

ECG Rhythm Reference

A pocket card condensing Aehlert, *ECGs Made Easy*, 7th ed. · Dr. Alice Matthews · amatthews@concorde.edu · Concorde Career College Portland

THE FIVE-QUESTION METHOD. Ask all five, in this order, on every strip. 1. Is it regular? 2. What is the rate? 3. Are there P waves, one for every QRS? 4. What is the PR interval? 5. How wide is the QRS?

The paper. All of it falls out of 25 mm/s.

- Small box, 1 mm: **0.04 s**, 0.1 mV
- Large box, 5 mm: **0.20 s**, 0.5 mV
- **5 large boxes per second**, 30 in 6 s
- **300 large boxes per minute**
- 10 mm/mV; standardization pulse 2 large boxes tall

Rate. Regularity picks the method.

- **300 sequence, regular only:** from an R on a heavy line, **300, 150, 100, 75, 60, 50**
- **1500 method**, regular, precision: 1500 / small boxes between R waves
- **6-second method, irregular or slow:** R waves in 6 s × 10

Intervals. Seconds and boxes together.

- P wave under 0.12 s: fewer than 3 boxes
- **PR 0.12 to 0.20 s: 3 to 5 boxes**
- **QRS 0.06 to 0.10 s: under 3. Wide at 0.12 s+**
- QT 0.44 s or less, rate dependent

Every Rhythm, Side by Side {Split by QRS width. Table A is supraventricular (narrow QRS, work is in the P wave). Table B: the width is the finding.}

Rhythm	Regularity	Rate	P waves	PR	QRS
TABLE A. Supraventricular. QRS narrow, 0.06 to 0.10 s, in every row.					
<i>Sinus</i>					
Normal sinus	Regular	60 to 100	Upright, uniform, one per QRS	0.12 to 0.20	0.06 to 0.10
Sinus bradycardia	Regular	Under 60	Unchanged	Unchanged	Narrow
Sinus tachycardia	Regular	Over 100	Upright; may hide in prior T	Unchanged	Narrow
Sinus arrhythmia	Irregular; R-R > 0.12 s	60 to 100	Upright, uniform	Unchanged	Narrow
SA block	Pause: exact multiple	60 to 100	Whole P-QRS-T drops ; gap empty	Unchanged	Narrow
Sinus arrest	Pause not a multiple	60 to 100	Whole P-QRS-T drops	Unchanged	Narrow
<i>Atrial</i>					
PAC	Regular, one early beat	Underlying	Early P, differs from own sinus P	Varies	Narrow
Wandering atrial pacer	Irregular	Under 100	3+ shapes in one lead	Varies	Narrow
Multifocal atrial tach.	Irregularly irregular	Over 100	3+ shapes in one lead	Varies	Narrow
Atrial tach., SVT, AVNRT	Regular	150 to 250	One abnormal shape , often buried	Not measurable	Narrow
Atrial flutter	Set by conduction ratio	Atrial 250 to 350	Sawtooth F waves, all alike	Not measurable	Narrow
Atrial fibrillation	Irregularly irregular	Atrial 350 to 600	None. Fibrillatory baseline, never flat	Not measurable	Narrow
<i>Junctional</i>					
PJC	Regular, one early beat	Underlying	Inverted in II: before, buried, or after	Under 0.12	Narrow
Junctional escape	Regular	40 to 60	Inverted, buried, or retrograde	Under 0.12	Narrow
Accelerated junctional	Regular	61 to 100	Inverted, buried, or retrograde	Under 0.12	Narrow
Junctional tachycardia	Regular	101 to 180	Often lost inside the prior T	Under 0.12	Narrow

Flutter ratios: 2:1 ≈ 150, 3:1 ≈ 100, 4:1 ≈ 75. A metronomic narrow tachycardia at 150: hunt for flutter waves.

