CPRVAM
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# ACLS

## STUDY GUIDE

ADVANCED CARDIOVASCULAR LIFE SUPPORT

## WHAT IS ACLS?

ACLS is the advanced life support administered for life-threatening cardiovascular emergencies.

- Cardiac Arrest
- Acute Coronary Syndrome (ACS)
- Stroke
- Advanced Airway Management
- Medications
- Team-Based Care

## REVIEW OF BLS SKILLS

Recognize Emergency → High-Quality CPR → Rescue Breaths → AED Use → Teamwork → Post-Care

## HIGH QUALITY CPR

| | |
|---|---|
| Compression Rate | 100–120/min |
| Compression Depth | 5–6 cm (2–2.4 in) in adults |
| Chest Recoil | Full recoil after each compression |
| Compression Fraction | >80% (minimize pauses) |
| Pulse Check Duration | <10 seconds only |

## INITIAL INTERVENTION

### ABC ASSESSMENT

**A Airway**

- OPA
- NPA
- ETT
- LMA

**B Breathing**

- Oxygenation
- Ventillation
- Monitor Sp02

**C Circulation**

- Pulse Check
- IV /IO Access
- Monitor BP

## REVERSIBLE CAUSES

**Hs Metabolic/Physiologic Causes**

- Hypoxia
- Hypovolemia
- Hydrogen ion (Acidosis)
- Hypo-/Hyperkalemia
- Hypothermia

**Ts Mechanical / Toxic Causes**

- Tension Pneumothorax
- Tamponade
- Toxins
- Thrombosis (Pulmonary)
- Thrombosis (Coronary)

# PHARMACOLOGY IN ACLS

| DRUG | USE | DOSE (ADULT) |
|---|---|---|
| **Epinephrine** | Cardiac Arrest All Rhythms | 1 mg IV/IO every 3-5 min |
| **Amiodarone** | VF/pulseless VT | 300 mg IV/IO bolus may repeat 150 mg |
| **Atropine** | Symptomatic Bradycardia | 0.5 mg IV every 3-5 min, max dose 3 mg |
| **Adenosine** | SVT (Supraventricular Tachycardia) | 6 mg rapid IV push then 12 mg IV push after 1-2 min if needed |
| **Magnesium Sulfate** | Torsades de Pointes and Hypomagnesemia | 1-2 g IV diluted in 10 mL D5W over 5-20 min |
| **Dopamine** | Bradycardia/ Hypotension when atropine is ineffective | 0.05-1mcg/kg/ min IV infusion |
| **Norepinephrine** | Severe Hypotension & Shock | 0.1-0.5 mcg/kg/min IV infusion |
| **Aspirin** | ACS (Acute Coronary Syndrome) | 160-325 mg orally, chew if possible |
| **Nitroglycerin** | ACS/Chest Pain | 0.4 mg SL every 5 min (max 3) |

# ACLS ALGORITHMS

## CARDIAC ARREST

### Shockable Rhythms (VF / pVT)

- Shock
- CPR 2 min
- Epinephrine 1 mg IV/IO
- Amiodarone 300 mg IV
- Treat Hs & Ts

### Non-Shockable Rhythms (Asystole/PEA)

- CPR Immediately
- IV/IO Access
- Epinephrine 1 mg IV/IO every 3-5 min
- Treat Hs & Ts

## BRADYCARDIA (with pulse)

- Assess Early Symptoms
- Administer Atropine 1 mg IV
- Repeat Every 3-5 Minutes (limit up to 3 mg)
- If ineffective
- Dopamine (5-20 mcg/kg/min) or Epinephrine (2-10 mcg /min)

## TACHYCARDIA (WITH PULSE)

### STABLE

- Check QRS width and rhythm.
- **Narrow QRS**: Vagal maneuvers → Adenosine 6 mg rapid IV push, then 12 mg if needed.
- **Wide QRS**: Antiarrhythmics (Procainamide 20–50 mg/min IV or Amiodarone 150 mg IV over 10 min).
- Treat underlying causes.

### UNSTABLE

- Administer synchronized cardioversion immediately.

## ACS ALGORITHM


## STROKE ALGORITHM

# ECG RHYTHM RECOGNITION

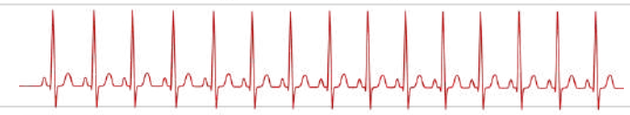
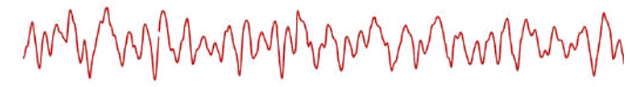
## KEY ECG COMPONENTS

| | |
|---|---|
| **P Wave** | Atrial depolarization. |
| **QRS Complex** | Ventricular depolarization. |
| **T Wave** | Ventricular repolarization. |
| **PR Interval** | Time from atrial to ventricular activation |
| **Wide QRS** | ≥ 0.12 seconds |
| **Narrow QRS** | < 0.12 seconds |
| **Regularity** | Regular or irregular rhythm aids in diagnosis. |

