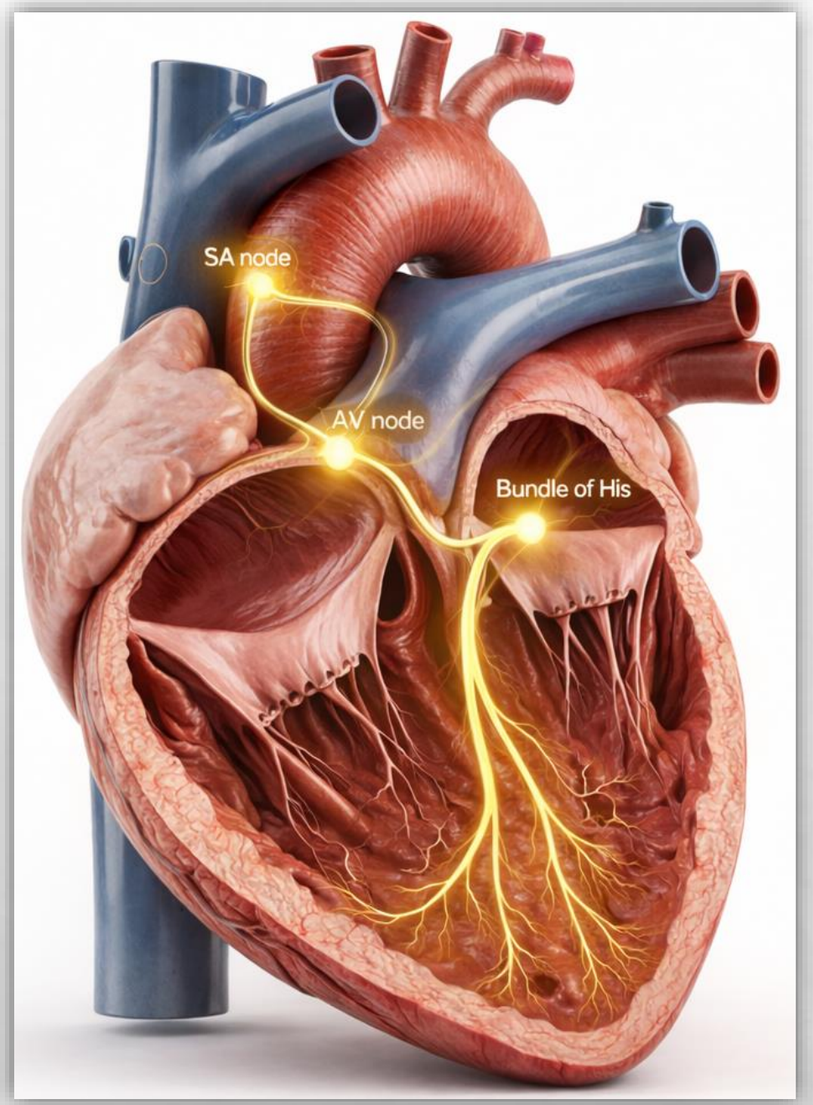
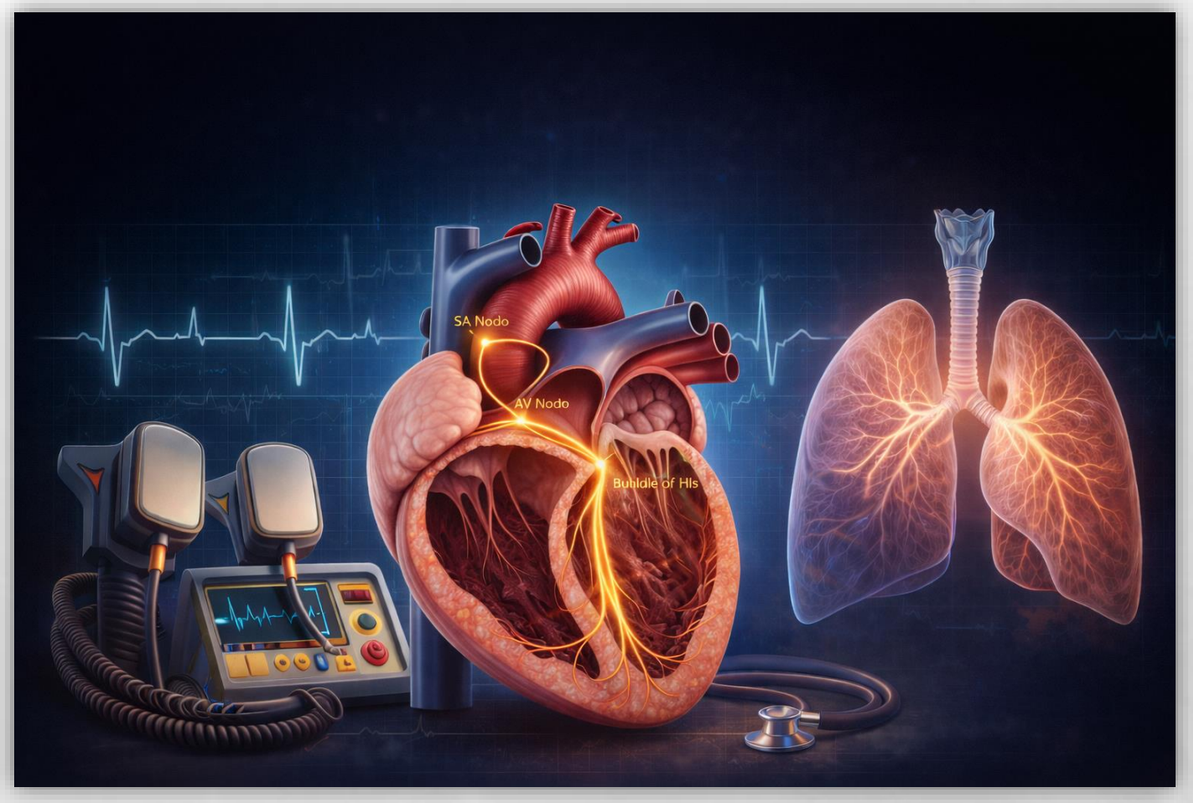
Part-3 RT-ACLS ADVANCED CEU SERIES

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

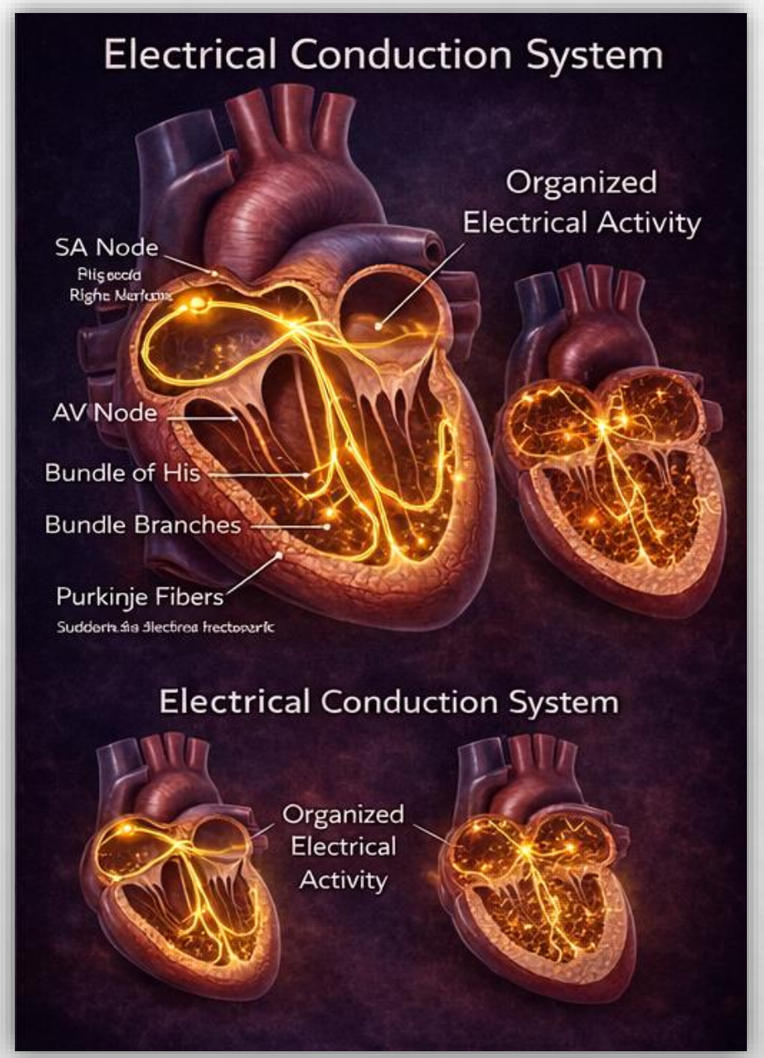
Course Outline

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. $ETCO_2$ integration
8. Post-ROSC ventilation
9. Team coordination
10. Capstone clinical case
11. Wrap-up and references

