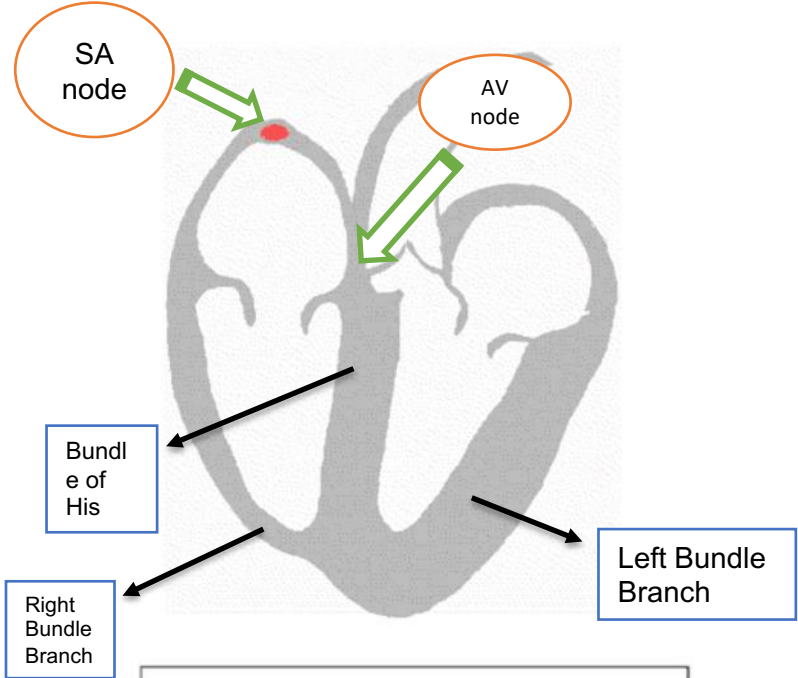




# EKG Interpretation

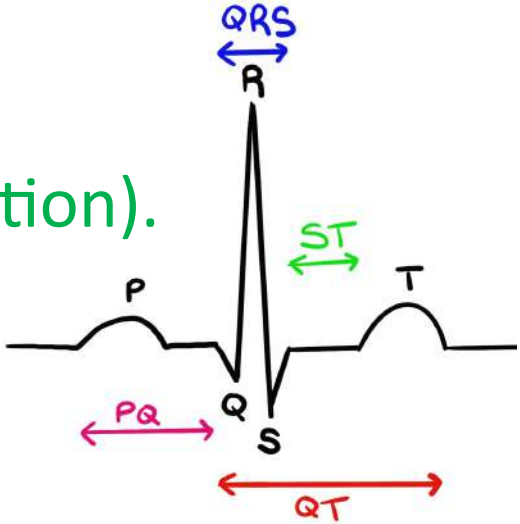
Shaira Cohen MSN, APRN, FNP-C, CNE

# EKG Basics



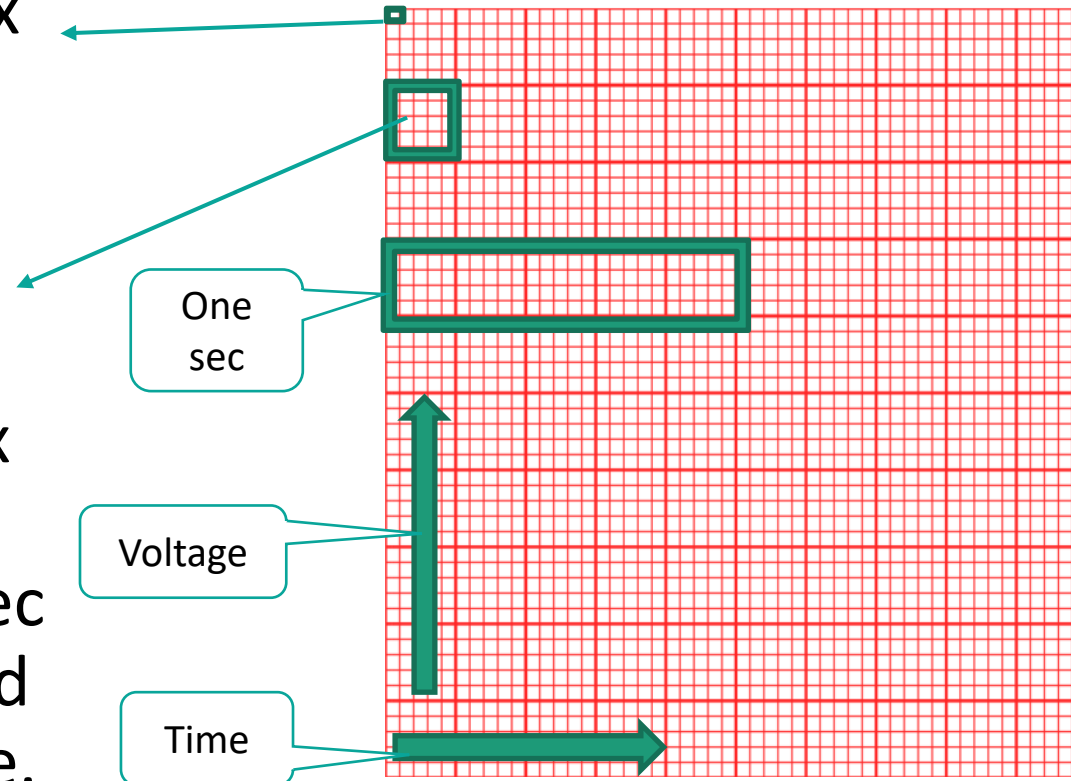
Kalumet, via Wikimedia Commons

- **P wave**: Atrial depolarization (contraction).
