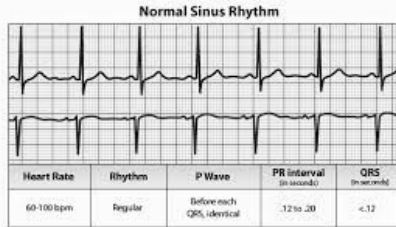


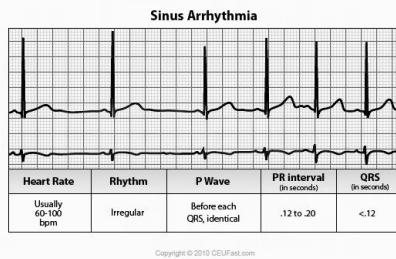
Normal Rhythms

Normal Sinus Rhythm Sinus Arrhythmia

Normal Sinus Rhythm



Sinus Arrhythmia



Inc. prevalence w/ younger age

Rhythm based on breathing, r/t changes in intrathoracic pressure:

- Inspiration = HR inc. / Expiration = HR dec.

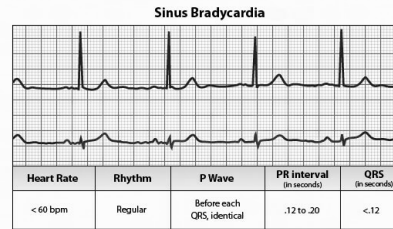
Irregular Rhythms

Sinus Bradycardia Sinus Tachycardia

Premature Atrial Contractions (PAC)

Arrhythmias r/t changes in **CO & perfusion**

Sinus Bradycardia



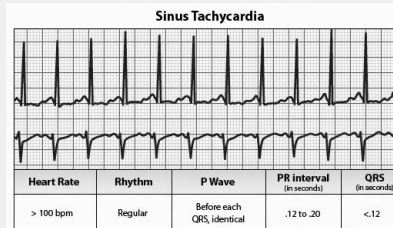
Low HR = give atropine! - epi, pacemaker

(temporary/permanent)

Usually no symptoms, not treated unless symptoms present - AMS, cyanosis, extreme syncope/fatigued, hypotensive, SOB

Treated by treating cause - can occur after: vagal nerve stimulation, beta-blockers, digoxin, inferior wall MI (back of heart), **hyperkalemia**, **hypothyroid**, falls asleep

Sinus Tachycardia



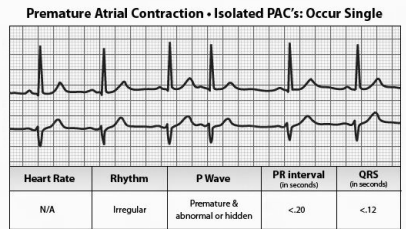
Heart beats too fast to allow to fill

PR interval may be smaller depending on rate

Causes: anxiety, hypovolemia, infection, fever, caffeine, pain, HF, **hyperkalemia**, **nitro & epi**

Only treat if necessary - treat underlying cause! - beta-blocker or CCB if necessary, bear down, O₂, digoxin, calm environment, relax/meditate

Premature Atrial Contractions (PAC)



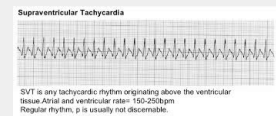
Beat not coming from SA node (ectopic focus)

Not usually treated, told to dec. cause -

treated if more frequent/several consecutive

Causes: MI, stretching of cardiac muscle, alcohol, smoking, HF & pericarditis, meds, irritability of cardiac muscle

Supraventricular Tachycardia (SVT)



P-waves = buried in T-waves, hard to see

PR interval = usually not possible to measure

QRS = normal (0.06-0.10) but may be wide if abnormally conducted through ventricles

Person symptomatic

Perfusion and CO affected

Treat with adenosine & flush w/ 20 mL NSS

→ heart restarts

Causes: anxiety, caffeine, amphetamines, irritability of atrial muscle

C

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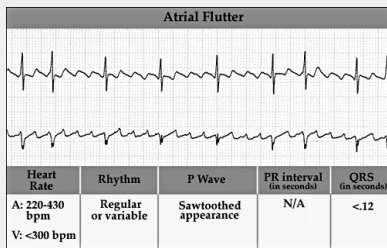
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More Rhythm Disorders

Atrial Flutter Atrial Fibrillation

Atrial Flutter



Saw-toothed appearance

Ectopic pacemaker

Causes: *pulmonary emboli, CHF, pericarditis, cardiac ischemia*

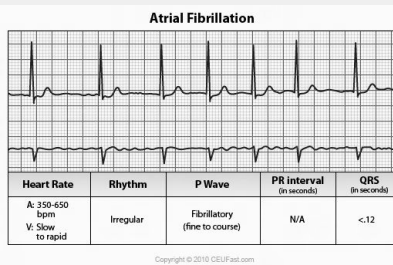
Can walk around if low rate

Want to control rate - digoxin, CCB, anti-arrhythmics; override pacing to fix rhythm, ablation therapy

May see ratio of beats to QRS's

Similar shape = coming from same site

Atrial Fibrillation



Biggest concern = blood pooling → clots (a fib → NSR = clots → stroke/PE)

Dec. CO < 30%

Not effective beats, rapid & chaotic

Causes: *MI, CHF, cardiomyopathy (anything that causes heart to expand)*

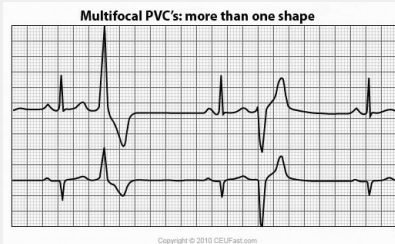
Ventricular Rhythms

Premature Ventricular Contractions (PVC)

Ventricular Tachycardia

Ventricular Fibrillation

Premature Ventricular Contractions (PVC)



Unifocal: 1 ectopic site on ventricle

Multifocal: 1+ site on ventricle - more dangerous!