Rhythm	Regularity	Rate	P waves	PR	QRS
TABLE B. Ventricular, AV blocks, paced. QRS width is the finding.					
<i>Ventricular</i>					
PVC	Regular, one early beat	Underlying	None before the PVC	Not measurable	0.12+ , T opposite
Idioventricular	Regular	20 to 40	Absent	Not measurable	Wide
Accelerated idioventricular	Regular	41 to 100	Absent	Not measurable	Wide
Monomorphic VT	Essentially regular	Over 100	Absent or dissociated	Not measurable	Wide, all alike
Polymorphic VT, torsades	Irregular	200 to 250	None visible	Not measurable	Wide, always changing
Ventricular fibrillation	Chaotic	Not countable	None	None	None. Coarse/fine
Asystole	Flat	None	Sometimes P alone	None	Absent
<i>AV blocks. P waves are sinus; the question is whether they got through.</i>					
First degree	Regular	Underlying	One per QRS, all conduct	Over 0.20 , constant	Usually narrow
Type I, Wenckebach	Irregular	Ventricular slower	More P than QRS	Lengthens until drop	Usually narrow
Type II, Mobitz II	Pause: exact multiple	Ventricular slower	More P than QRS	Constant	Often wide
2:1 AV block	Regular	Twice ventricular	Two P per QRS	Unclassifiable	Narrow or wide
Third degree	Both regular, independent	Vent. 40-60 or 20-40	Present, no relation to QRS	None	Narrow junc., wide vent.
<i>Paced. Find the spike first.</i>					
Atrial paced	Regular	Programmed	Spike before each P	Normal if intact	Narrow
Ventricular paced	Regular	Programmed	Absent or unrelated	Not measurable	Wide , LBBB-like
Dual chamber paced	Regular	Programmed	Spike before P and QRS	Set by device	Wide

Beyond the columns. VF: coarse ≥ 3 mm, fine < 3 mm; prognosis words, not a treatment fork (both get CPR + defibrillation). **Mobitz II:** ~3 in 4 below the His (wide); 1 in 4 within it (narrow). **Malfunctions:** *failure to pace*, no spike; *failure to capture*, spike with nothing after; *failure to sense*, spike lands on the patient's own beat. **NBG 2002:** I paced, II sensed, III response, IV rate modulation (O/R); O in II forces O in III.

Three Rules, Not Thirty Facts

1. **Deflection.** Current **toward** the positive electrode writes **up**; **away** writes **down**.
2. **Bifurcation.** Above the bifurcation: fast bundles, **narrow** QRS. Below it: cell to cell, **wide** QRS.
3. **Escape hierarchy.** SA 60-100, junction 40-60, ventricles 20-40. Fastest wins. **Never suppress an escape.**

Decision Paths

1. Narrow vs wide, always first. **Narrow (0.06-0.10):** above the bifurcation, Table A. **Wide (0.12+):** impulse missed the fast pathway, Table B.

2. P wave sorter (Table A). Count shapes in one lead.

- **One normal P:** sinus tachycardia
- **One abnormal P:** atrial tachycardia
- **3+ shapes:** WAP under 100, MAT over 100
- **No P, no flat baseline:** atrial fibrillation

Exception: flutter also lacks discrete P and flat baseline, but its waves are **all alike and evenly spaced**.

3. PR consistency (blocks). On conducted beats: **consistent PR** → first degree or type II. **Inconsistent** → Wenckebach or third degree.

4. Pause test. Calipers on the underlying interval, walk across the gap.

- **Exact multiple:** SA block (whole P-QRS-T dropped) or type II (naked P in gap)
- **Not a multiple:** sinus arrest
- **Under 2× shortest R-R + lengthening PR:** Wenckebach

Pause ≥ 3 s: investigate.

Confusion Pairs

Pair	Discriminator
SA block vs sinus arrest	Pause is an exact multiple (SA block) or not (arrest). Both drop the whole P-QRS-T.
Flutter vs fibrillation	Flutter waves all alike, evenly spaced (250-350); fibrillatory waves vary (350-600).
MAT vs atrial fibrillation	Both irregularly irregular. MAT has discrete P waves , 3+ shapes, flat baseline between. A-fib has neither .
Wenckebach vs Mobitz II	PR lengthens then drops (I) vs constant then drops (II). Width does not decide it.
VT vs SVT with aberrancy	Not stability. 4 in 5 wide tachycardias are VT. Criteria rule VT in, never out. If in doubt, treat as VT.
Hyperkalemic vs hyperacute T	Narrow base , symmetric, diffuse (K+). Broad base , asymmetric, regional (infarct).

Common Trap

Never list.

- **Never suppress an escape rhythm.** It may be the only thing perfusing the patient.
- **Never classify 2:1 block from one strip.** Call it 2:1 AV block; classification needs 3:2.
- **Never let stability rule out VT.** A young heart holds pressure in VT for a long time.
- **Never call PEA from a strip.** It looks like a perfusing rhythm. **Check a pulse.**
- **Never let one normal 12-lead rule out infarction.** If the story fits, repeat it.