ELECTRICAL FOUNDATIONS

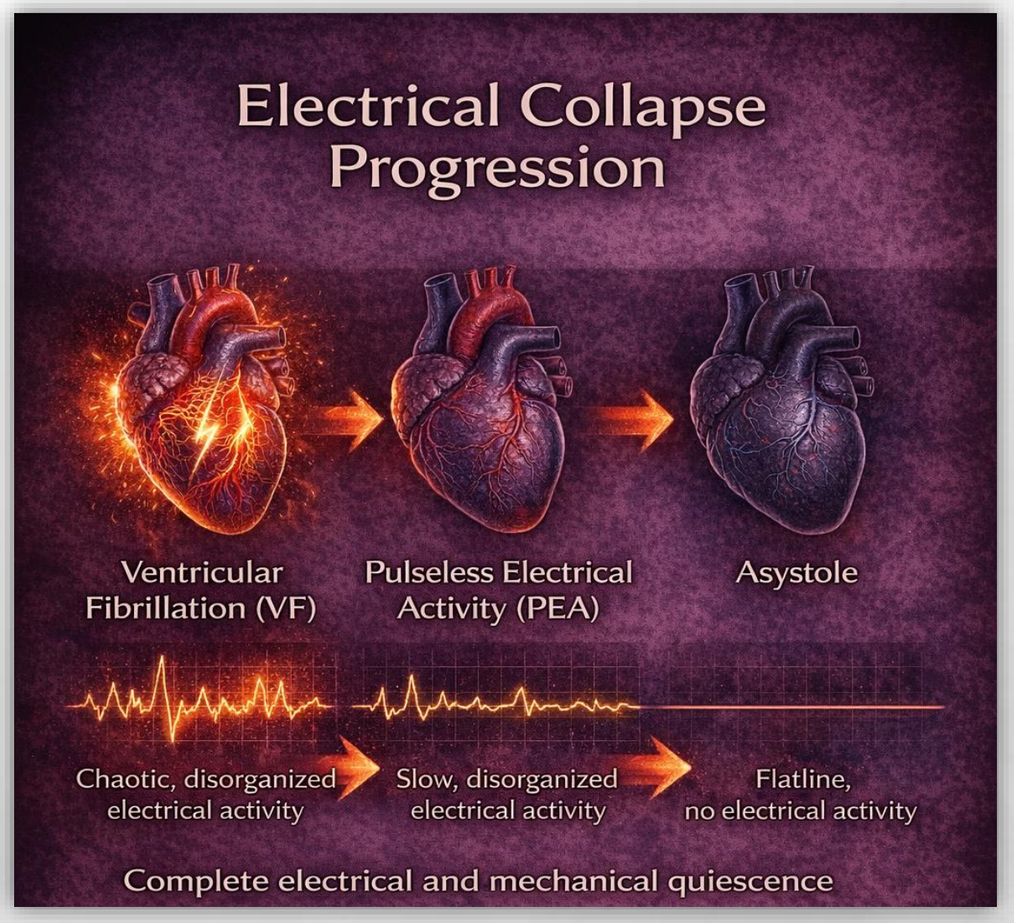
Cardiac Conduction System

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



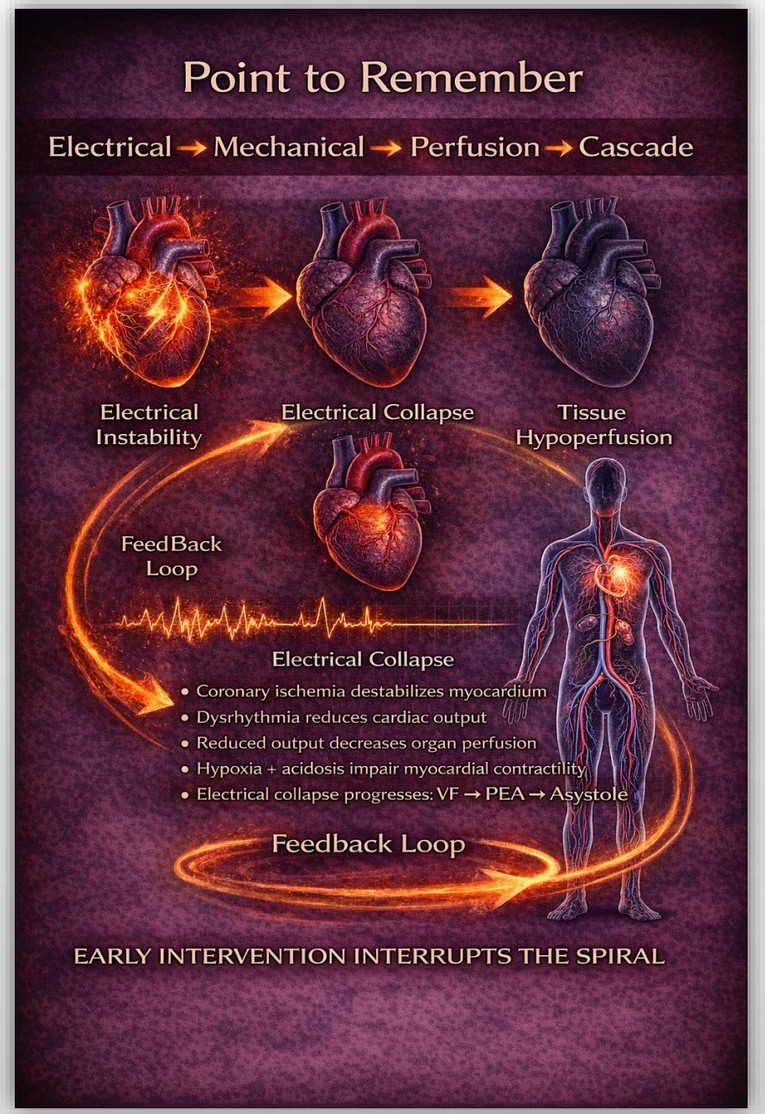
Electrical Collapse Progression

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



Points to Remember

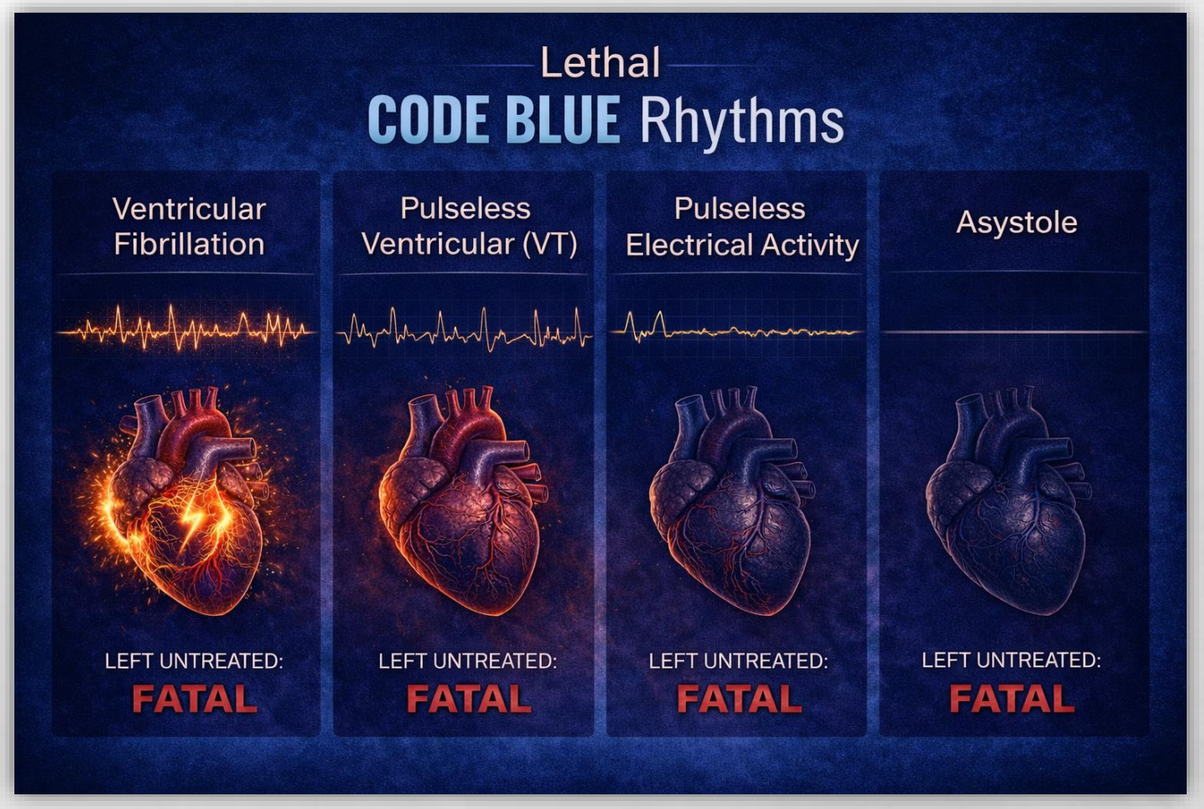
- Electrical failure causes sudden arrest
- Pulse confirmation is essential
- Early recognition saves lives

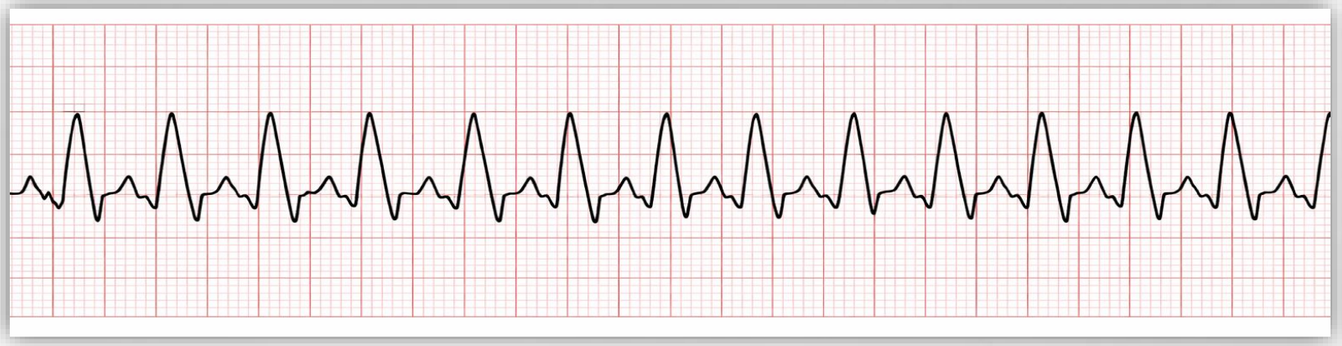


LETHAL CARDIAC RHYTHMS

Ventricular Fibrillation

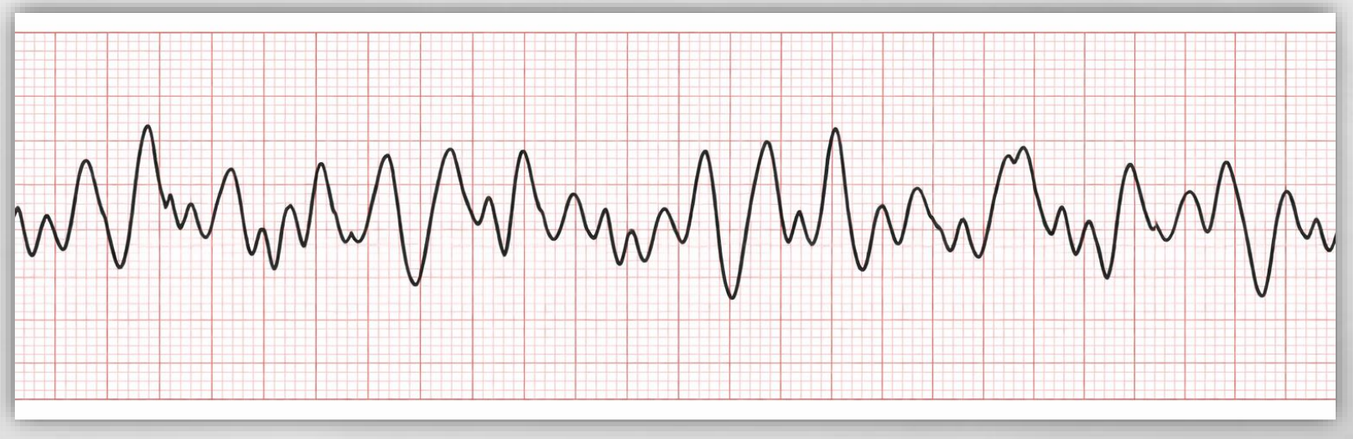
- Chaotic electrical activity
- No effective cardiac output
- Requires immediate defibrillation





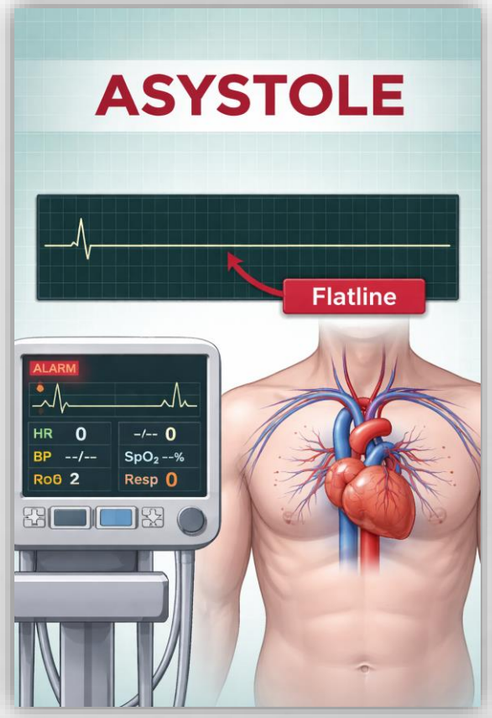
Pulseless Ventricular Tachycardia And Ventricular Fibrillation

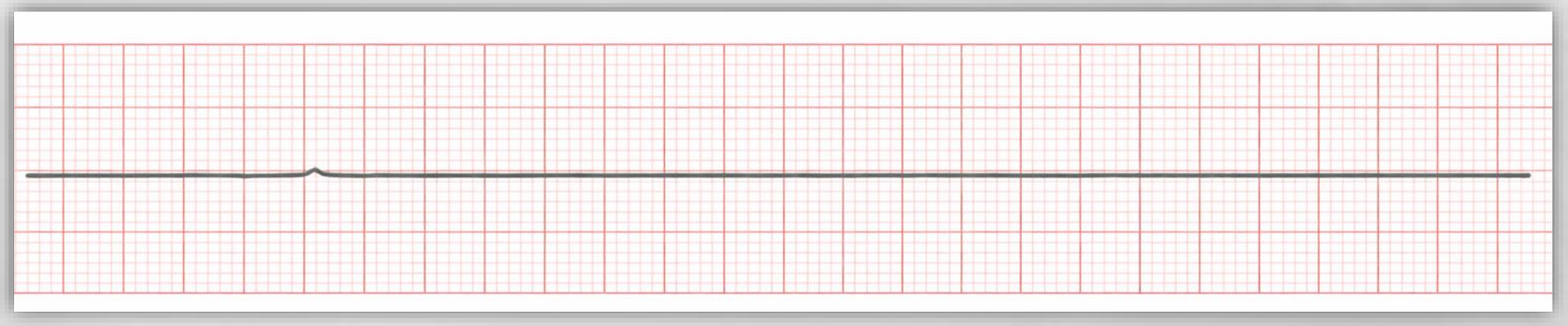
- Rapid ventricular rhythm
- No perfusion present
- Shockable rhythm