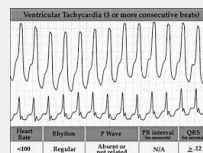
Inc w/... age, *ischemia, CHF, hypokalemia, acidosis, hypomagnesemia, stress, caffeine, nicotine*

Symptoms: palpitations

Runs of PVCs → V-tach

May not treat if limited number

Ventricular Tachycardia



Usually w/ significant heart disease (CHF, MI)

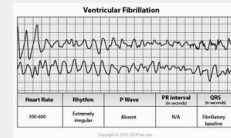
Causes: *anything that inc. automaticity of heart*

Symptoms: *r/t dec. CO*

Treatment: *anti-arrhythmics (amiodarone, lidocaine, cardizem); beta-blockers (control rate); betapace (controls rate & rhythm); cardiovert (ICD)*

If not treated → V-fib

Ventricular Fibrillation



Ventricles quivering

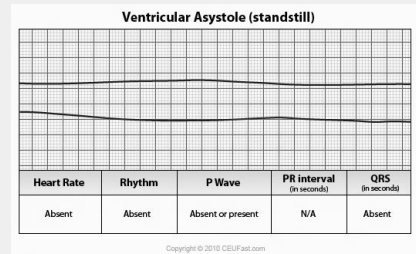
O₂ demand is through the roof → ischemia

Treatment: defibrillate

Causes: *CAD, MI, CHF, hypokalemia, hypomagnesemia*

Pt is often... *unconscious, no pulses, no BP, acidotic, may seize*

Asystole



Cannot shock → CPR & epi

Occurs w/ myocardial hypoxia

Atrioventricular (AV) Blocks

First Degree Second Degree

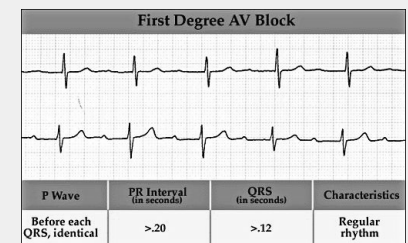
Third Degree Bundle Branch

Diagnosis: *EKG*

Asymptomatic unless HR is too low

Treatment (w/ slow HR): *O₂, atropine, pacemaker*

First Degree AV Block

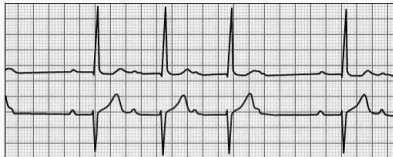


Causes: *ischemia, MI*

Not usually treated

Second Degree AV Block

Second Degree AV Block - Mobitz (Wenckebach)



| P Wave | PR Interval (in seconds) | QRS (in seconds) | Characteristics |
|-------------------------|--------------------------|----------------------------|------------------------------------|
| Conduction intermittent | Increasingly Prolonged | Before each QRS, identical | QRS dropped in a repeating pattern |

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Causes: MI, digoxin, Lyme's disease

Symptoms: usually none unless HR is too low

Treatment: atropine, pacemaker

Third Degree (Complete) AV Block

Third Degree (complete) AV Block



| P Wave | PR Interval (in seconds) | QRS (in seconds) | Characteristics |
|-------------------------------|--------------------------|------------------|------------------------------|
| Normal but not related to QRS | None | N/A | No relationship between P&RS |

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Causes: ischemia, CAD, MI

Treatment: pacemaker

Left Bundle Branch Block

Left Bundle Branch Block



| P Wave | PR Interval (in seconds) | QRS (in seconds) | Characteristics |
|----------------------------|--------------------------|------------------|-----------------|
| Before each QRS, identical | .12 to .20 | $\geq .12$ | RR' in V5 |

Right Bundle Branch Block

Right Bundle Branch Block



| P Wave | PR Interval (in seconds) | QRS (in seconds) | Characteristics |
|----------------------------|--------------------------|------------------|-----------------|
| Before each QRS, identical | .12 to .20 | $> .12$ | RSR' in V1 |

Analysis

Dec. CO

Tissue Perfusion

Pacemaker Spikes

Electronic Pacemaker Spikes



Artificially induces electronic stimulus that paces the patient's rhythm causing a blip or spike on the ECG waveform

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Pharmacological Interventions

Anti-Arhythmics

Beta-Blockers

Calcium Channel Blockers

Implantable Cardioverter Defibrillator (ICD)

What is it?

An internal defibrillator

Who are candidates?

Pts who have survived an episode of sudden cardiac arrest
Documented life-threatening dysrhythmias

Uncomfortable, not necessarily painful

Defibrillation vs. Cardioversion

Defibrillation: shock heart in emergency

Cardioversion: sync w/ heart, want normal rhythm

- Want to medicate beforehand

- Fibrillate in middle → shock & defib.

External Defibrillator Vests

ZOLL LifeVest



Worn 24/7 except showers

Ablation Therapy

Want to go in & stop abnormal beats

3 Types - all cause destruction to area of heart causing problem

- Chemical

- Mechanical (cut, lasers)

- Radiofrequency

Used w/ electrophysiology/conduction problems

Evaluation of Treatment

Improved CO

Improved tissue perfusion

Improved EKG

C

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