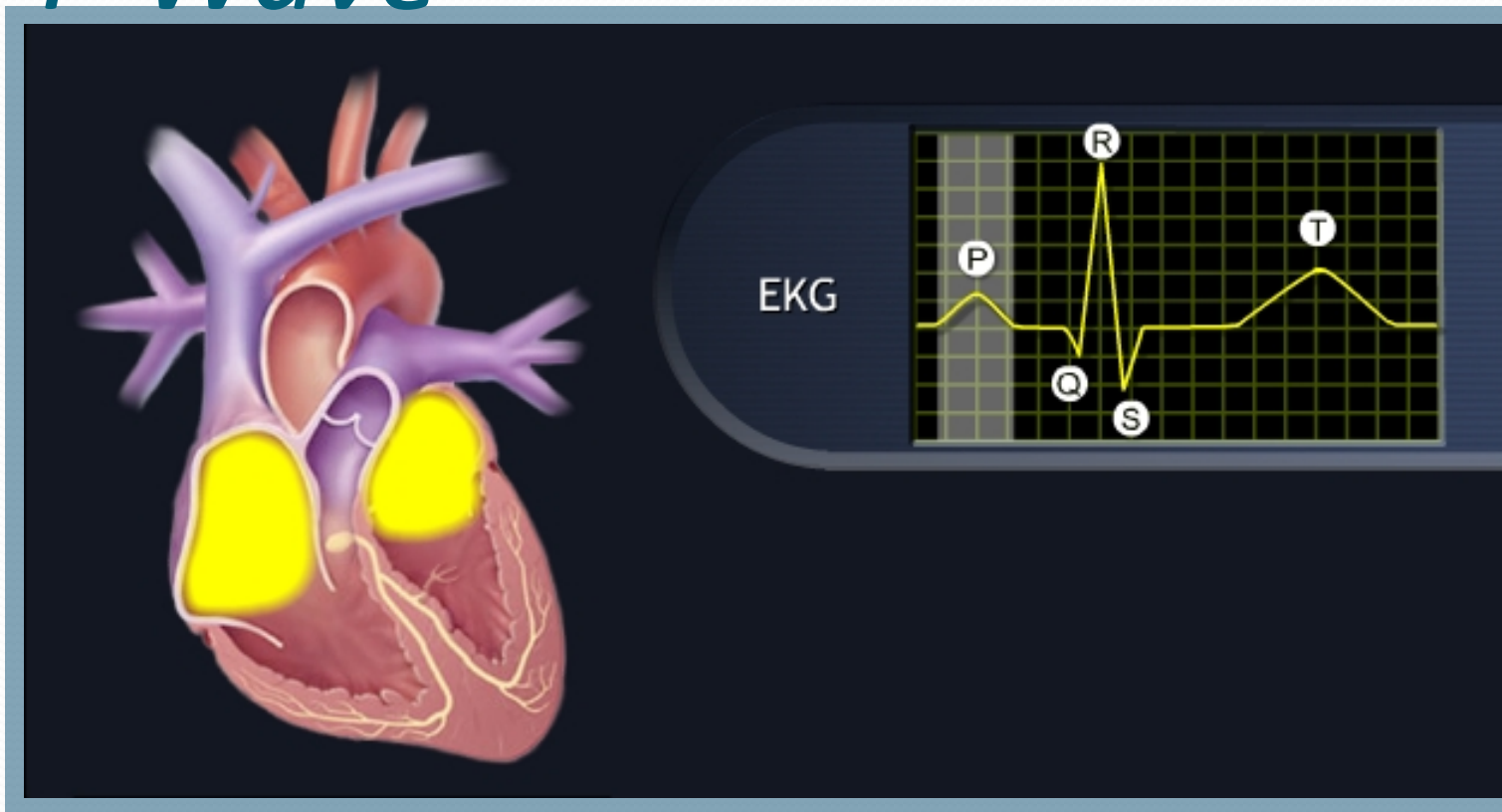
30 minutes followed by discussion

- Basics of ECG
- Common ECGs/ rhythm strips & their basis
- Some common & less common conditions

