

ACLS &

Tachy and Brady arrhythmias

Emergency Lectures

pre call: lower morbidity & mortality
 Cardiac arrest (collapse) → activate BLS

BLS: Call for help
 safe approach
 look: chest rising
 listen: breathing sound
 feel: carotid pulse

No breathing & pulse - CPR
 chest compression: breathing
 AED & 30:2
 shockable - 20% survival
 change every 2min - until return of spontaneous circulation (ROSC)

No breathing & present pulse → foreign body (not collapsed)
 hemic, chest thrust, back blows
 remove only if can see it
 respiratory depression (opioid overdose)
 only give positive pressure ventilation & ant-dot

present breathing & no pulse
 dying or gasping - CPR



Early Recognition and Prevention | Activation of Emergency Response | High-Quality CPR | Defibrillation | Post-Cardiac Arrest Care | Recovery

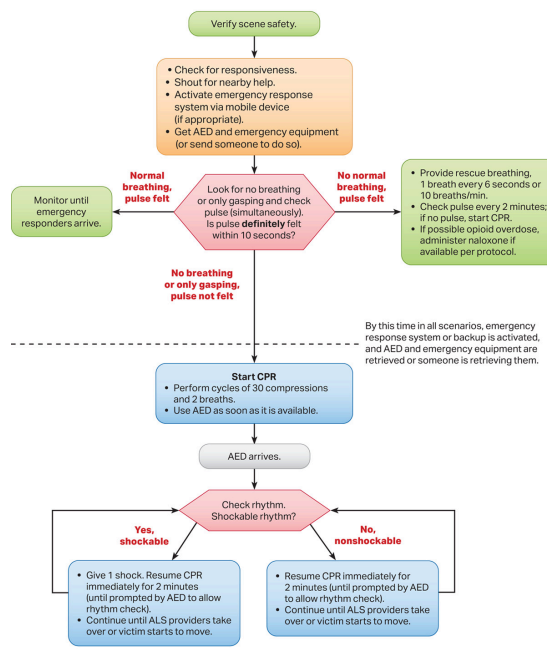
Adult IHCA Chain of Survival



Activation of Emergency Response | High-Quality CPR | Defibrillation | Advanced Resuscitation | Post-Cardiac Arrest Care | Recovery