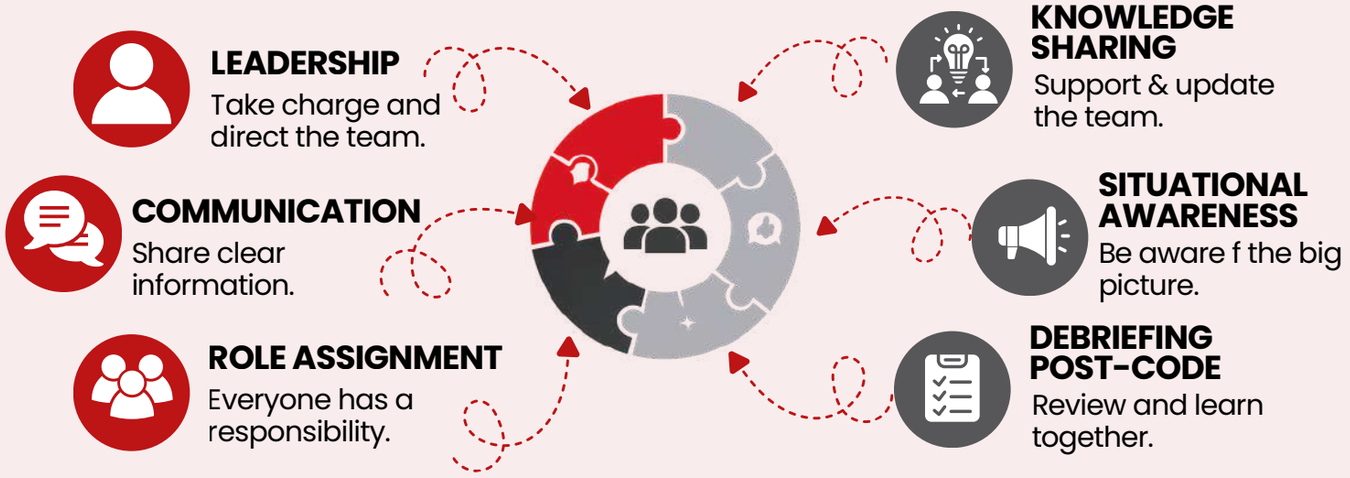
## HEART BLOCK LEVELS

| | | |
|---|---|---|
| 1 | **First-Degree AV Block** | PR interval > 0.20 sec; all impulses conducted. |
| 2 | **Second-Degree AV Block** | Some atrial impulses fail to reach ventricles. |
| 2.1 | **Mobitz Type I (Wenckebach)** | PR interval progressively lengthens, then a QRS is dropped. |
| 2.2 | **Mobitz Type II** | Dropped QRS without PR prolongation; may progress to complete block. |
| 3 | **Third-Degree AV Block (Complete Heart Block)** | No P–QRS relationship; atria and ventricles beat independently. |

## HEART RHYTHM

| | | |
|---|---|---|
| **Normal Sinus Rhythm** | **Rate: 60-100 bpm** |  |
| **Bradycardia** | **Rate: < 60 bpm** |  |
| **Tachycardia** | **Rate: > 100 bpm** |  |
| **Atrial Fibrillation (AF)** | **No distinct P waves, irregularly irregular ventricular response** |  |
| **Ventricular Fibrillation (VF)** | **Chaotic electrical activity, no effective contraction** |  |
| **Asystole** | **No electrical activity visible, flatline.** |  |

## TEAM DYNAMICS



# CASE SCENARIOS

## VF CARDIAC ARREST

- Patient collapses, pulseless, VF on monitor—what is the immediate action?

- Shock Immediately
- CPR for 2 min
- Epinephrine
- Amiodarone
- Treat Hs & Ts

## SYMPTOMATIC BRADYCARDIA

- Slow heart rate causing symptoms—what is the first-line treatment?

- Assess symptoms
- Atropine 1 mg IV
- Dopamine or Epinephrine if ineffective

## TACHYCARDIA WITH PULSE

- Rapid heart rate with symptoms—what medical interventions are needed?

- Stable vs Unstable
- Vagal maneuvers
- Adenosine
- Cardioversion if unstable

## STROKE RESPONSE

- How can early recognition and treatment improve outcomes?

- FAST assessment
- Imaging (CT)
- Consider thrombolytics
- Supportive care

# SPECIAL CONSIDERATIONS

- Identify & treat reversible causes (Hs & Ts)
- Post-ROSC care & monitoring
- Targeted temperature management
- Oxygenation & ventilation goals
- Special populations (Pregnancy, Elderly)
- Medication safety & dosing
- Closed-loop communication

# ASSESSMENT GUIDE

- Master the Core Algorithms First
- Prioritize Rhythm Recognition
- Memorize Key Drug Actions and Timing
- Practice ACLS Scenarios Regularly
- Focus on Decision Points, Not Details
- Use Flowcharts for Revision
- Simulate Exam Timing
- Revise in Short, Repeated Sessions

# ACLS EXAM QUICK FACTS

**MUST HAVE BLS CERTIFICATION**

**PASSING SCORE 84%**

**CERTIFICATION VALID - 2 YEARS**

**COURSE DURATION 13-15 HOURS**

**REMEMBER:** Knowledge + Skills + Calm = Save Lives



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