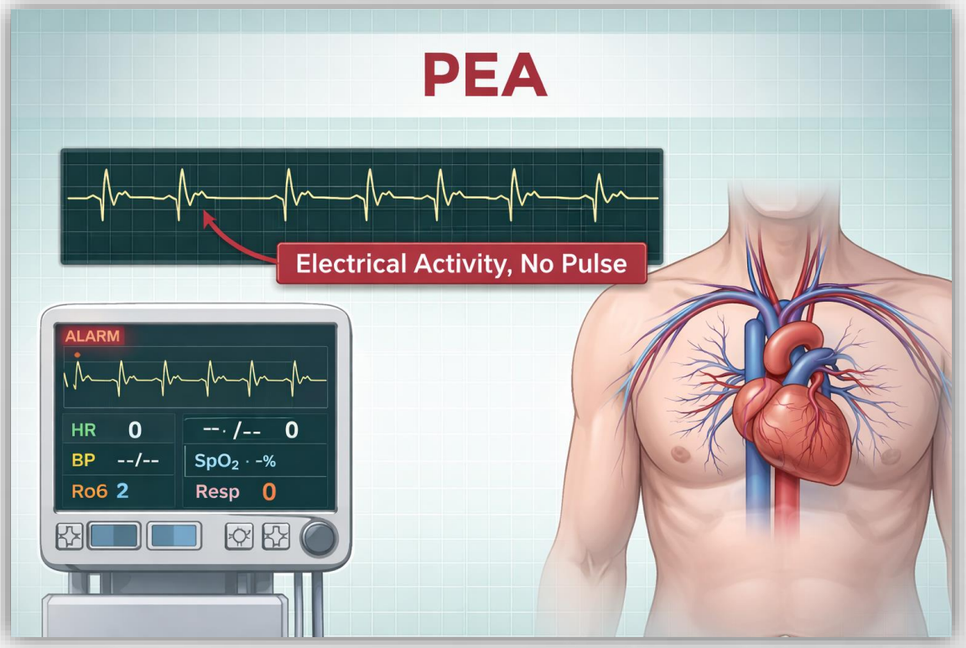


Asystole

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

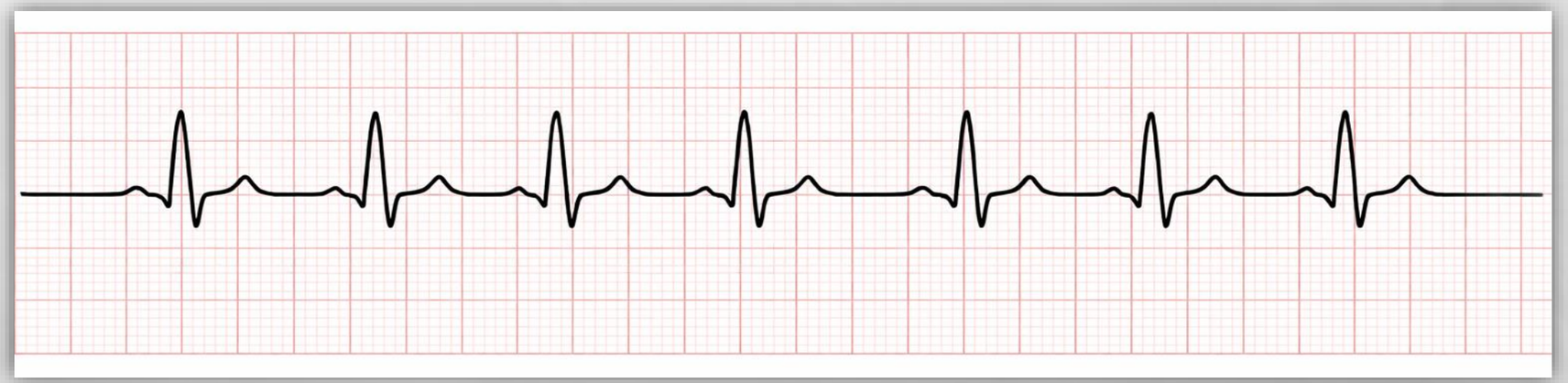






Pulseless Electrical Activity

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

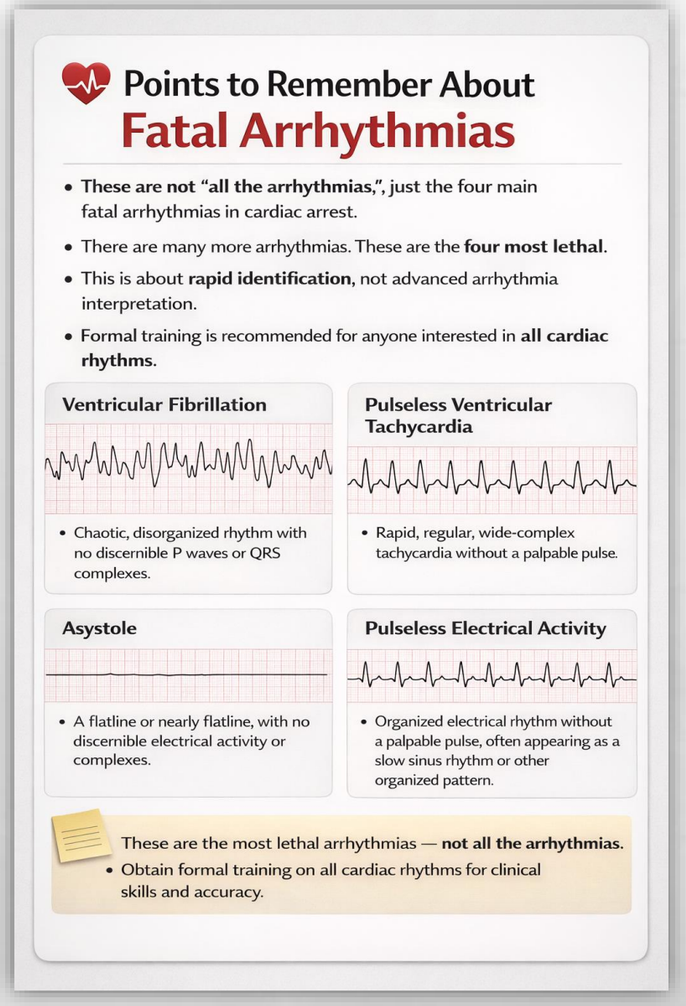


Rhythm Check Discipline

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

Points to Remember

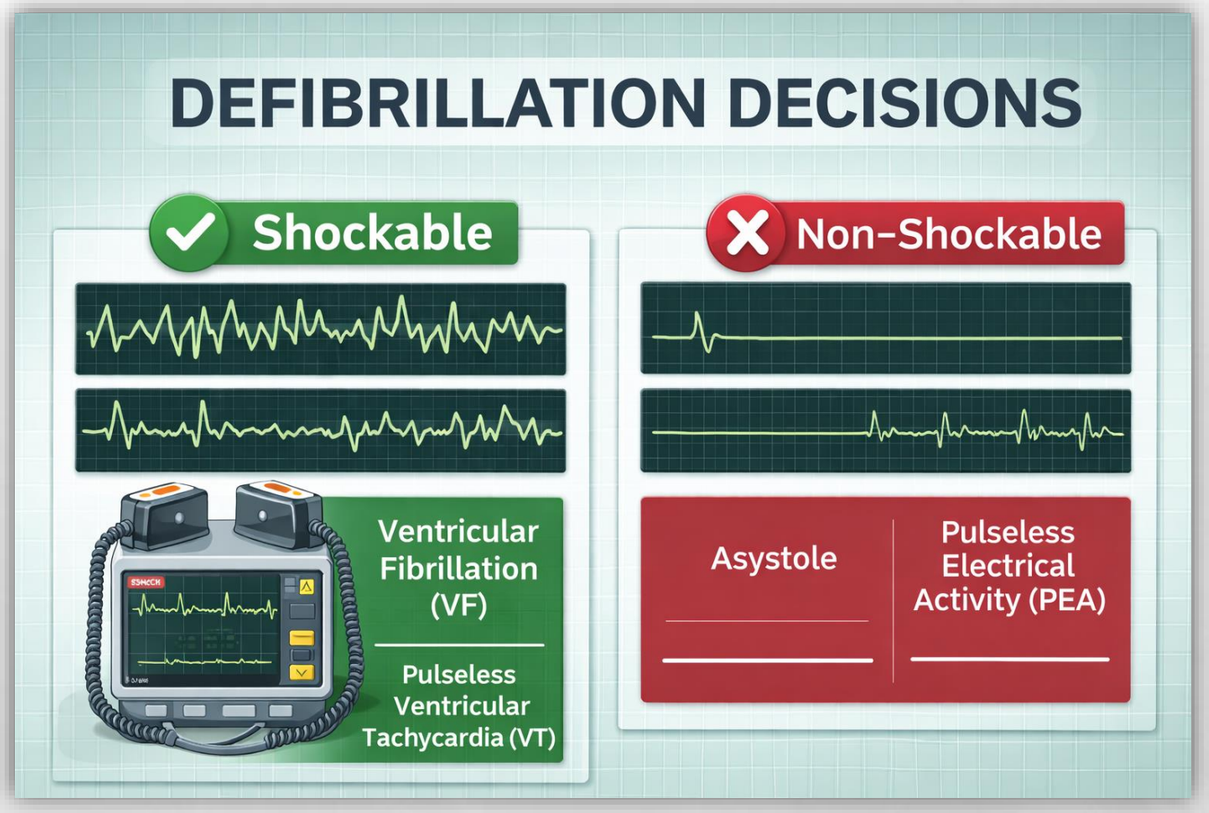
- VF and pulseless VT are shockable
- Asystole and PEA are not
- Minimize interruptions