Adult OHCA Chain of Survival

Adult Basic Life Support Algorithm for Healthcare Providers



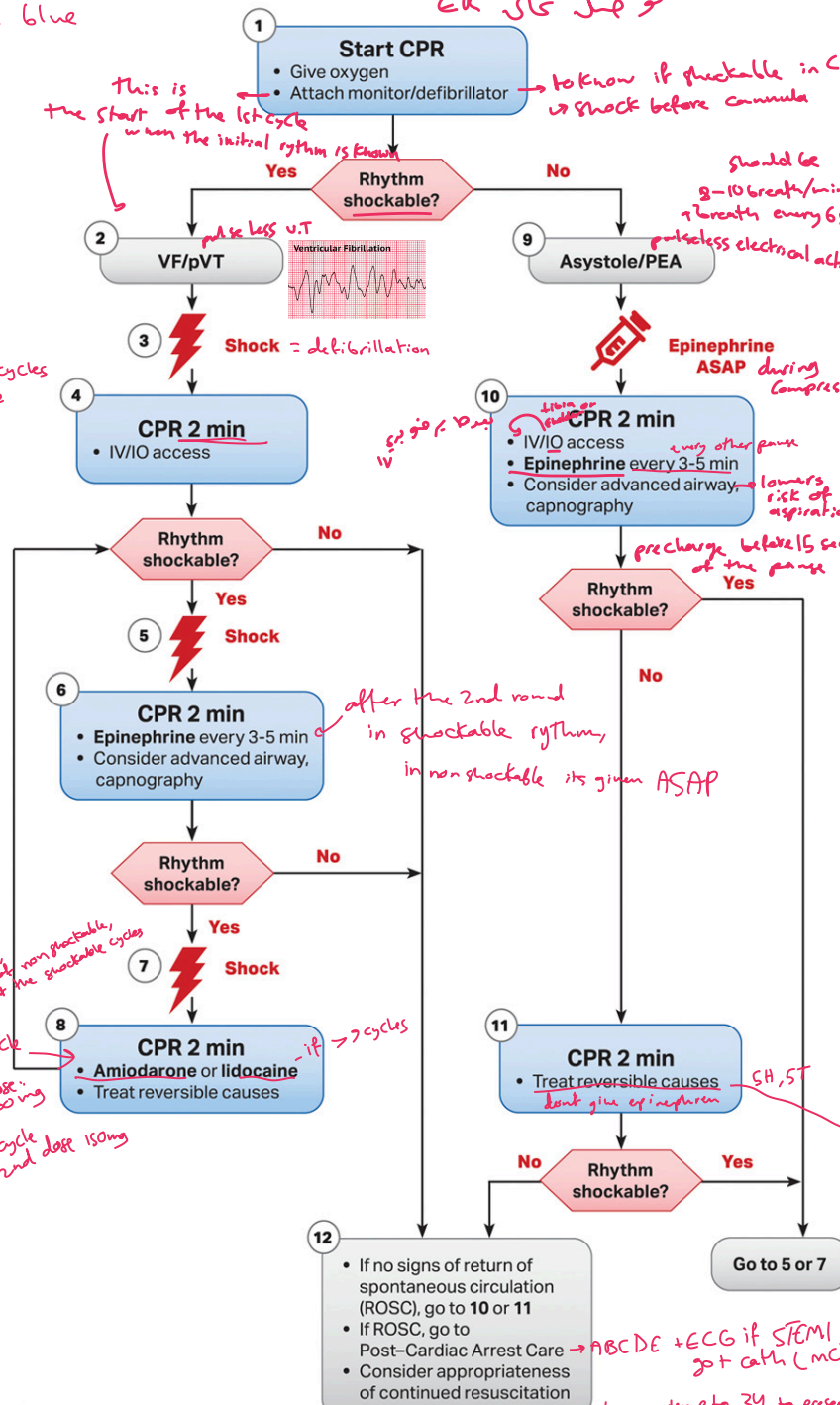
The correct steps of basic life support (BLS):
 Assess the victim, activate EMS and bring AED, perform chest compressions, rescue breaths

Adult Cardiac Arrest Algorithm

Code blue

ER JS Jp 3

ACLS



CPR Quality
<ul style="list-style-type: none"> Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil. Minimize interruptions in compressions. Avoid excessive ventilation. Change compressor every 2 minutes, or sooner if fatigued. If no advanced airway, 30:2 compression-ventilation ratio. Quantitative waveform capnography - If PETCO₂ is low or decreasing, reassess CPR quality.
Shock Energy for Defibrillation
<ul style="list-style-type: none"> Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. Monophasic: 360 J
Drug Therapy
<ul style="list-style-type: none"> Epinephrine IV/IO dose: 1 mg every 3-5 minutes Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg. Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
Advanced Airway
<ul style="list-style-type: none"> Endotracheal intubation or supraglottic advanced airway Waveform capnography or capnometry to confirm and monitor ET tube placement Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> Pulse and blood pressure Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg) Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
<ul style="list-style-type: none"> Hypovolemia - 2L Hypoxia - O₂ Hydrogen ion (acidosis) - Hx (if analysis), in cannula 1st blood drawn is VBle - 1min if pH < 7 → NaHCO₃ Hypo-/hyperkalemia - Insulin & glucose to shift K intracellularly, by Hx (analysis) Hypothermia → if with ECG changes - peak Twaves then wide QRS → Ca Tension pneumothorax - Hx (truma, mofan), by auscultation, percussion, US (absent lung sliding) Tamponade, cardiac - US (RV collapse), Beck's triad (distended neck veins, muffled heart sounds, hypotension (not seen here)) Toxins Thrombosis, pulmonary → ↑ Wells score, Hx of DVT/PE, US show RV dilation → larger than LV, normally its V3 LV ← thrombolysis Thrombosis, coronary → see STEMI after ROSC need cath

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 Chest compression
 defibrillation
 secure airway

