

Diagnostic Approach to Arrhythmias

(abnormal cardiac rate and rhythm on ECG or Cardiac Monitor)

→ Are P-waves present?
→ Relationship btw P-waves and QRS?

→ Is QRS normal or wide?
→ P-waves: present? Shape? Rate?
→ Relationship btw P-waves + QRS?
→ Response to vagal maneuvers?

Tachy-arrhythmias (>100bpm)

Brady-arrhythmias (<60 bpm)

Wide QRS on ECG (>120ms) *(slow ventricular depolarization)*

Narrow QRS on ECG (<120ms) *(fast ventricular depolarization)*

Regular Rhythm

Irregular Rhythm

Ventricular Tachy (VT)

→ Hx of MI (esp Anterior STEMIs): re-entrant circuit around ventricular scar
→ Hx of other structural heart diseases: HF, ventricular hypertrophy, valve disease, congenital abnormality
→ Hx of Long-QT syndromes (genetic, potassium imbalance, etc)
→ ECG: P-waves unrelated to QRS complexes, V1-V6 concordance of QRS complexes (all deflecting + or -)
→ **Sustained VT = dangerous! Could lead to 0 cardiac output**

SVT with conduction delay ("abherrancy")

(responds to/stops with vagal maneuvers; QRS morphology constant regardless of heart rate)
→ SVT w/ BBB
→ R/o A-fib if irregular
→ Antidromic AVRT (ventricular contractions via accessory path only)
(Tx Wide-complex tachy as VT until proven otherwise)

Supra-ventricular Tachy (SVT)

→ Sudden-onset, constant palpitations
→ ECG: P-waves abnormal

Normal Sinus Rhythm

→ Sinus Bradycardia (can be normal)

No P-waves

→ Escape rhythms due to SA block/arrest (Junctional, Idio-Ventricular)

A/V dissociation

→ 3rd deg AV block

PR interval > 200ms

→ 1st deg AV block

Missed QRS after P-waves

→ 2nd deg AV block

Sinus pauses, chonotropic incompetence

→ Sick Sinus Syndrome
→ Tachy-Brady syndrome (w/ A-fib/A-flutter)

Atrial Fibrillation (Afib)

→ No distinct P-waves, chaotic baseline (not isoelectric)
→ Caused by ectopic foci near pulmonary veins

Multifocal Atrial Tachycardia (MAT)

→ 3+ P-wave shapes; isoelectric baseline btw P-waves
→ Caused by severe pulmonary disease/hypoxemia

Atrial Flutter w/ variable block

Regular Rhythm (constant P-P interval)

Irregular Rhythm

Monomorphic VT

→ Lone re-entry circuit around single scar
→ ECG: Capture + fusion beats, AV dissociation

Polymorphic VT

→ Multiple ectopic foci or changing re-entry circuits
→ Long QT predisposes R-on-T events (i.e. torsades de pointes)

Ventricular Fibrillation (VF)

→ Triggered by V-tach in a pt w/ Serious underlying heart dx
→ 0 cardiac output, fatal!
→ Tx: immediate defibrillation! Anti-arrhythmics (prevent recurrence); ICD (Long-term; only tx that ↓ mortality)

Treatment of VT:

→ If unstable: electric cardioversion
→ If stable: anti-arrhythmic drugs
→ LT: implanted cardiac defibrillator

	Atrial rate (bpm)	P-wave morphology	Carotid Sinus Massage response (↑ vagal tone)
→ Sinus Tachy	100-180	Can be normal	Atrial rate may ↓
→ Re-entrant SVTs (AVRT, AVNRT)	140-250 (paroxysmal)	Hidden in QRS, or retrograde	May abruptly stop
→ Focal Atrial Tachycardia	130-250 (paroxysmal)	Different shape, due to ectopic pacemaker	Doesn't usually stop tachy AV block may ↑
→ Atrial Flutter	180-350	"saw-toothed"	AV block may ↑