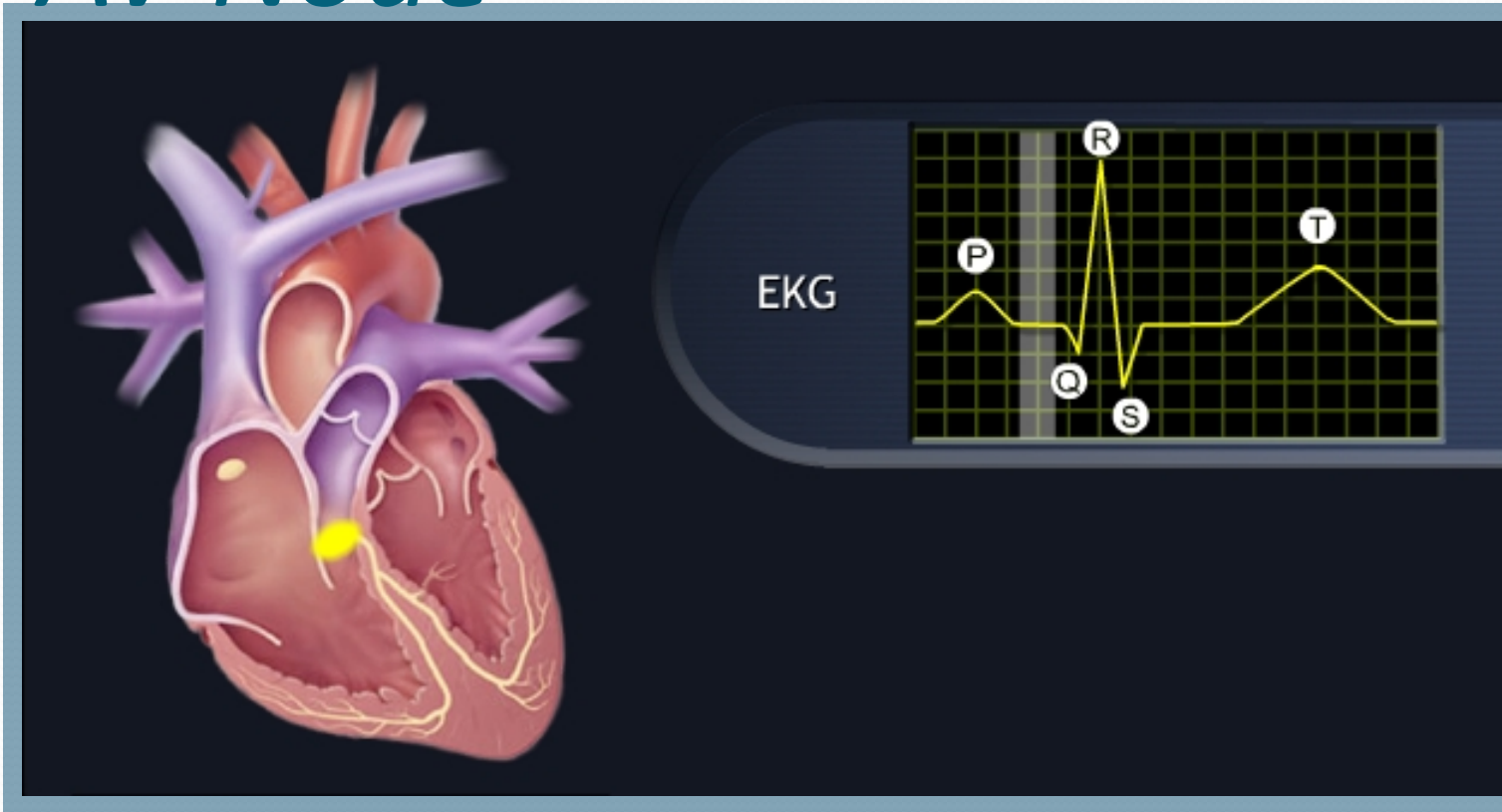
Cardiac Conduction: *Cycle Initiation*



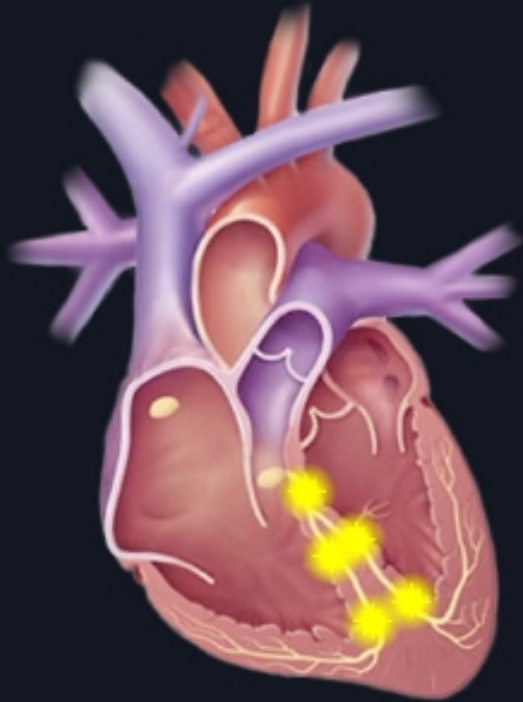
P Wave



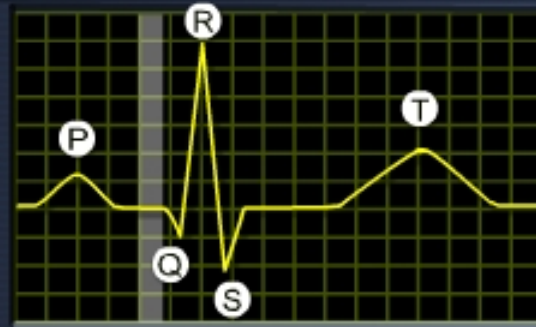
AV Node



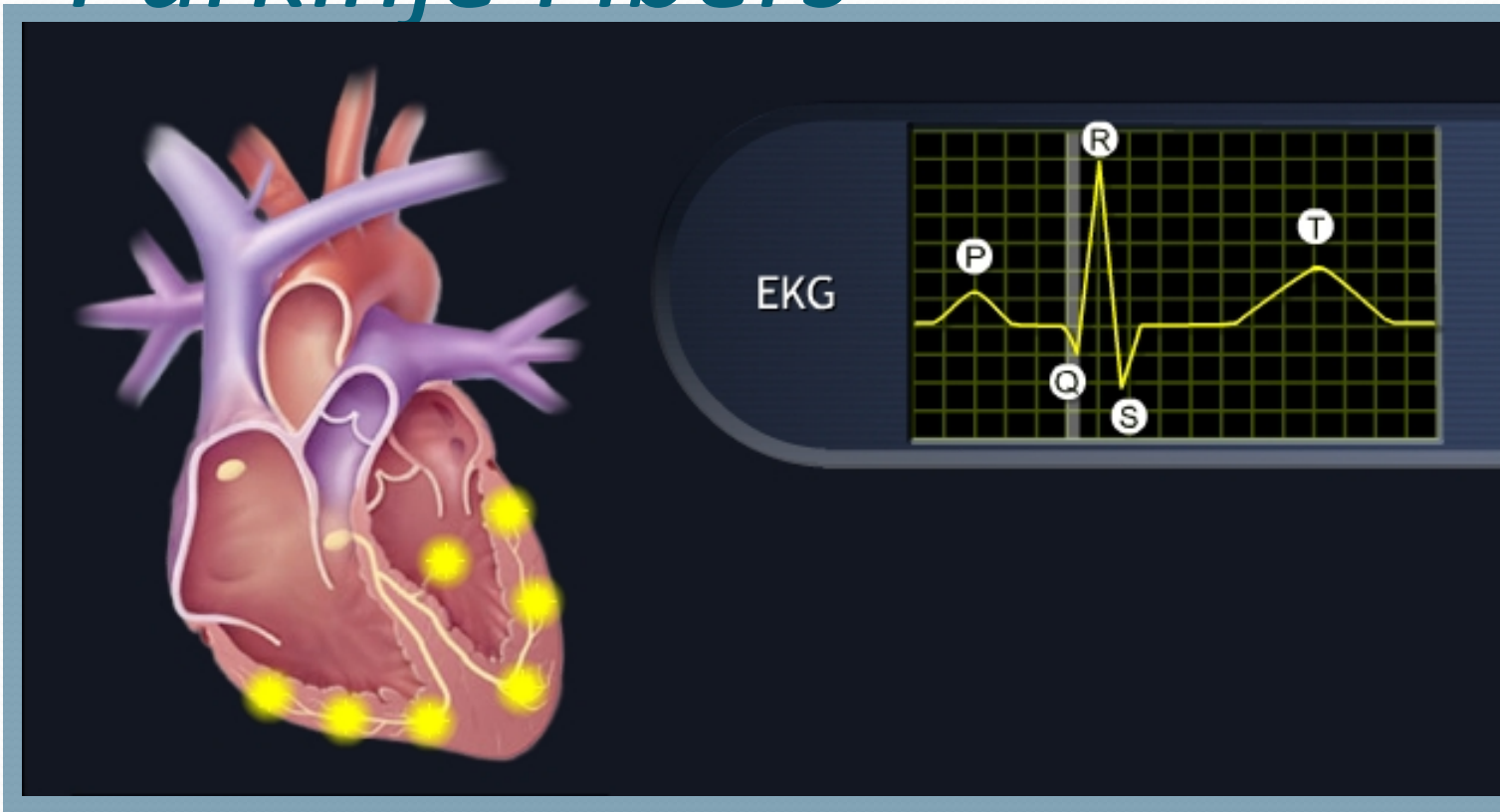
Bundle Branches



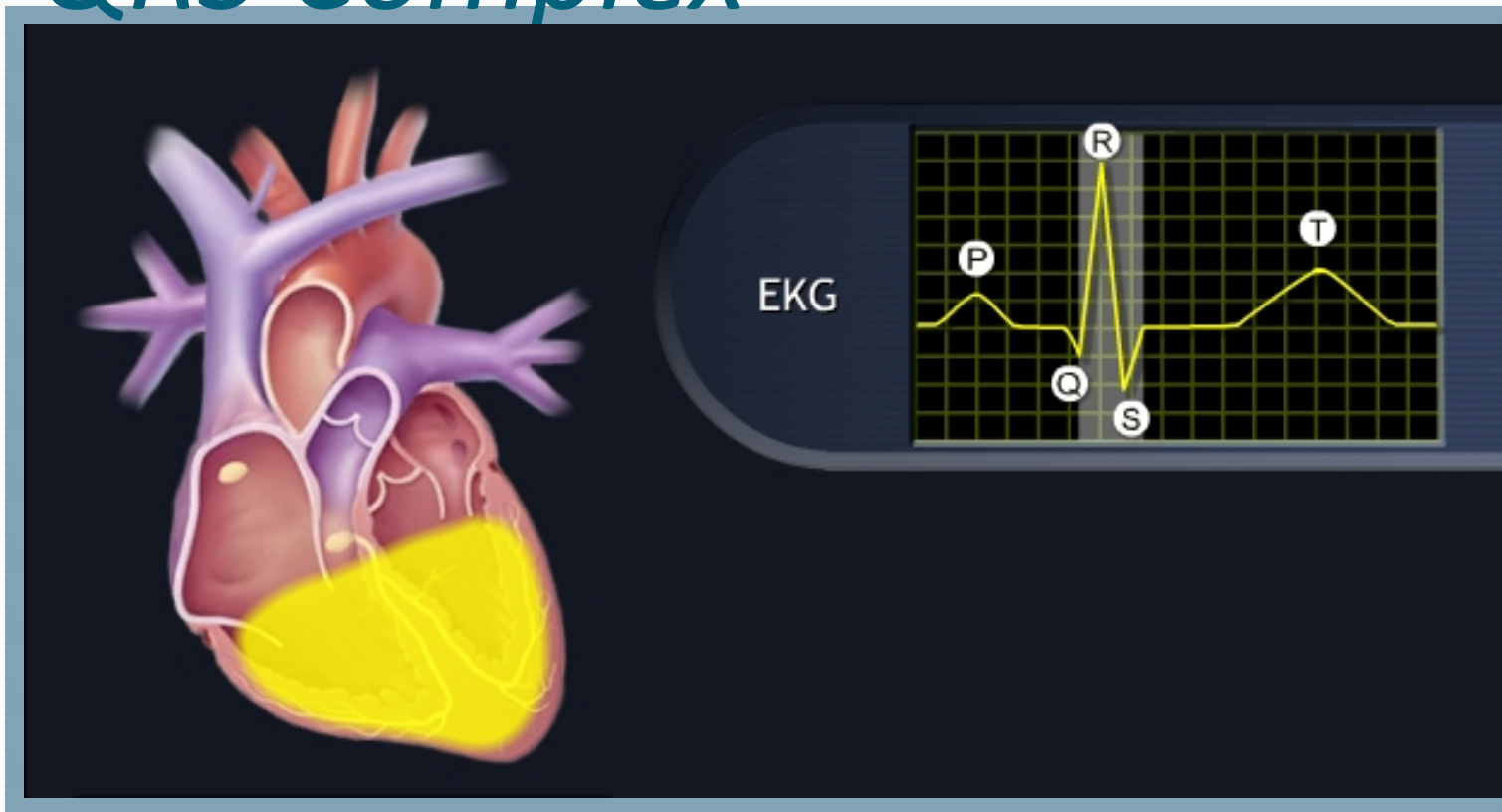
EKG



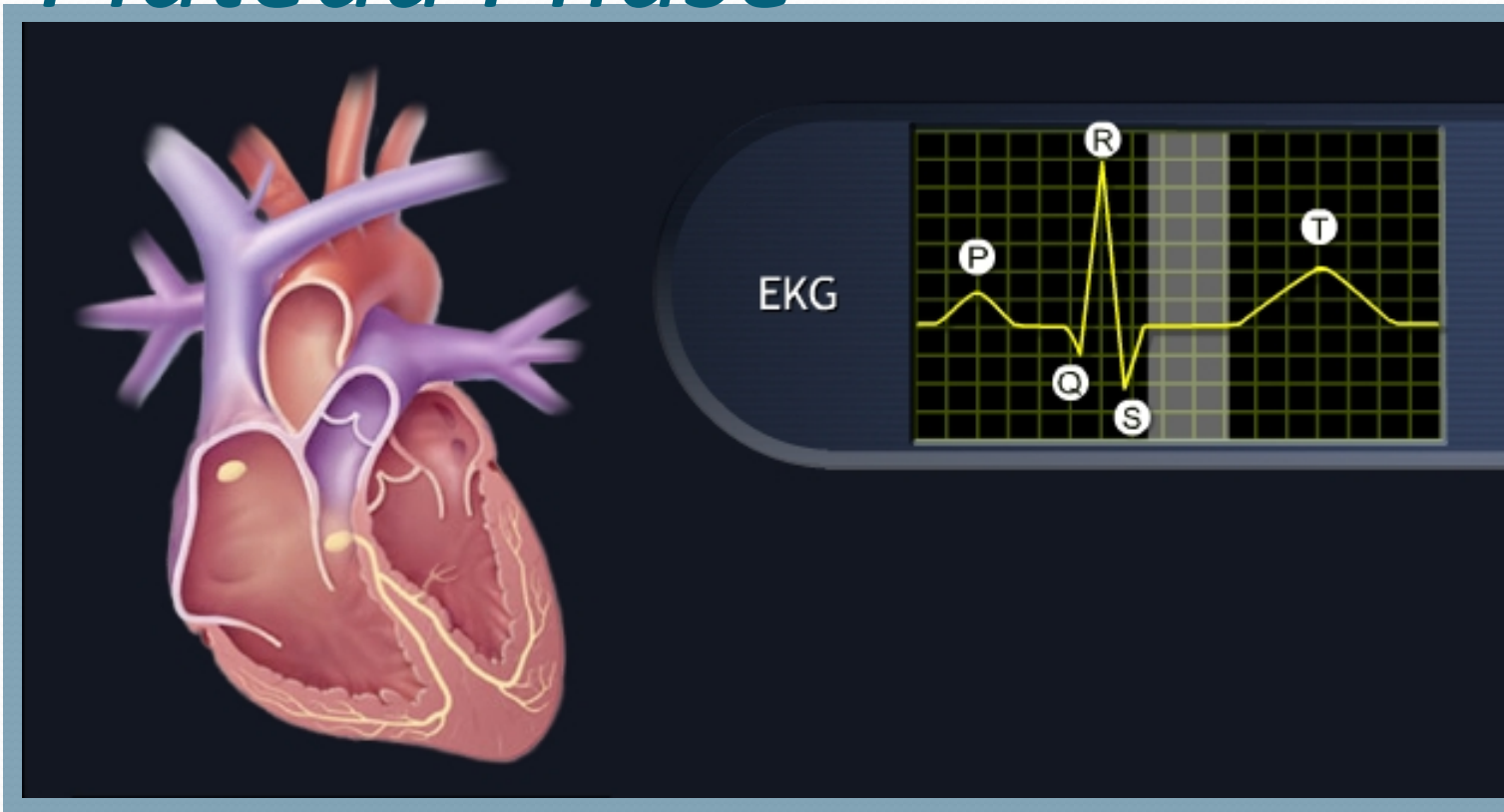
Purkinje Fibers



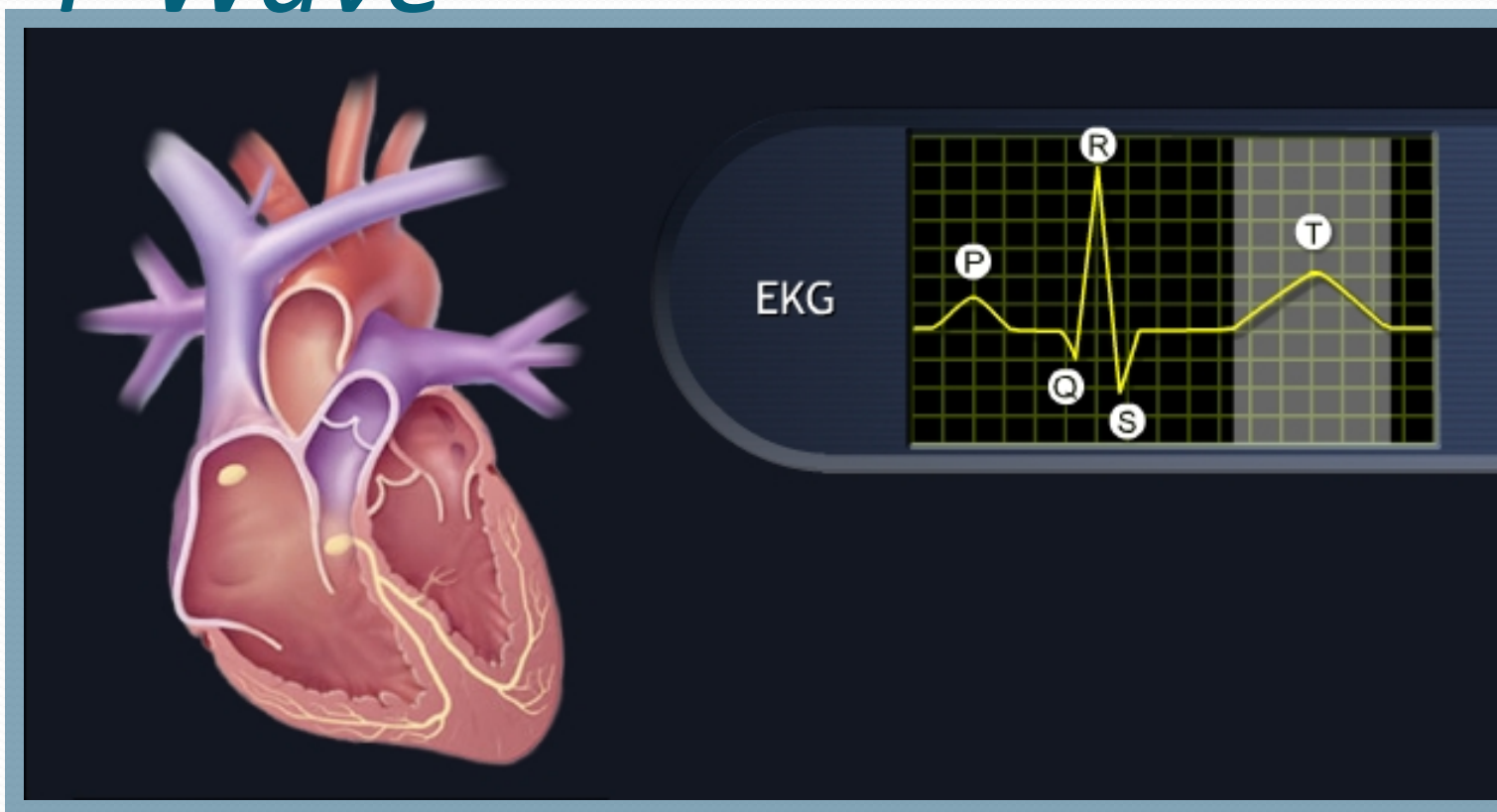
QRS Complex



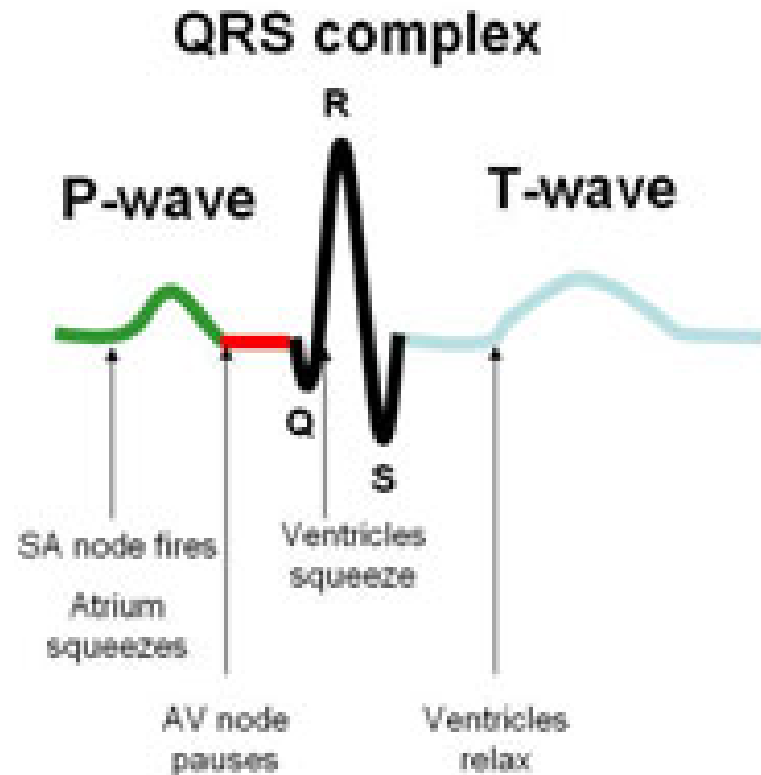
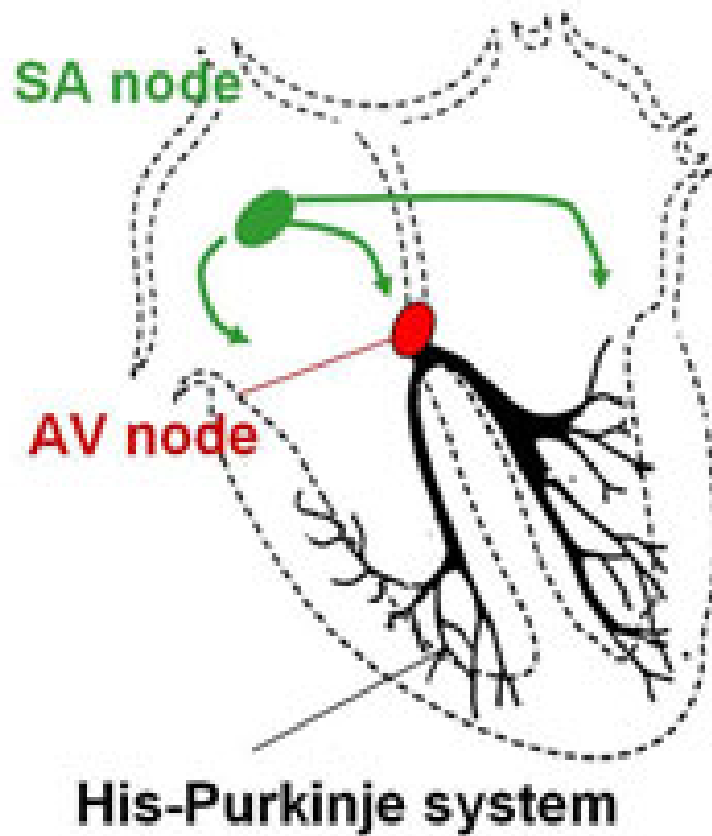
Plateau Phase



T-Wave



ECG Complex





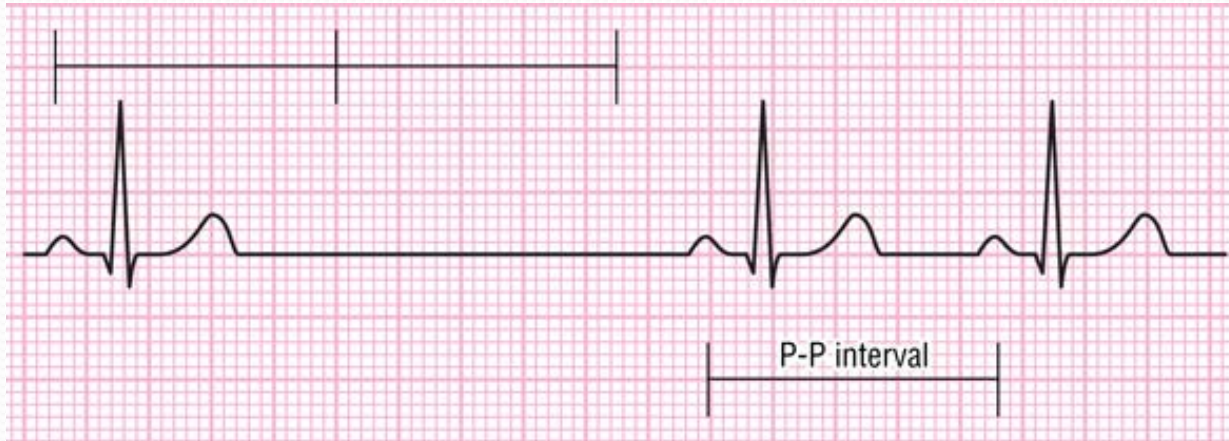
Rate	Less than 60bpm
P-P Regularity	Regular
R-R Regularity	Regular
P wave	Present
P:QRS Ratio	1:1
PR Interval	Normal
QRS Width	Normal



Rate	Greater than 100bpm, Gradual onset
P-P Regularity	Regular
R-R Regularity	Regular
P wave	Present
P:QRS Ratio	1:1, associated
PR Interval	Normal, gradually shortens with HR increase
QRS Width	Normal



Rate	60-100bpm
P-P Regularity	Irregular
R-R Regularity	Irregular
P wave	Present
P:QRS Ratio	1:1, associated
PR Interval	Normal
QRS Width	Normal



