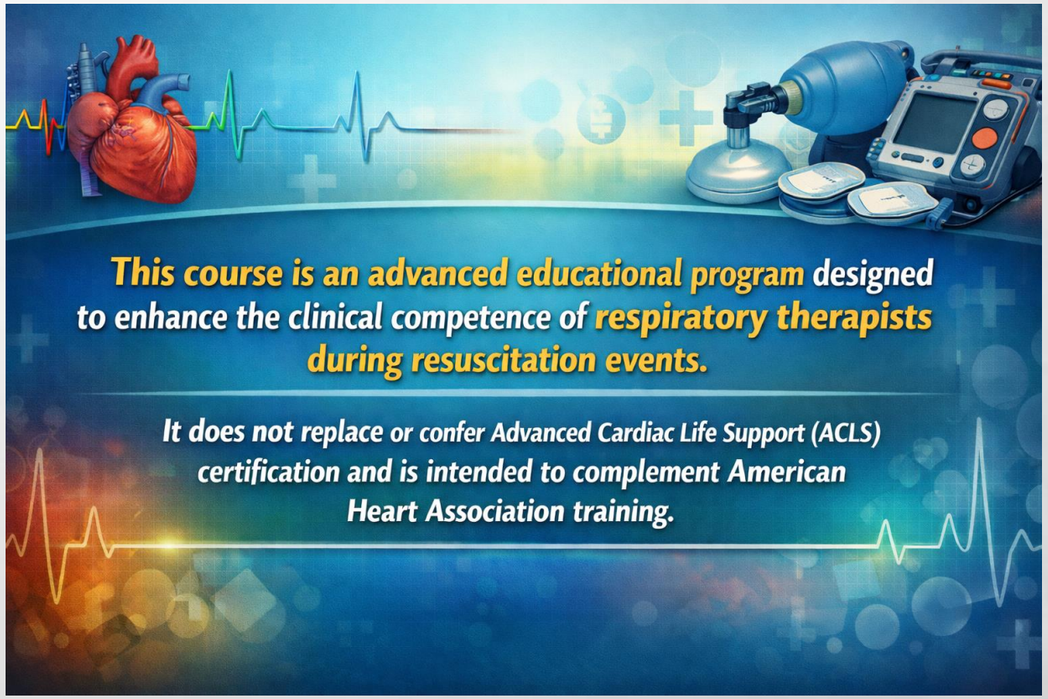
Part-1 RT-Advanced Cardiac Life Support for Respiratory Therapists



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- Designed for acute and critical-care respiratory therapists.
- Focus: Airway control | Hemodynamic stabilization | Team leadership.
- Goal: Strengthen survival outcomes through respiratory precision

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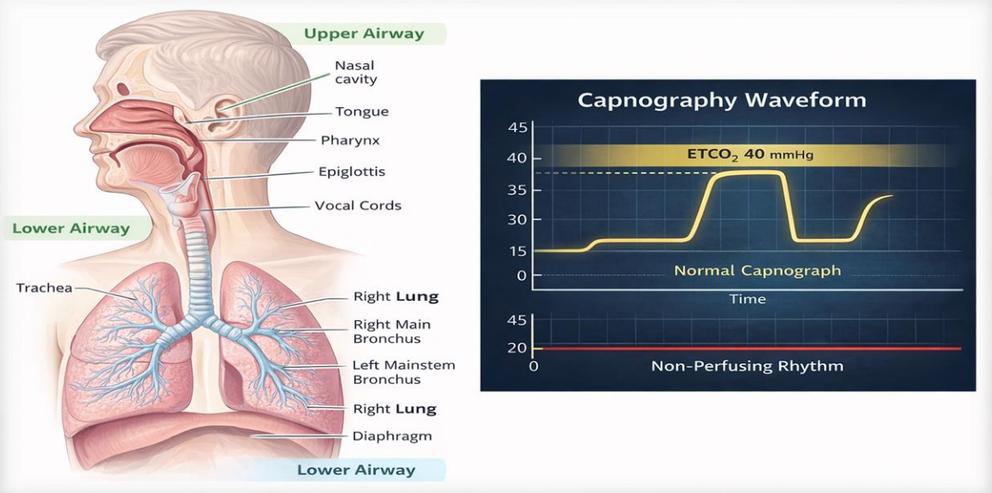
Upon completion of this program, the participant will be able to:

