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Paramedic Cardiology Study Guide

12-Lead Interpretation • ACS Recognition • Dysrhythmias • ACLS Protocols • Pharmacology
2025–2026 Edition • ACLS / NREMT Paramedic Aligned

Built for the NREMT Paramedic cognitive & psychomotor exams, critical care transport certification prep, and high-acuity 911/CCT practice.
Cardiology = ~20–25% of exam questions. Master this domain.

Core Paramedic Cardiology Principle (2025–2026):
Coronary perfusion pressure is king. Every intervention either improves it, preserves it, or destroys it.
The Formula: High-performance CPR + rapid defibrillation (shockable) + early epinephrine (non-shockable) + definitive airway + targeted post-ROSC care = survivors.

Section 1: 12-Lead ECG Interpretation – The Paramedic Superpower

Must-Know STEMI Patterns (Memorize These Leads)

STEMI Territory	Primary Leads with ST Elevation	Reciprocal Changes	Artery Involved	Special Considerations
Anterior / Anteroseptal	V1–V4	Inferior leads (II, III, aVF)	Left Anterior Descending (LAD)	Large territory → high mortality, pump failure risk
Inferior	II, III, aVF	I, aVL (often), sometimes anterior	Right Coronary Artery (RCA)	Check V4R for RV involvement → preload dependent
Lateral	I, aVL, V5–V6	Inferior leads	Left Circumflex (LCx) or LAD diagonal	Often subtle; look for subtle elevation in I/aVL
Posterior	V1–V3 depression + tall R waves	V7–V9 elevation (posterior leads)	Posterior descending (RCA or LCx)	Do posterior leads if inferior + anterior depression
Right Ventricular	V4R elevation (right-sided lead)	Often with inferior STEMI	Proximal RCA	Avoid nitrates → preload drop = hypotension

⚠ High-Risk STEMI Mimics to Recognize

- **Hyperkalemia:** Peaked T waves, wide QRS, sine wave
- **LV Aneurysm:** Persistent ST elevation after old MI
- **Pericarditis:** Diffuse concave ST elevation + PR depression
- **Early Repolarization:** Notched J point, concave, young males
- **Brugada Pattern:** V1–V2 coved ST elevation

Right-Sided & Posterior Leads – When to Do Them

- **Any inferior STEMI** → do V4R (right-sided)
- **Inferior STEMI + anterior depression** → do V7–V9 (posterior)

Section 2: Acute Coronary Syndrome (ACS) Recognition & Management

Spectrum of ACS

- **Unstable Angina:** Ischemic symptoms *without* biomarker elevation
- **NSTEMI:** Ischemic symptoms + troponin elevation
- **STEMI:** Ischemic symptoms + ST elevation + eventual troponin rise

Paramedic ACS/STEMI Sequence (Priority Order)

1. **Aspirin 325 mg chewed** (unless active bleed)
2. **P2Y12 inhibitor** (clopidogrel 600 mg or ticagrelor 180 mg PO) if protocol allows
3. **Heparin 60 units/kg IV** bolus (max 4,000 units) or enoxaparin
4. **Nitroglycerin IV infusion** (start 10–20 mcg/min, titrate to pain/BP; avoid in RV infarct)
5. **Pain control** (fentanyl 50–100 mcg IV titrated – preferred over morphine)
6. **12-lead transmission** / **PCI alert**
7. **Rapid transport** to PCI-capable center (goal: scene-to-balloon <90 min)

⚠ Right Ventricular Infarct Rule

Inferior STEMI + V4R elevation = Preload Dependent

- **AVOID nitrates** (causes dangerous hypotension)
- Cautious **250–500 mL fluid bolus**
- **Dopamine** if hypotensive

Section 3: Dysrhythmias – Recognition & ACLS Treatment (2025)

Dysrhythmia	Stability Criteria	Unstable Treatment (Immediate)	Stable Treatment
Sinus Bradycardia (<50 bpm)	Hypotension, AMS, shock, chest pain	Atropine 1 mg IV q3–5 min (max 3 mg) → TCP → dopamine/epi drip	Monitor/transport; atropine if borderline unstable
AV Blocks (2nd Mobitz II or 3rd degree)	Hypotension, AMS, shock	Atropine (may fail) → TCP immediate	TCP ready; atropine trial
Narrow-Complex Tachycardia (SVT)	Hypotension, AMS, chest pain, shock	Synchronized cardioversion (50–100 J biphasic)	Vagal maneuvers → adenosine 6 mg → 12 mg rapid IV push
A-Fib / **A-Flutter** (unstable)	Hypotension, AMS, chest pain, shock	Synchronized cardioversion (120–200 J biphasic)	Rate control (diltiazem/metoprolol) if stable
Monomorphic VT (wide complex)	Hypotension, AMS, chest pain, shock	Synchronized cardioversion (100 J)	Amiodarone 150 mg IV over 10 min
Polymorphic VT / **Torsades**	Unstable	Defibrillation (unsynchronized) + $MgSO_4$ 1–2 g IV	$MgSO_4$ 1–2 g IV over 5–60 min

⚡ Section 4: ACLS Cardiac Arrest Protocols – Paramedic Mastery

Shockable: VF / Pulseless VT

- CPR + defib (120–200 J biphasic)
- Epi 1 mg q3–5 min
- Amiodarone 300 mg → 150 mg after 2nd shock
- Consider double sequential defib if refractory (per protocol)

Non-Shockable: Asystole / PEA

- CPR + epi 1 mg ASAP & q3–5 min
- Treat reversible causes (Hs & Ts)
- No routine atropine/calcium/bicarb unless specific indication

Post-ROSC Bundle (2025)

- **Airway:** Definitive airway + continuous capnography → $EtCO_2$ 35–45 mmHg
- **Oxygenation:** SpO_2 94–98% (avoid hyperoxia)
- **Hemodynamics:** MAP ≥65 mmHg → norepinephrine first-line
- **12-Lead ECG:** STEMI → cath-lab activation
- **Temperature:** Targeted temperature 32–36°C × 24 h if comatose

Section 5: Pharmacology Quick Reference – Core ACLS Meds

Medication	Dose & Route	Indication	Key Cautions
Epinephrine	1 mg IV/IO q3–5 min	Cardiac arrest (all rhythms)	Increases myocardial O_2 demand
Amiodarone	300 mg IV/IO → 150 mg	Refractory VF/pVT	Hypotension, bradycardia
Lidocaine	1–1.5 mg/kg IV/IO → 0.5–0.75 mg/kg	Alternative for refractory VF/pVT	Neurotoxicity at high doses
Adenosine	6 mg → 12 mg rapid IV push	Stable narrow-complex SVT	Chest pain, brief asystole, bronchospasm
Atropine	1 mg IV q3–5 min (max 3 mg)	Symptomatic bradycardia	Ineffective in high-degree blocks
Magnesium Sulfate	1–2 g IV over 5–60 min	Torsades de pointes	Hypotension, flushing
Nitroglycerin	10–20 mcg/min IV, titrate	ACS / pulmonary edema	Hypotension, headache; avoid in RV infarct
Fentanyl	50–100 mcg IV titrated	Chest pain / post-arrest sedation	Respiratory depression

High-Yield Judgment Reminder

Every rhythm strip, every 12-lead, every arrest cycle asks the same question:
"What am I doing right now that is increasing coronary perfusion pressure?"

If the answer is "nothing" or "making it worse," **change what you're doing**.

Master the 12-lead like it's your native language. Treat every arrest like it's the one that will survive.

Stay precise. Stay relentless. Stay in the fight.
The heart doesn't negotiate. Neither should you.

Keep pushing. We're counting on you.