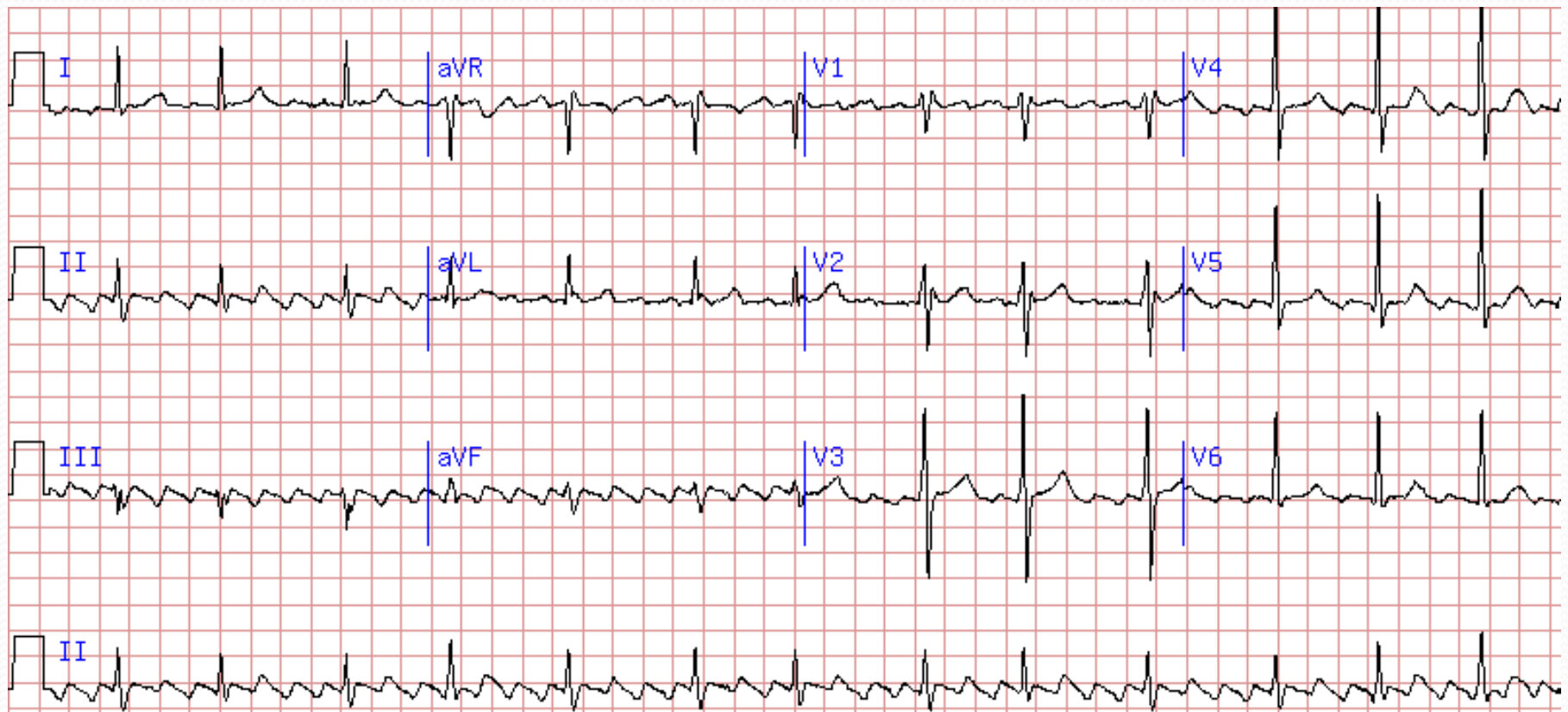
Rate	Varies
P-P Regularity	Irregular
R-R Regularity	Irregular
P wave	Present, except during pause
P:QRS Ratio	1:1, associated
PR Interval	Normal
QRS Width	Normal



Rate	100-180bpm, Sudden onset
P-P Regularity	Regular
R-R Regularity	Regular
P wave	Morphology will differ from sinus p-wave
P:QRS Ratio	1:1, associated
PR Interval	Interval of ectopic focus will differ from sinus PR
QRS Width	Normal, but can develop aberrant (wide) complexes



Rate	Greater than 100bpm
P-P Regularity	Irregularly irregular
R-R Regularity	Irregularly irregular
P wave	At least 3 different p-wave morphologies
P:QRS Ratio	1:1, associated
PR Interval	Varies
QRS Width	Normal

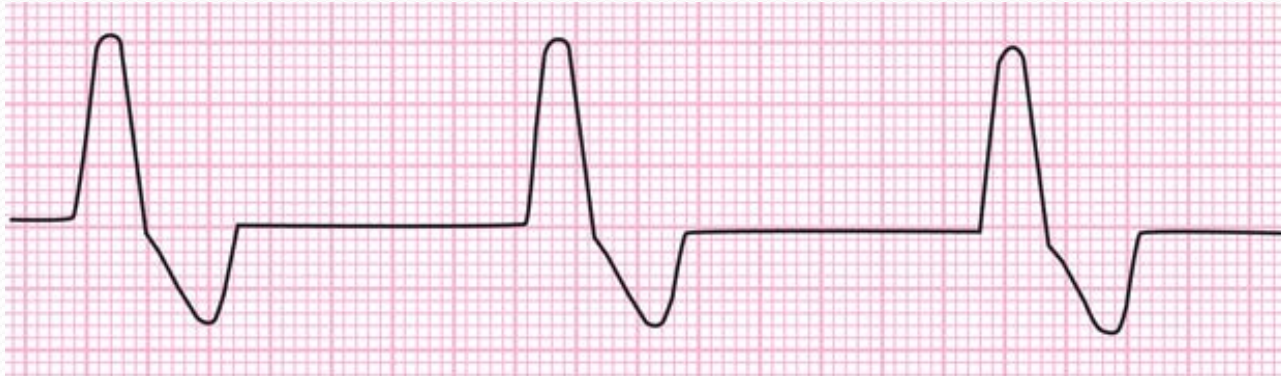




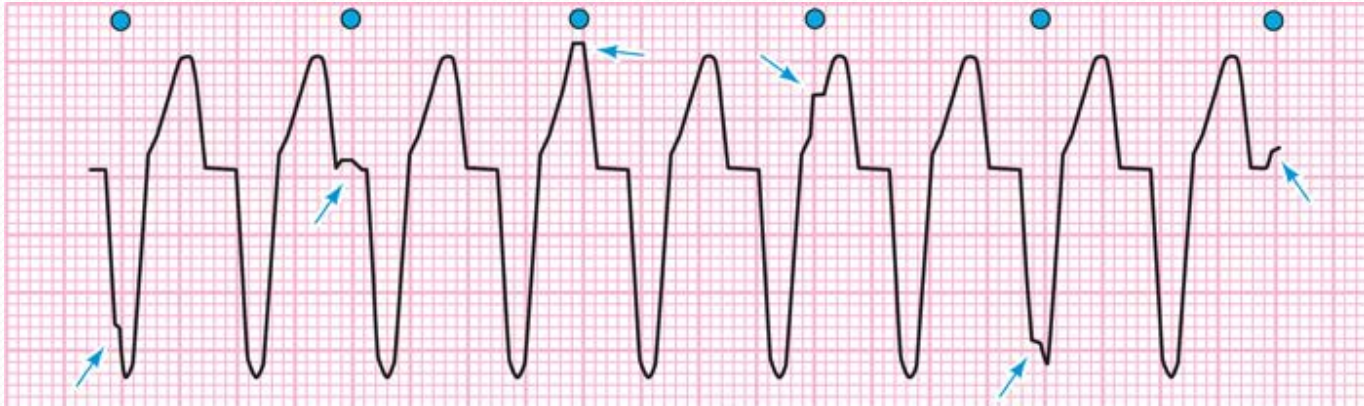
Rate	Varies
P-P Regularity	Chaotic atrial activity
R-R Regularity	Irregularly irregular
P wave	Usually No discernable p-waves
P:QRS Ratio	None
PR Interval	None
QRS Width	Normal, but can develop aberrant (wide) complexes



Rate	40-60bpm
P-P Regularity	None, or Regular if antegrade or retrograde
R-R Regularity	Regular
P wave	Variable (none, antegrade, or retrograde)
P:QRS Ratio	None, or 1:1 if antegrade or retrograde
PR Interval	None, short, or retrograde
QRS Width	Normal



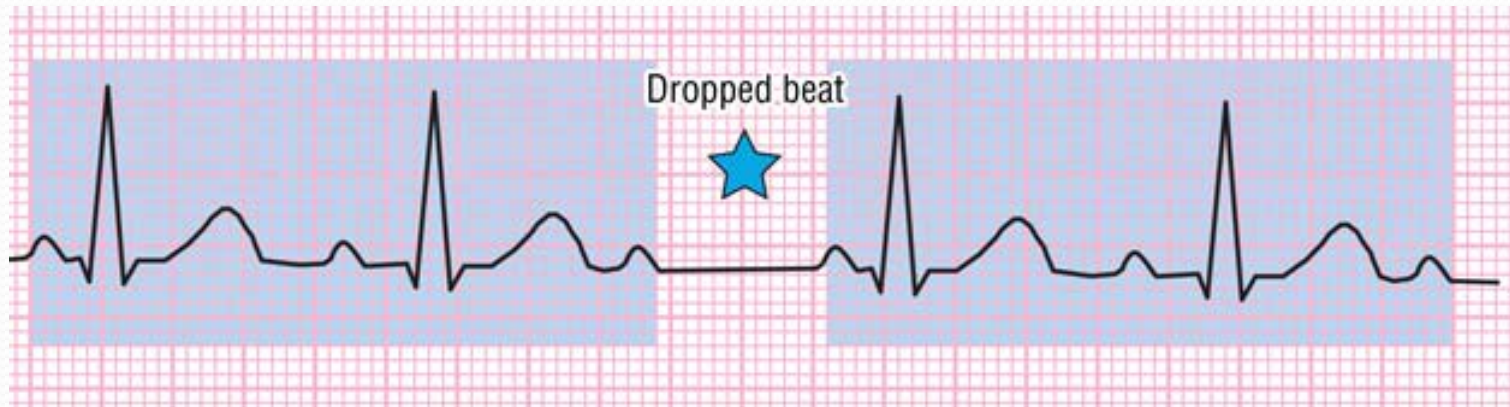
Rate	20-40bpm
P-P Regularity	None
R-R Regularity	Regular
P wave	None
P:QRS Ratio	None
PR Interval	None
QRS Width	Wide complex (≥ 0.12 sec).



Rate	100-200bpm
P-P Regularity	Variable
R-R Regularity	Regular
P wave	Dissociated atrial rate
P:QRS Ratio	Variable
PR Interval	None
QRS Width	Wide complex (≥ 0.12 sec).



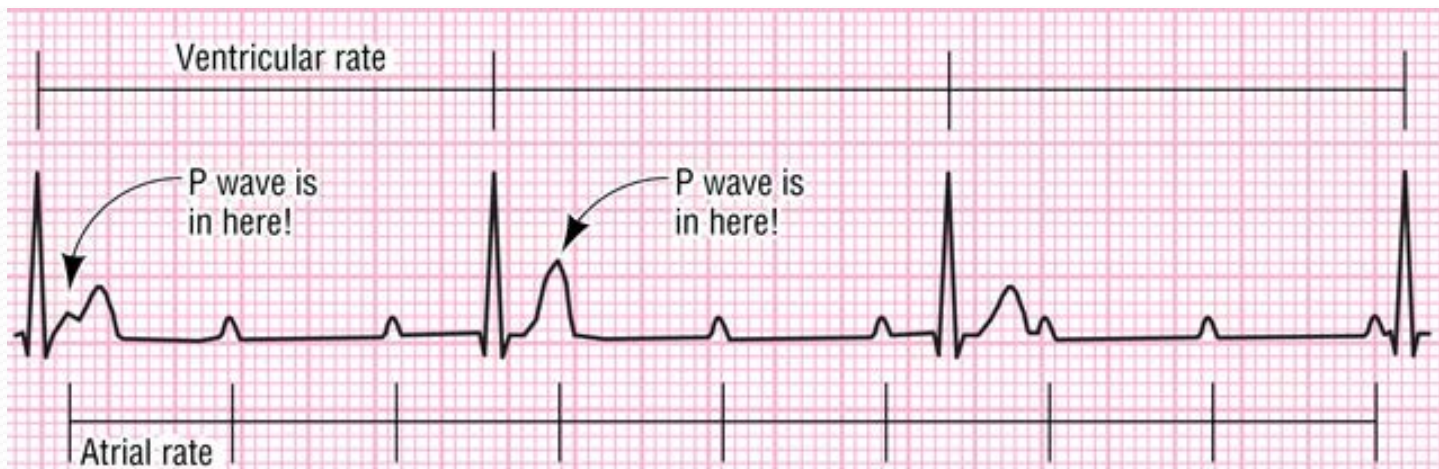
Rate	Depends on underlying rhythm
P-P Regularity	Regular
R-R Regularity	Regular
P wave	Present, Normal
P:QRS Ratio	1:1, associated
PR Interval	Prolonged, > 0.20sec
QRS Width	Normal



Rate	Depends on underlying rhythm
P-P Regularity	Regular
R-R Regularity	Regularly irregular
P wave	Present
P:QRS Ratio	Variable; 2:1, 3:2, 4:3, etc
PR Interval	Variable, gradually lengthens until dropped
QRS Width	Normal



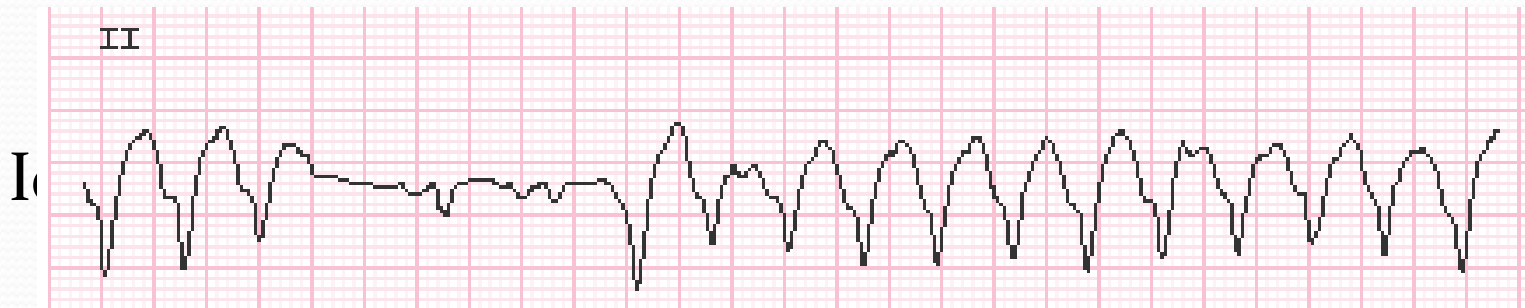
Rate	Depends on underlying rhythm
P-P Regularity	Regular
R-R Regularity	Regularly irregular
P wave	Present
P:QRS Ratio	Variable; 2:1, 3:2, 4:3, etc
PR Interval	Normal for conducted beats
QRS Width	Normal



Atrial Rate	Atrial rate is the underlying rhythm (i.e, Sinus, Atrial Fib, etc.)
Ventricular Rate	Ventricular rate is from the dissociated escape rhythm
P-P Regularity	Regular
R-R Regularity	Regular
P wave	Present
P:QRS Ratio	Variable, dissociated
PR Interval	Variable, No pattern
QRS Width	Normal (Junctional escape rhythm) Wide (Ventricular escape rhythm)



Rate	Depends on the underlying Atrial Fibrillation, Ventricular rate can be fast or slow.
P-P Regularity	Chaotic atrial activity
R-R Regularity	Irregularly irregular
P wave	Usually absent
P:QRS Ratio	None
PR Interval	None
QRS Width	Wide (>0.12ms)



- A. Ventricular Tachycardia
- B. Sinus Bradycardia
- C. Complete Heart Block
- D. Atrial Fibrillation
- E. Ventricular Fibrillation