- Apply advanced airway management and ventilation techniques during cardiac arrest and peri-arrest events
- Verify airway placement using waveform capnography and prevent ventilation-related complications
- Recognize cardiac arrest rhythms and differentiate true arrhythmias from monitoring artifact
- Perform high-quality CPR with proper compression mechanics and ventilation coordination
- Safely deliver defibrillation therapy including correct pad placement and rapid CPR resumption
- Describe the role and physiologic effects of core ACLS medications during resuscitation
- Correlate $ETCO_2$ and ABG findings to guide ventilation and post-ROSC management
- Demonstrate effective communication and leadership during emergency response situations
- Adapt resuscitation strategies for special patient populations
- Manage post-resuscitation oxygenation, ventilation, and documentation in accordance with clinical and ethical standards

Module 1 – Airway and Ventilation Review

- Review upper and lower airway anatomy and function.
- Demonstrate effective bag-mask ventilation without hyperinflation.
- Identify methods to prevent barotrauma and gastric insufflation.



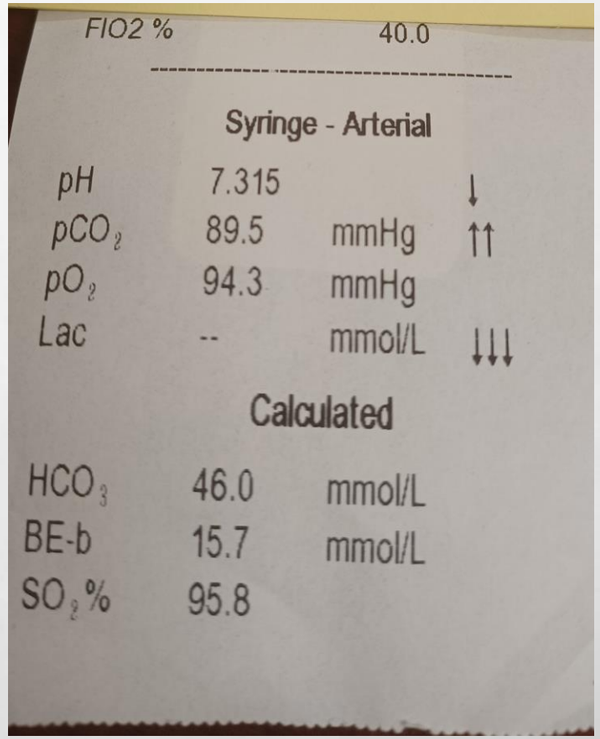
ABG SAMPLING DURING CODE EVENTS

- **PRIMARY SITES**
- RADIAL (PREFERRED)
- FEMORAL (LOW-FLOW STATES)
- BRACHIAL (ALTERNATIVE)
- **WHY LOCATION MATTERS**
- CONFIRMS TRUE ARTERIAL VALUES
- ALLOWS RAPID ACCESS IN INSTABILITY
- REDUCES SAMPLING ERROR

BASIC CODE BLUE ABG INTERPRETATION

Common Findings (This Blood Gas Example is Among Many Scenarios)

- ↓ PH: RESPIRATORY ACIDOSIS
  ↑↑ $PACO_2$: HYPOVENTILATION OR CO_2 RETENTION
  NORMAL PAO_2: ADEQUATE OXYGENATION (THOUGH MONITORING IS KEY)
  ↑ HCO_3^-: METABOLIC COMPENSATION FOR CHRONIC CO_2 ELEVATION
- RT FOCUS:
  ADDRESS HYPOVENTILATION
  GRADUALLY REDUCE $PACO_2$—AVOID RAPID SHIFTS
  CORRELATE WITH $ETCO_2$ TRENDS



Points to Remember

- Confirm endotracheal tube placement using waveform capnography.
- Deliver one breath every six seconds with an advanced airway in place.
- Avoid excessive bagging pressure to reduce gastric distention and risk of aspiration.
- Proper assessment of all advanced airways is absolutely essential.

Case Study

Scenario: A sixty-four-year-old male arrives in respiratory distress that progresses to cardiac arrest. The RT initiates bag-mask ventilation while the team prepares for intubation.