DEFIBRILLATION DECISIONS

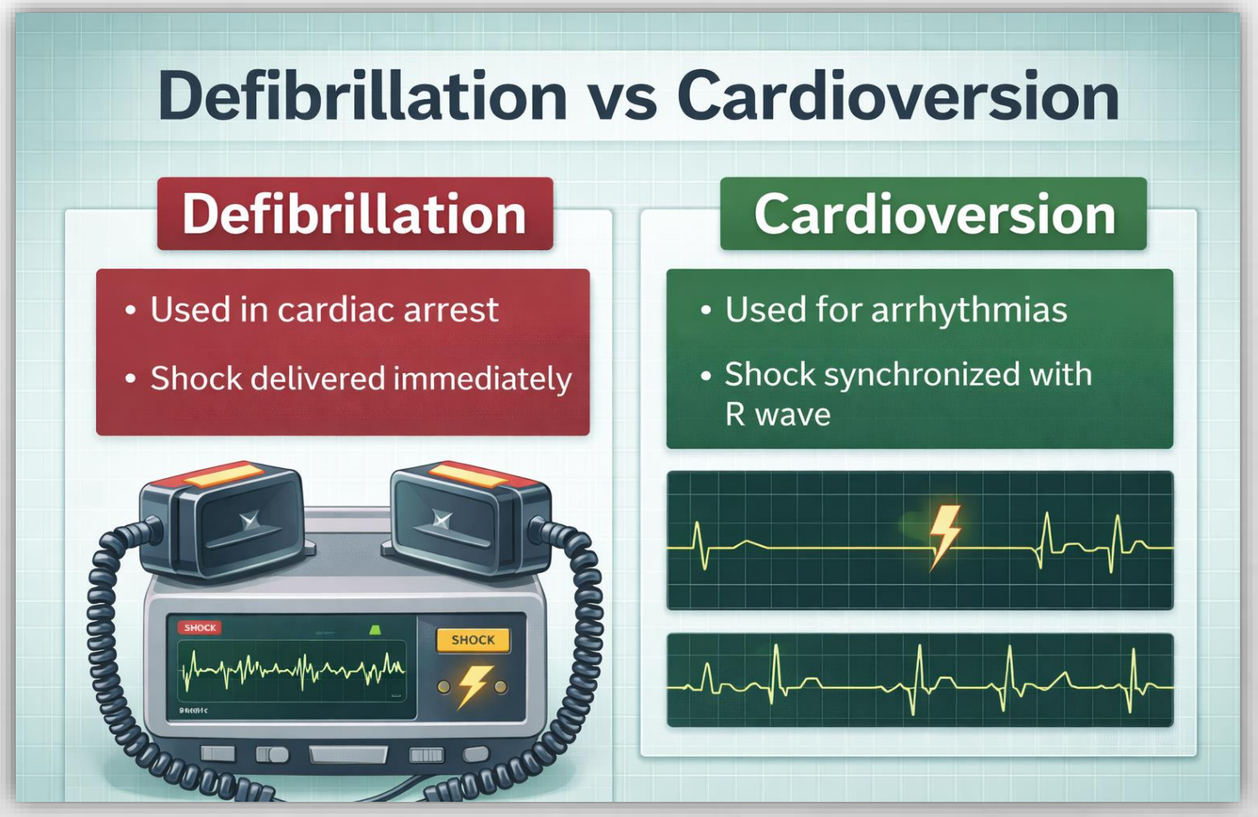
Defibrillation Purpose

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



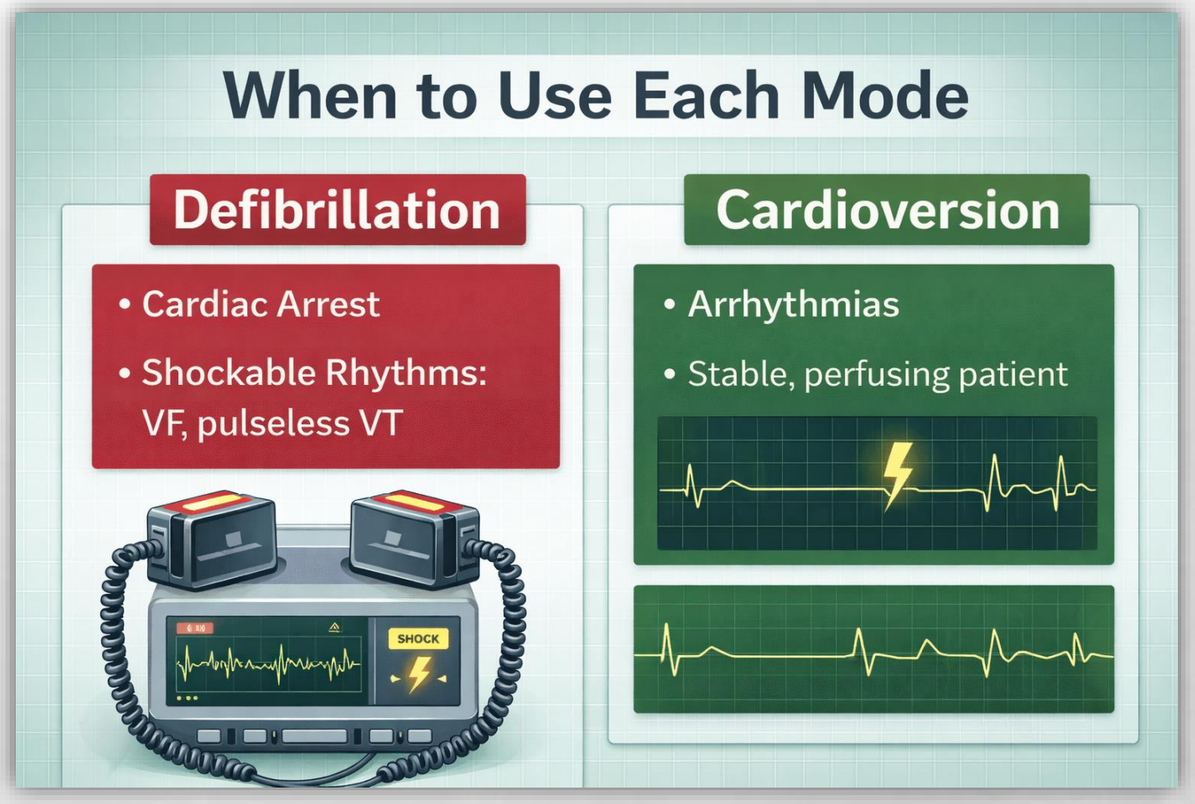
Defibrillation vs Cardioversion

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



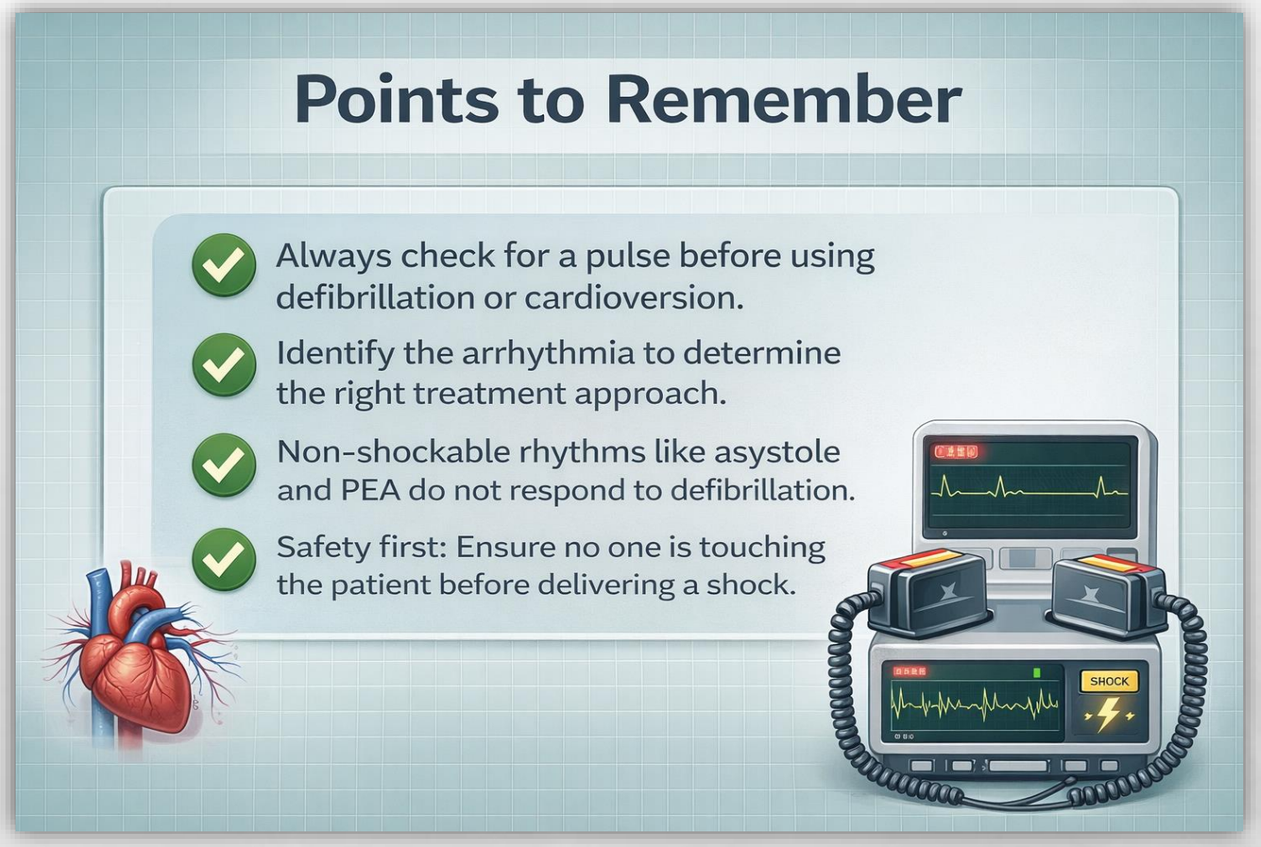
When to Use Each Mode

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



Points to Remember

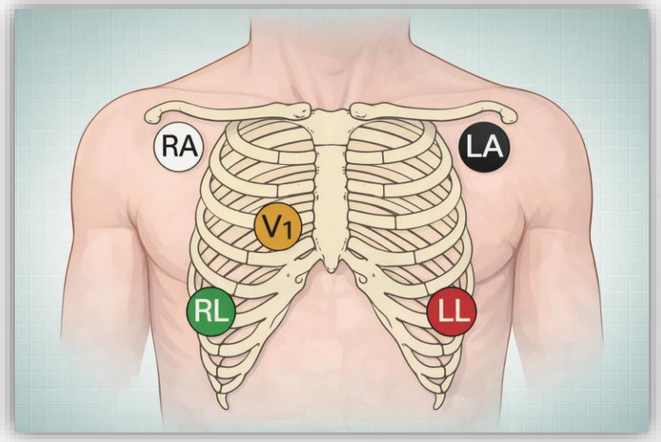
- Correct mode prevents delays
- Wrong mode reduces survival
- Match therapy to rhythm