- **QRS complex**: Ventricular depolarization (contraction).
- **T wave**: Ventricular repolarization (relaxation).



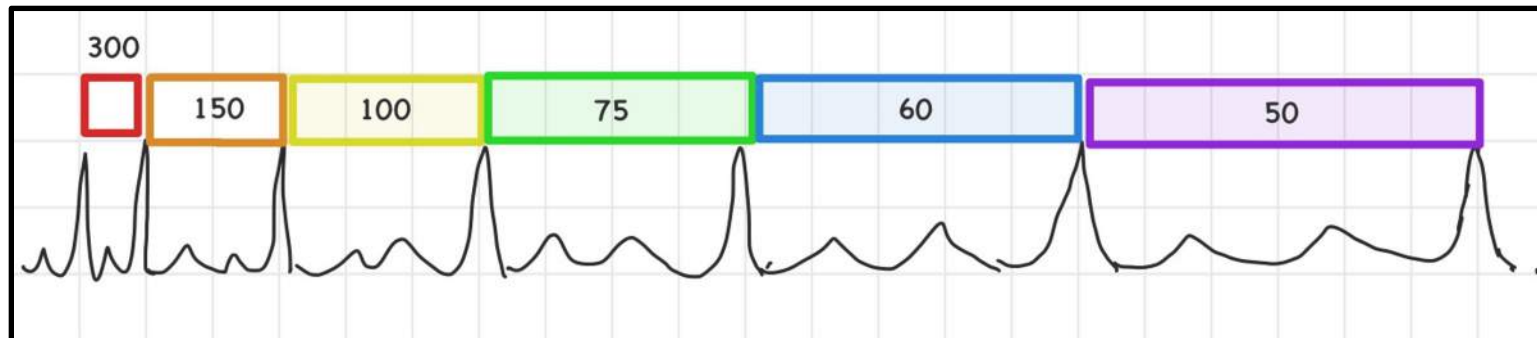
# EKG Grid

- One small 1mm x 1mm, block represents 40ms time and 0.1mV amplitude.
- One large 5mm x 5mm box represents 0.2 sec (200ms) time and 0.5mV amplitude.



