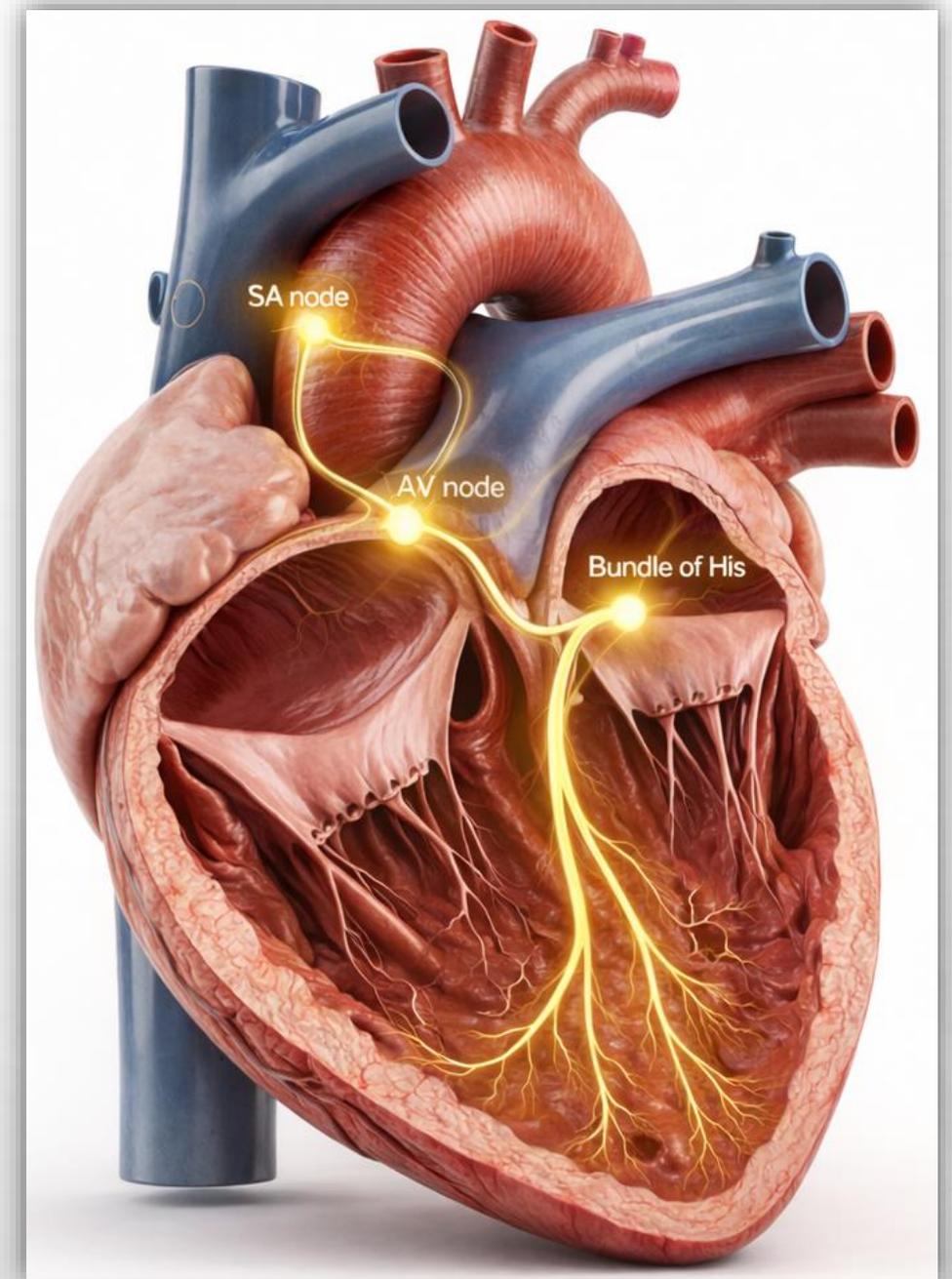


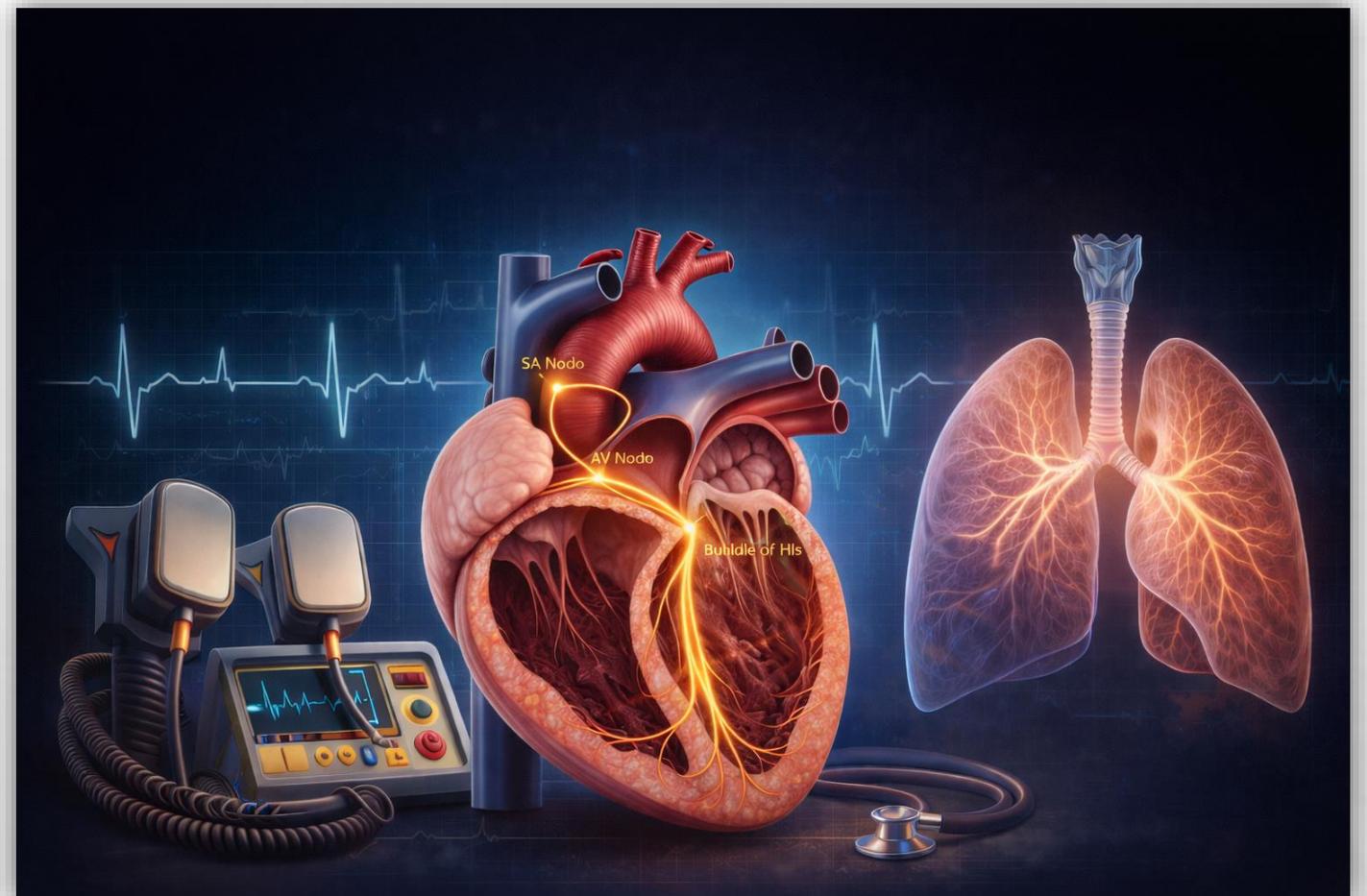
# Part-3 RT-ACLS ADVANCED CEU SERIES

## Advanced EKG & Defibrillation for Respiratory Therapists



# Respiratory Therapy

RT-ACLS Advanced CEU Series Advanced EKG & Defibrillation for Respiratory Therapists



# Course Introduction

- RTs play a central role in cardiac arrest response
- Early rhythm recognition improves survival
- Defibrillation safety prevents secondary injury
- Team coordination reduces delays



# Learning Objectives

By the end of this module, the respiratory therapist will be able to:

- Describe the critical role of the RT during cardiac arrest, including airway management, oxygenation, ventilation, and rhythm support and Post Code patient temperature control
- Rapidly recognize common lethal cardiac rhythms and explain how early identification improves resuscitation success
- Integrate effectively into the code team by communicating clearly, anticipating interventions, and reducing delays in life-saving care
- Prioritize oxygen delivery and ventilation strategies during resuscitation to support cerebral and cardiac perfusion
- Apply teamwork principles to improve efficiency, minimize errors, and enhance patient outcomes during cardiac emergencies



# Legal Disclaimer

- Educational purposes only
- Not a substitute for facility policy
- Follow physician orders and protocols
- Practice within professional scope

## Disclaimer

By the end of this module, the respiratory therapist will be able to:



- Educational purposes only
- Not a substitute for facility policy
- Follow physician orders and protocols
- Practice within professional scope



- Always follow **local guidelines** and consult with your supervisor or medical director with any questions.



Always follow **local guidelines** and consult with your supervisor or medical director with any questions.



# Course Outline

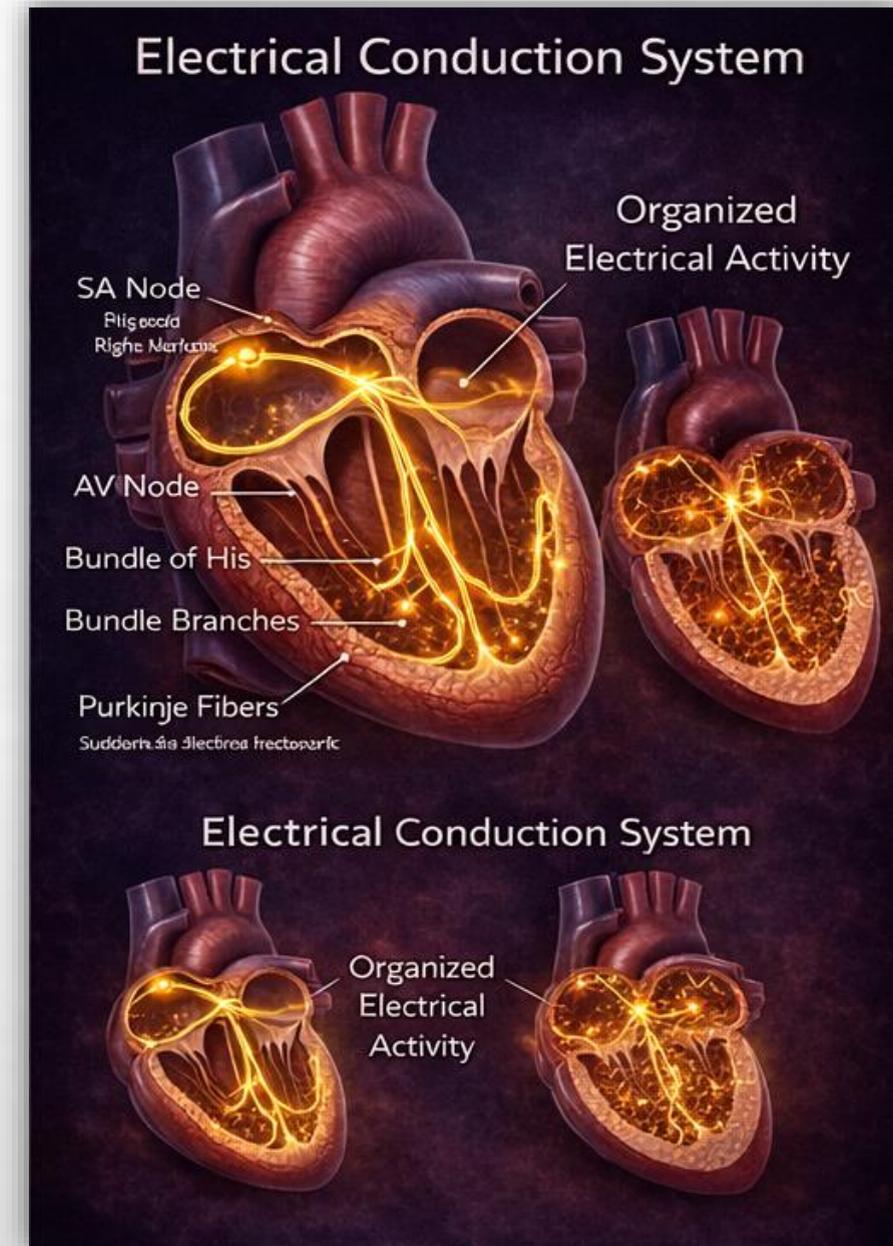
1. Cardiac electrical basics
2. Lethal arrest rhythms
3. Shockable vs non-shockable decisions
4. Monitoring vs defibrillation
5. Defibrillator operation
6. Pad placement and safety
7. ETCO<sub>2</sub> integration
8. Post-ROSC ventilation
9. Team coordination
10. Capstone clinical case
11. Wrap-up and references