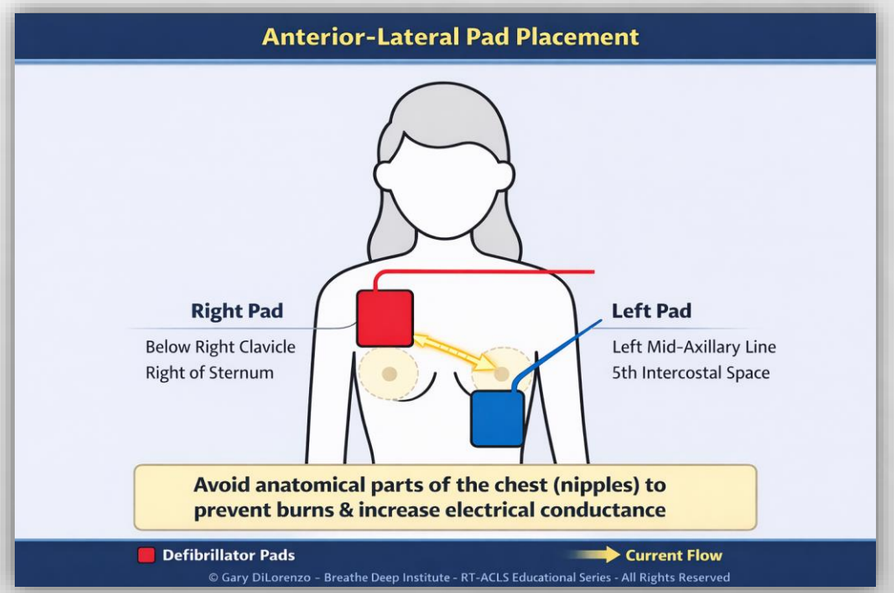


MONITORING VS THERAPY

Monitor Leads

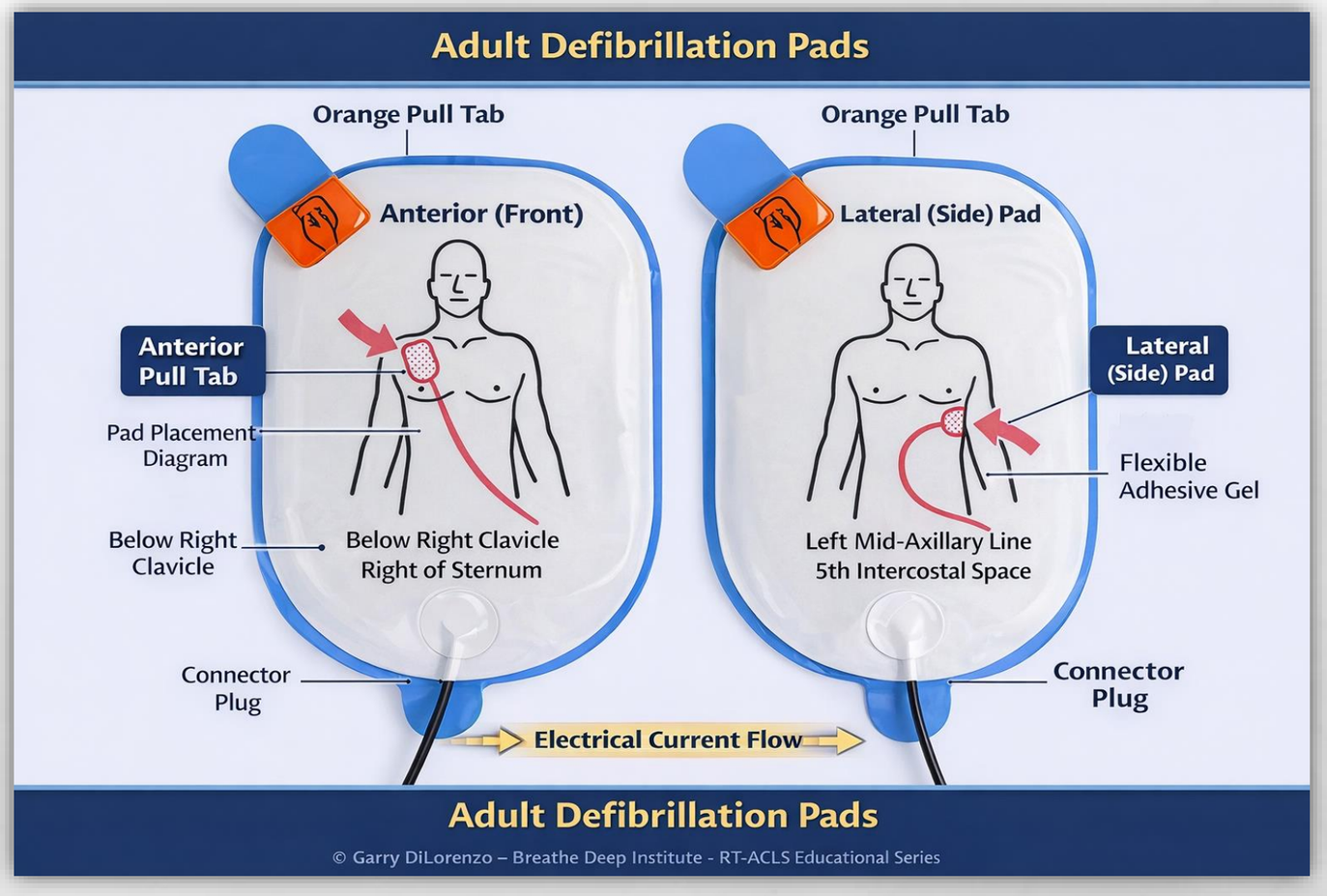
- Display electrical rhythm only
- Do not deliver therapy
- Used for rhythm recognition





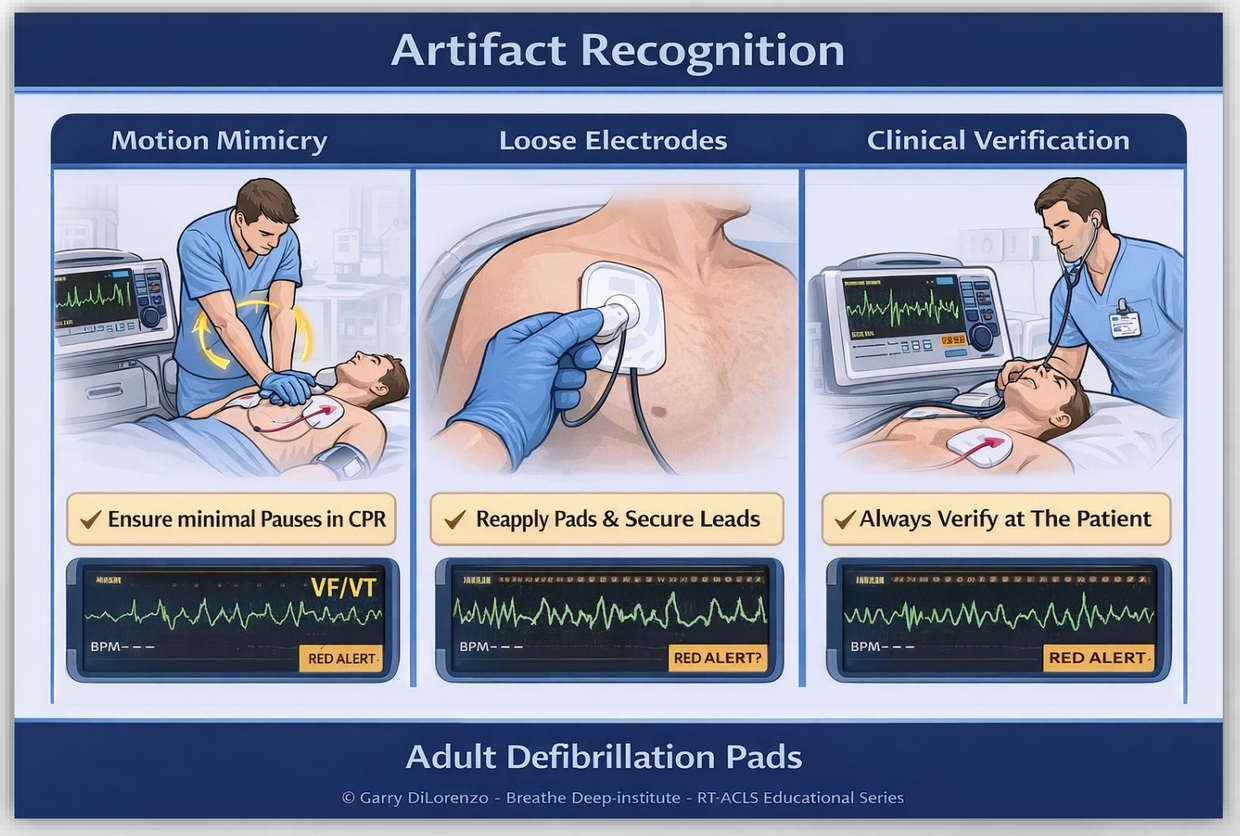
Defibrillation Pads

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



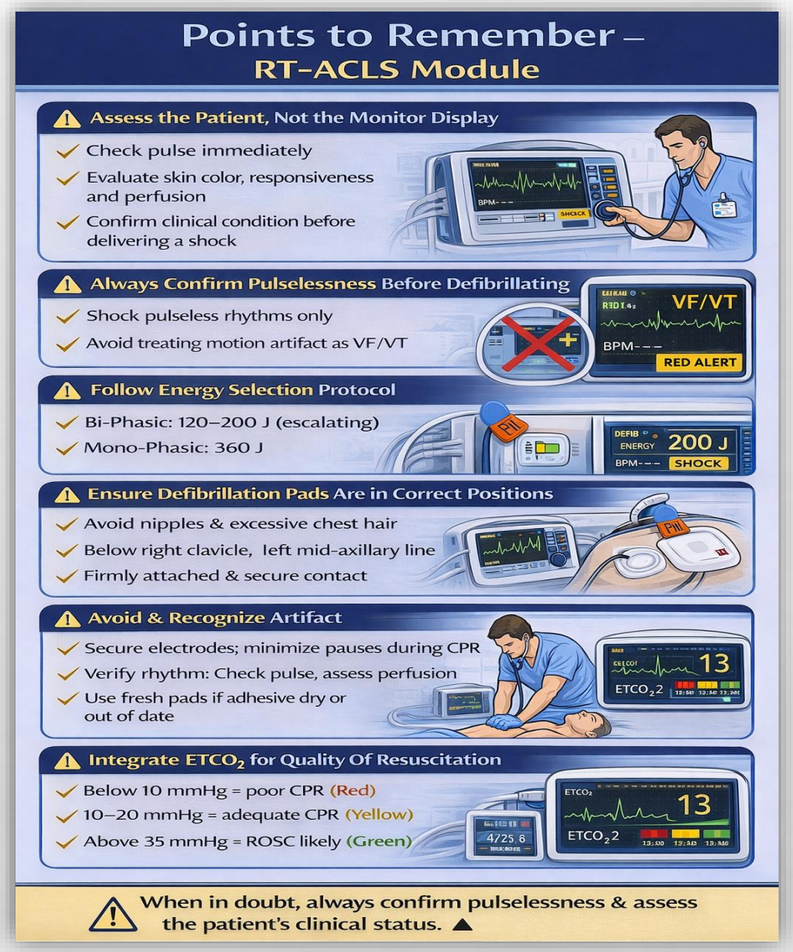
Artifact Recognition

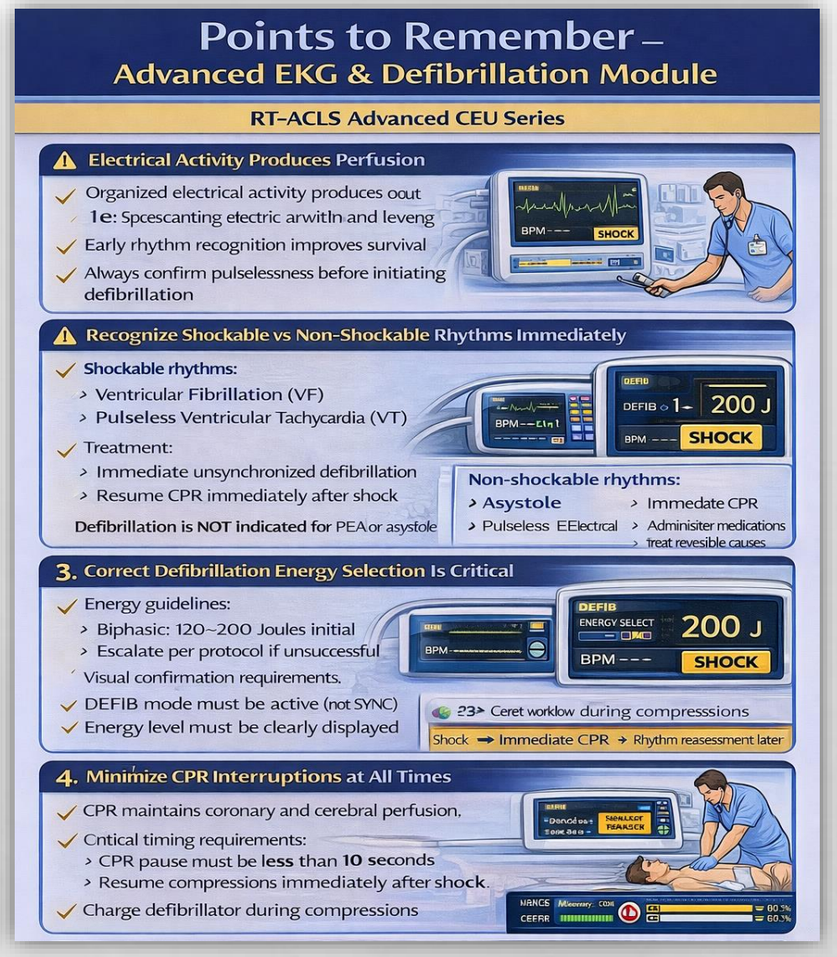
- Motion may mimic VF
- Loose leads distort rhythm
- Verify clinically