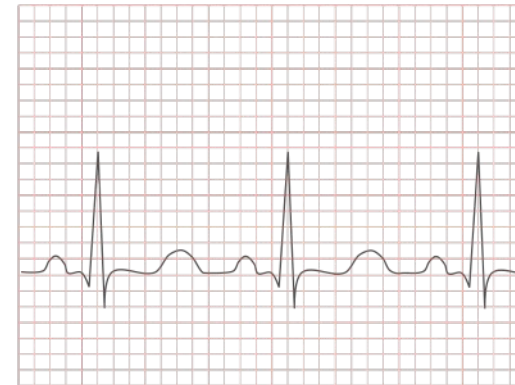
# HR Calculation

- The interval between QRS complexes determines the HR with regular cardiac rhythm. Divide 300 by the number of large boxes between two successive QRS complexes to calculate the HR.
- For example, if the interval between two QRS complexes is two large boxes, then the rate is 150 beats per minute (bpm) ( $300 \div 2 = 150$  bpm).



# EKG Strip

- Is the rhythm regular?
  - (Normal 60-100, Tachycardia >100, Bradycardia <60.)
- Calculate HR.
- Assess P waves: Does each P wave follow a QRS? Do P waves look normal? Duration of time? Are they absent?
- **Sawtooth baseline = flutter waves.**
- Chaotic baseline = fibrillation waves.
- Flat line = no activity.
- Assess PQ interval prolongation: 1st, 2nd, 3<sup>rd</sup>. degree heart block.
  - Missing QRS?

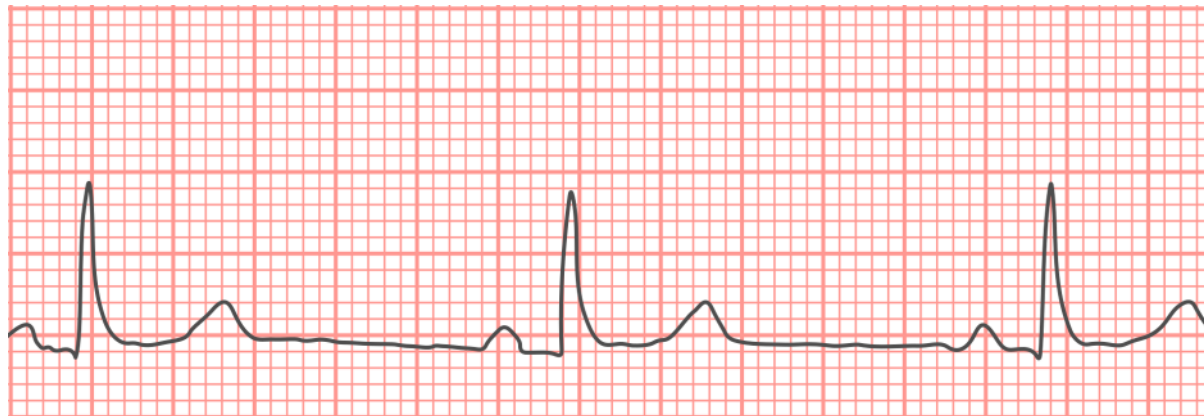


Madhero88, via Wikimedia Commons

# Sinus Bradycardia

- Components

- Rate <60 bpm.
- Regular rhythm.
- P-waves with constant preceding every QRS complex.