# ELECTRICAL FOUNDATIONS

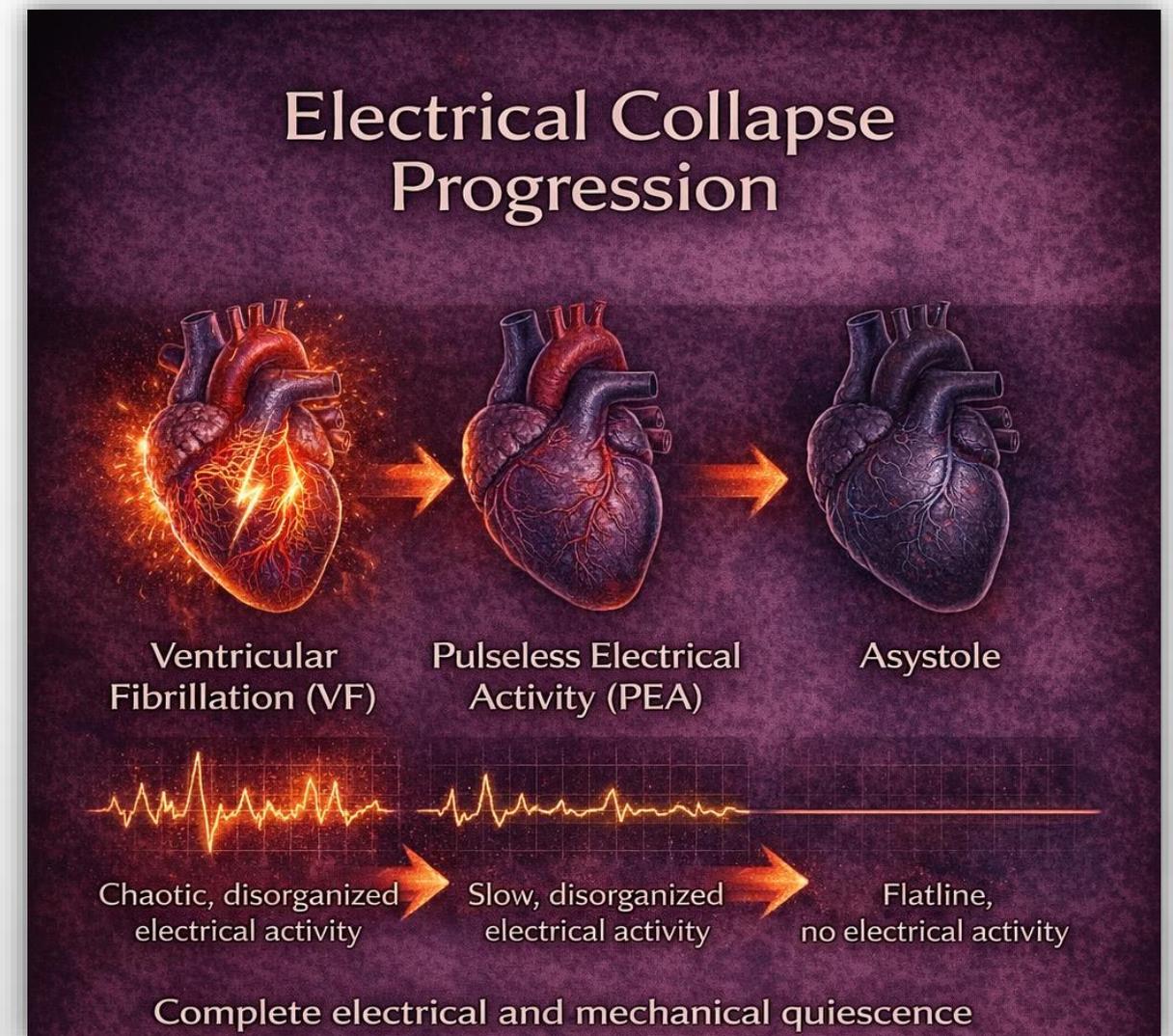
## Cardiac Conduction System

- SA node initiates rhythm
- AV node delays conduction
- Ventricles depolarize for contraction



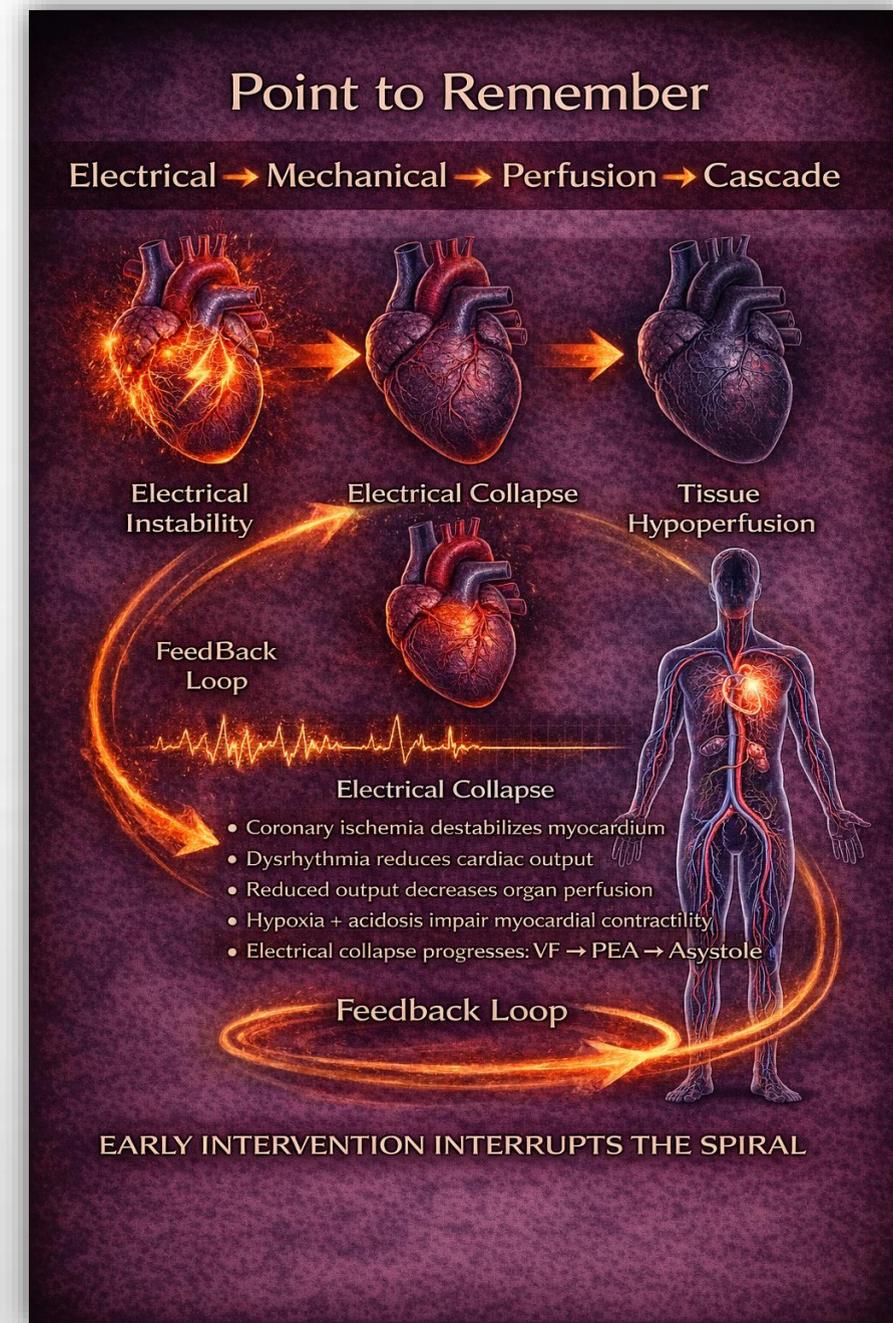
# Electrical Collapse Progression

- Loss of coordinated conduction
- Rapid drop in cardiac output
- Hypoxia and acidosis develop quickly



## Points to Remember

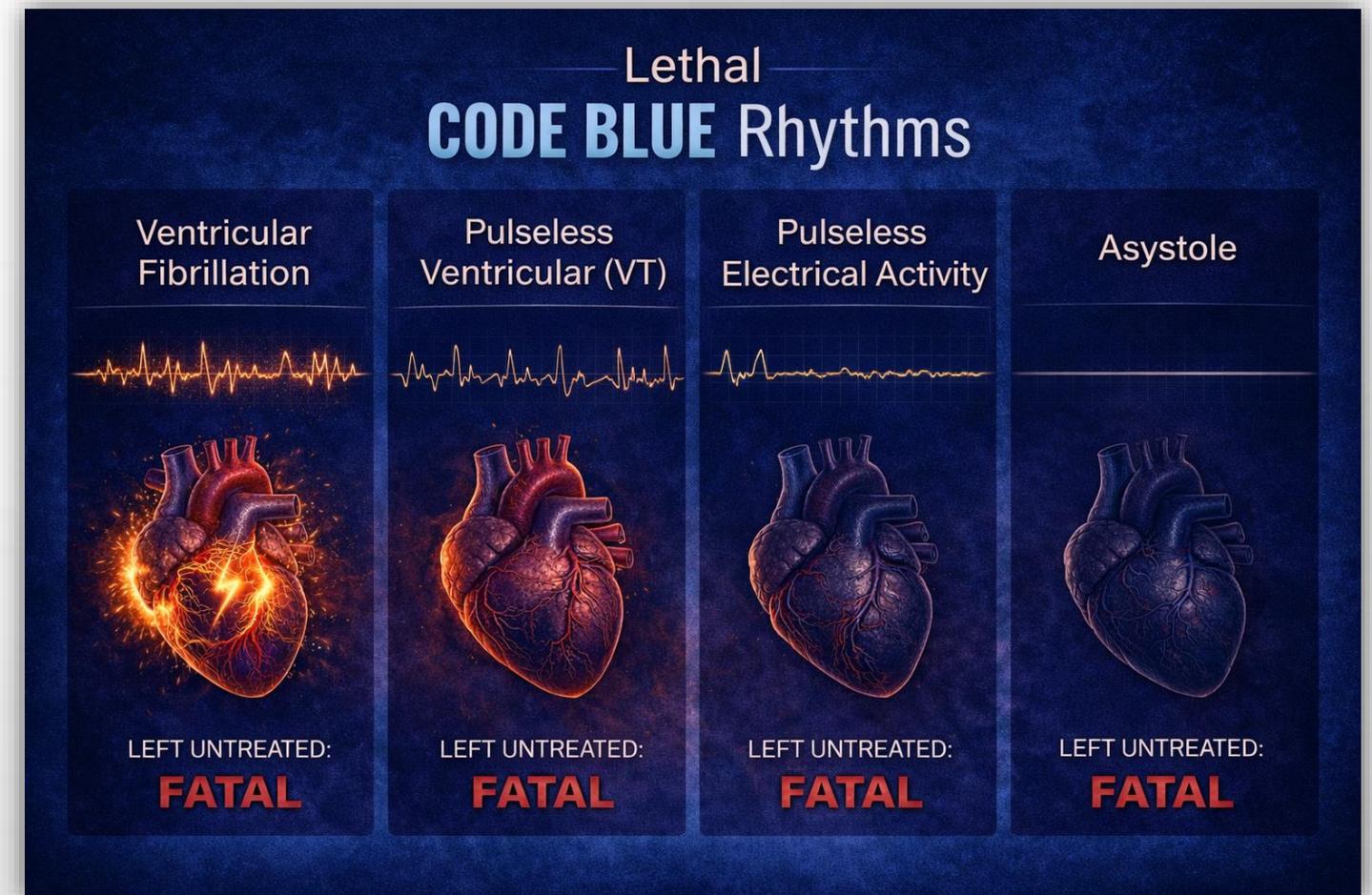
- Electrical failure causes sudden arrest
- Pulse confirmation is essential
- Early recognition saves lives