Points to Remember

- Leads observe
- Pads treat
- Artifact can mislead

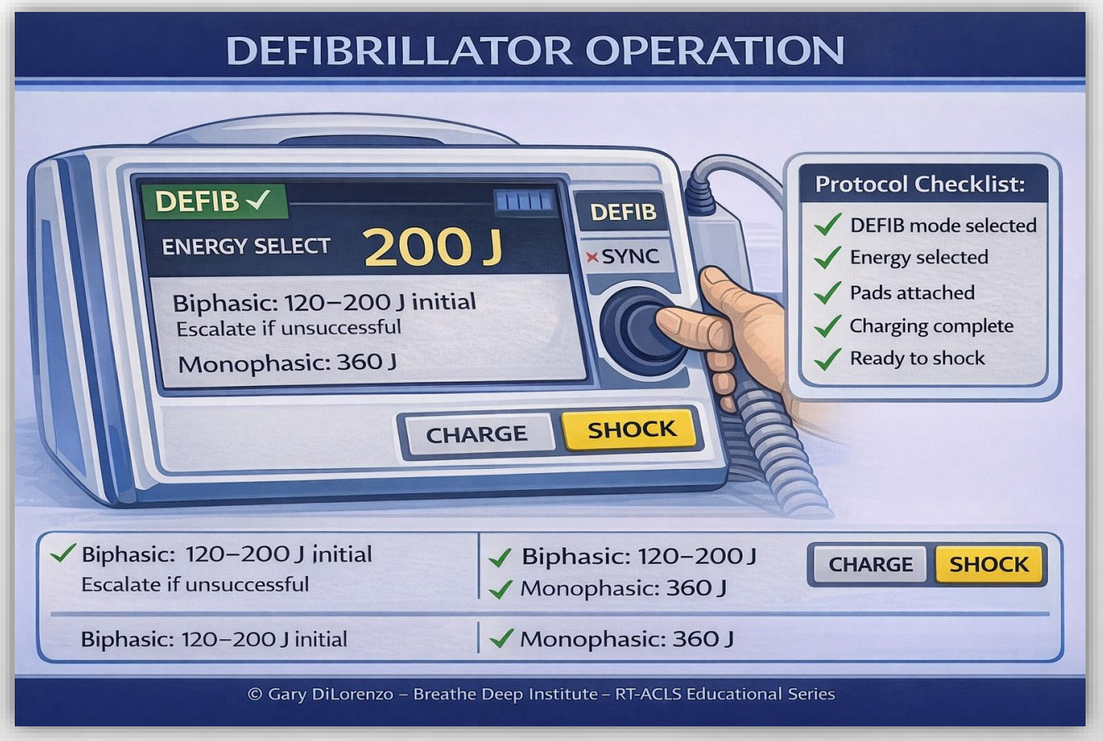




DEFIBRILLATOR OPERATION

Power and Energy Selection

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

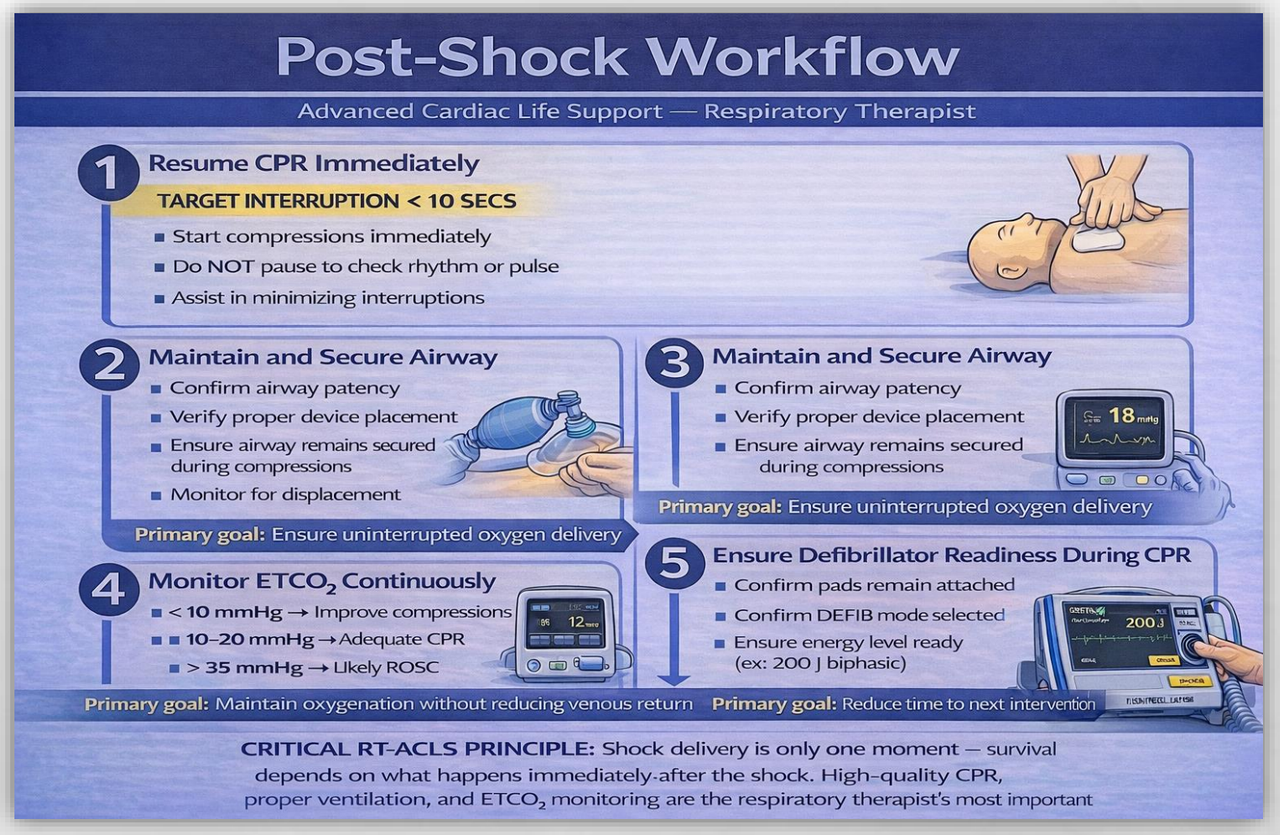


Charging During CPR

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

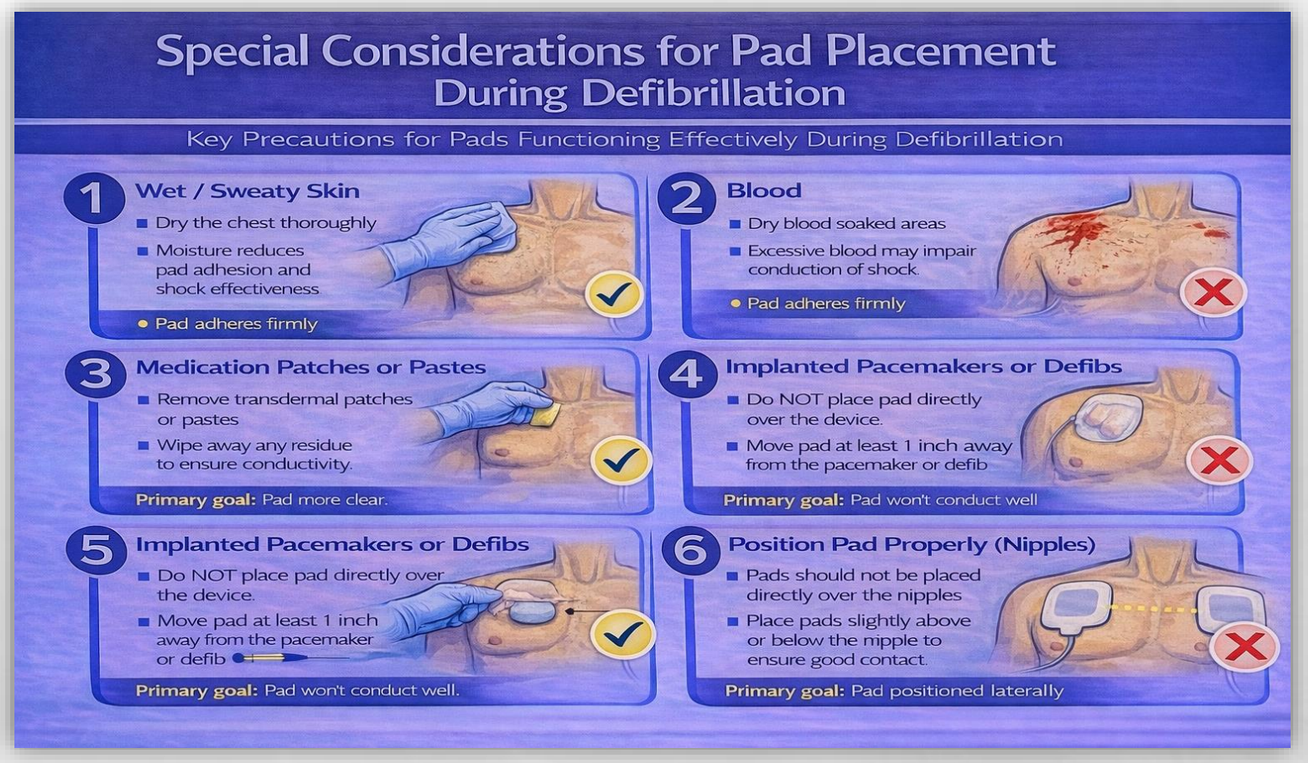
Post-Shock Workflow

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



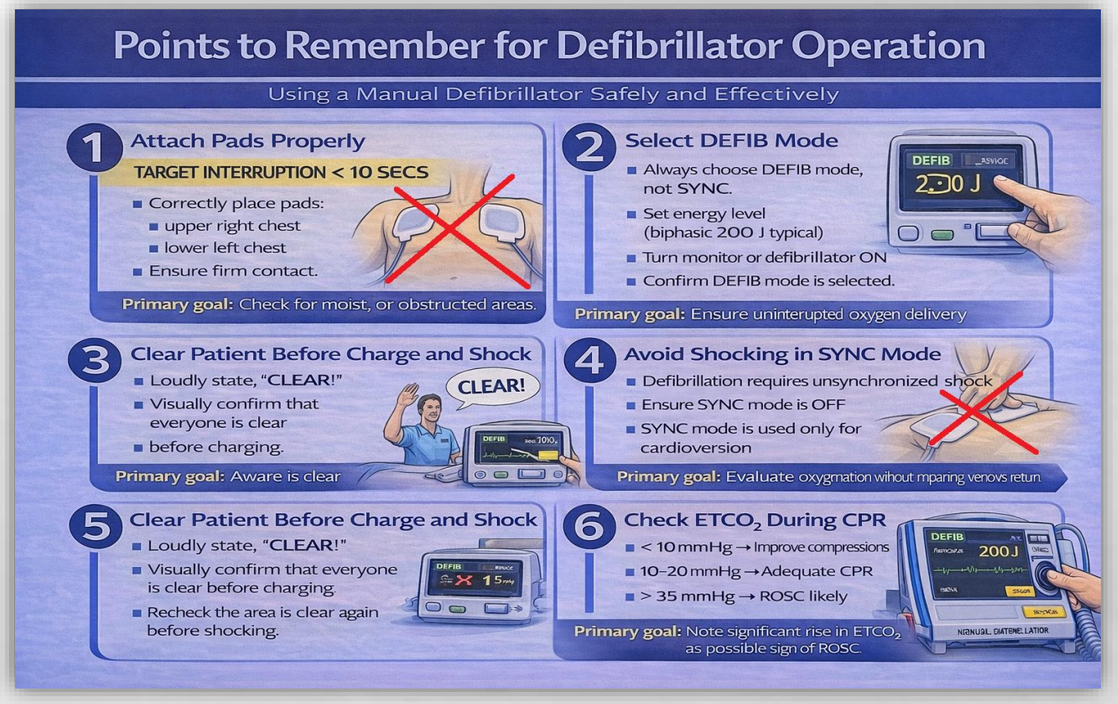
Special Considerations

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



Points to Remember

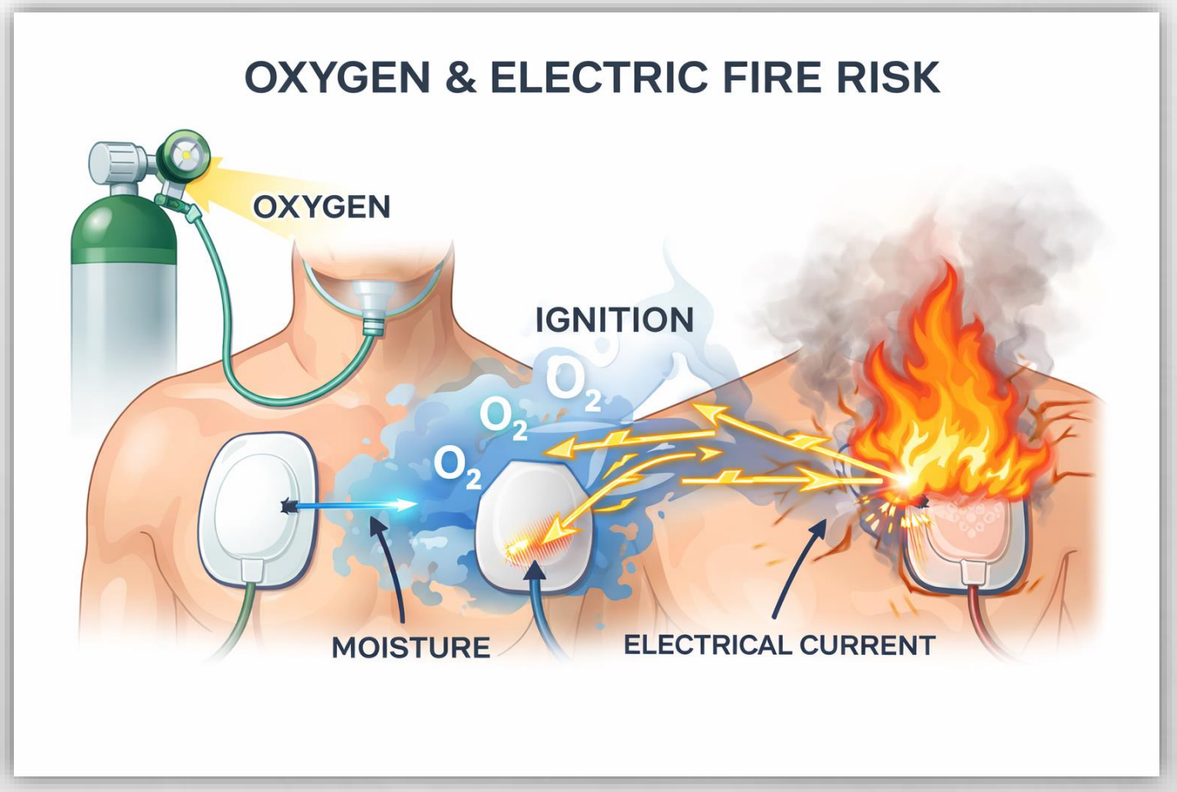
- Minimize interruptions
- Charge during compressions
- Restart CPR quickly