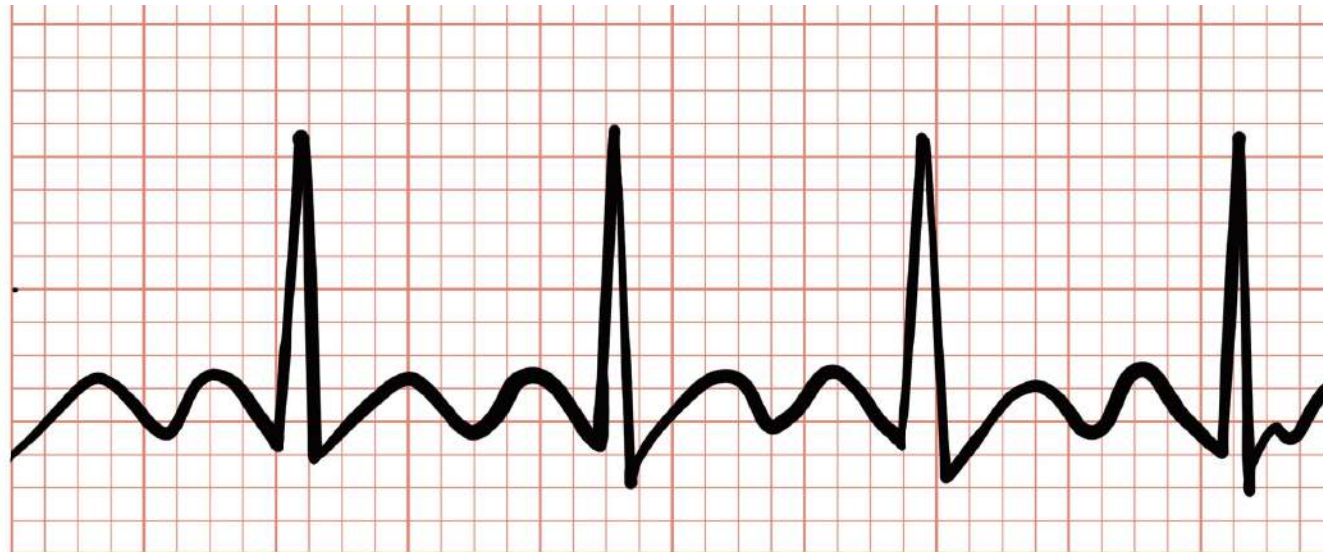


Sinusbradylead2.JPG: James Heilman, MDderivative work: Mysid (using Perl and Inkscape, via Wikimedia Commons)

# Sinus Tachycardia

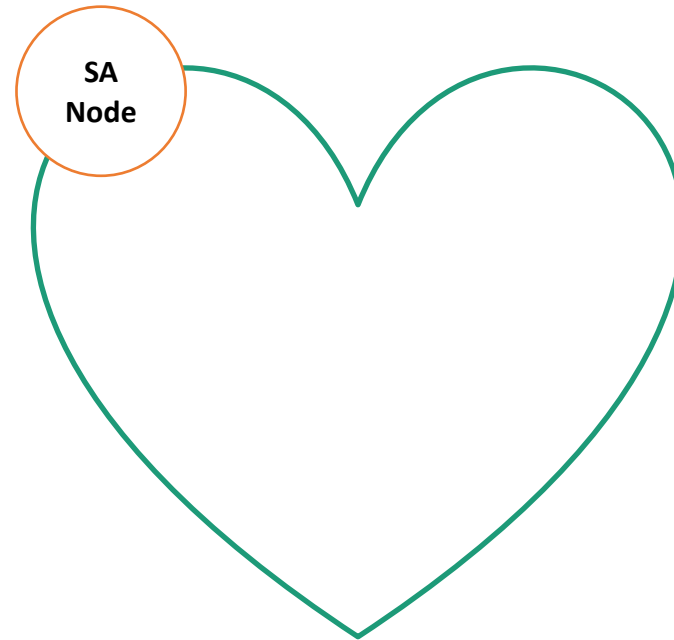
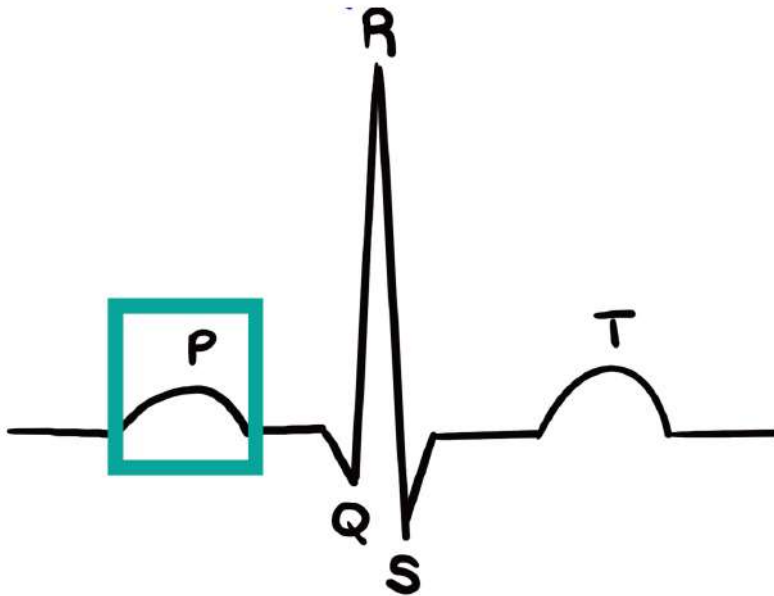
- Components