Identify the rhythm



- A. Ventricular Tachycardia
- B. Sinus Bradycardia
- C. Complete Heart Block
- D. Atrial Fibrillation
- E. Ventricular Fibrillation

Identify the Rhythm:

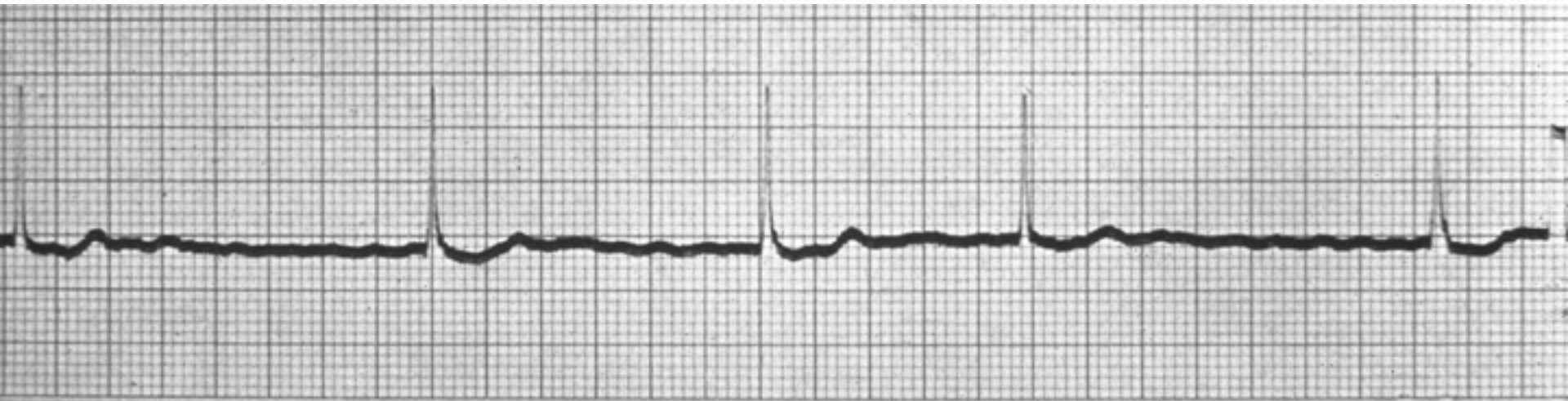


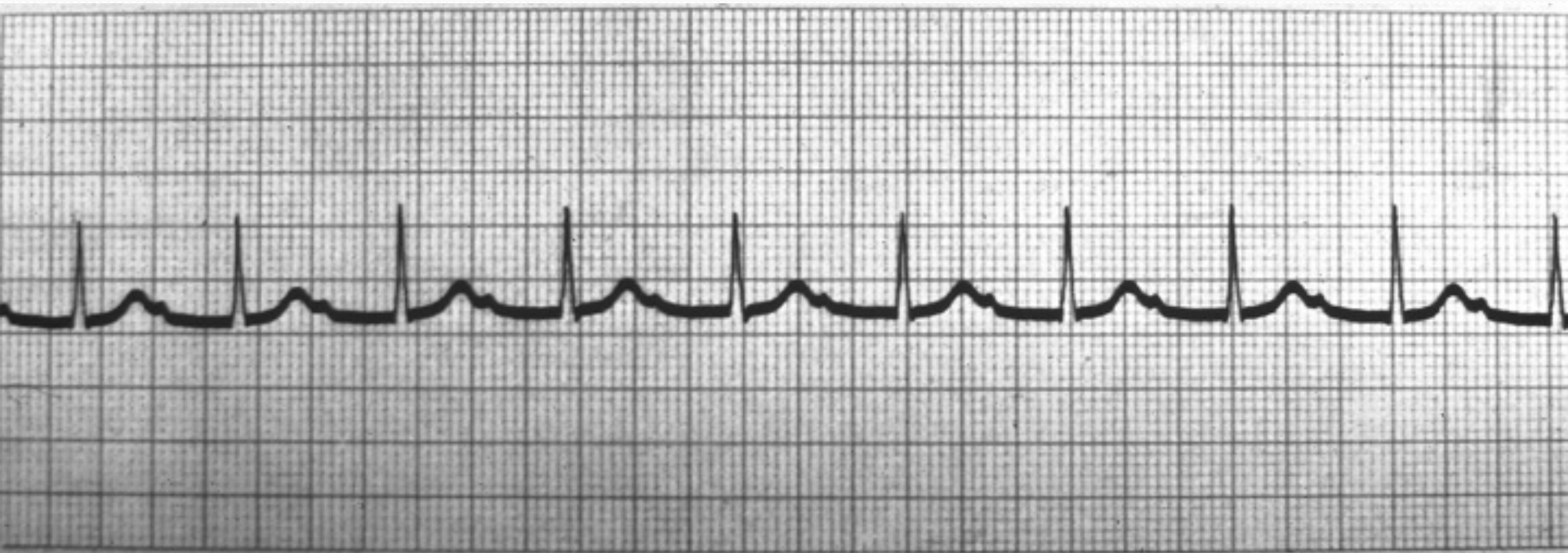
- A. Ventricular Tachycardia
- B. Sinus Bradycardia
- C. Complete Heart Block
- D. Atrial Fibrillation
- E. Ventricular Fibrillation

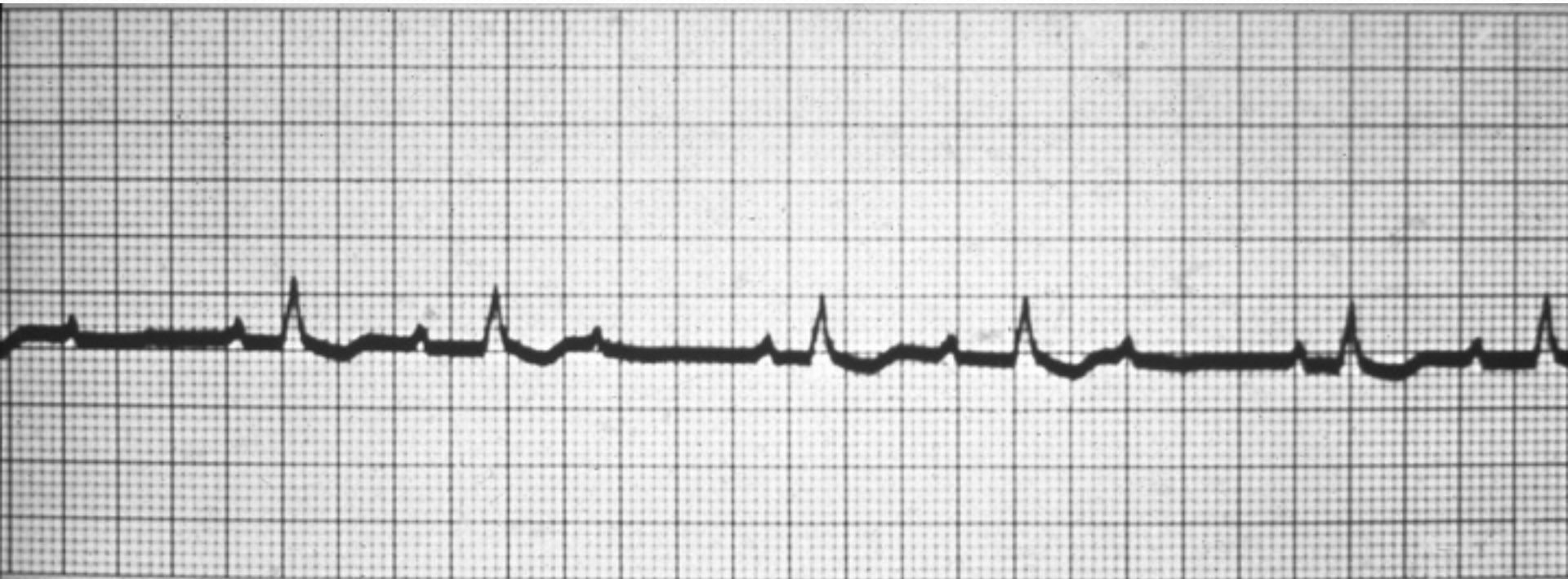
Identify the Rhythm:



- A. Ventricular Tachycardia
- B. Sinus Bradycardia
- C. Complete Heart Block
- D. Atrial Fibrillation
- E. Ventricular Fibrillation