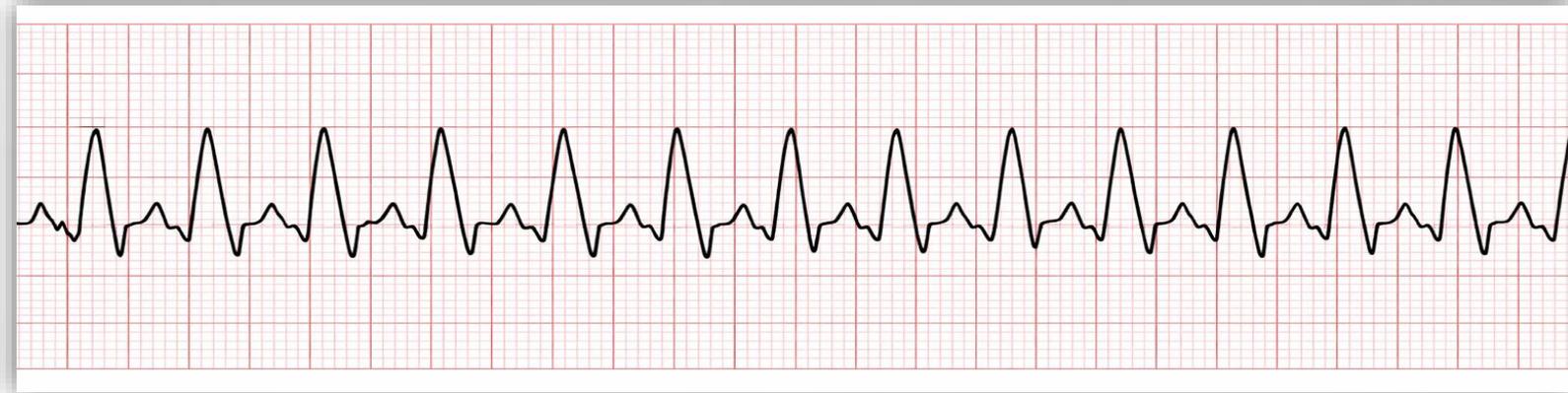


# LETHAL CARDIAC RHYTHMS

## Ventricular Fibrillation

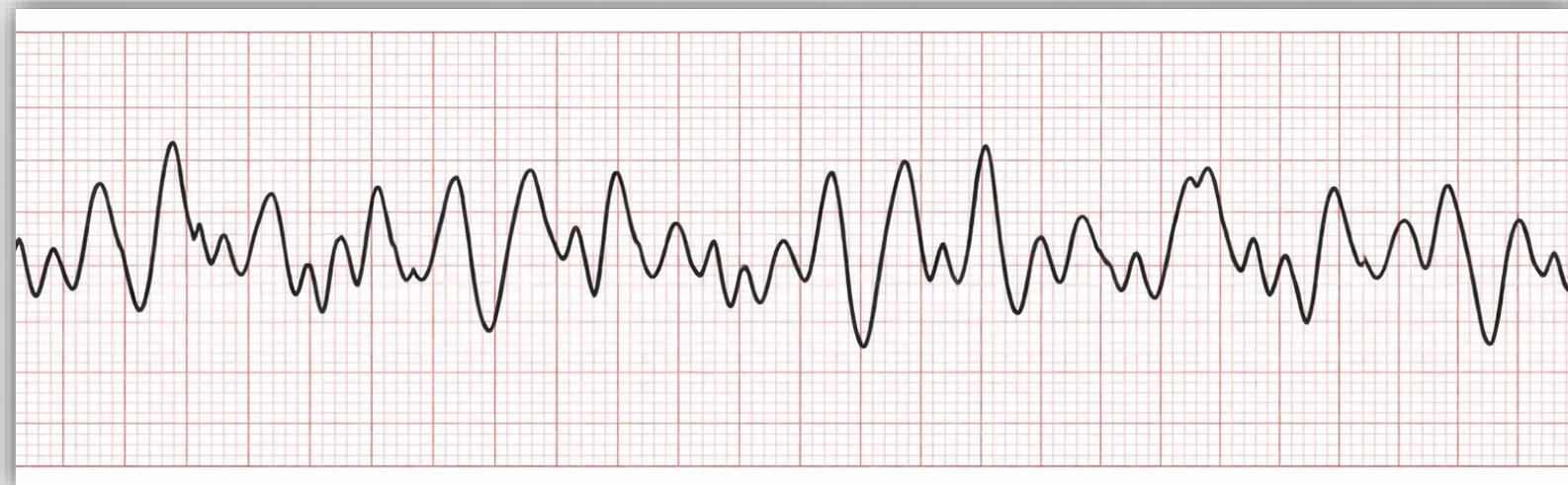
- Chaotic electrical activity
- No effective cardiac output
- Requires immediate defibrillation





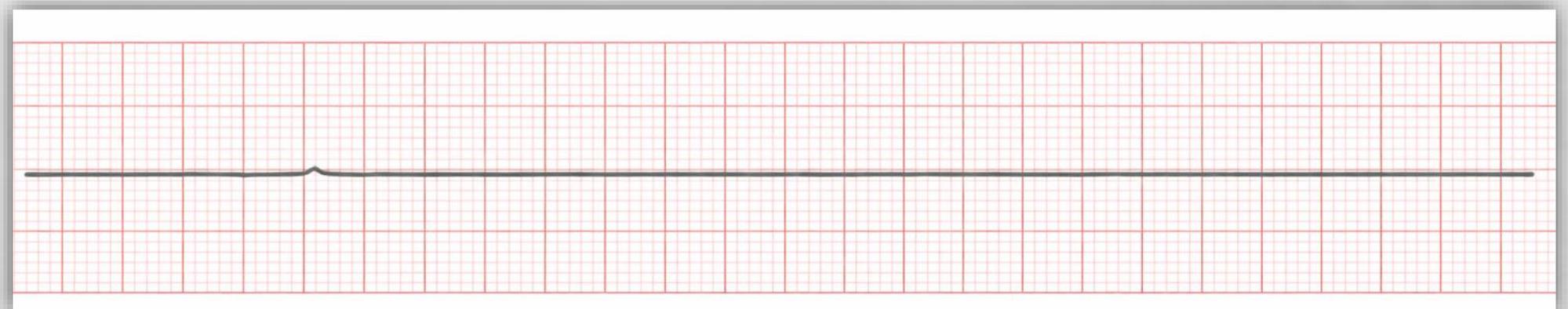
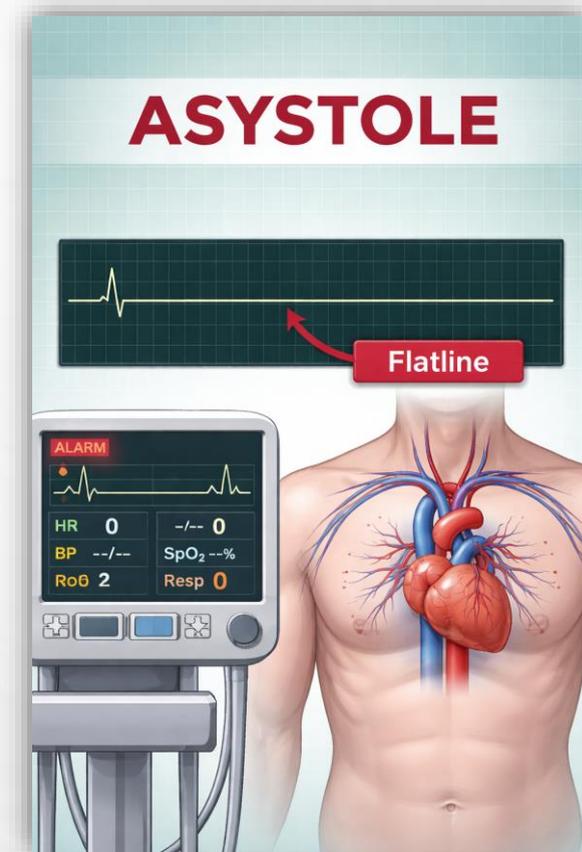
## Pulseless Ventricular Tachycardia And Ventricular Fibrillation

- Rapid ventricular rhythm
- No perfusion present
- Shockable rhythm



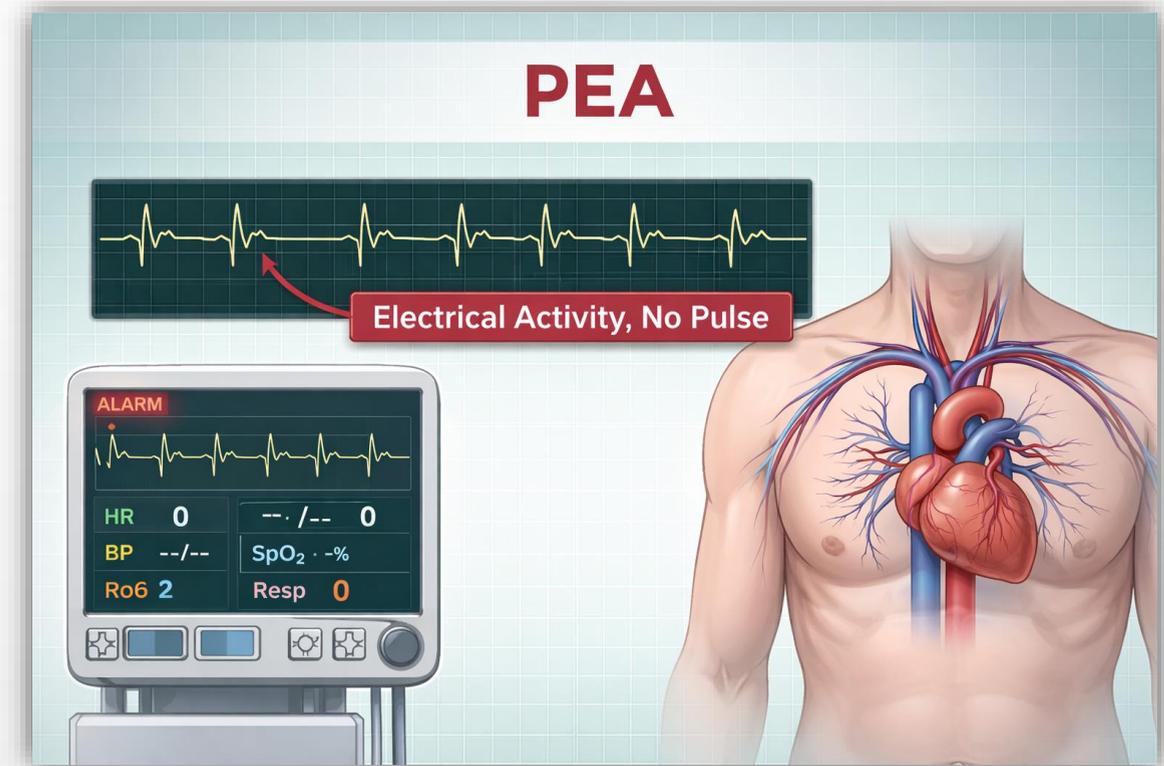
# Asystole

- Absent electrical activity
- Not shockable
- Requires CPR and medication



# Pulseless Electrical Activity

- Electrical rhythm without pulse
- Not shockable
- Treat causes plus CPR



## Rhythm Check Discipline

- Pause briefly for rhythm assessment
- Confirm pulse with organized rhythms
- Return to compressions immediately

Slide 15 - Rhythm Check Discipline

### Rhythm Check Discipline



- ✓ Pause compressions for 4–5 seconds only
- ✓ Observe monitor screen carefully
- ✓ Rotate out CPR to minimize pause
- ✓ Resume CPR immediately

No “fishing for a pulse”  
CPR or shock if no pulse



# Points to Remember

- VF and pulseless VT are shockable
- Asystole and PEA are not
- Minimize interruptions

## Points to Remember About Fatal Arrhythmias

- These are not “all the arrhythmias,” just the four main fatal arrhythmias in cardiac arrest.
- There are many more arrhythmias. These are the **four most lethal**.
- This is about **rapid identification**, not advanced arrhythmia interpretation.
- Formal training is recommended for anyone interested in **all cardiac rhythms**.