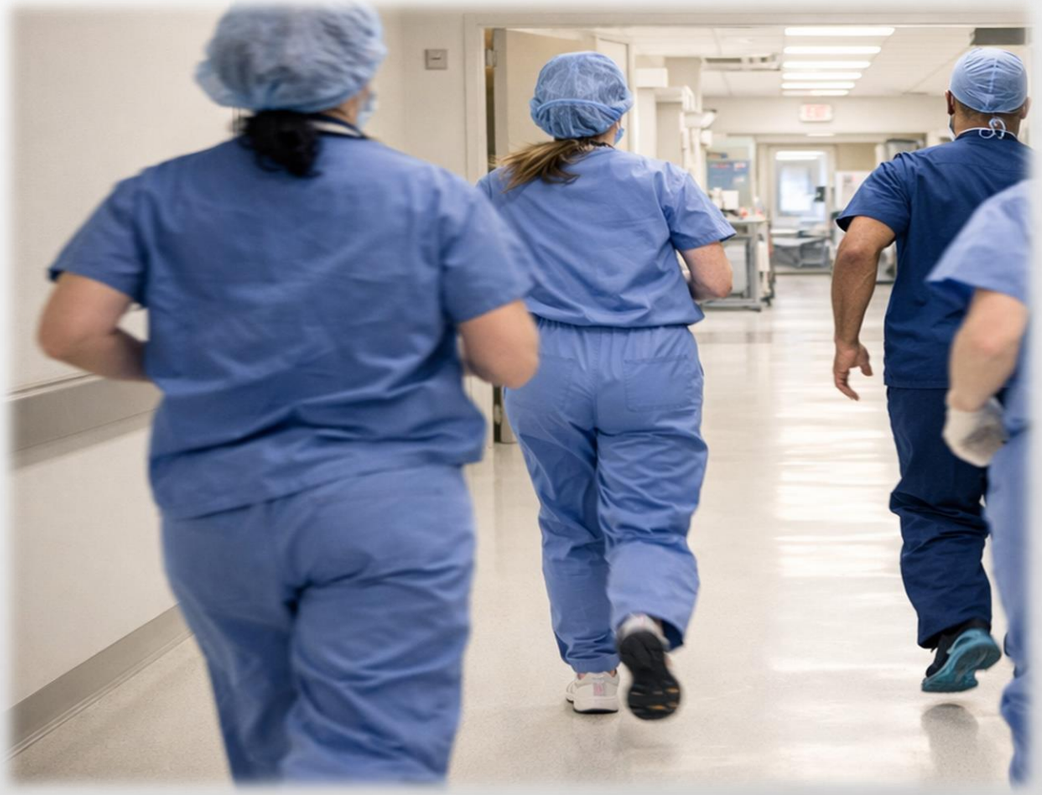
- The RT positions the head for optimal airway patency.
- Bag-Mask and bilateral chest rise.
- Controlled ventilations restore oxygen saturation and allow compressions to continue uninterrupted.

Module 2 – Recognizing Cardiac Rhythms

- Identify key ECG rhythms related to ACLS intervention.
- Differentiate artifact from true arrhythmia before acting.
- Coordinate pulse checks and rhythm verification for accuracy.

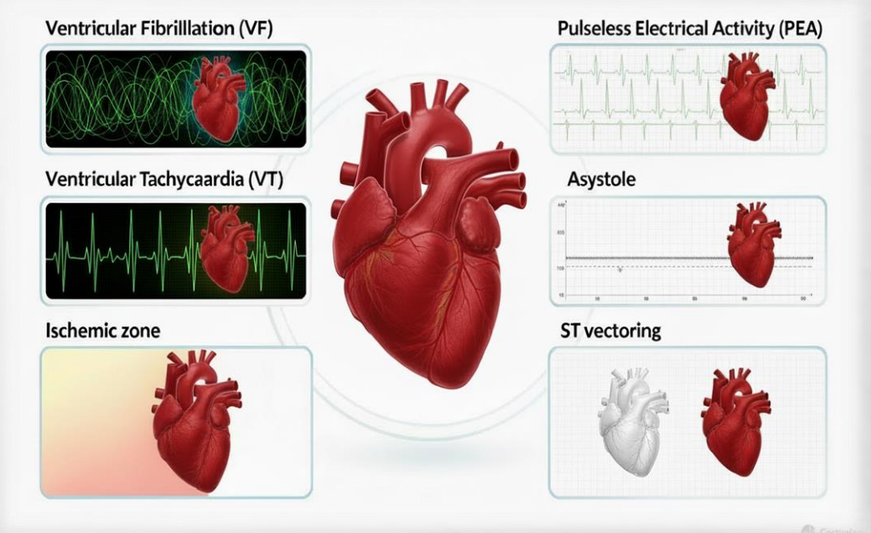
CODE BLUE CARDIAC RHYTHMS

- **SHOCKABLE RHYTHMS**
- VENTRICULAR FIBRILLATION (VF)
- PULSELESS VENTRICULAR TACHYCARDIA (VT)
- **NON-SHOCKABLE RHYTHMS**
- ASYSTOLE
- PULSELESS ELECTRICAL ACTIVITY (PEA)