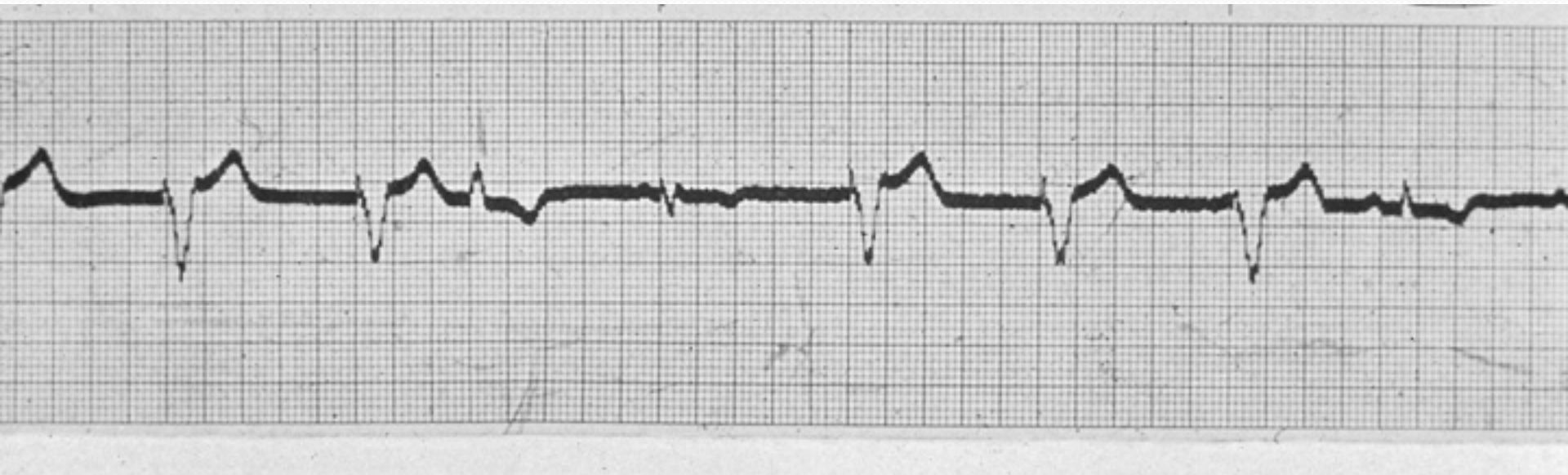








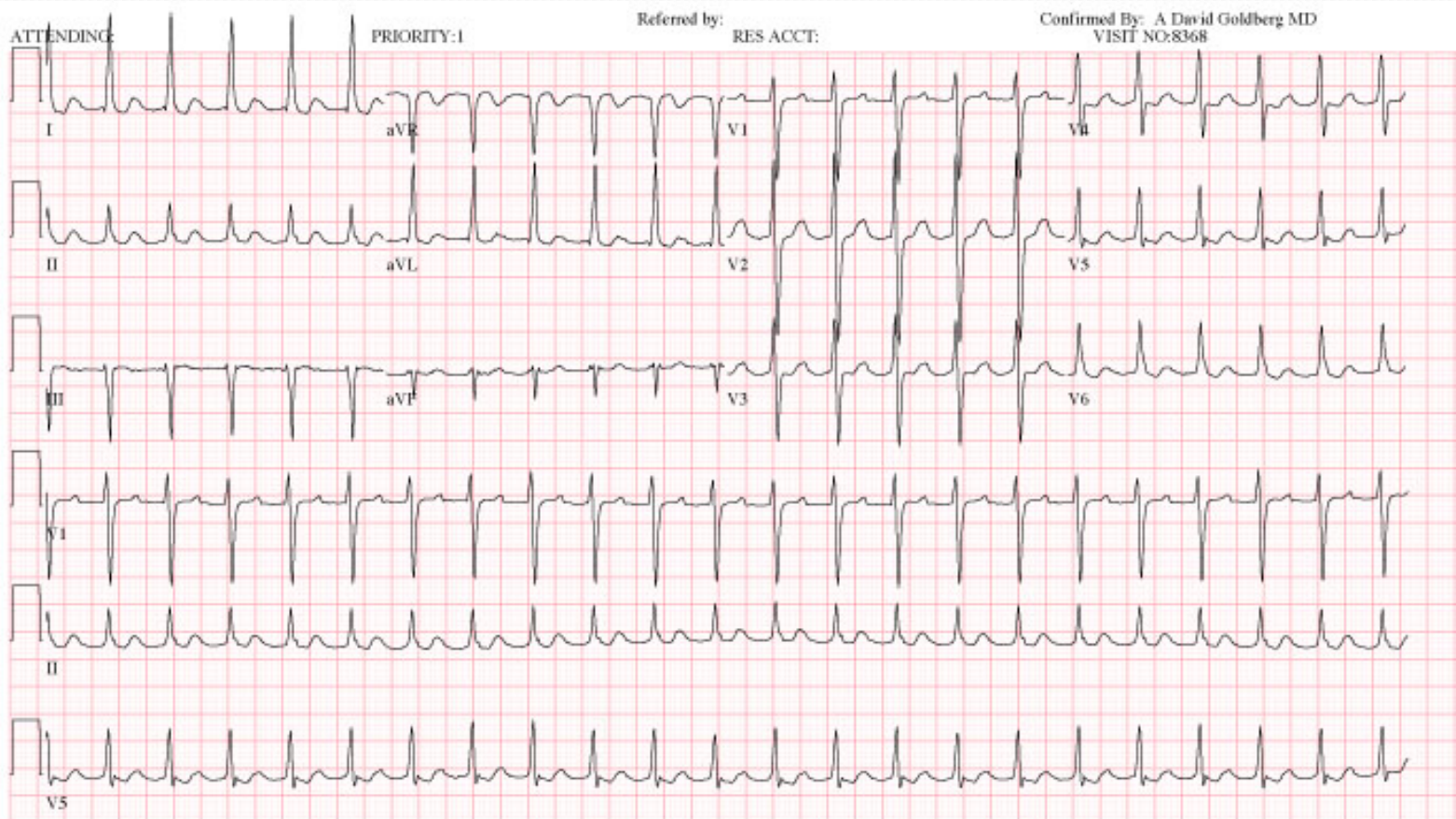


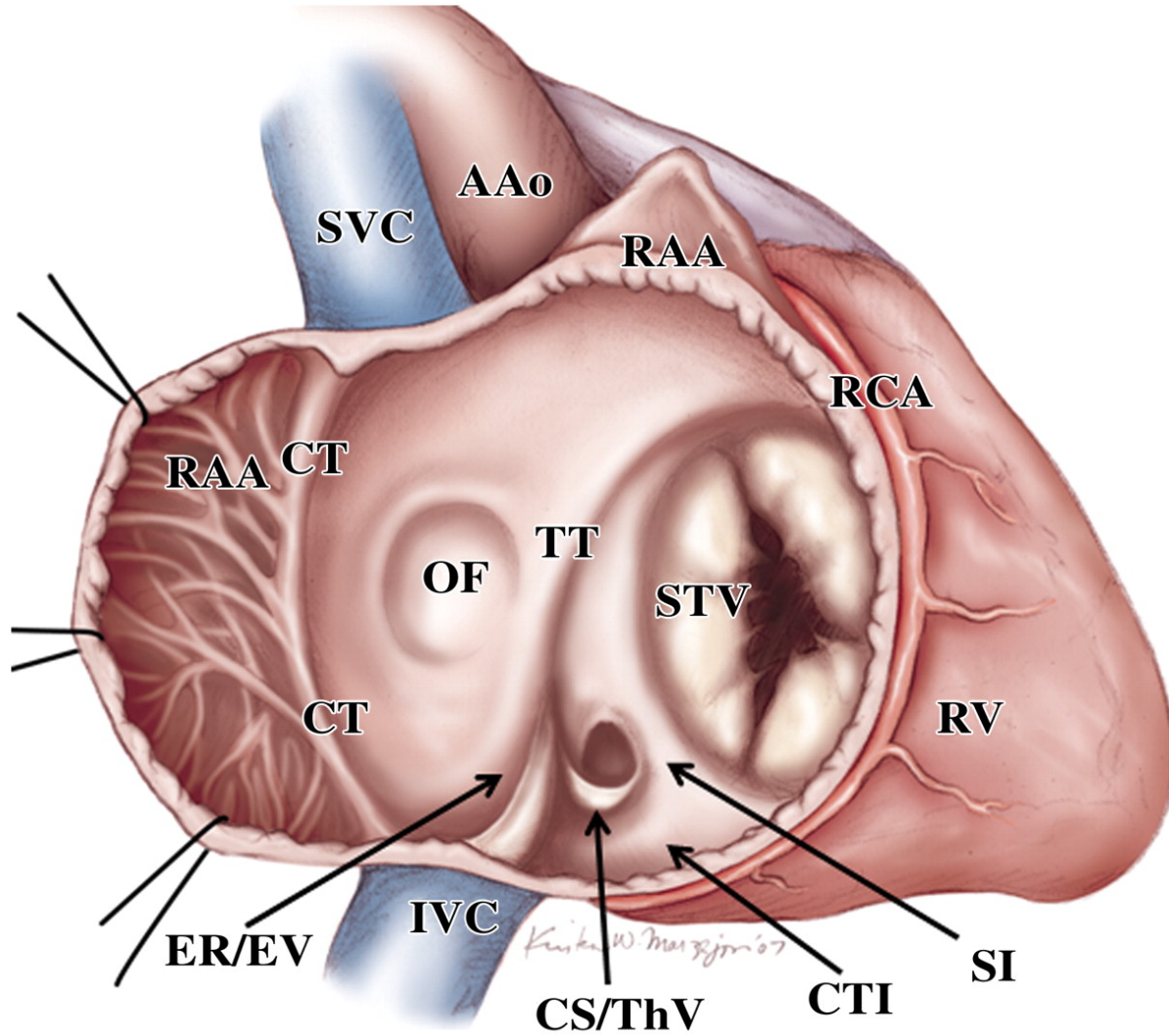




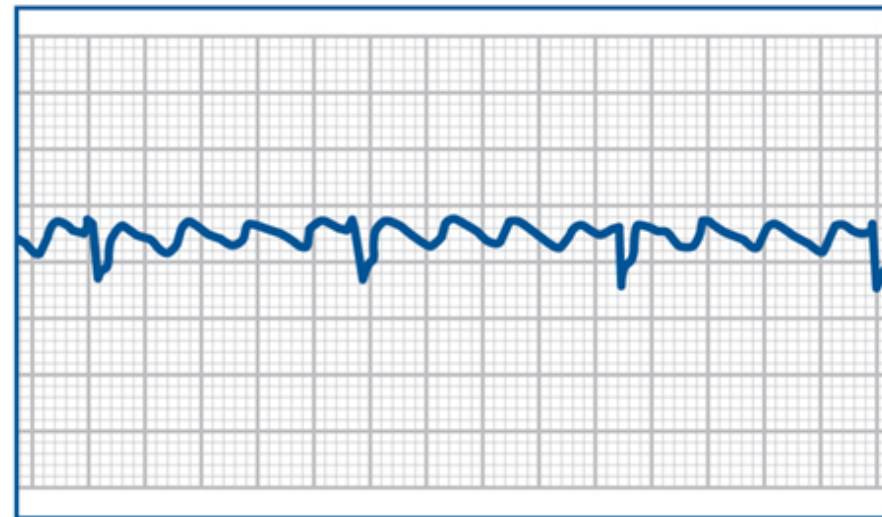
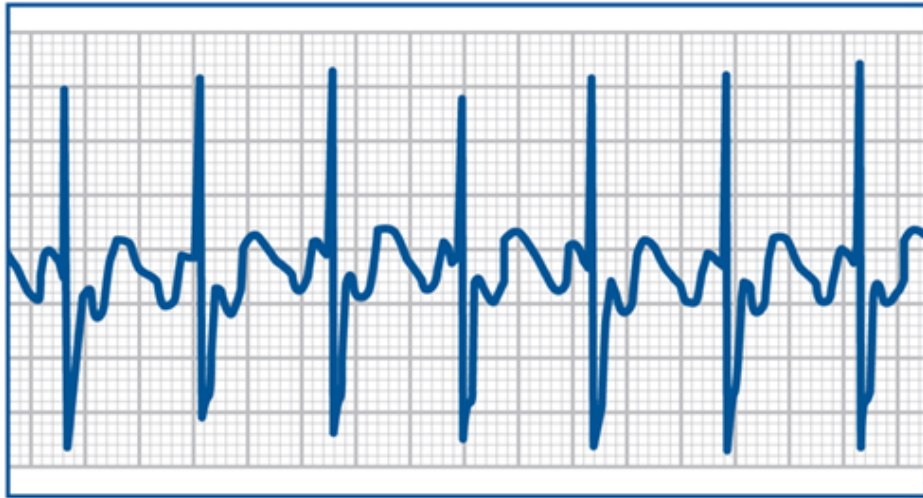