ELECTRICAL & FIRE SAFETY

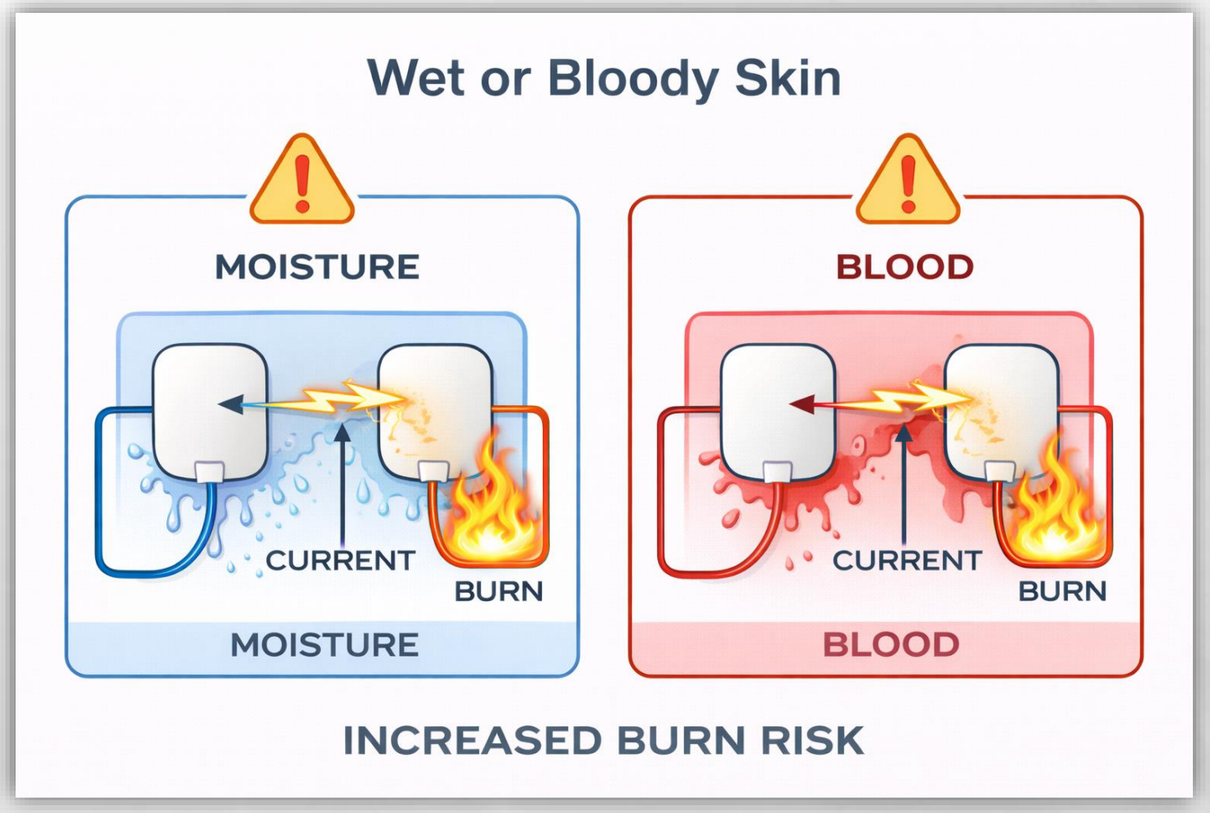
Oxygen Fire Risk

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



Wet or Bloody Skin

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

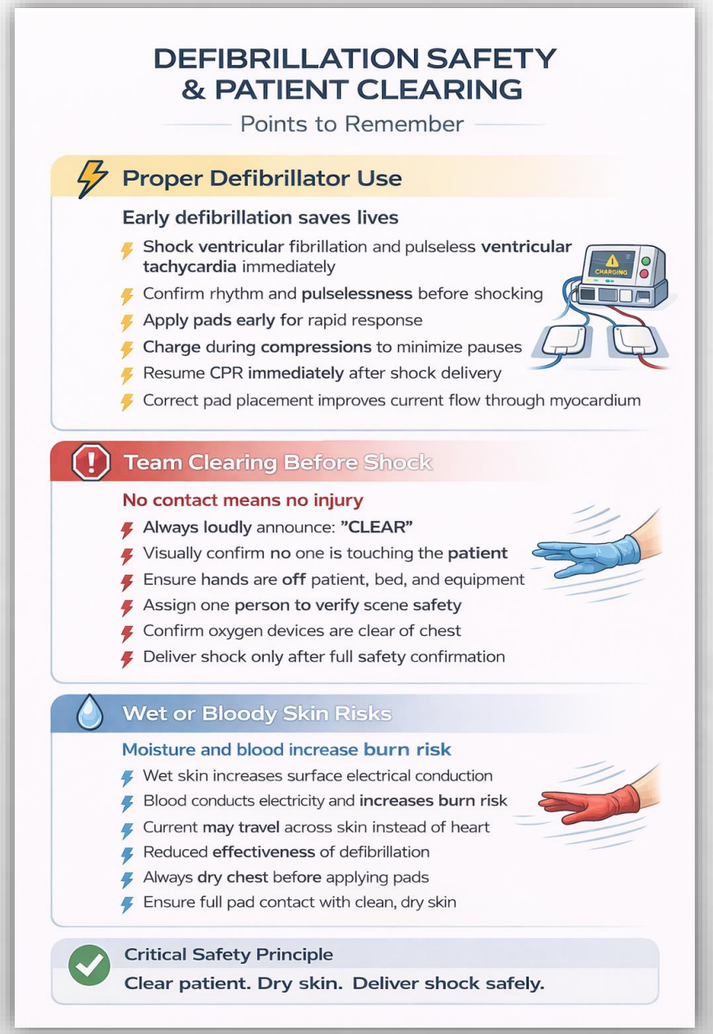


Team Clearing

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

Points to Remember

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



Points to Remember

- Low $ETCO_2$ indicates poor CPR
- Rising $ETCO_2$ suggests ROSC
- Use for real-time guidance

$ETCO_2$ & PERFUSION

Points to Remember

$ETCO_2$ Reflects Cardiac Output

- $ETCO_2$ directly **correlates with pulmonary** blood flow
- Pulmonary blood flow depends on **cardiac output**
- Higher **cardiac output** delivers more CO_2 to the lungs
- Higher $ETCO_2$ indicates better **perfusion**
- Low $ETCO_2$ suggests poor circulation

Key Principle: $ETCO_2$ is an indirect measure of cardiac output

$ETCO_2$ Indicates CPR Effectiveness

- **Effective compressions** generate measurable $ETCO_2$
- $ETCO_2$ reflects forward blood flow during CPR
- Low $ETCO_2$ indicates **inadequate perfusion**
- **Increasing** $ETCO_2$ suggests improving circulation
- **Consistent** $ETCO_2$ confirms effective compression quality

Critical Threshold: $ETCO_2 < 10$ mmHg indicates poor CPR effectiveness

Sudden Rise Suggests ROSC

- **Rapid increase** in $ETCO_2$ often indicates **return of circulation**
- CO_2 delivery suddenly increases when cardiac output returns
- $ETCO_2$ rise may be **first** sign of ROSC
- Always **confirm** pulse and blood pressure
- Do not rely on $ETCO_2$ alone — **verify clinically**

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

$ETCO_2$ Reflects Ventilation and Perfusion Balance

- $ETCO_2$ depends on **ventilation, perfusion**, and **metabolism**
- Poor perfusion reduces CO_2 delivery to lungs
- Excess ventilation reduces $ETCO_2$
- Hypoventilation increases $ETCO_2$
- Interpretation requires clinical context