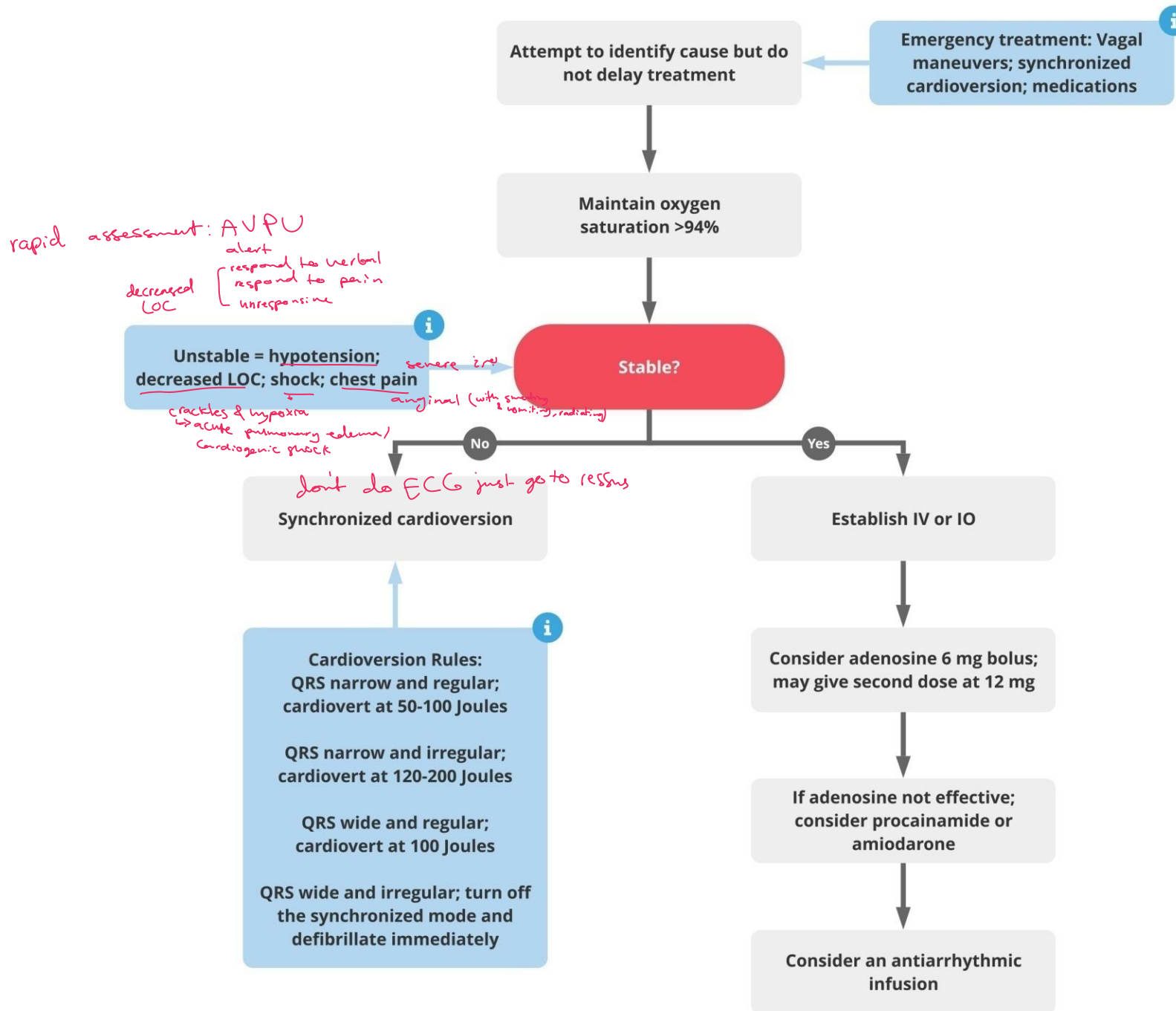
Wells score

Criteria	Points
Clinical signs/symptoms of DVT	3
PE is most likely diagnosis	3
Tachycardia (>100 bpm)	1.5
Immobilization/surgery in previous 4 weeks	1.5
Prior DVT/PE	1.5
Hemoptysis	1
Active malignancy (wt w/in 6 months)	1