Micro re-entry : AVNRT

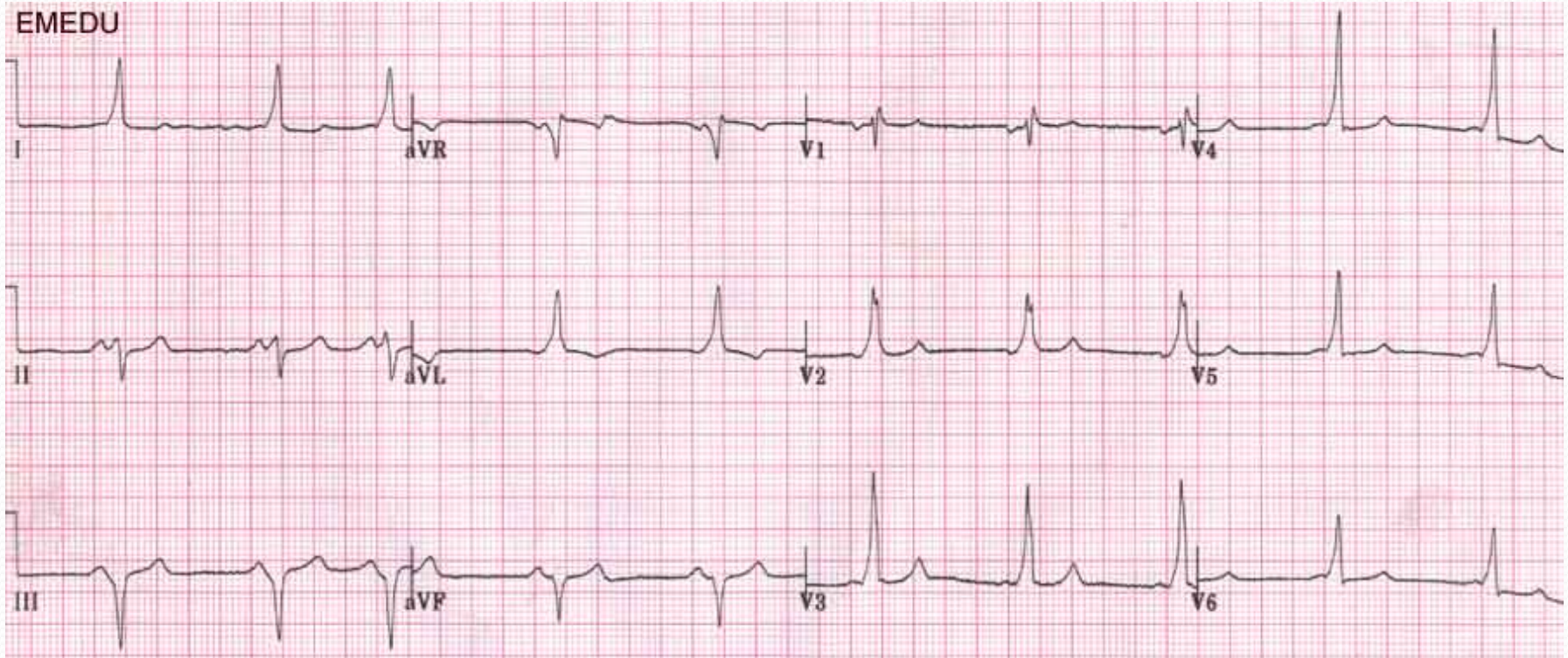




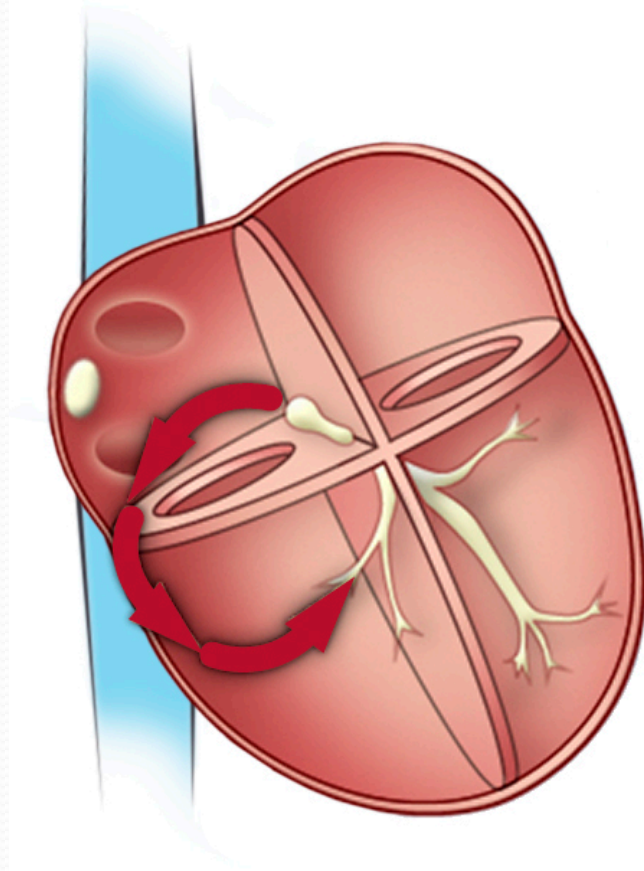
Macro re-entry : Type 1 flutter



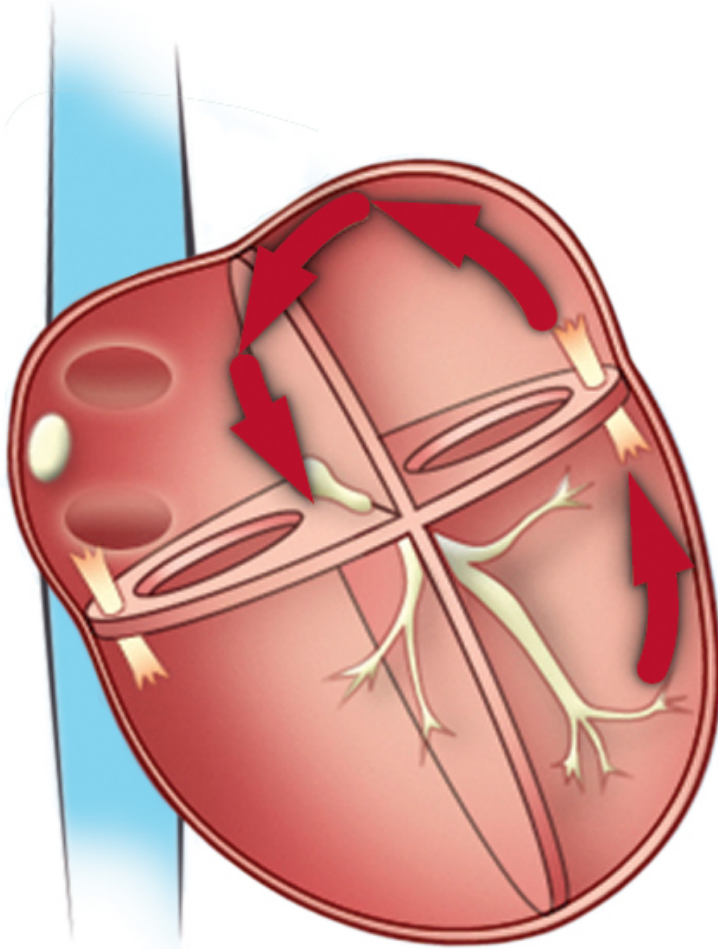
EMEDU

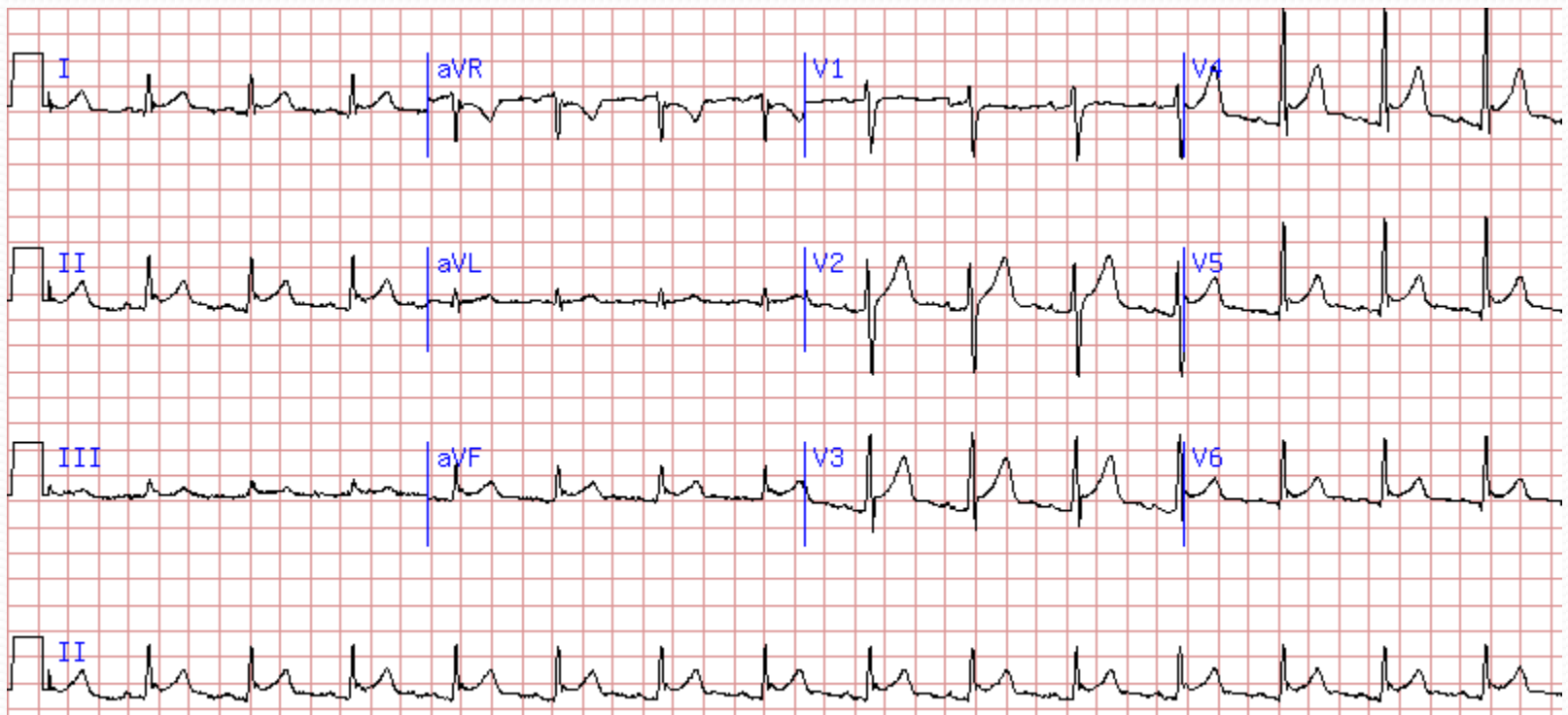


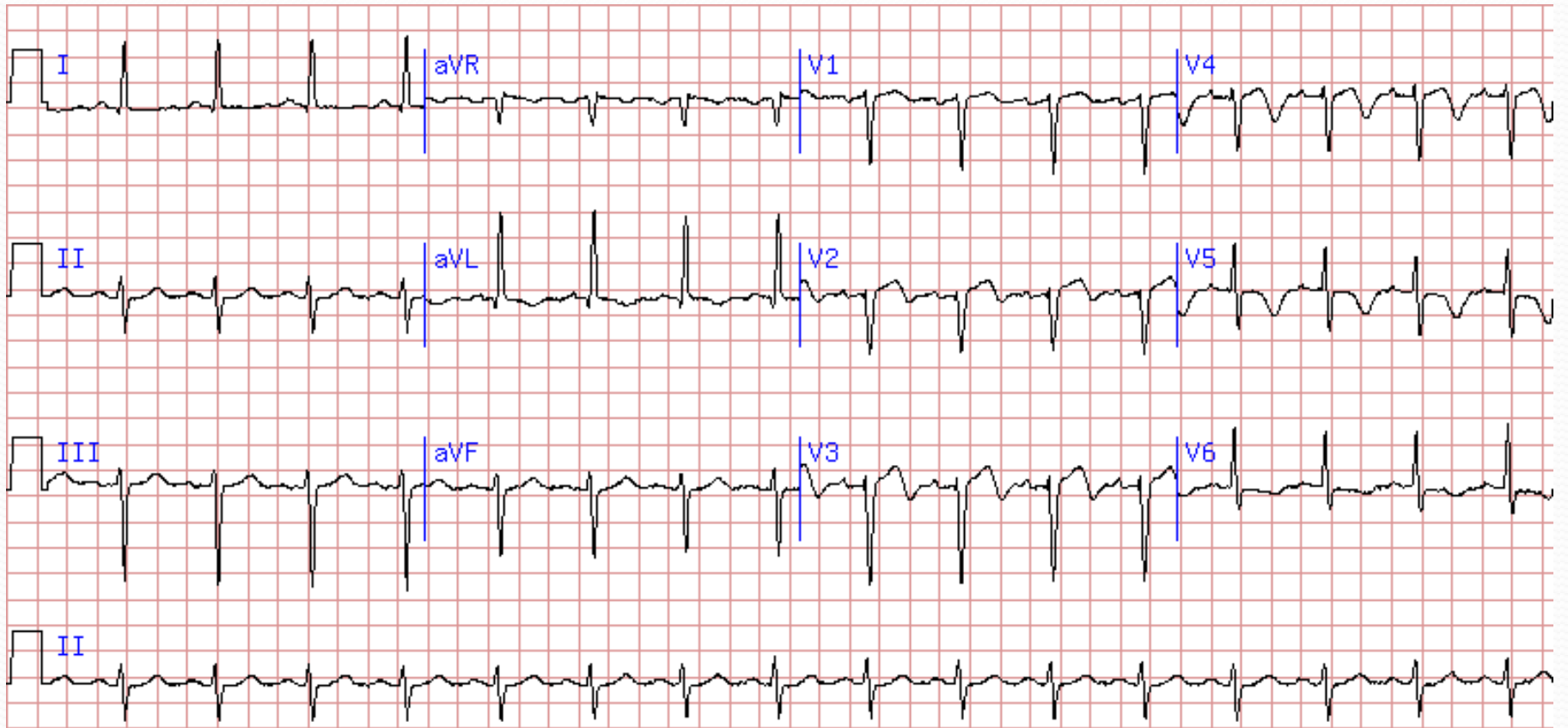
WPW- macro re-entrant

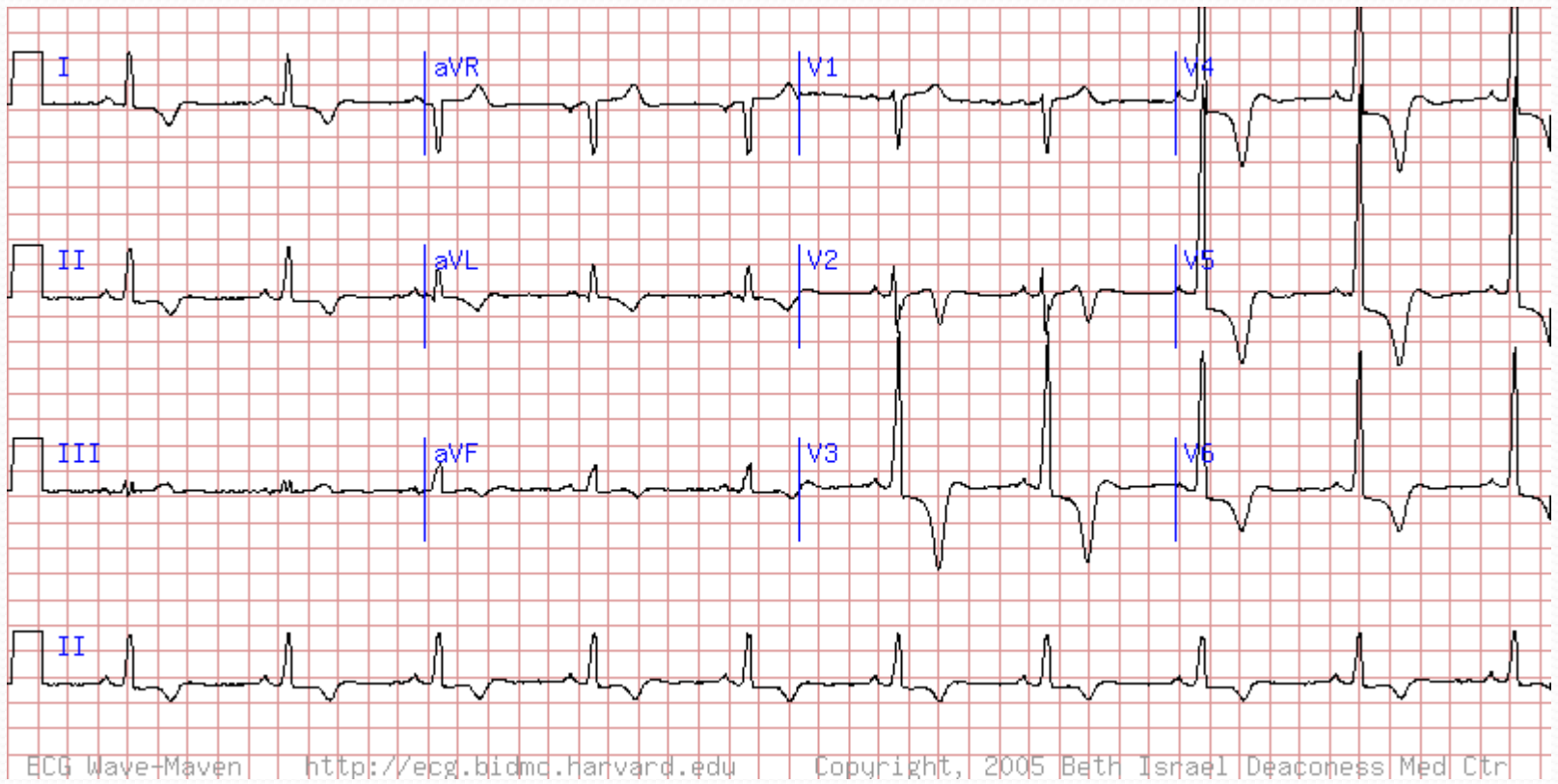


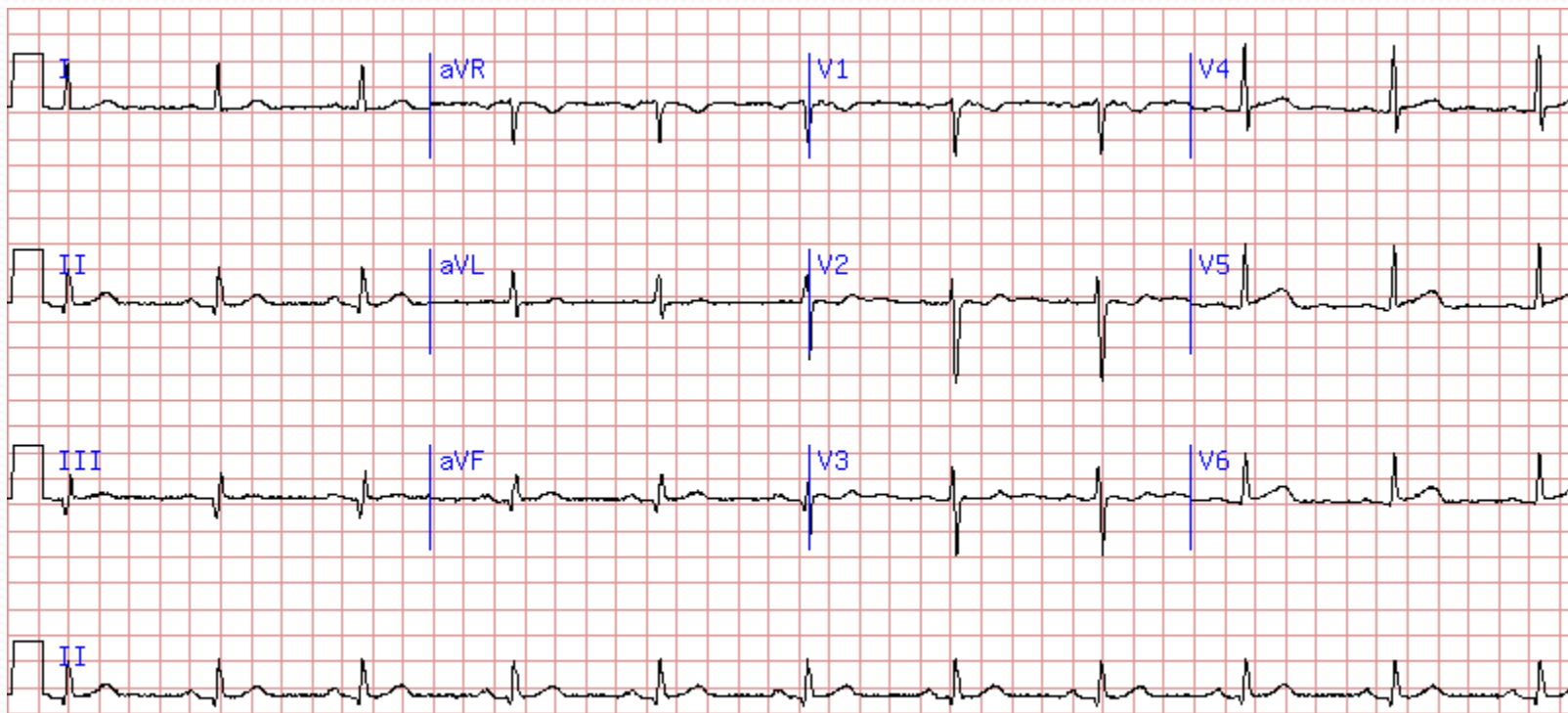
Concealed WPW

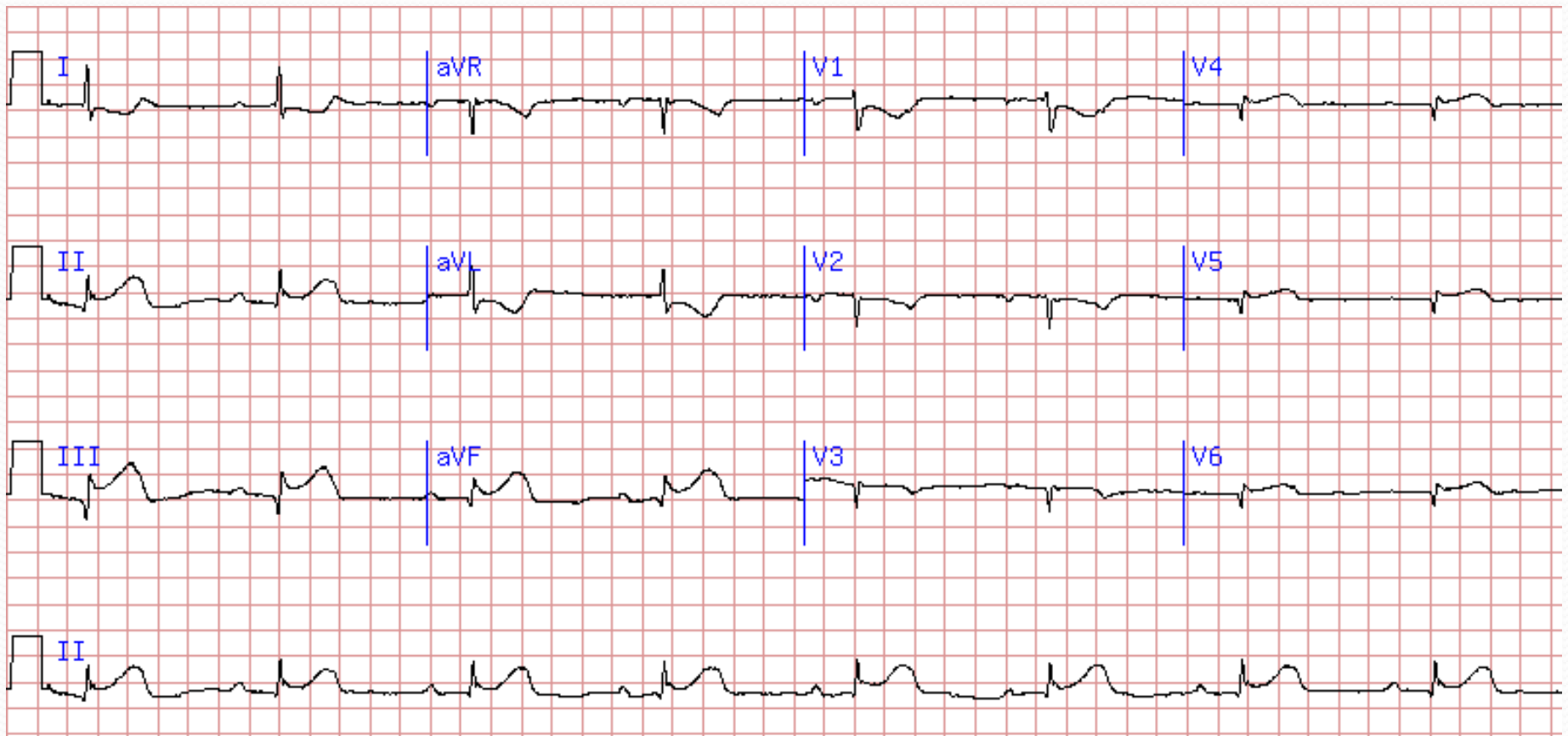


