www.emsnotes.com • By Forrest Munden

❤ Paramedic Cardiology Study Guide

2025–2026 Edition • ACLS / NREMT Paramedic Aligned
Cardiac Arrest • ACS/STEMI • Arrhythmias • Post-ROSC Care

Built for the NREMT Paramedic cognitive & psychomotor exams, critical care transport certification prep, and real-world 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: Cardiac Arrest – The Paramedic Battlefield

Shockable: VF / Pulseless VT

1. **High-performance CPR** (100–120/min, 2–2.4 in, full recoil, rotate q2 min)
2. **Defibrillate ASAP** (biphasic 120–200 J initial; subsequent same or higher)
3. **CPR immediately after shock** (no rhythm/pulse check)
4. **Epinephrine 1 mg IV/IO** q3–5 min
5. After 2nd shock → **Amiodarone 300 mg IV/IO** bolus (preferred) or Lidocaine 1–1.5 mg/kg
6. Continue 2-min cycles; consider **double sequential defibrillation** if refractory
7. If ROSC → immediate 12-lead, post-arrest bundle

Non-Shockable: Asystole / PEA

1. **High-performance CPR**
2. **Epinephrine 1 mg IV/IO ASAP** & q3–5 min
3. Aggressive search for **reversible causes (Hs & Ts)**
4. No routine atropine, calcium, bicarbonate, or pacing
5. Consider field termination after ~20–30 min if no ROSC & no reversible causes

Hs: Hypovolemia, Hypoxia, H+ (acidosis), Hypo/Hyperkalemia, Hypothermia
Ts: Tension pneumo, Tamponade, Toxins, Thrombosis (PE/MI)

2025 ACLS Key Changes / Reminders

- **Epinephrine early** in non-shockable rhythms (first drug after CPR start)
- **Amiodarone preferred** over lidocaine for refractory VF/pVT
- $EtCO_2$ <10 mmHg after advanced airway → poor CPR quality or futility
- Sudden $EtCO_2$ rise >35–40 mmHg → likely ROSC

Section 2: Acute Coronary Syndrome & STEMI Management

Recognition: High-Risk ECG Patterns (Must Memorize)

STEMI Territory	Leads with ST Elevation	Artery	Key Notes
Anterior / Anteroseptal	V1–V4	LAD	Large territory, high mortality, pump failure risk
Inferior	II, III, aVF	RCA (most common)	Check V4R for RV involvement → preload dependent
Lateral	I, aVL, V5–V6	LCx or LAD diagonal	Often subtle; look carefully at I/aVL
Posterior	V1–V3 depression + tall R	RCA or LCx	Do V7–V9 if inferior + anterior depression
Right Ventricular	V4R elevation	Proximal RCA	Avoid nitrates → preload drop = hypotension

Paramedic ACS/STEMI Sequence (Priority Order)

1. **Aspirin 325 mg chewed** (unless active bleed)
2. **P2Y12 inhibitor** (clopidogrel 600 mg or ticagrelor 180 mg) 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)
5. **Pain control** (fentanyl 50–100 mcg IV titrated)
6. **12-lead transmission** / alert to receiving PCI center
7. **Rapid transport** (goal: scene-to-balloon <90 min)

⚠ Right Ventricular Infarct Rule (Inferior STEMI)

If V4R elevation → **Preload dependent**

- **AVOID nitrates** (causes dangerous hypotension)
- Give cautious **250–500 mL fluid bolus**
- Consider **dopamine** if hypotensive

Section 3: Arrhythmia Recognition & Treatment

Rhythm	Unstable Signs	Unstable Treatment	Stable Treatment
Symptomatic 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
Narrow-Complex Tachycardia (SVT)	Hypotension, AMS, chest pain, shock	Synchronized cardioversion (50–100 J)	Vagal maneuvers → adenosine 6 mg → 12 mg rapid IV push
Wide-Complex Tachycardia (Monomorphic VT)	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

Synchronized Cardioversion Doses (2025)

- **Narrow regular (SVT):** 50–100 J
- **Narrow irregular (A-fib):** 120–200 J biphasic
- **Wide regular (VT):** 100 J
- **Sedate if conscious:** etomidate, ketamine, or midazolam

Section 4: Post-Cardiac Arrest Care Bundle (ROSC)

Domain	Target	Intervention
Airway/Ventilation	$EtCO_2$ 35–45 mmHg	Definitive airway + continuous waveform capnography
Oxygenation	SpO_2 94–98%	Titrate FiO_2 (avoid PaO_2 >300 mmHg / hyperoxia)
Hemodynamics	MAP ≥65 mmHg	Norepinephrine first-line vasopressor
Temperature	32–36°C × 24 h	Targeted temperature management if comatose
12-Lead ECG	Immediate	STEMI → cath-lab activation
Neuro Prognostication	Delayed ≥72 h	Do not prognosticate early post-ROSC

Section 5: High-Yield NREMT / Street Judgment Questions

Q1: You defibrillate VF → ROSC with weak carotid pulse. First 12-lead shows *inferior STEMI*. Next step?

A: Cautious fluids (250–500 mL), avoid nitrates, rapid PCI-center transport, right-sided leads (V4R).

Q2: 58 y/o female, unstable monomorphic VT, BP 76/40. You cardiovert once (100 J) → still VT. Next?

A: Repeat synchronized cardioversion (higher energy if biphasic), amiodarone 150 mg IV over 10 min.

Q3: Post-ROSC patient, comatose, BP 82/48 on norepinephrine. $EtCO_2$ 28 mmHg. Next?

A: Increase ventilation rate slightly → target $EtCO_2$ 35–45 mmHg to improve cerebral perfusion.

Q4: Refractory VF after 4 shocks, amiodarone given. $EtCO_2$ consistently 6 mmHg despite excellent CPR.

A: Poor prognosis → consider double sequential defibrillation (if protocol) or prepare family for termination.

Master Paramedic Cardiology

Treat every arrest like a symphony:
- **CPR** is the rhythm section
- **Defibrillation** is the cymbal crash
- **Medications** are the strings
- **Capnography** is the conductor

Keep the rhythm tight. Keep the interruptions short. Keep the perfusing pressure up.
The heart doesn't care about your feelings—it cares about coronary perfusion pressure. Give it what it needs.

Stay relentless. Stay precise. Stay in the fight.