### Ventricular Fibrillation



- Chaotic, disorganized rhythm with no discernible P waves or QRS complexes.

### Pulseless Ventricular Tachycardia



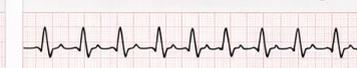
- Rapid, regular, wide-complex tachycardia without a palpable pulse.

### Asystole



- A flatline or nearly flatline, with no discernible electrical activity or complexes.

### Pulseless Electrical Activity



- Organized electrical rhythm without a palpable pulse, often appearing as a slow sinus rhythm or other organized pattern.



These are the most lethal arrhythmias — **not all the arrhythmias**.

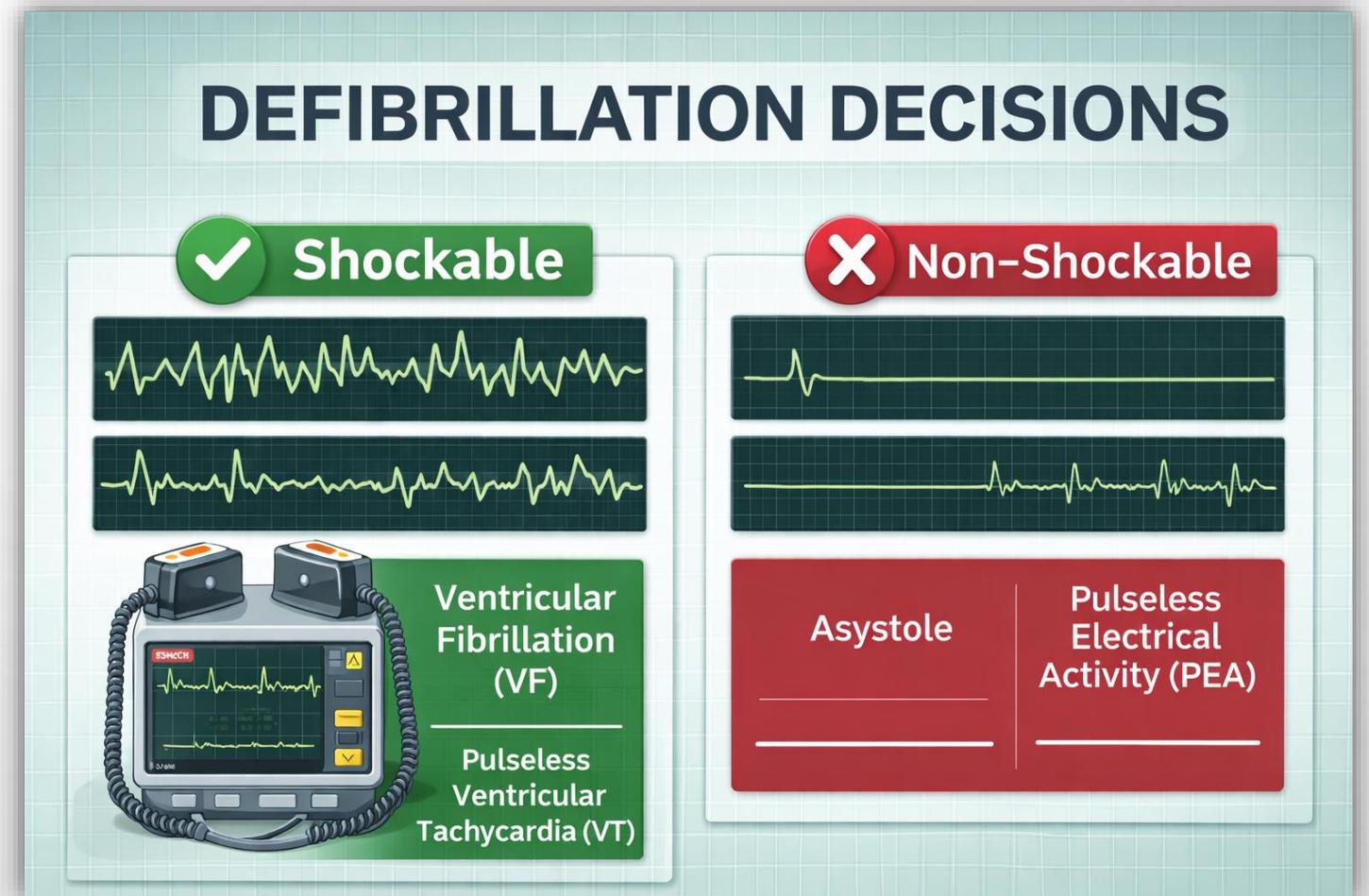
- Obtain formal training on all cardiac rhythms for clinical skills and accuracy.



# DEFIBRILLATION DECISIONS

## Defibrillation Purpose

- Interrupt chaotic electrical activity
- Allow natural pacemaker recovery
- Restore organized rhythm



# Defibrillation vs Cardioversion

- Defibrillation is unsynchronized shock
- Cardioversion is synchronized shock
- Therapy must match rhythm

## Defibrillation vs Cardioversion

Defibrillation	Cardioversion
<ul style="list-style-type: none"><li>• Used in cardiac arrest</li><li>• Shock delivered immediately</li></ul>	<ul style="list-style-type: none"><li>• Used for arrhythmias</li><li>• Shock synchronized with R wave</li></ul>
	 

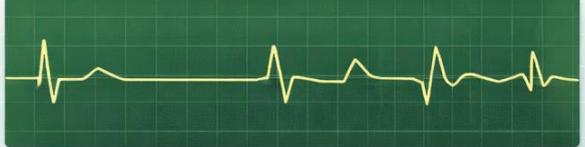


## When to Use Each Mode

- VF and pulseless VT need unsynchronized shock
- Unstable tachycardia with pulse uses synchronized shock
- If pulseless, treat as arrest

### When to Use Each Mode

Defibrillation	Cardioversion
<ul style="list-style-type: none"><li>• Cardiac Arrest</li><li>• Shockable Rhythms: VF, pulseless VT</li></ul>	<ul style="list-style-type: none"><li>• Arrhythmias</li><li>• Stable, perfusing patient</li></ul>



## Points to Remember

- Correct mode prevents delays
- Wrong mode reduces survival
- Match therapy to rhythm

## Points to Remember

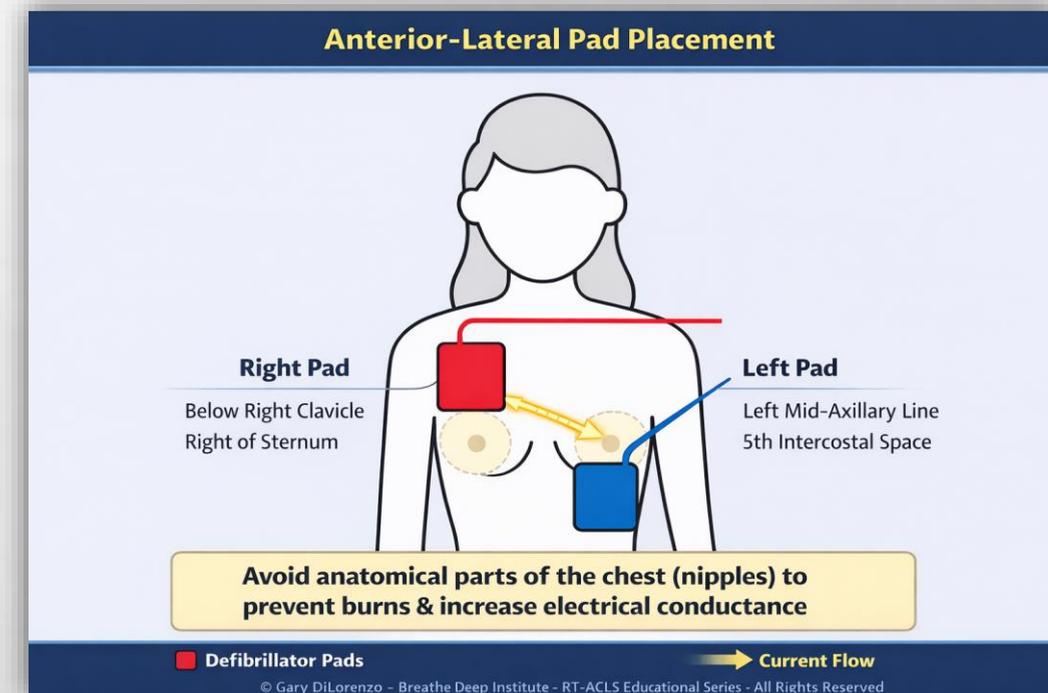
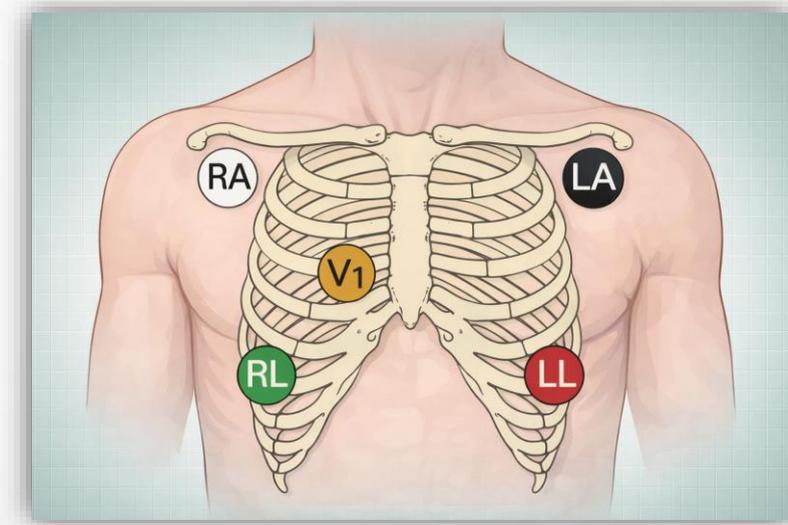
- ✓ Always check for a pulse before using defibrillation or cardioversion.
- ✓ Identify the arrhythmia to determine the right treatment approach.
- ✓ Non-shockable rhythms like asystole and PEA do not respond to defibrillation.
- ✓ Safety first: Ensure no one is touching the patient before delivering a shock.