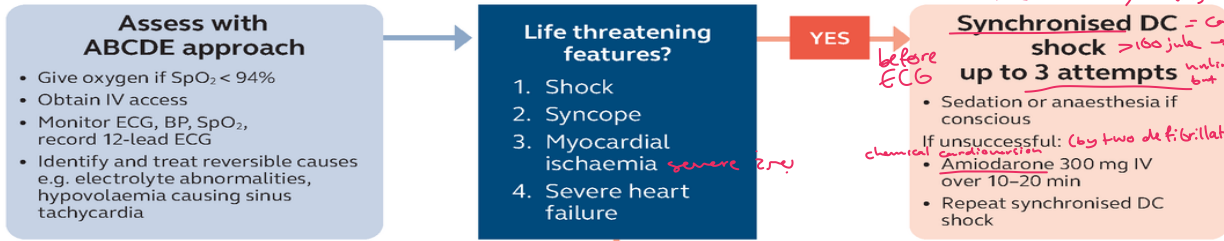
Low Risk <2 points | Intermediate risk 2-6 points | High risk >6 points
 PE unlikely 0-4 points | PE Likely >4 points

lower temp to 34 to preserve neurological function

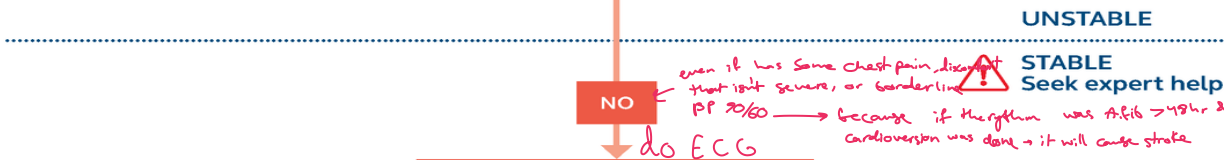
How to approach Tachy-arrhythmias



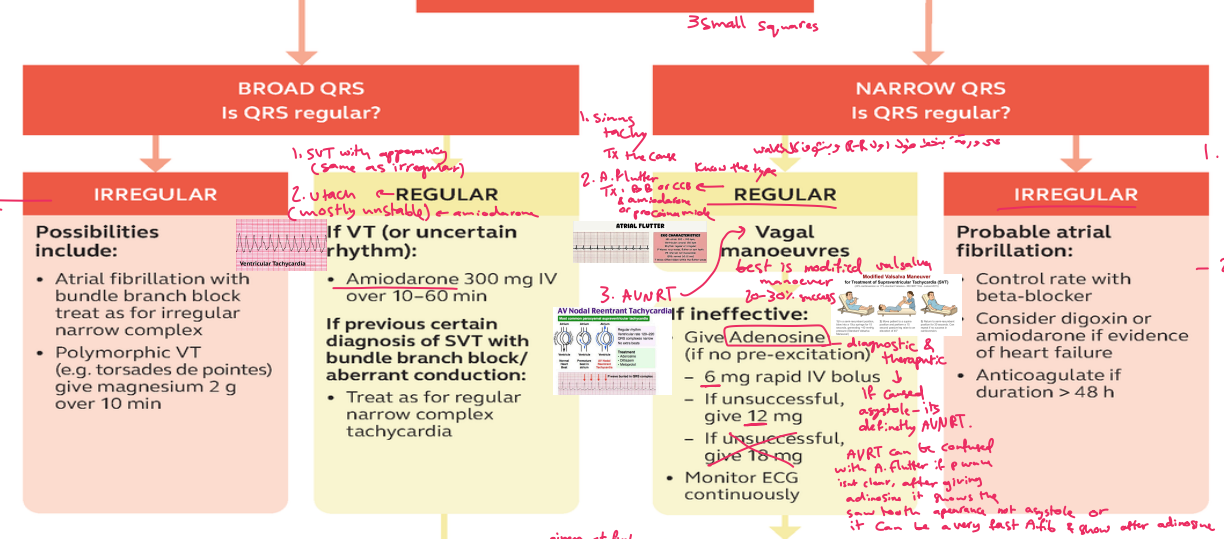
Adult tachycardia



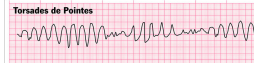
at the R wave, if was done on T wave → V.fib
 Synchronised DC shock = Cardioversion/mon
 > 100 J → if didn't work use defibrillators unlimited but after 3rd need a dx



Is the QRS narrow (< 0.12 s)?



hard to give synchronised shock (lots of large R waves), if didn't work, can give DC shock



1 - polymorphic ventricular tachycardia (torsades de pointes) - crescendo decrescendo Tx: magnesium sulfate

2 - Supra ventricular tachycardia with aberrancy RBBB, LBBB or WBV

- if known WBV, should never give AV nodal agent adenosine, BB or CCB if Afib it will turn V.fib Tx: procainamide