- Rate >100 bpm.
- Regular rhythm.
- P-waves with constant preceding every QRS complex.



# Atrial Dysrhythmias

- Atria = Problems with the P wave.

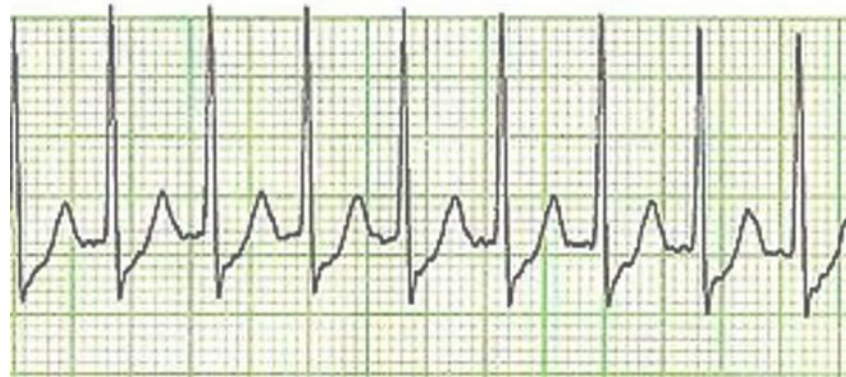




# Atrial Dysrhythmia

## *Supraventricular Tachycardia (SVT)*

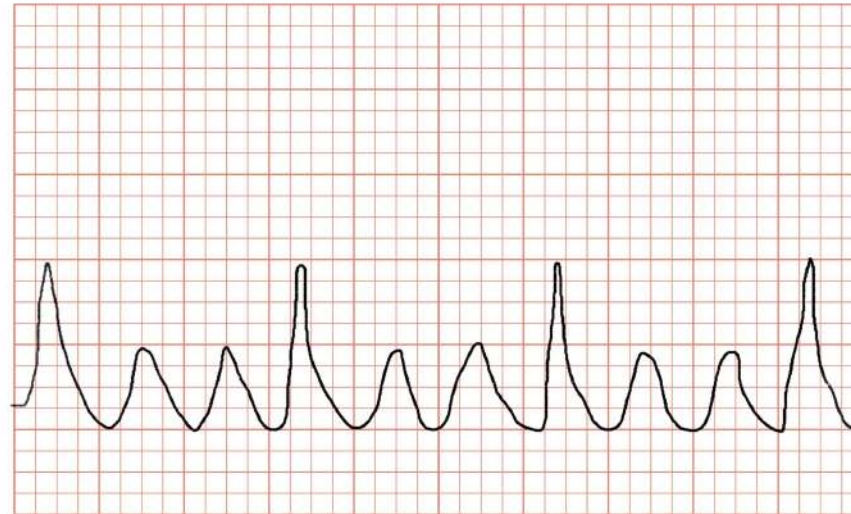
- Problem with either the SA or AV node.
- Tachycardia: rate  $>150$ bpm.
- P hidden behind previous QRS.
- Typically, regular rhythm.