# MONITORING VS THERAPY

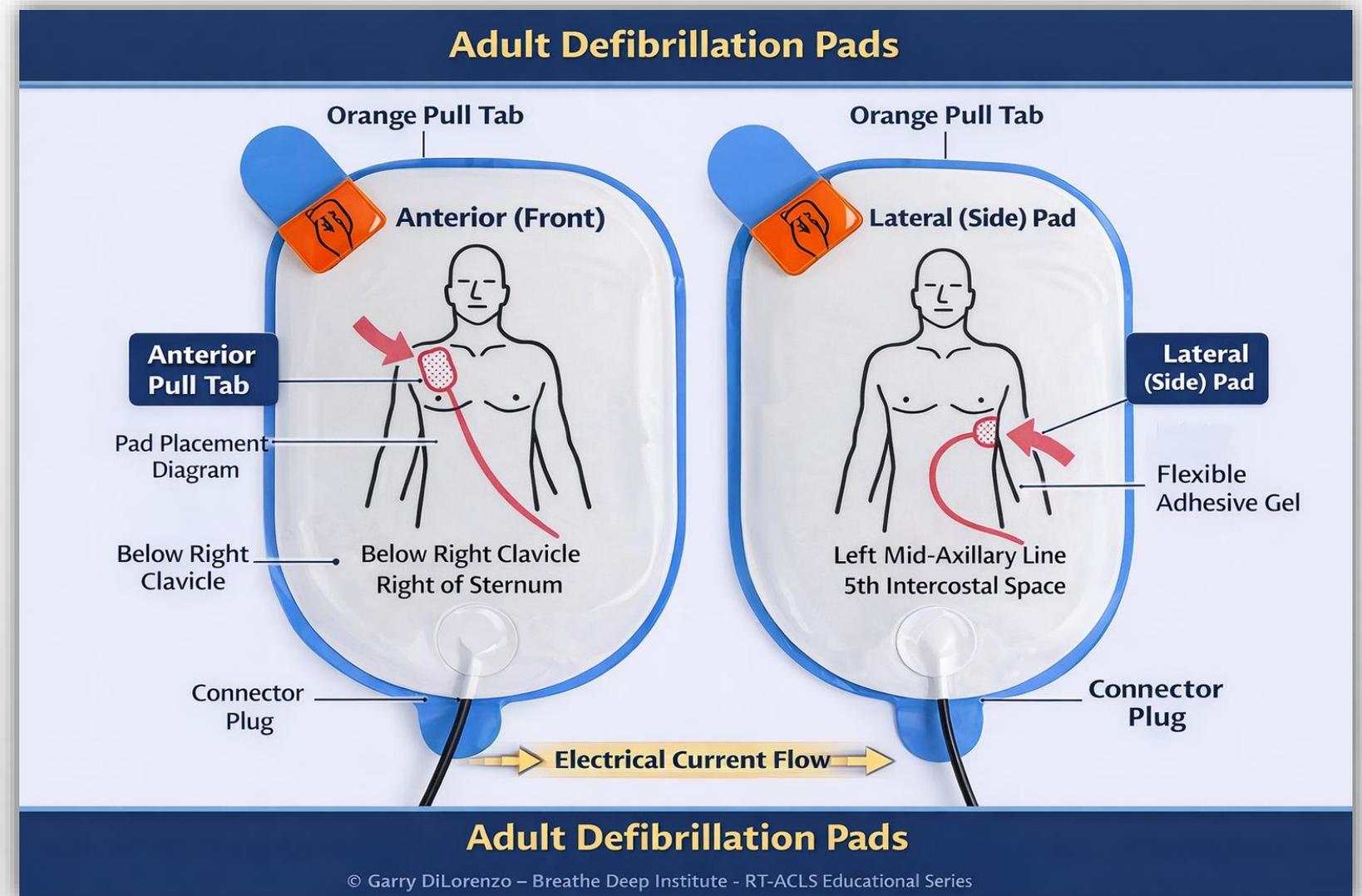
## Monitor Leads

- Display electrical rhythm only
- Do not deliver therapy
- Used for rhythm recognition



# Defibrillation Pads

- Deliver therapeutic current
- Allow rapid shock delivery
- Should be applied early



# Artifact Recognition

- Motion may mimic VF
- Loose leads distort rhythm
- Verify clinically

## Artifact Recognition

Motion Mimicry	Loose Electrodes	Clinical Verification
		
✓ Ensure minimal Pauses in CPR	✓ Reapply Pads & Secure Leads	✓ Always Verify at The Patient
		

### Adult Defibrillation Pads

© Garry DiLorenzo - Breathe Deep-institute - RT-ACLS Educational Series



# Points to Remember

- Leads observe
- Pads treat
- Artifact can mislead

## Points to Remember – RT-ACLS Module

**⚠️ Assess the Patient, Not the Monitor Display**

- ✓ Check pulse immediately
- ✓ Evaluate skin color, responsiveness and perfusion
- ✓ Confirm clinical condition before delivering a shock



**⚠️ Always Confirm Pulselessness Before Defibrillating**

- ✓ Shock pulseless rhythms only
- ✓ Avoid treating motion artifact as VF/VT



**⚠️ Follow Energy Selection Protocol**

- ✓ Bi-Phasic: 120–200 J (escalating)
- ✓ Mono-Phasic: 360 J



**⚠️ Ensure Defibrillation Pads Are in Correct Positions**

- ✓ Avoid nipples & excessive chest hair
- ✓ Below right clavicle, left mid-axillary line
- ✓ Firmly attached & secure contact



**⚠️ Avoid & Recognize Artifact**

- ✓ Secure electrodes; minimize pauses during CPR
- ✓ Verify rhythm: Check pulse, assess perfusion
- ✓ Use fresh pads if adhesive dry or out of date



**⚠️ Integrate ETCO<sub>2</sub> for Quality Of Resuscitation**

- ✓ Below 10 mmHg = poor CPR (Red)
- ✓ 10–20 mmHg = adequate CPR (Yellow)
- ✓ Above 35 mmHg = ROSC likely (Green)



**⚠️ When in doubt, always confirm pulselessness & assess the patient's clinical status. ▲**

## Points to Remember – Advanced EKG & Defibrillation Module

RT-ACLS Advanced CEU Series

**⚠️ Electrical Activity Produces Perfusion**

- ✓ Organized electrical activity produces output
- ✓ 1e: Spicanting electric arwithn and leving
- ✓ Early rhythm recognition improves survival
- ✓ Always confirm pulselessness before initiating defibrillation



**⚠️ Recognize Shockable vs Non-Shockable Rhythms Immediately**

**✓ Shockable rhythms:**

- > Ventricular Fibrillation (VF)
- > Pulseless Ventricular Tachycardia (VT)

**✓ Treatment:**

- > Immediate unsynchronized defibrillation
- > Resume CPR immediately after shock

**Non-shockable rhythms:**

- > Asystole
- > Pulseless Electrical
- > Immediate CPR
- > Administer medications
- > treat reversible causes

Defibrillation is NOT indicated for PEA or asystole



**3. Correct Defibrillation Energy Selection Is Critical**

- ✓ Energy guidelines:
  - > Biphasic: 120–200 Joules initial
  - > Escalate per protocol if unsuccessful
- ✓ Visual confirmation requirements.
- ✓ DEFIB mode must be active (not SYNC)
- ✓ Energy level must be clearly displayed



23> Ceret worklow during compressions  
Shock → Immediate CPR → Rhythm reassessment later

**4. Minimize CPR Interruptions at All Times**

- ✓ CPR maintains coronary and cerebral perfusion.
- ✓ Cntical timing requirements:
  - > CPR pause must be less than 10 seconds
  - > Resume compressions immediately after shock.
- ✓ Charge defibrillator during compressions

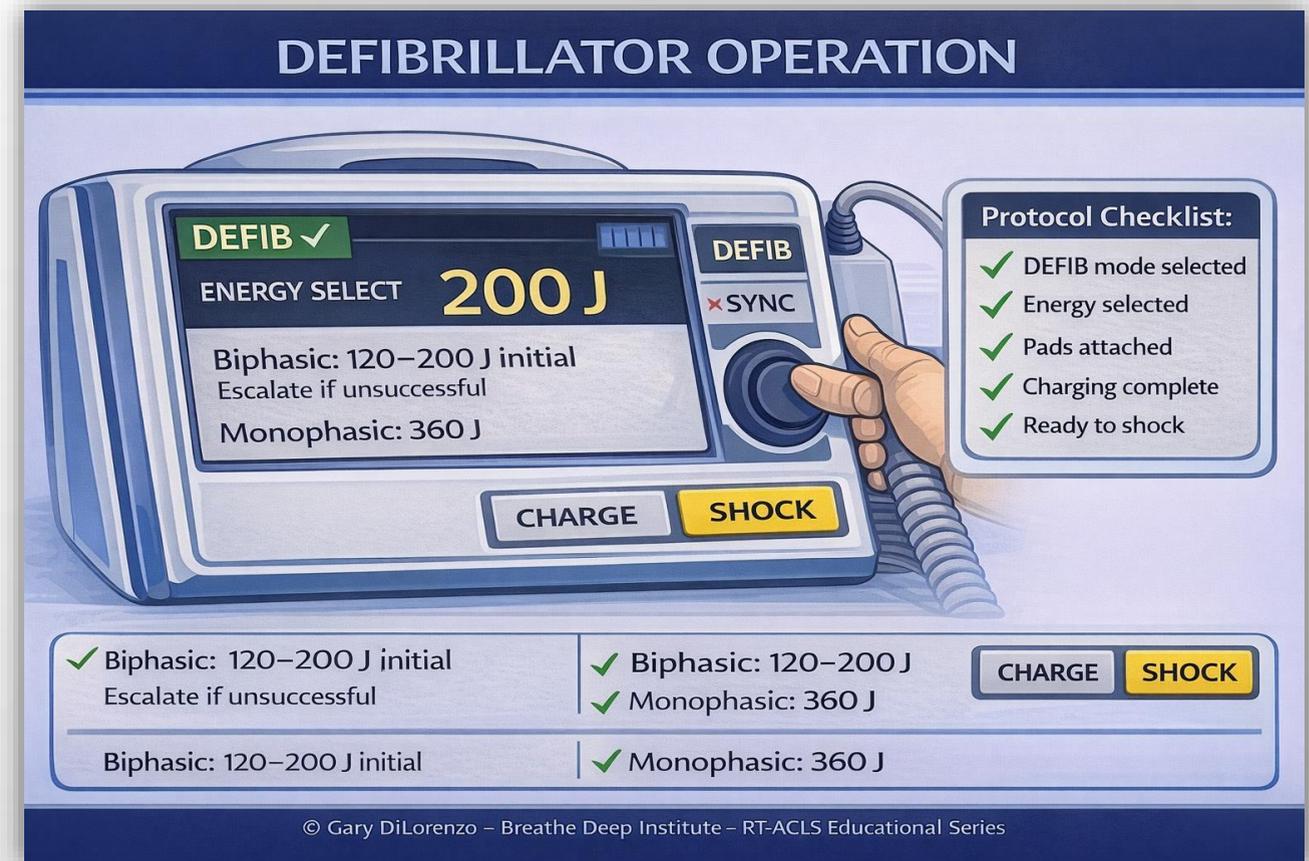




# DEFIBRILLATOR OPERATION

## Power and Energy Selection

- Turn device on immediately
- Select protocol energy
- Confirm shock mode



## Charging During CPR

- Maintain perfusion pressure
- Reduce pauses
- Prepare for rapid shock



# Post-Shock Workflow

- Deliver shock safely
- Resume CPR immediately
- Reassess at rhythm check

## Post-Shock Workflow

Advanced Cardiac Life Support — Respiratory Therapist

- 1 Resume CPR Immediately**  
**TARGET INTERRUPTION < 10 SECS**
  - Start compressions immediately
  - Do NOT pause to check rhythm or pulse
  - Assist in minimizing interruptions
- 2 Maintain and Secure Airway**
  - Confirm airway patency
  - Verify proper device placement
  - Ensure airway remains secured during compressions
  - Monitor for displacement

**Primary goal:** Ensure uninterrupted oxygen delivery
- 3 Maintain and Secure Airway**
  - Confirm airway patency
  - Verify proper device placement
  - Ensure airway remains secured during compressions

**Primary goal:** Ensure uninterrupted oxygen delivery
- 4 Monitor ETCO<sub>2</sub> Continuously**
  - < 10 mmHg → Improve compressions
  - 10–20 mmHg → Adequate CPR
  - > 35 mmHg → Likely ROSC

**Primary goal:** Maintain oxygenation without reducing venous return
- 5 Ensure Defibrillator Readiness During CPR**
  - Confirm pads remain attached
  - Confirm DEFIB mode selected
  - Ensure energy level ready (ex: 200 J biphasic)

**Primary goal:** Reduce time to next intervention

**CRITICAL RT-ACLS PRINCIPLE:** Shock delivery is only one moment — survival depends on what happens immediately after the shock. High-quality CPR, proper ventilation, and ETCO<sub>2</sub> monitoring are the respiratory therapist's most important

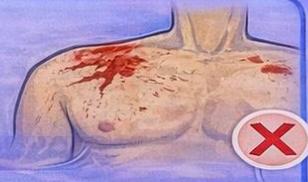


# Special Considerations

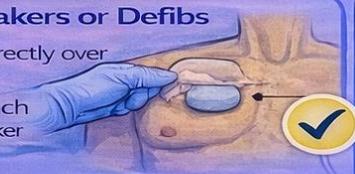
- Avoid pacemakers and patches
- Dry wet skin
- Clip excessive hair

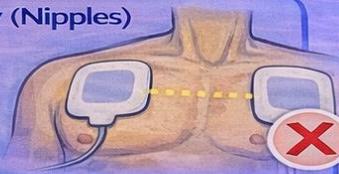
## Special Considerations for Pad Placement During Defibrillation

Key Precautions for Pads Functioning Effectively During Defibrillation

- 1 Wet / Sweaty Skin**
  - Dry the chest thoroughly
  - Moisture reduces pad adhesion and shock effectiveness
  - Pad adheres firmly
- 2 Blood**
  - Dry blood soaked areas
  - Excessive blood may impair conduction of shock.
  - Pad adheres firmly
- 3 Medication Patches or Pastes**
  - Remove transdermal patches or pastes
  - Wipe away any residue to ensure conductivity.