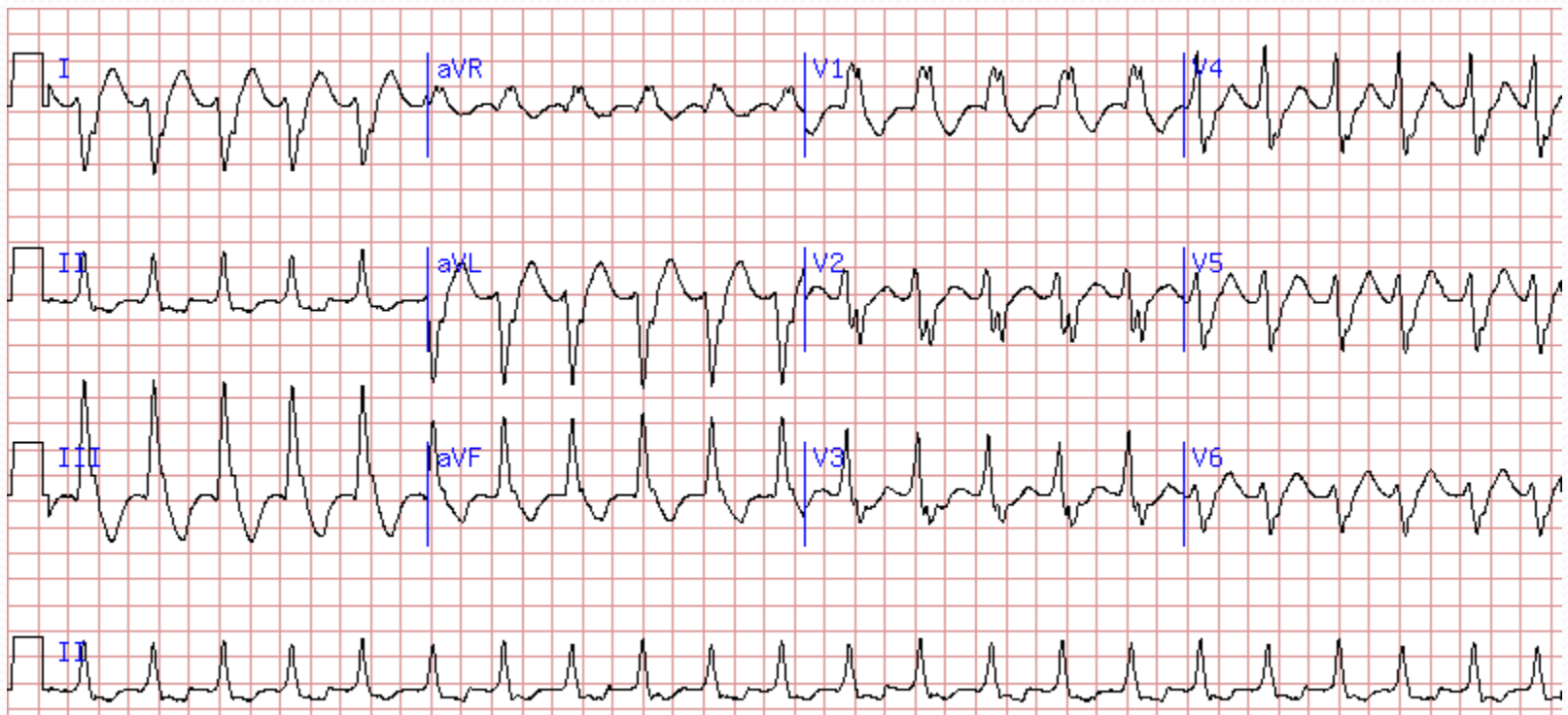




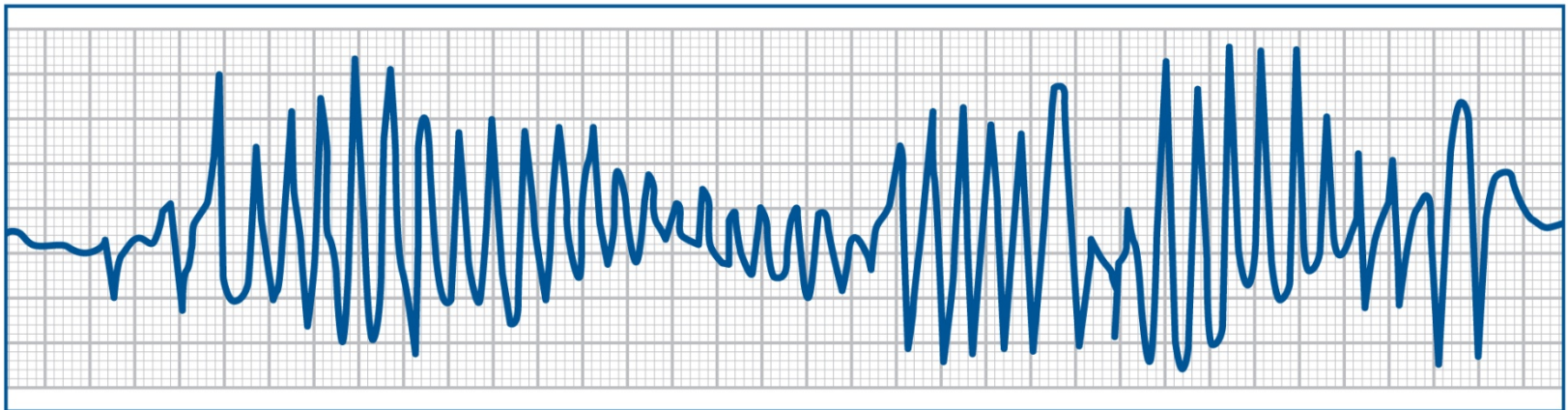
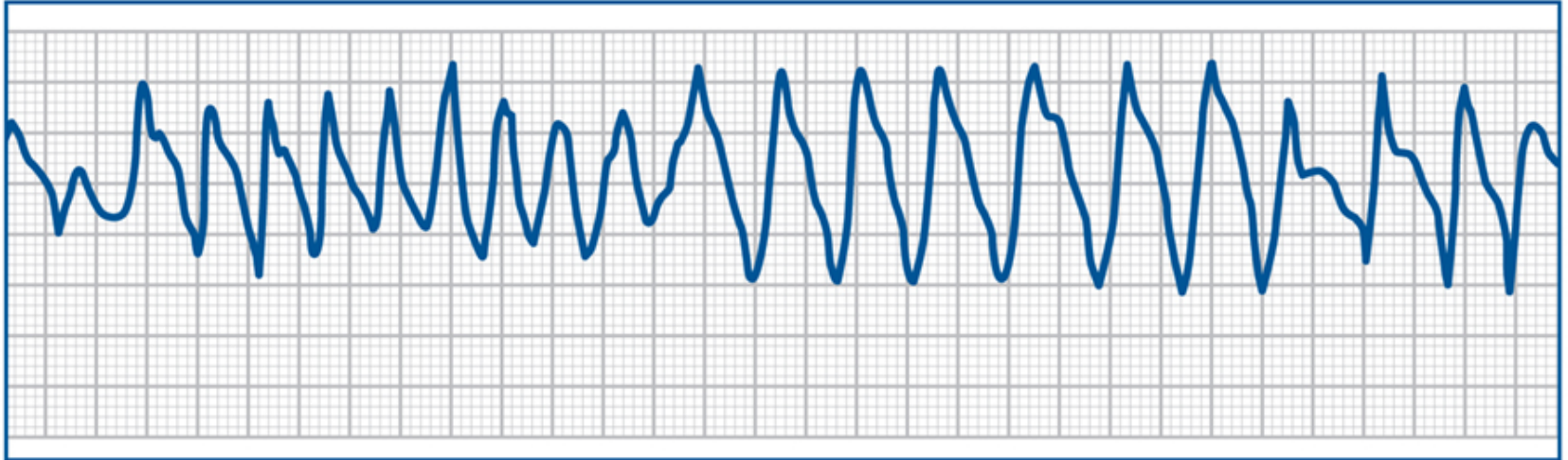


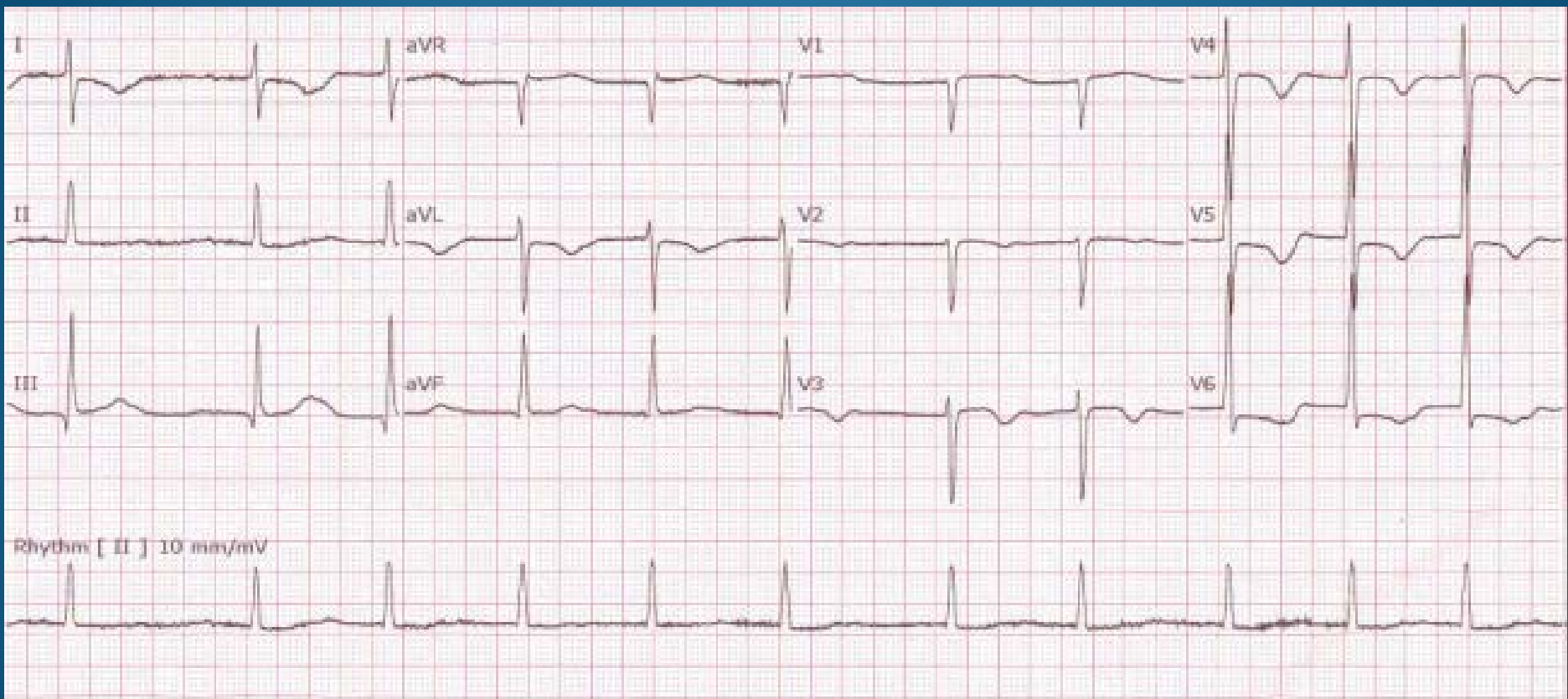




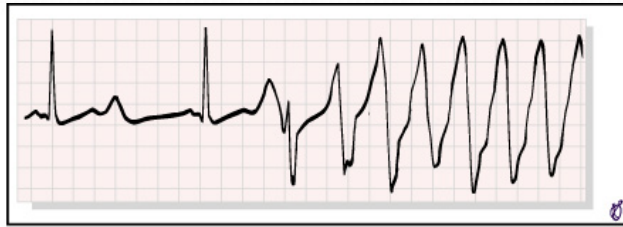


Polymorphic VT

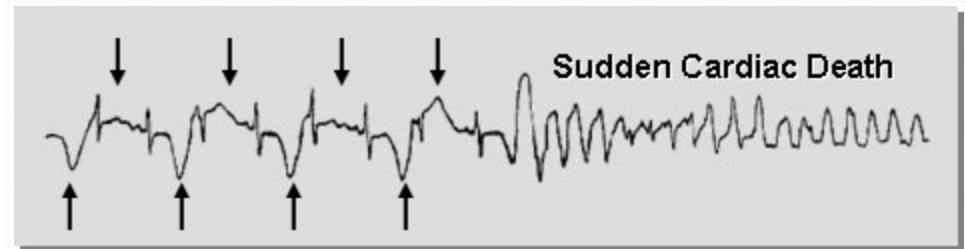
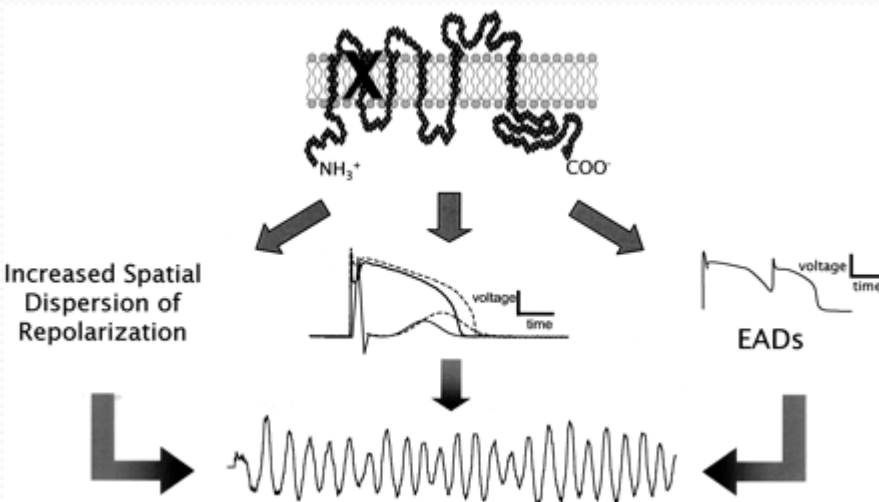
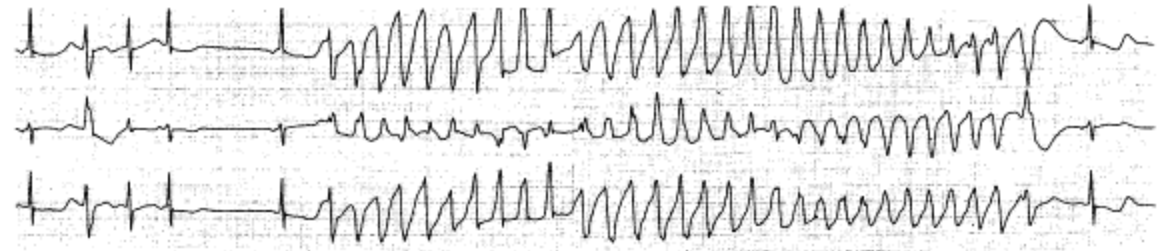


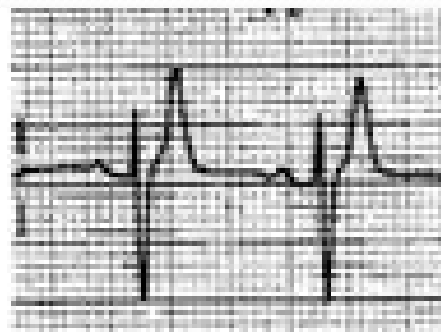
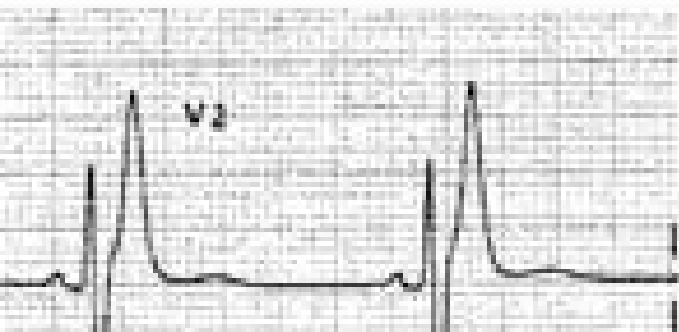