# Atrial Dysrhythmias

## *A-Flutter*

- Multiple P waves.
- **Sawtooth pattern of the P waves.**
- Repeated loop of electrical activity by atria at a rate.
- More Ps than QRS.
- Regular/Irregular pattern.



# Atrial Dysrhythmias

## *A-Fib*

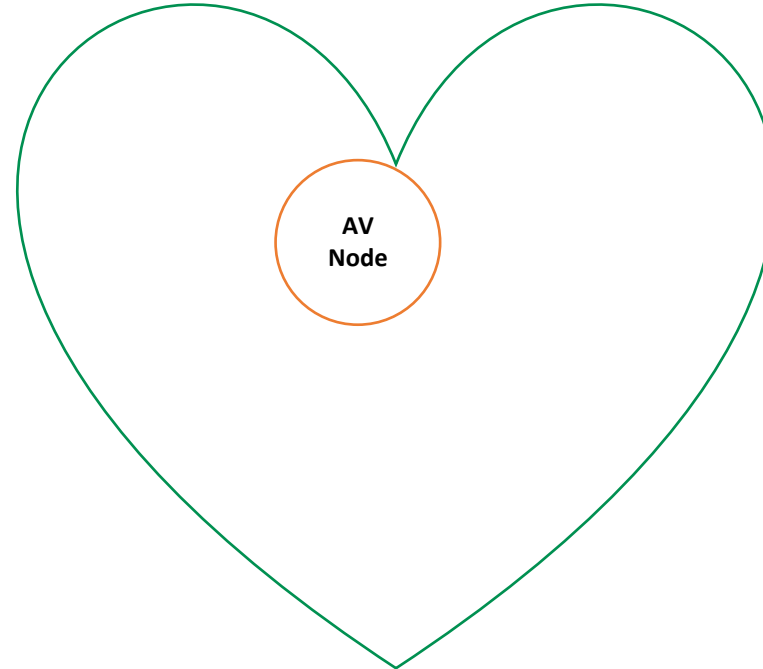
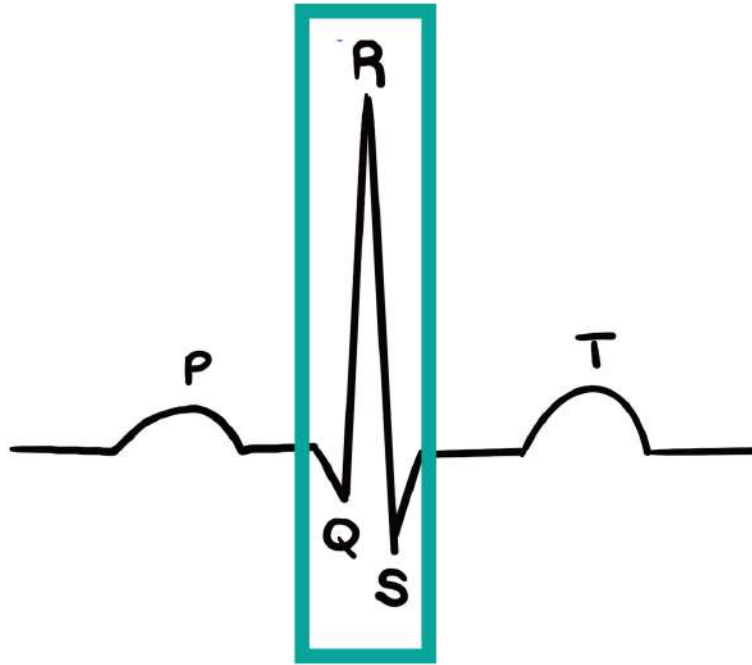


- Atrial quivering, **NO consistent P waves.**
- “Doctor’s signature or 5-year-old scribble.”