**Primary goal:** Pad more clear.
- 4 Implanted Pacemakers or Defibs**
  - Do NOT place pad directly over the device.
  - Move pad at least 1 inch away from the pacemaker or defib

**Primary goal:** Pad won't conduct well
- 5 Implanted Pacemakers or Defibs**
  - Do NOT place pad directly over the device.
  - Move pad at least 1 inch away from the pacemaker or defib

**Primary goal:** Pad won't conduct well.
- 6 Position Pad Properly (Nipples)**
  - Pads should not be placed directly over the nipples
  - Place pads slightly above or below the nipple to ensure good contact.

**Primary goal:** Pad positioned laterally



# Points to Remember

- Minimize interruptions
- Charge during compressions
- Restart CPR quickly

## Points to Remember for Defibrillator Operation

Using a Manual Defibrillator Safely and Effectively

- 1 Attach Pads Properly**  
**TARGET INTERRUPTION < 10 SECS**
  - Correctly place pads:
    - upper right chest
    - lower left chest
  - Ensure firm contact.

**Primary goal:** Check for moist, or obstructed areas.
- 2 Select DEFIB Mode**
  - Always choose DEFIB mode, not SYNC.
  - Set energy level (biphasic 200 J typical)
  - Turn monitor or defibrillator ON
  - Confirm DEFIB mode is selected.

**Primary goal:** Ensure uninterrupted oxygen delivery
- 3 Clear Patient Before Charge and Shock**
  - Loudly state, "CLEAR!"
  - Visually confirm that everyone is clear
  - before charging.

**Primary goal:** Aware is clear
- 4 Avoid Shocking in SYNC Mode**
  - Defibrillation requires unsynchronized shock
  - Ensure SYNC mode is OFF
  - SYNC mode is used only for cardioversion

**Primary goal:** Evaluate oxygenation without impairing venous return.
- 5 Clear Patient Before Charge and Shock**
  - Loudly state, "CLEAR!"
  - Visually confirm that everyone is clear before charging
  - Recheck the area is clear again before shocking.

**Primary goal:** Note significant rise in ETCO<sub>2</sub> as possible sign of ROSC.
- 6 Check ETCO<sub>2</sub> During CPR**
  - < 10 mmHg → Improve compressions
  - 10–20 mmHg → Adequate CPR
  - > 35 mmHg → ROSC likely

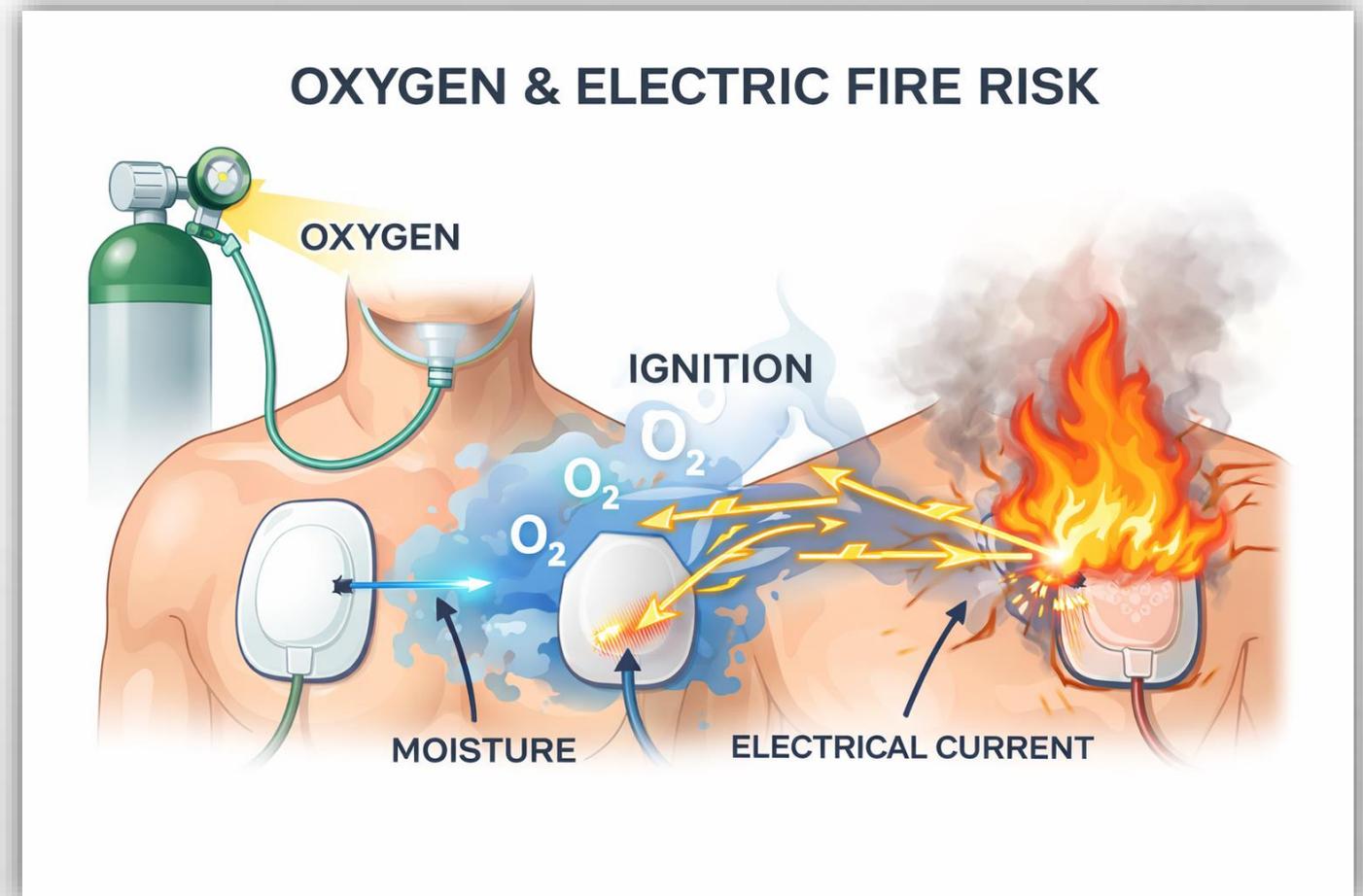
**Primary goal:** Note significant rise in ETCO<sub>2</sub> as possible sign of ROSC.



# ELECTRICAL & FIRE SAFETY

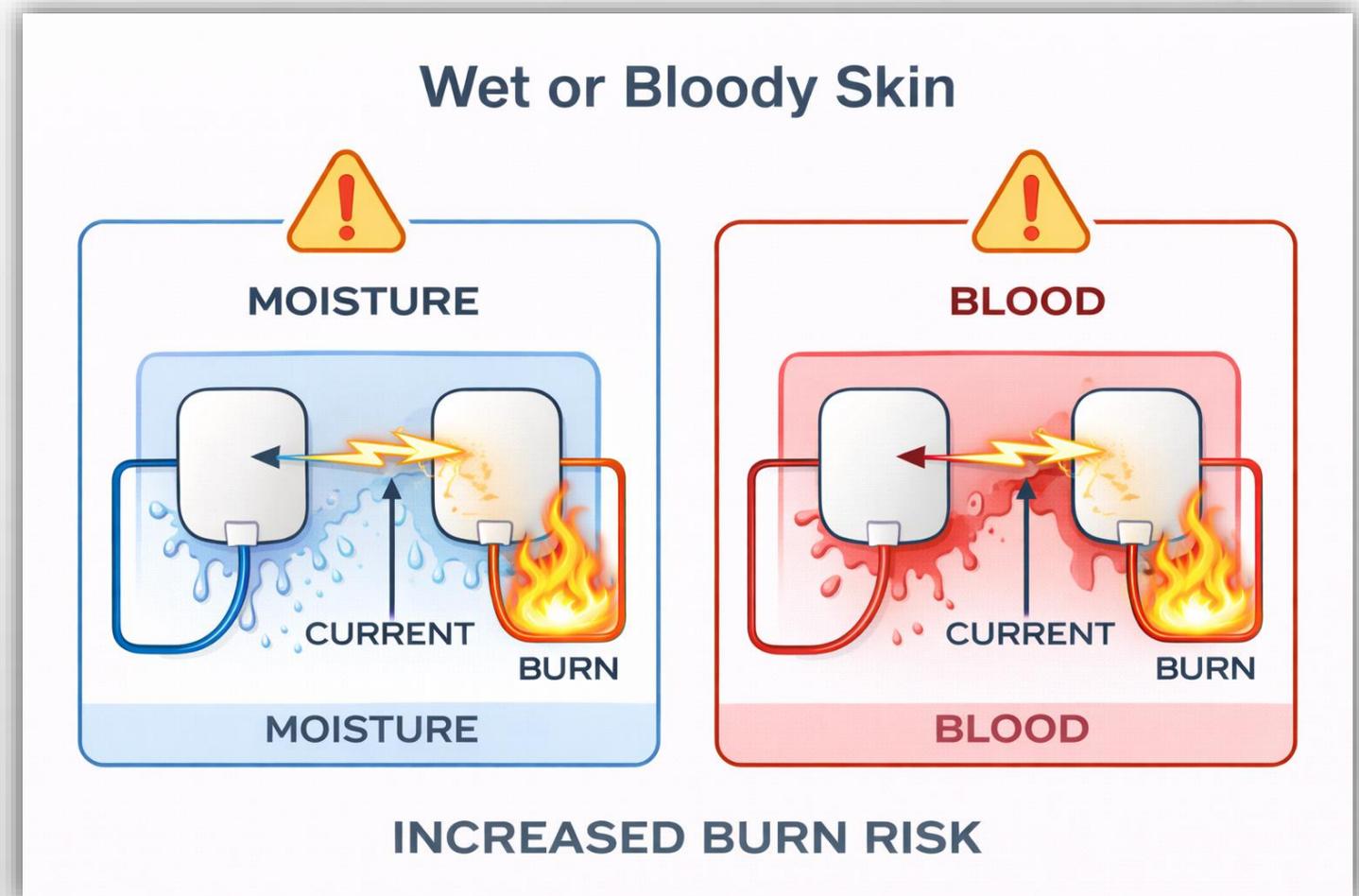
## Oxygen Fire Risk

- Oxygen increases ignition potential
- Clear oxygen from chest
- Control ventilation flow



## Wet or Bloody Skin

- Conducts electrical current
- Increases burn risk
- Dry before shock



## Team Clearing

- Verbal clear command
- Visual confirmation
- Shock only when safe



# Points to Remember

- Oxygen fuels fire
- Moisture conducts electricity
- Communication prevents injury

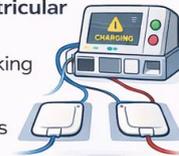
## DEFIBRILLATION SAFETY & PATIENT CLEARING

Points to Remember

### Proper Defibrillator Use

#### Early defibrillation saves lives

- ⚡ Shock ventricular fibrillation and pulseless ventricular tachycardia immediately
- ⚡ Confirm rhythm and pulselessness before shocking
- ⚡ Apply pads early for rapid response
- ⚡ Charge during compressions to minimize pauses
- ⚡ Resume CPR immediately after shock delivery
- ⚡ Correct pad placement improves current flow through myocardium



### Team Clearing Before Shock

#### No contact means no injury

- ⚡ Always loudly announce: "CLEAR"
- ⚡ Visually confirm no one is touching the patient
- ⚡ Ensure hands are off patient, bed, and equipment
- ⚡ Assign one person to verify scene safety
- ⚡ Confirm oxygen devices are clear of chest
- ⚡ Deliver shock only after full safety confirmation



### Wet or Bloody Skin Risks

#### Moisture and blood increase burn risk

- ⚡ Wet skin increases surface electrical conduction
- ⚡ Blood conducts electricity and increases burn risk
- ⚡ Current may travel across skin instead of heart
- ⚡ Reduced effectiveness of defibrillation
- ⚡ Always dry chest before applying pads
- ⚡ Ensure full pad contact with clean, dry skin



### Critical Safety Principle

Clear patient. Dry skin. Deliver shock safely.