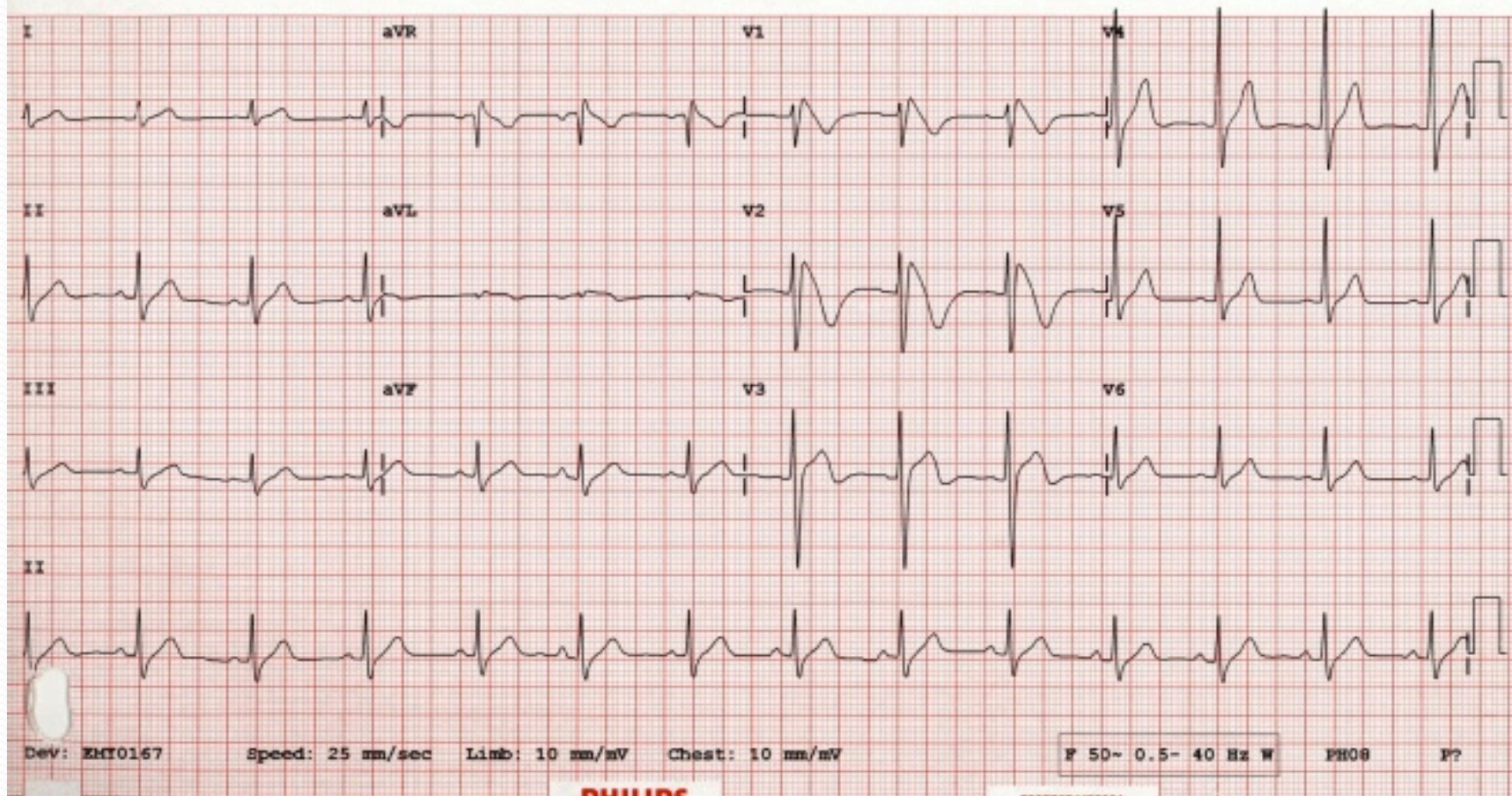
Arrhythmia in LQTS

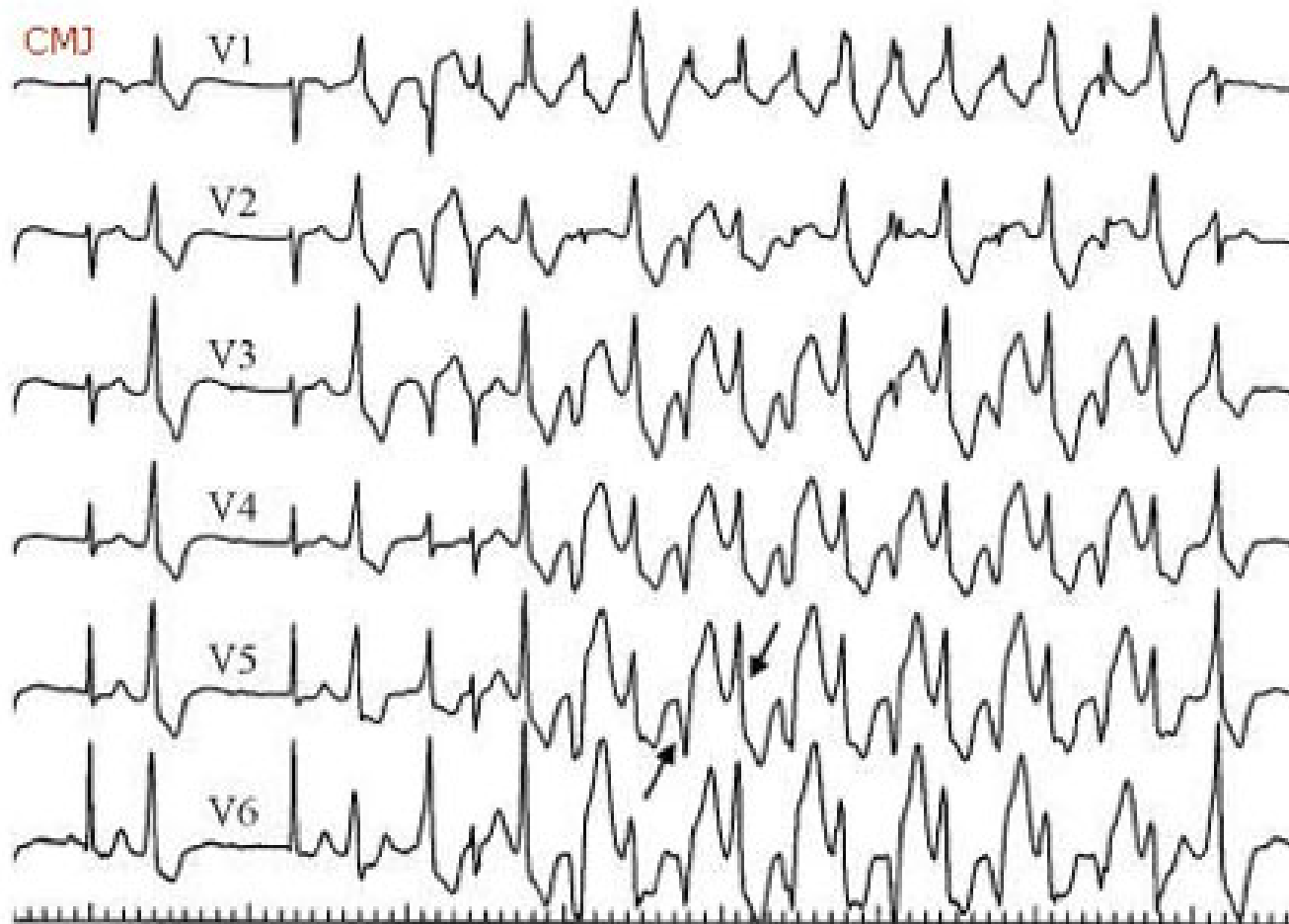


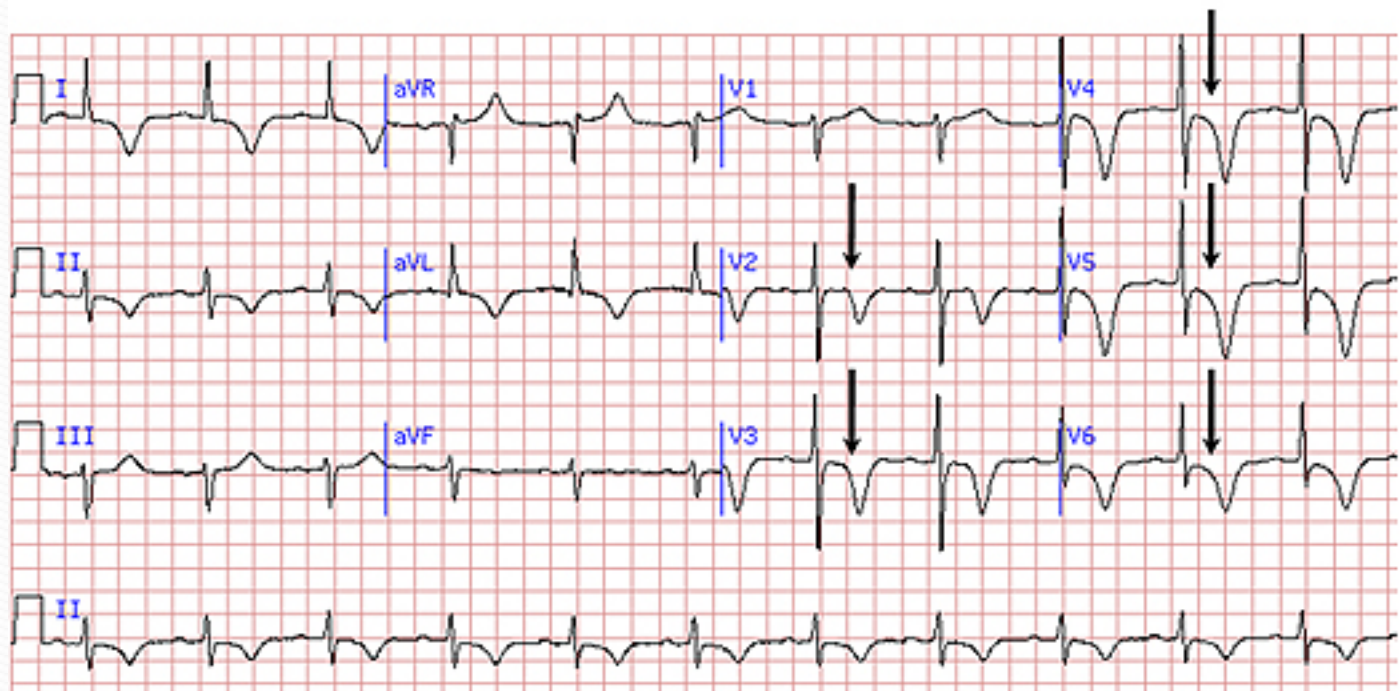
Copyright © 2005 by Elsevier Inc.







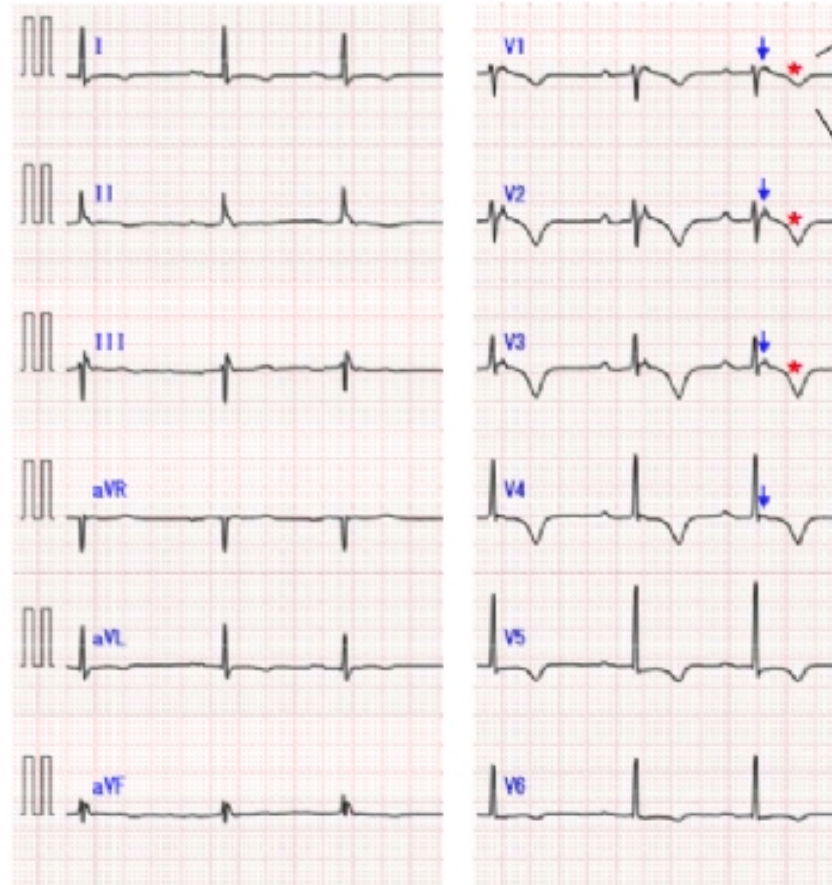




ARVD (ARVC)

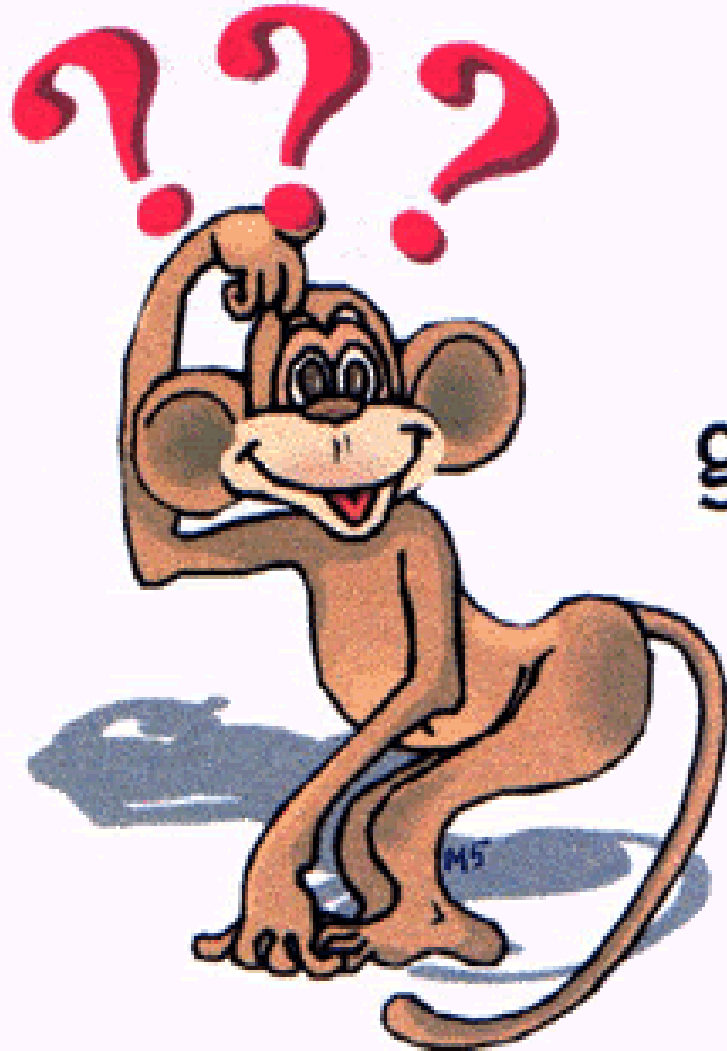
ECG in sinus rhythm

1) QRS in V1 ≥ 110 msec



↓ 2) epsilon wave

* 3) T wave inversion



Questions
are
guaranteed in
life;
Answers
aren't.