- R-R waves irregular/ not equidistant.
- Narrow QRS complex.

# Ventricular Dysrhythmias

💀 *Deadly rhythms* 💀

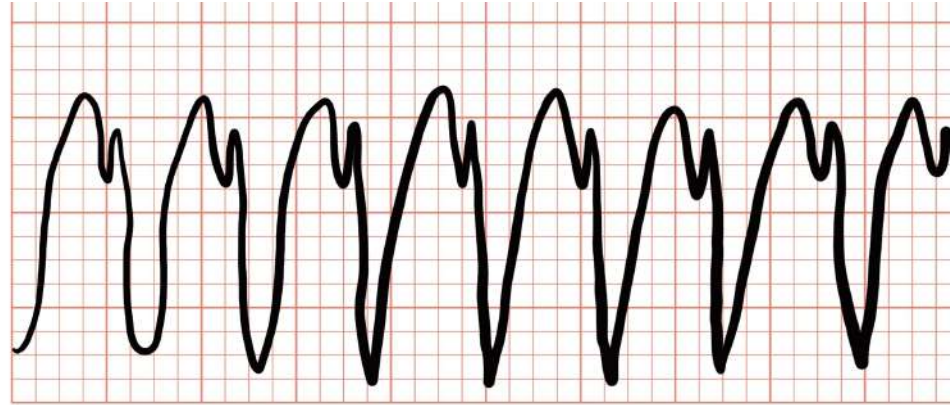


Problems with the QRS wave = Ventricle

# Ventricular dysrhythmia

## *Ventricular tachycardia*

- Fast rate.
- Wide QRS complex.
- No P waves.
- No T waves.
- R-R waves equidistant.
- Check patient for pulse!  
May or may not have one.  
Pulse may not last long!



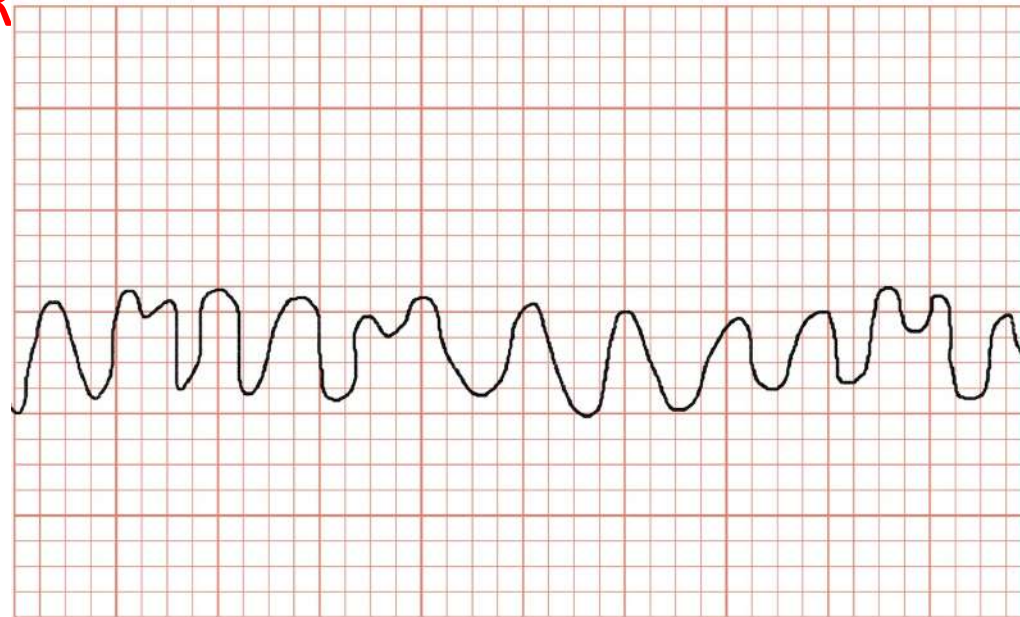
# Ventricular dysrhythmia

## *Ventricular Fibrillation*

- Ventricles quivering.
- Ventricles not pumping.