# Points to Remember

- Low ETCO<sub>2</sub> indicates poor CPR
- Rising ETCO<sub>2</sub> suggests ROSC
- Use for real-time guidance

## ETCO<sub>2</sub> & PERFUSION

Points to Remember



### ETCO<sub>2</sub> Reflects Cardiac Output

- ⚡ ETCO<sub>2</sub> directly correlates with pulmonary blood flow
- ⚡ Pulmonary blood flow depends on cardiac output
- ⚡ Higher cardiac output delivers more CO<sub>2</sub> to the lungs
- ⚡ Higher ETCO<sub>2</sub> indicates better perfusion
- ⚡ Low ETCO<sub>2</sub> suggests poor circulation

**Key Principle:** ETCO<sub>2</sub> is an indirect measure of cardiac output



### ETCO<sub>2</sub> Indicates CPR Effectiveness

- ⚡ Effective compressions generate measurable ETCO<sub>2</sub>
- ⚡ ETCO<sub>2</sub> reflects forward blood flow during CPR
- ⚡ Low ETCO<sub>2</sub> indicates inadequate perfusion
- ⚡ Increasing ETCO<sub>2</sub> suggests improving circulation
- ⚡ Consistent ETCO<sub>2</sub> confirms effective compression quality

**Critical Threshold:** ETCO<sub>2</sub> < 10 mmHg indicates poor CPR effectiveness



### Sudden Rise Suggests ROSC

- ⚡ Rapid increase in ETCO<sub>2</sub> often indicates return of circulation
- ⚡ CO<sub>2</sub> delivery suddenly increases when cardiac output returns
- ⚡ ETCO<sub>2</sub> rise may be first sign of ROSC
- ⚡ Always confirm pulse and blood pressure
- ⚡ Do not rely on ETCO<sub>2</sub> alone — verify clinically

**Classic Sign:** Sudden increase of 10 mmHg or more suggests ROSC



### ETCO<sub>2</sub> Reflects Ventilation and Perfusion Balance

- ⚡ ETCO<sub>2</sub> depends on ventilation, perfusion, and metabolism
- ⚡ Poor perfusion reduces CO<sub>2</sub> delivery to lungs
- ⚡ Excess ventilation reduces ETCO<sub>2</sub>
- ⚡ Hypoventilation increases ETCO<sub>2</sub>
- ⚡ Interpretation requires clinical context



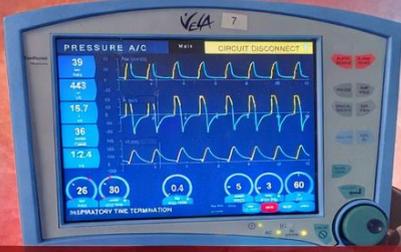
# POST-ROSC CARE Oxygen Management

- Avoid hyperoxia
- Titrate to appropriate saturation
- Prevent secondary injury

## VENTILATOR PATTERNS: Impending Arrest vs Post-ROSC Stabilization

Respiratory Therapist Recognition and Management

**PRE-CODE PATTERN:  
Severe Compensatory Distress**



**Key Ventilator Findings**

**PRE-Code Pattern: Severe Compensatory  
Actual: 39 bpm Distress**

**POST-ROSC PATTERN:  
Stabilized Ventilatory Control**



**Key Ventilator Findings**

**Post-ROSC Pattern:  
Stabilized Ventilation**

Pre-Code Compensation → ROSC → Controlled Ventilation

- **Respiratory Rate:**
  - **Actual: 39 bpm** ▲ Set: 26 bpm
  - **Minute Ventilation: 15.7 L/min** ▲  
Critically elevated  
Indicates metabolic compensation or hypoxia
  - **Peak Pressure: 36 cmH<sub>2</sub>O** ▲  
• Suggests worsening lung compliance
  - **Ventilator Synchrony:**
    - Patient over-triggering ventilator
    - Excessive work of breathing

**RT Priority Actions:**

  - Immediate bedside assessment
  - Obtain ABG
  - Assess oxygenation and perfusion
  - Evaluate cause of distress
  - Prepare for deterioration
  - Notify physician / rapid response

- **Respiratory Rate:**
  - **25 bpm** - Improved ventilatory control
  - **Minute Ventilation: 11.6 L/min**  
Reduced from pre-arrest state
  - **Peak Pressure: 18 cmH<sub>2</sub>O**  
Excellent lung compliance
  - **Ventilator Mode: PRVC A/C**
    - Optimal post-ROSC mode

**Clinical Interpretation:**

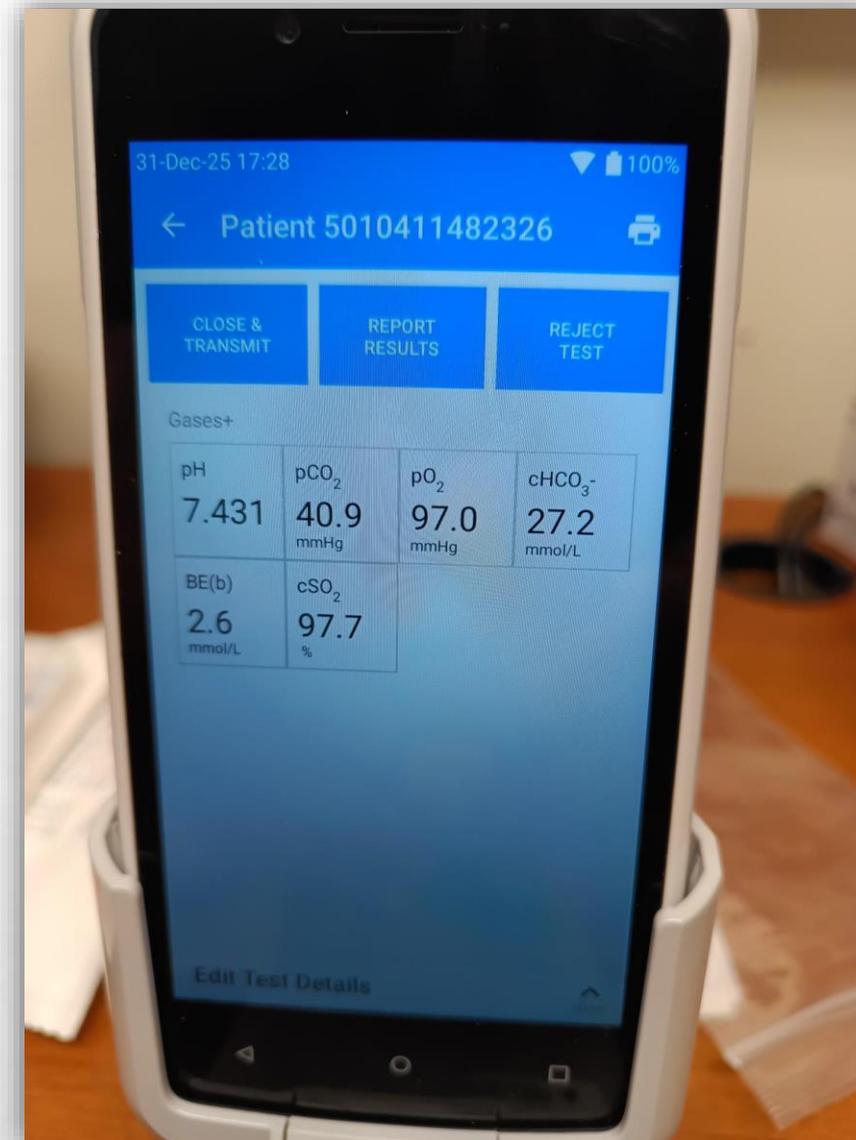
  - Target normocapnia (PaCO<sub>2</sub> 35–45 mmHg)
  - Avoid hyperventilation
  - Titrate FiO<sub>2</sub> to SpO<sub>2</sub> 94–99%
  - Maintain lung-protective ventilation
  - Monitor for post-arrest complications

Respiratory therapists play a decisive role in preventing arrest and stabilizing ventilation after ROSC. Recognition of ventilator distress patterns allows early intervention and improves neurological and survival outcomes.



# Ventilation Strategy

- Avoid hyperventilation
- Normalize CO<sub>2</sub>
- Monitor ETCO<sub>2</sub> continuously



# Points to Remember

- Titrate oxygen carefully
- Avoid over-ventilation
- Reassess frequently

## VENTILATOR AND ABG MANAGEMENT: POINTS TO REMEMBER AFTER ROSC

Respiratory Therapist Critical Actions and Clinical Targets

RECOGNIZE IMPENDING ARREST EARLY	POST-ROSC VENTILATION PRIORITIES
<ul style="list-style-type: none"><li>• <b>Warning Signs on the Ventilator:</b><ul style="list-style-type: none"><li>• <b>Respiratory rate</b> rising above set rate</li><li>• <b>Minute ventilation</b> excessively elevated (&gt;10–12 L/min)</li><li>• <b>Patient over-triggering</b> ventilator</li><li>• Increasing peak airway pressures</li><li>• Signs of ventilator asynchrony</li><li>• Rapid, shallow, or labored breathing pattern</li></ul></li></ul> 	<p><b>Primary Goals:</b></p> <ul style="list-style-type: none"><li>• <b>Restore</b> controlled ventilation</li><li>• <b>Reduce</b> excessive respiratory drive</li><li>• <b>Prevent</b> hyperventilation</li><li>• Maintain adequate oxygenation</li><li>• Reduce myocardial and cerebral stress</li></ul> <p>Recommended initial ventilator targets:</p> <ul style="list-style-type: none"><li>• <b>Respiratory rate:</b> 10–16 breaths/min</li><li>• <b>Tidal volume:</b> 6–8 mL/kg ideal body weight</li><li>• <b>PEEP:</b> 5–8 cmH<sub>2</sub>O</li><li>• <b>FiO<sub>2</sub>:</b> titrate to SpO<sub>2</sub> 94–99%</li><li>• Use lung-protective ventilatory strategies</li></ul> <p><b>Preferred Modes:</b></p> <ul style="list-style-type: none"><li>• PRVC A/C •• Volume A/C</li><li>• Pressure A/C (with close monitoring)</li></ul>
<p><b>⚠️ AVOID HYPERVENTILATION</b></p> <ul style="list-style-type: none"><li>• <b>Hyperventilation causes:</b><ul style="list-style-type: none"><li>• Reduced cerebral blood flow</li><li>• Cerebral vasoconstriction</li><li>• Reduced coronary perfusion</li><li>• Increased neurological injury risk</li></ul></li></ul> <p><b>Key Point:</b> 35–45 mmHg ⚠️ Not lower.</p> <p>The ventilator often shows deterioration before cardiac arrest occurs.</p>	<p><b>⚠️ ABG CONFIRMS SUCCESSFUL MANAGEMENT</b></p> <p><b>Desired ABG Targets Post-ROSC:</b></p> <ul style="list-style-type: none"><li>✓ pH: 7.35–7.45</li><li>✓ PaCO<sub>2</sub>: 35–45 mmHg</li><li>✓ PaO<sub>2</sub>: 80–120 mmHg</li><li>✓ SpO<sub>2</sub>: 94–99%</li></ul> <p><b>ABG Confirms:</b></p> <ul style="list-style-type: none"><li>✓ Ventilator settings appropriate</li><li>✓ Oxygen delivery adequate</li><li>✓ Brain perfusion protected</li><li>✓ Physiologic stability restored.</li></ul> 

**CRITICAL RT-ACLS PRINCIPLE:** The goal after ROSC is **controlled, normal ventilation** — not aggressive ventilation. Excessive ventilation can worsen neurological outcome. Controlled ventilation improves survival.