- if known Lt or Rl BBB & came with SVT with aberrancy treat the SVT type as mentioned (sinus tachy, Aflutter, AVNRT) - if unknown history - don't give anything & call consultant

	LBBB	RBBB
Causes	Aortic stenosis, IHD, hyperkalaemia, digoxin, PE	RVH, PE, IHD, congenital
WILLIAM	VI - W appearance V6 - M appearance	MARROW VI - M appearance V6 - normal appearance May be slurred S wave
QRS appearance on ECG		

SVT is a broad term don't use it because it refers to any tachycardia above AV node including Afib, Aflutter, sinus tachy. its better to use AVNRT (AV nodal re-entry tachycardia) instead (regular narrow complex tachycardia without a p wave)



1. sinus arrhythmia: HR increase with inspiration & RR expiration & RR normal - treat as sinus tachy, tx the cause (fever, pain, anxiety)



2. multifocal atrial tachycardia > 3 p waves different morphology

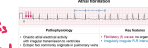
Tx: treat the underlying cause & ignore the rhythm

3. premature atrial contraction (PVC)



only 1 or 2 irregular beats & the rest is regular, respiratory or if cause NO Tx is needed

acute Tx is rate control BB or CCB → if Afib & stable - if > 49hr - with thrombolysis risk, need thrombolysis - echo & rate control not rhythm by BB, if contraindicated CCB



acute Tx is rate control BB or CCB

- if < 48hr or already on anticoagulation - rhythm control (amiodarone or procainamide)

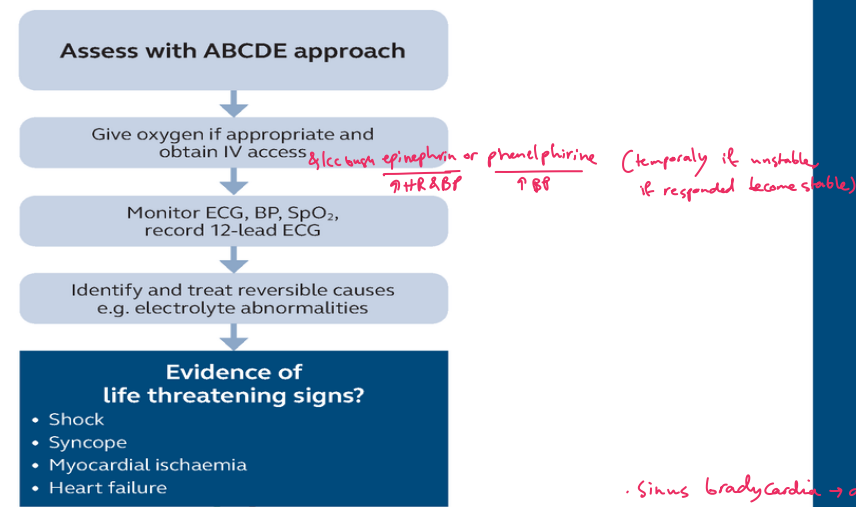
CHA ₂ DS ₂ -VASc risk factor	Points
C Congestive heart failure	+1
H Hypertension	+1
A ₂ Age 75 years or older	+2
D Diabetes mellitus	+1
S ₂ Previous stroke, transient ischaemic attack or thromboembolism	+2
V Vascular disease	+1
A Age 65-74 years	+1
Sc Sex category (female)	+1
CHA ₂ DS ₂ -VASc score Recommendation	
0	No anticoagulation therapy needed
1	Options include no anticoagulation therapy, aspirin, or anticoagulation therapy
≥2	Oral anticoagulation therapy is recommended