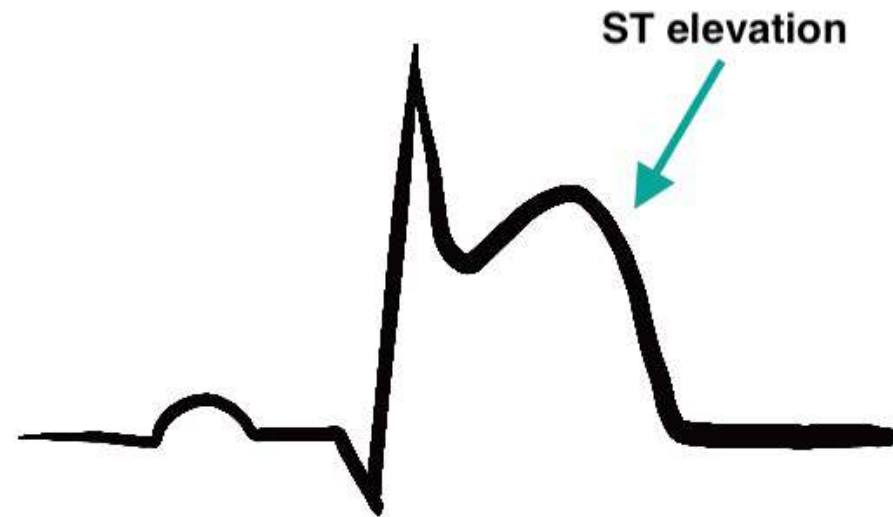
**NEVER**



**HOCK!**

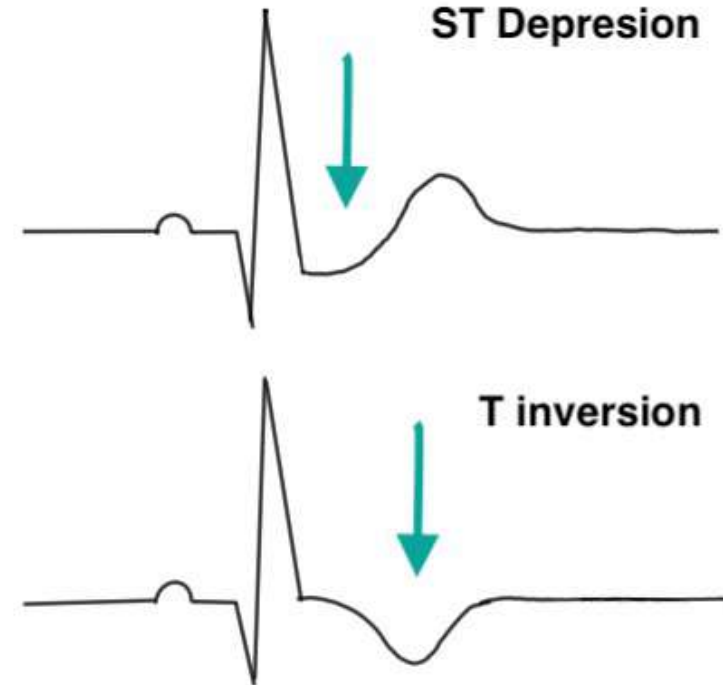
# STEMI

- ST Elevation Myocardial Infarction
- A severe type of heart attack during which one of the heart's major arteries is blocked.
- Time is muscle!
- No O<sub>2</sub> = muscle damage.



# NSTEMI

- Non-ST Elevation Myocardial Infarction
- Pay attention to ST depression or T inversion.
- It causes less damage than STEMI.
- Heart attack=acute coronary syndrome.





# The End

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