EKG TECH BASICS · ONE-PAGER

AV Blocks, Bundle Branch Blocks and Pre-excitation

Criteria tables for every degree of AV block, AV dissociation, bundle branch and fascicular blocks, and WPW, with what to measure and when to report

23 sources + more detail
ekgtechbasics.com/sheets/ekg-av-blocks-conduction.html
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1 Measure before you name

- At 25 mm/s one small box is 0.04 s. Normal PR 0.12–0.20 s (3–5 small boxes); a QRS of 0.12 s (3 small boxes) or more is wide.
- The PR runs from the start of the P wave to the start of the QRS, a small q wave included.
- March out the P waves with calipers: does every P have a QRS, and is the PR the same each time?
- Name a bundle branch block from V1 and from I or V6, not from lead II. Drawn strips of each AV block: see the Rhythm Gallery.

2 AV blocks

BLOCK	WHAT YOU MEASURE	USUAL LEVEL	REPORT
First-degree	PR over 0.20 s, constant; every P conducts	AV node	Document the PR
Mobitz I (Wenckebach)	PR lengthens until a P does not conduct; shortest PR after the pause	AV node if the QRS is narrow	Per protocol
Mobitz II	PR the same before and after the dropped P; pause equals two R-R	His bundle or bundle branches; QRS often wide	Promptly
2:1	Every second P blocked; regular P-P; constant PR on conducted beats	Either	As '2:1 AV block'
High-grade	Two or more P waves in a row blocked (3:1, 4:1); conducted beats keep one PR	Usually below the node	At once
Third-degree	No P conducts; PR varies at random; atria faster than the escape	Narrow escape higher, wide escape lower	At once; check the patient

EXAM TIP 2:1 cannot be typed from one strip: Mobitz I and II are told apart by two conducted beats in a row, and 2:1 never has two. A long PR with a narrow QRS points to the AV node; a normal PR with a wide QRS points below it. First rule out blocked PACs: the P-P must be regular.



2:1 AV block: regular P waves (here 84/min), every second one not conducted, the same PR on each conducted beat, ventricular rate half the atrial (42).

3 Block or dissociation?

FINDING	THIRD-DEGREE BLOCK	AV DISSOCIATION WITHOUT BLOCK
Rates	Atria faster than the ventricles	Ventricles as fast as or faster than the atria; isorhythmic if nearly equal
Cause	Atrial impulses cannot get through	Sinus slows below the junction, or a junctional or ventricular focus speeds up (AIVR, VT)
Conducted beats	None	A well-timed P can capture: an early beat with a normal QRS

Dissociation with occasional conducted beats at a constant PR is high-grade block, not third-degree. A pause with no P wave in it is not AV block at all: it is a sinus pause or SA block.

4 Bundle branch and fascicular blocks

PATTERN	QRS	KEY LEADS	AXIS
RBBB	0.12 s or more	rSR' ('M') in V1–V3; wide, slurred S in I, aVL, V5–V6	Usually normal
LBBB	0.12 s or more	Dominant S (rS or QS) in V1; broad, notched R with no q in I, aVL, V5–V6	Usually −30° to +60°
Incomplete RBBB or LBBB	Under 0.12 s	Same shapes	As above
LAFB	Under 0.12 s	qR in I and aVL; rS in II, III, aVF	Left, −45° to −90°
LPFB	Under 0.12 s	rS in I and aVL; qR in II, III, aVF	Right, beyond +90°, other causes excluded
Nonspecific IVCD	Wide	Neither RBBB nor LBBB shape	Any

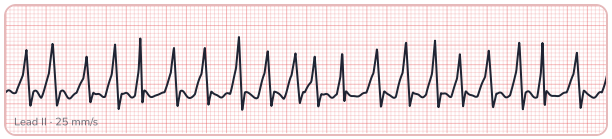
- Bifascicular: RBBB plus LAFB (left axis, the common one) or RBBB plus LPFB (right axis).
- 'Trifascicular': strictly, bifascicular block plus third-degree block. Bifascicular plus first-degree block is often given the name, but the PR delay is usually in the AV node.
- RBBB and LBBB alternating from beat to beat or strip to strip: all three fascicles are diseased. Report it.

SAFETY ST and T pointing opposite the main QRS are expected in a bundle branch block. ST changes in the same direction as the QRS, or a new bundle branch block in a patient with chest pain, go to the provider at once with the old tracing.

5 Pre-excitation

PATTERN	ECG
WPW pattern	PR under 0.12 s; delta wave (slurred QRS upstroke); QRS often wide; ST-T opposite the QRS. Syndrome = pattern plus tachycardia
Short PR, no delta wave	PR under 0.12 s, normal QRS (the disputed 'LGL' label)
Concealed pathway	Normal resting ECG; the pathway conducts only backward
Orthodromic AVRT	Regular, narrow, 120–250/min; no delta wave; inverted P after the QRS in II, III, aVF
Antidromic AVRT	Regular and wide, fully pre-excited; can look exactly like VT
Pre-excited AF	Irregularly irregular, very fast, wide; QRS shape changes beat to beat

SAFETY Pre-excited AF is urgent: the pathway bypasses the AV node's brake, so the rate can reach 200–300/min and turn into VF, and AV-nodal blockers (adenosine, verapamil, diltiazem, digoxin) can speed it. Alert the nurse or provider now and stay with the patient. Pulseless: code team, CPR, AED if trained.



Pre-excited AF: irregular, very fast (mean here about 220/min), wide complexes that change from beat to beat. A shortest pre-excited R-R of 250 ms (6¼ small boxes) or less marks a high-risk pathway.

6 Example strips



WPW pattern (here 75/min): a short PR (about 0.10 s) running straight into a slurred delta wave, and a QRS widened to about 0.12 s.

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