## Respiratory Therapist Responsibility for warming patients after code



# Common Errors

- Delayed shocks
- Poor pad contact
- Wrong shock mode
- Prolonged pauses

## COMMON ERRORS – PRE-CODE

Missed deterioration leads to missed arrest prevention

### MOST COMMON ERRORS

- Ventilator distress goes unnoticed
- Assuming tachypnea =improving
- Delaying ABG
- Not correcting (rising minute ventilation > 12 L/min (often indicates acidosis/shock)
- Ventilator asynchrony goes unnoticed
- Failure to escalate early
- Missing the simple stuff: leaks/disconnects, kinked tube, water in circuit.

### MOST COMMON ERROR:

Ventilator distress goes unnoticed

Educational Use Only • Not a substitute for clinical judgment or ACLS

## COMMON ERRORS – CODE BLUE

Poor ventilation reduces perfusion, delaying ROSC

### MOST COMMON ERRORS

- Hyperventilation during CPR
- Interrupting compressions for airway tasks.
- Failure to confirm airway placement
- Unrecognized disconnect/leak
- Over-focusing on the airway
- Failure to use ETCO<sub>2</sub> correctly
- Poor team communication

### MOST COMMON ERROR:

Hyperventilation during CPR

Educational Use Only • Not a substitute for clinical judgment or ACLS protocols.

## COMMON ERRORS – POST-ROSC

Post-arrest harm causes preventable brain injury.

### MOST COMMON ERRORS

- Hyperventilation after ROSC
- Leaving FiO<sub>2</sub> too high too long
- Failure to reset ventilator
- Failure to obtain ABG early
- ETCO<sub>2</sub> abnormalities go unnoticed
- Not reassessing lung mechanics
- Missing shock physiology

### MOST COMMON ERROR:

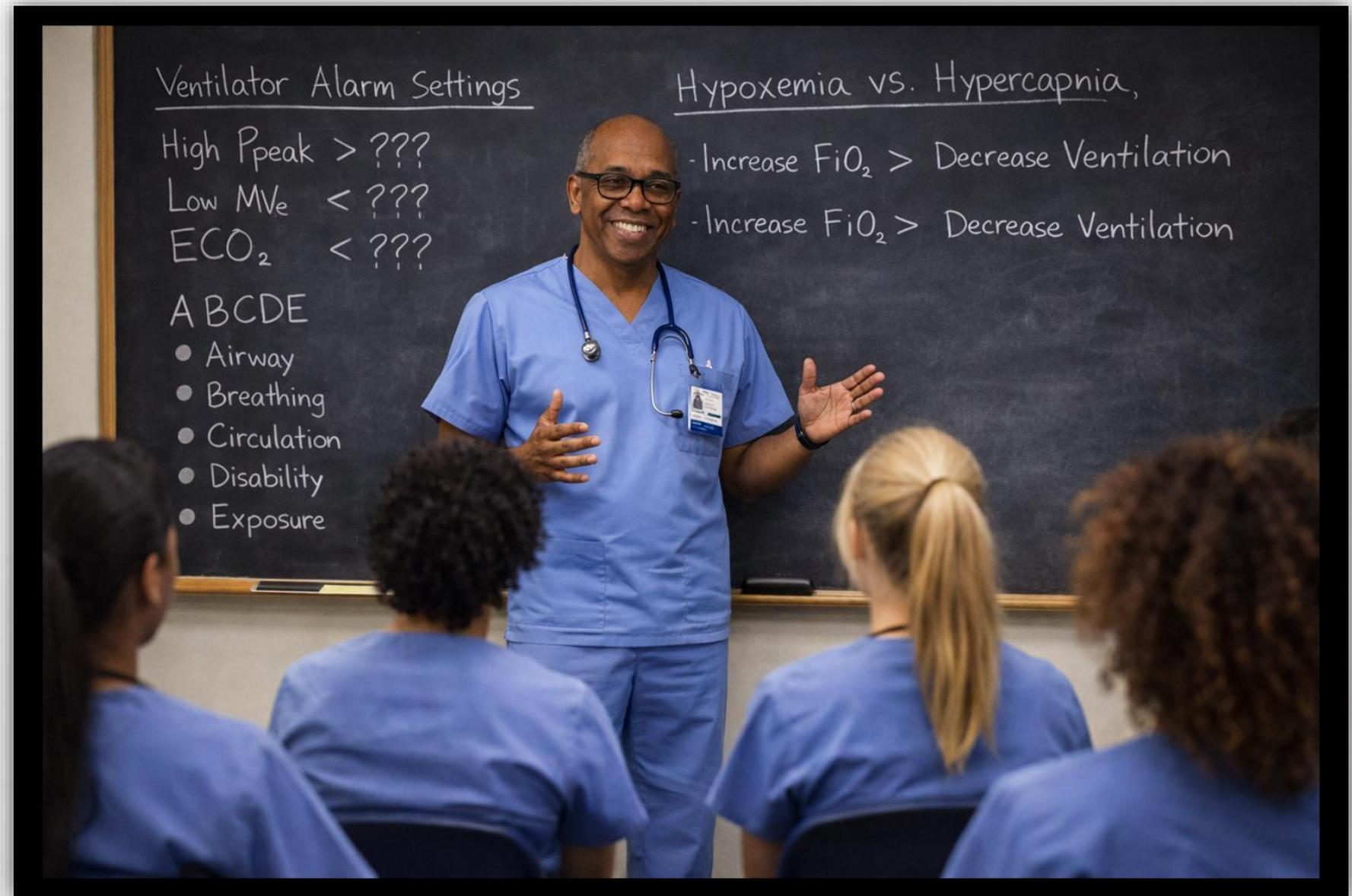
Hyperventilation after ROSC

Educational Use Only • Not a substitute for clinical judgment or ACLS protocols.



## RT Leadership

- Closed-loop communication
- Anticipate next steps
- Coordinate airway and  $\text{ETCO}_2$



## Points to Remember

- Preparation reduces delays
- Leadership improves outcomes
- RTs are critical team members

# POINTS TO REMEMBER

## Respiratory Therapist Leadership During Pre-Code, Code Blue, and ROSC

- 1 Ventilators warn of arrest before monitors do**
  - Rising minute ventilation, tachypnea, and ventilator distress often occur before cardiac arrest. These warning signs must **never go unnoticed**.
- 2 Hyperventilation is the most common and most dangerous error**
  - Excess ventilation reduces cerebral and coronary perfusion by lowering PaCO<sub>2</sub> and causing vasoconstriction.
  - Target ventilation—not maximum ventilation—is the goal.
- 3 ETCO<sub>2</sub> is the respiratory therapist's most valuable real-time perfusion indicator**
  - Falling ETCO<sub>2</sub> suggests **worsening perfusion**.
  - Sudden ETCO<sub>2</sub> increase may indicate ROSC.

- 4 After ROSC, the respiratory therapist protects the brain**
  - Ventilator settings must be adjusted immediately to maintain:
    - PaCO<sub>2</sub> 35–45 mmHg
    - SpO<sub>2</sub>: 94–99%
    - FiO<sub>2</sub>: reduce from 100% as soon as safely possible.
- 5 Ventilator reassessment is required after every phase change**
  - **Pre-Code • Code Blue • ROSC**
  - Failure to reassess allows preventable injury.
- 6 Respiratory therapists are leaders in physiologic stabilization**
  - The respiratory therapist manages **oxygenation**, ventilation, and perfusion interaction in real time.

### FINAL REMEMBER THIS:

**The ventilator is not just a support device.** It is an early warning system, a resuscitation tool, and a **brain protection tool**. The respiratory therapist is the clinical expert responsible for recognizing and acting on these signals.



## Case Intervention

- Pads already applied
- Shock delivered safely
- CPR resumed immediately



## Case Outcome

- ETCO<sub>2</sub> rises suddenly
- Pulse confirmed
- Ventilation stabilized



# WRAP-UP

## Key Takeaways

- Rapid rhythm recognition saves lives
- Correct defibrillation improves survival
- Safety prevents harm
- ETCO<sub>2</sub> guides resuscitation
- RT leadership is essential



# MASTER REFERENCE LIST – RT-ACLS COURSE

References covering airway management, ventilation, capnography, ABGs, cardiac arrest, RT ACLS, team performance, and post-ROSC care.

## Core ACLS and Resuscitation Guidelines

1. American Heart Association. (2020). *2020 American Heart Association Guidelines for Cardiopulmonary, Emergency Resuscitation and Emergency Cardiovascular Care. Circulation, 142*(Suppl. 21, S887-2.
2. Panchal AR, et al. (2020). *Adult Basic and Advanced Life Support, 2020 AHA Guidelines Update. Resuscitation, 161*, 115-151.
3. Neumar RW, et al. (European Resuscitation Council Guidelines for Resuscitation 2021). *Resuscitation, 161*, 115-161.

## Ventilation, Airway and Respiratory Physiology

5. Tobin MJ. (2013). *Principles and Practice of Mechanical Ventilation (3rd ed.)*. McGraw-Hill.
6. Hess DR, Macintyre NR, Galvin WF. (2016). *Respiratory Care. Principles and Practice. 38th ed.*
7. Kacmarek RM, Stoller JK, Heuer AJ. (2022). *Egans Fundamentals of Respiratory Care. (21st ed.)* Elsevier.

## These references cover your entire course

- Airway Management
- Mechanical Ventilation
- Cardiac Arrest Recognition
- CPR Physiology
- Defibrillation
- Capnography
- Ventilator Management

## Ventilation, Airway, and Respiratory Physiology

9. Kodall BS. (2013). *Principles and Practice of Mechanical Ventilation. (3rd ed.)*. McGraw-Hill.
10. Sandroni C, et al (2015); Fartitent C. (2016). End-tidal, COs Monitoring During CPR: *Resuscitation, 67*.
11. Falk JL et al. (1998); *End-Tidal Carbon Dioxide Concentration During CPR: New England Journal of Medicine, 316*, 607-611.

## Capnography and ETCO<sub>2</sub> Monitoring

9. Kodall BS. (2013). *Capnography Outside the Operating Room*.
10. Sandroni C, et al (2015). *End-tidal CO<sub>2</sub>: Monitoring During CPR: Resuscitation, 37*.
11. Falk JL, et al (1998). *End-tidal carbon dioxide Concentration During CPR: New England Journal of Medicine, 319*.

## Ventilator Management and Critical Care Monitoring

20. Marini JJ, et al (2015); *Adult Advanced Life Support - Freudenthal*
21. Macintyre NR; et al (2003); *Mechanical Ventilation*
10. Chatburn RL et al (2003). *Classification of Mechanical Ventilators: Anesthetology. Resuscitation, 97*.
11. Branson RD et al (2012); *Existing Evidence to Improve Resuscitation Performance: Resuscitation, 39*:10-811.

## Defibrillation and Electrical Therapy

12. Link MS, et al (2015), Part 7 *Adult-Advanced Cardiovascular Life Support. Circulation, 132*. S444-S484.
16. Kerber RE, et al (1997). *Automatic External Defibrillators. Annals of Emergency Medicine, 30*.

## Post-ROSC Care and Oxygen Management

15. Kilgannon JH et al. (2010); *Adult-Advanced Cardiovascular Life Support. Circulation, 132*. S244-S464.
16. Kerber RE, et al (1997). *Automatic-External Defibrillators. Annals of Emergency Medicine, 30*.

## Human Factors, Team Performance, and Debriefing.

- Airway Management
- Mechanical Ventilation
- Cardiac Arrest Recognition
- CPR Physiology
- Defibrillation
- Capnography

Educational Use Only • Not a substitute for clinical judgment or ACLS protocols.