Arrhythmia	First Step	Preferred Strategy	Key Drugs / Appro
Atrial fibrillation (AF)	Rate control first	Rate control initially; rhythm control in selected patients	β-blocker, diltiazem; rhythm: amiodarone or procainamide
Atrial flutter	Rate control first	Rate control initially; rhythm control often later (more definitive than AF)	β-blocker or diltiazem → elective cardioversion / ablation
AVNRT / AVRT (SVT)	Rhythm termination first	Acute termination of re-entry circuit	Vagal maneuvers - adenosine (first-line)
Sinus tachycardia	No rate/rhythm control	Treat underlying cause only	Fluids, antipyretics; treat pain, sepsis, hypoxia, anemia
Monomorphic ventricular tachycardia (stable)	Rhythm control	Termination of VT even if stable	IV amiodarone / procainamide
Polymorphic VT (non-torsades)	Rhythm control	Treat trigger + antiarrhythmic therapy	Correct ischemia/electrolytes ± amiodarone
Torsades de pointes	Rhythm stabilization immediately	Prevent degeneration to VF	IV magnesium sulfate
WPW with orthodromic tachycardia (stable)	Rhythm termination	Avoid AV nodal blockade if pre-excitation suspected	Procainamide preferred
Pre-excited AF (WPW + AF)	Urgent rhythm control	High risk of VF → avoid AV nodal blockers	Procainamide or synchronized cardioversion

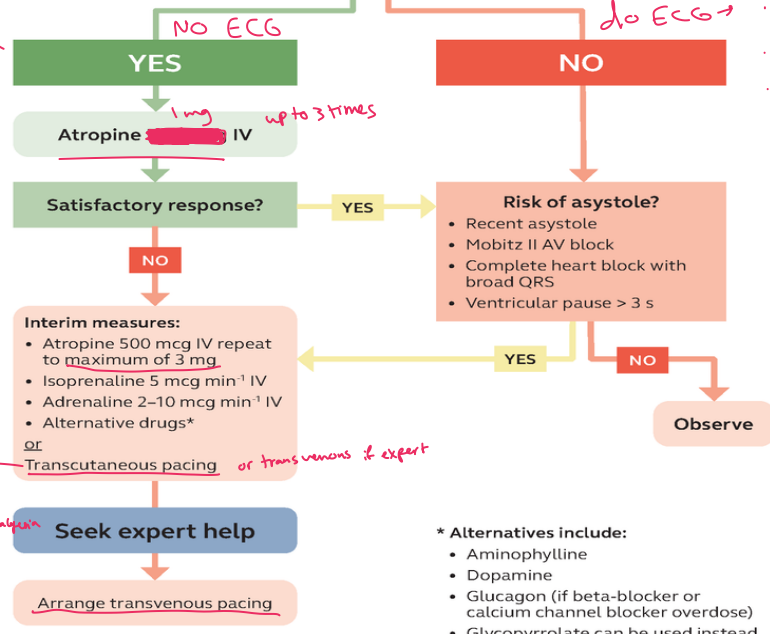
Acute management:

- wide QRS → rhythm control - amiodarone or procainamide
- narrow QRS → rate control - BB or CCB (non-dihydro) + adenosine → AVNRT 1st
- Adenosine & BB should be avoided in asthma pt & replaced with CCB (verapamil & diltiazem) except for cardioselective BB, can be used with asthma.

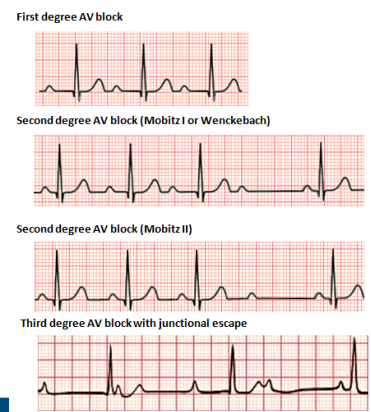
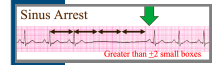
Adult bradycardia *CSO*



glyc max epinephrin or phenelphrine (temporarily if unstable if responded become stable)
↑HR & BP ↑BP



• Sinus bradycardia → do labs to know cause & Tx
• 1st HB Mobitz I (PR prolongation) → benign no need for intervention
• 2nd HB Mobitz I (PR gradual prolongation then drop)
• 2nd HB Mobitz II (patterned 2-3 PR prolongation then drop, regular irregularity) → need admission & pacemaker
• 3rd degree HB
• Sinus arrest



*** Alternatives include:**

- Aminophylline
- Dopamine
- Glucagon (if beta-blocker or calcium channel blocker overdose)
- Glycopyrrolate can be used instead of atropine

Cardioselective Beta Blockers

- Metoprolol
- Atenolol
- Nebivolol
- Bisoprolol
- Acebutolol
- Betaxolol
- Esmolol



β Receptor Locations
 β1 = Heart (1 heart)
 β2 = Lungs (2 lungs)