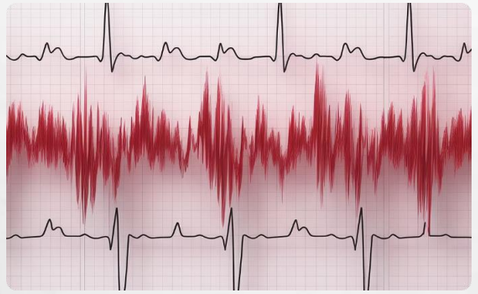


WHAT'S HAPPENING INSIDE THE HEART

- **ELECTRICAL CHAOS**
- VF: DISORGANIZED VENTRICULAR DEPOLARIZATION
- VT: RAPID, INEFFECTIVE VENTRICULAR CONTRACTION
- **ELECTRICAL SILENCE OR DISCONNECT**
- ASYSTOLE: ABSENCE OF VENTRICULAR ELECTRICAL ACTIVITY
- PEA: ORGANIZED ELECTRICAL ACTIVITY WITHOUT MECHANICAL OUTPUT
- **ST VECTORING CONCEPT**
- ELECTRICAL VECTORS LOSE COORDINATED DIRECTION
- MYOCARDIAL ISCHEMIA DISRUPTS DEPOLARIZATION PATHWAYS
- NO EFFECTIVE FORWARD BLOOD FLOW

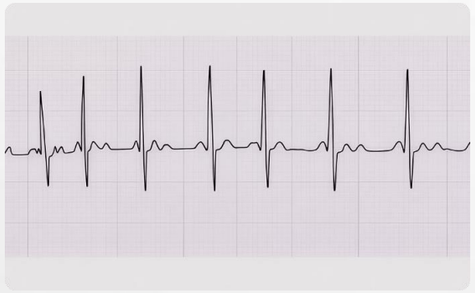


EKG Rhythm Examples



Ventricular Fibrillation (VF)

Chaotic, disorganized waveform with no identifiable P waves or QRS complexes

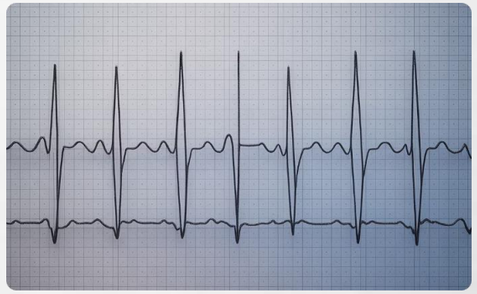


Pulseless Ventricular Tachycardia (VT)

Wide, fast QRS complexes

Second-Degree Type II Block

Regular P waves with dropped QRS complexes complexes



Atrial Fibrillation with RVR

Irregularly irregular rhythm

Points to Remember

- Always confirm rhythm with pulse and proper lead placement.
- Shockable rhythms include ventricular fibrillation and pulseless ventricular tachycardia.
- Begin high-quality CPR immediately while charging the defibrillator.

Case Study

Scenario: During ventilator transport, the monitor shows chaotic waveforms suggesting VFib. The RT must determine whether it is artifact or a true arrhythmia.

- The RT checks lead connections and palpates for a pulse.
- Artifact is confirmed and compressions continue without unnecessary shock.
- Proper verification prevents interruption of life-saving efforts.

Module 3 – High-Quality CPR

- Maintain compression rate of one-hundred to one-hundred-twenty per minute.
- Achieve two-inch depth with complete recoil after each compression.
- Coordinate ventilations without delaying compressions.

Points to Remember

- Rotate compressors every two minutes to prevent fatigue.
- Limit pauses to less than ten seconds during rhythm checks.
- Use feedback devices to monitor compression quality and depth.

Case Study

Scenario: Two clinicians' alternate compressions and ventilations in the ICU after a post-operative arrest.

- The team leader calls out two-minute intervals for rotation.
- The RT ensures adequate tidal volume and monitors $ETCO_2$.
- Continuous quality feedback confirms effective perfusion until ROSC.