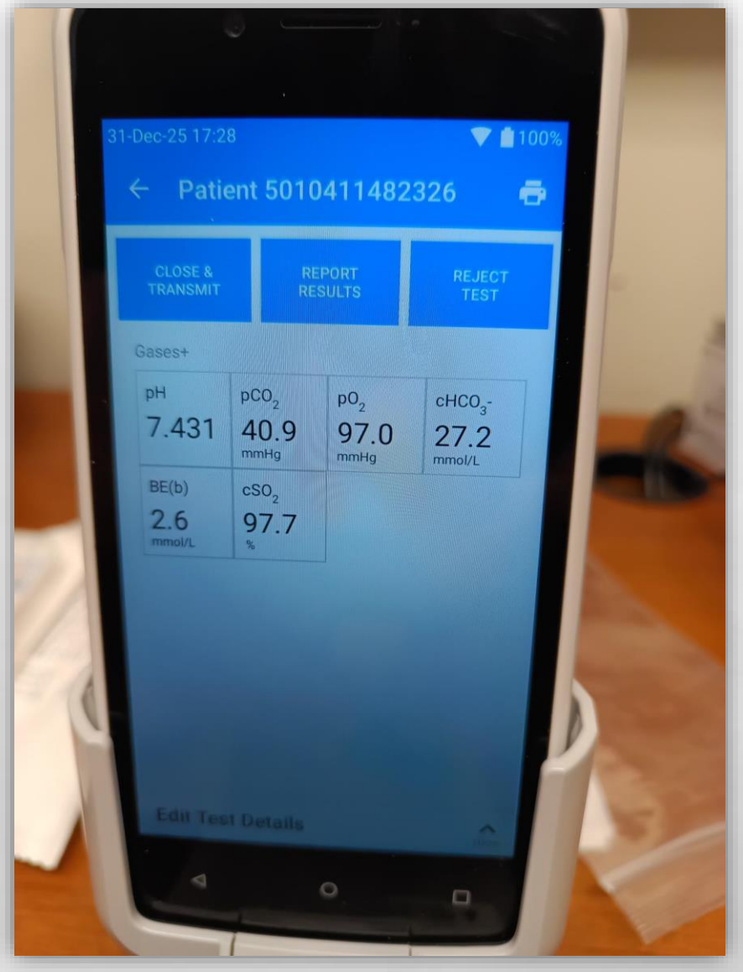
POST-ROSC CARE

Oxygen Management

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

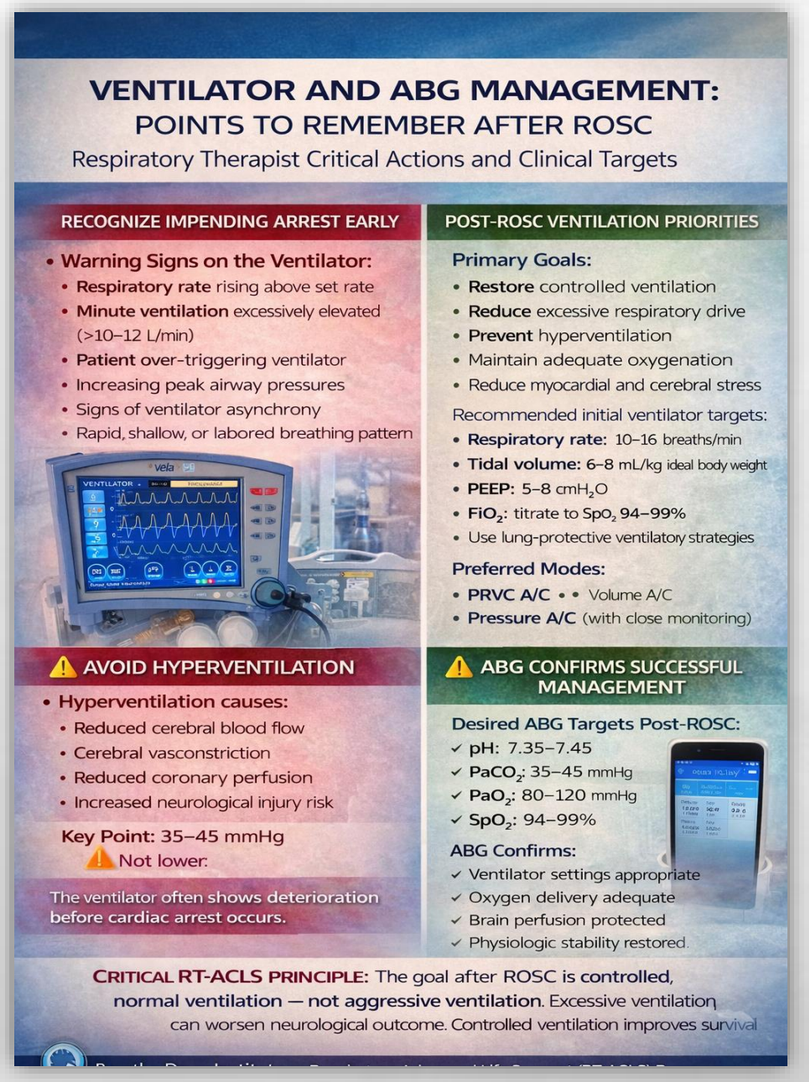
Ventilation Strategy

- Avoid hyperventilation
- Normalize CO_2
- Monitor $ETCO_2$ continuously



Points to Remember

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



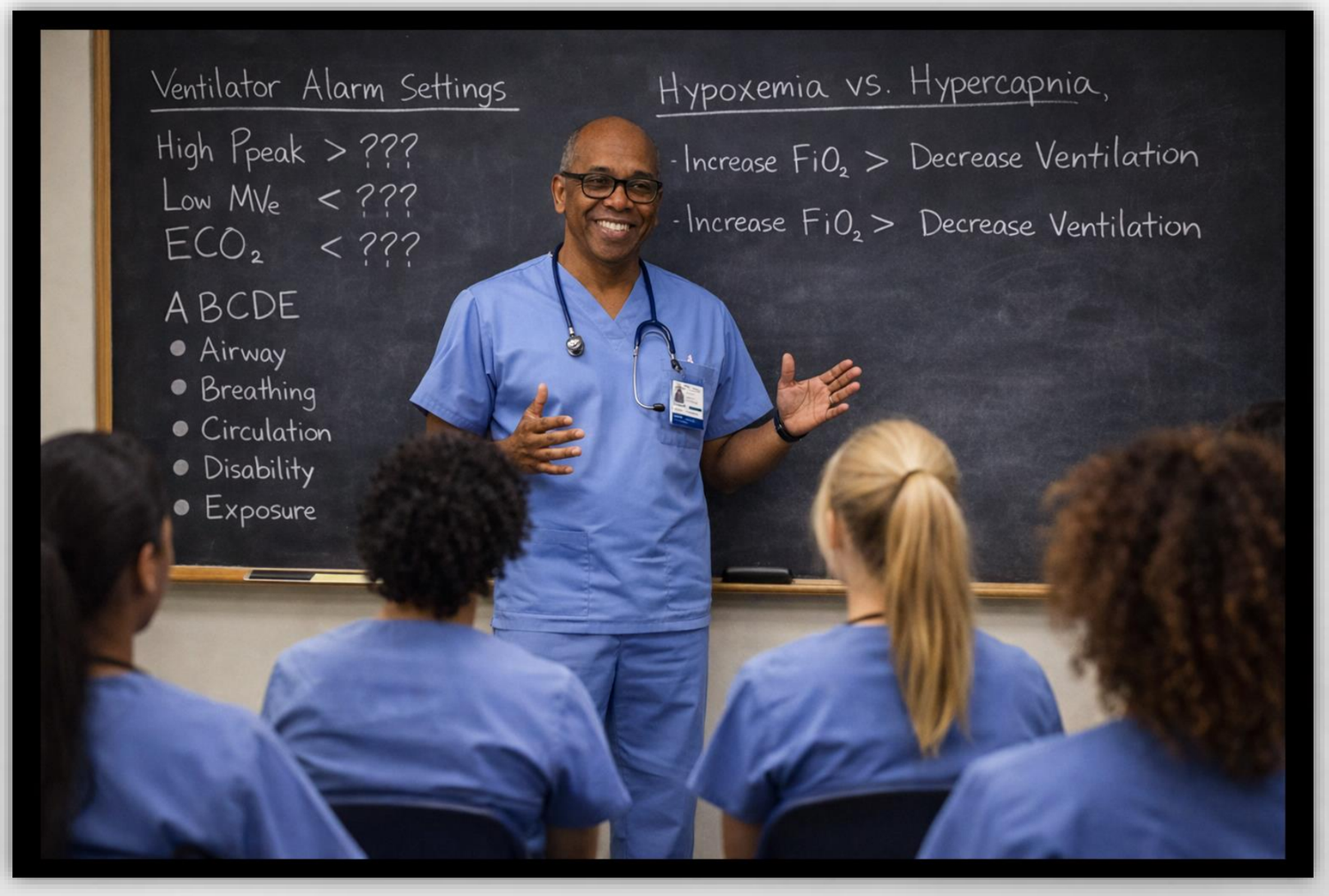
Respiratory Therapist Responsibility for warming patients after code

Common Errors

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

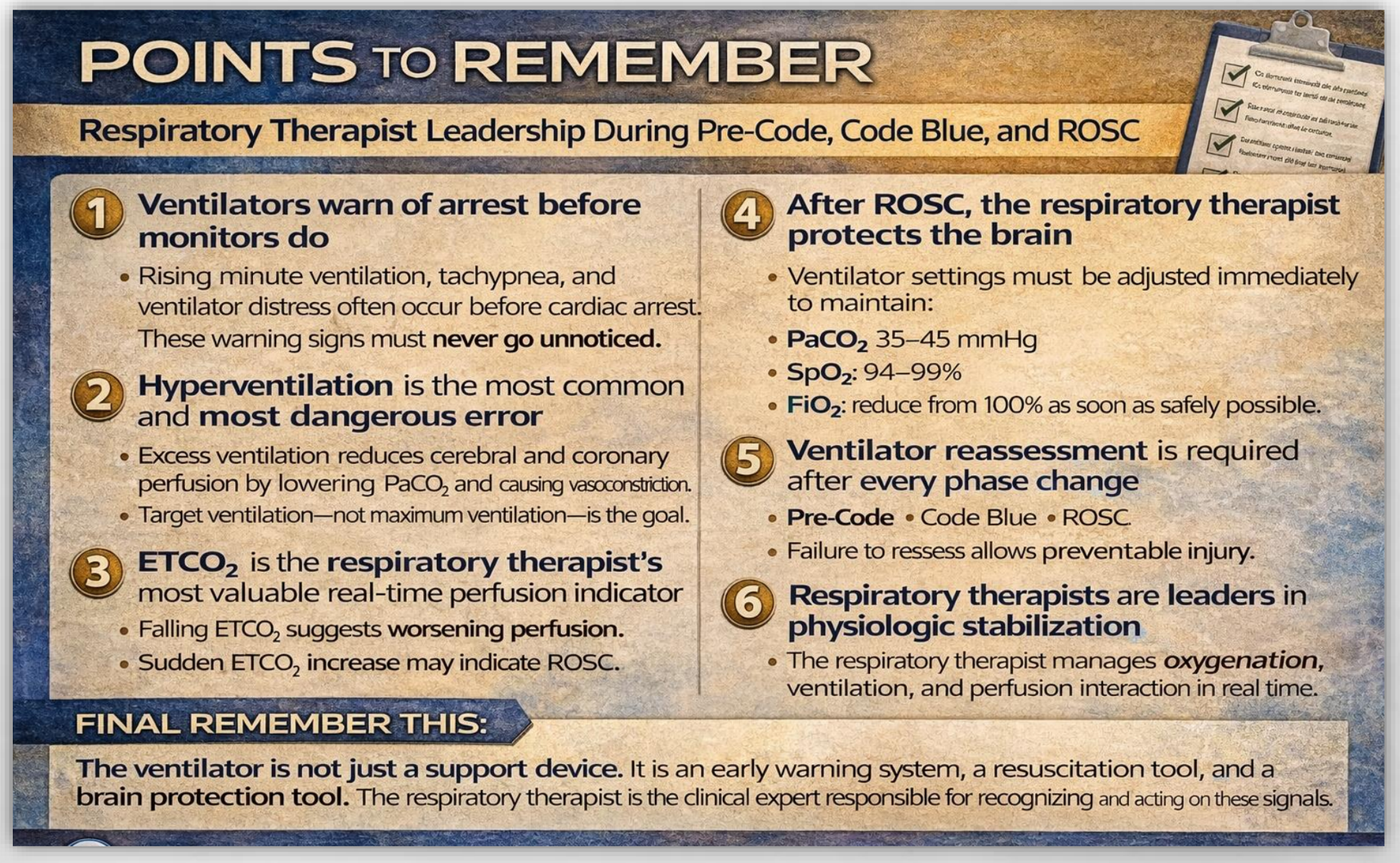
RT Leadership

- Closed-loop communication
- Anticipate next steps
- Coordinate airway and $ETCO_2$



Points to Remember

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



Case Intervention

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

Case Outcome

- $ETCO_2$ rises suddenly
- Pulse confirmed
- Ventilation stabilized

WRAP-UP

Key Takeaways

- Rapid rhythm recognition saves lives
- Correct defibrillation improves survival
- Safety prevents harm
- $ETCO_2$ 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 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.* 38rd ed.
7. Kacmarek RM, Stoller JK, Heuer AJ. (2022) *Egans Fundamentals of Respiratory Care.* ((21in ed.) Elssver.

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.).* McGrow-Hlt.
10. Sandroni C, et al (2015); Farrtitent C. (2016). End-tidal, COs Monitoring During CPR: Resuscitation, 67.
11. Falk JL et al. (1998); *End-Fidal Calbyn Guisite consentration During CPR: New England Journal of Medicine, 316, 607 611.*

Capnography and $ETCO_2$ Monitoring

9. Kodall BS. (2013). *Capnography Ouiside In Operating Roorn.*
10. Sandroni C, et al. (2015). *End-tidal CO_2: Monitoring Durring. CPR: Resuscitation, 37.*
11. Falk JL. et al (9985). *End-tidal ebon dovide Concentration During CPR: New England Journal of Medicine, 319.*

Ventilator Management and Critical Care Monitoring

20. Marini IJJ, et al. (2015): *Adult Amarced Life Support - Frecutian*
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10. Chatburn RL et al (2003), *Classitication of Mechanical Ventilators: Anariatory Care. Resuscitation, 97.*
11. Branson RD et al (2012); *Esistinie ng to Imprave Resuscitation* Performance: *Resuscitation, 3970.811.*

Defibrillation and Electrical Therapy

12. Link MS, et al. (2015), Part 7 *Adult-Advanced Cardiovascular Life Support Circulation, 132. S244 S464.*
16. Kerber RE, et al. (1997). *Automatic Paternal Defibrillators. Amals of Emergency, Medicine, 30.*

Post-ROSC Care and Oygen Managenet

15. Kilgannon JH et al. (2010); *Adult-Advanced Cardiovascurar Life Support, Circulation, 132. S244 S464.*
16. Kerber RE, et al. (1997), *Automatic-External Defibriilators, Annals of Emergeney.*

Human Factors, Team Performance, and Debriefing.

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

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