Module 4 – Defibrillation and Electrical Therapy

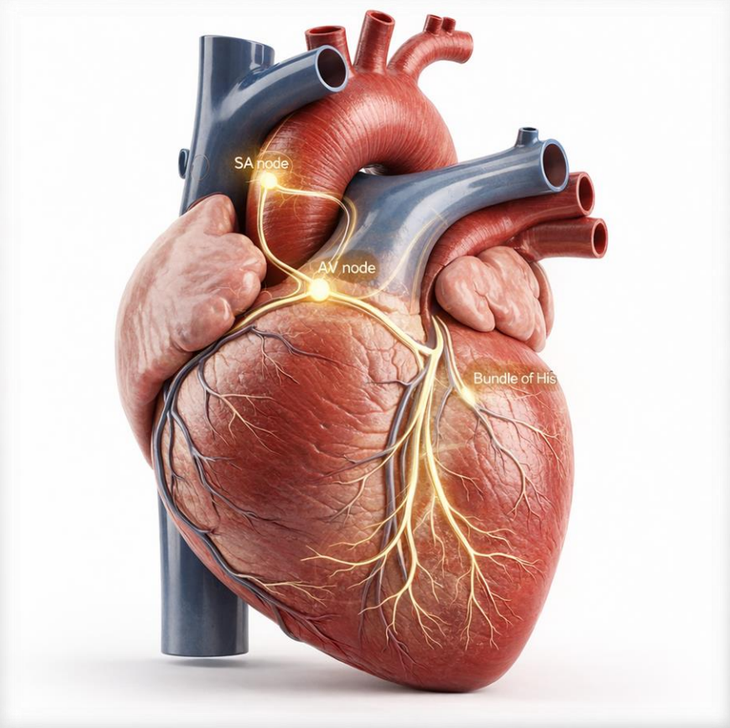
- Safely apply and operate defibrillator pads.
- Select appropriate energy levels for biphasic or monophasic units.
- Resume CPR immediately after shock delivery.

DEFIBRILLATION IN CARDIAC ARREST

- INDICATIONS
- VENTRICULAR FIBRILLATION (VF)
- PULSELESS VENTRICULAR TACHYCARDIA (VT)
- PURPOSE
- TERMINATE CHAOTIC VENTRICULAR ELECTRICAL ACTIVITY
- ALLOW ORGANIZED CONDUCTION TO RESUME

WHAT DEFIBRILLATION DOES PHYSIOLOGICALLY

- **ELECTRICAL RESET**
- DELIVERS SYNCHRONIZED MYOCARDIAL DEPOLARIZATION
- INTERRUPTS MULTIPLE RE-ENTRY CIRCUITS
- **CELLULAR EFFECT**
- TEMPORARILY HALTS ELECTRICAL ACTIVITY
- ALLOWS DOMINANT PACEMAKER CELLS TO REGAIN CONTROL
- **WHY TIMING MATTERS**
- EARLY SHOCK IMPROVES MYOCARDIAL RESPONSIVENESS
- PROLONGED ISCHEMIA REDUCES SUCCESS



Points to Remember

- Clear all team members and oxygen sources before shock.
- Check rhythm every two minutes after CPR cycles.
- Record energy levels and responses accurately for review.

Module 5 – Pharmacologic Interventions

- Identify core ACLS drugs and their timing.
- Understand respiratory therapist's role in drug verification.
- Monitor $ETCO_2$ and hemodynamics for response.

CODE BLUE MEDICATIONS

- PRIMARY ARREST MEDICATIONS
- EPINEPHRINE
- AMIODARONE
- LIDOCAINE
- SUPPORTIVE MEDICATIONS
- CALCIUM (SELECTED CASES)
- SODIUM BICARBONATE (SELECTED CASES)
- RT ROLE
- VERIFY DRUG, DOSE, AND TIMING
- MONITOR $ETCO_2$ AND HEMODYNAMIC RESPONSE
- COMMUNICATE EFFECTS TO TEAM LEADER

Points to Remember

- The nurses will administer epinephrine and other medications during any cardiac arrest.
- The nurses will also use amiodarone or lidocaine for refractory VF or VT.
- Evaluated $ETCO_2$ rise is a key indicator of ROSC.

Case Study

Scenario: Epinephrine is given every four minutes during asystole without $ETCO_2$ increase.

- The RT verifies dose timing and quality of compressions.
- Team identifies acidosis and corrects ventilation strategy.
- $ETCO_2$ rises, indicating return of circulation.

Module 6 – Team Dynamics and Leadership

- Demonstrate closed-loop communication during codes.
- Assign roles and maintain clear leadership.
- Manage stress and conflict professionally.

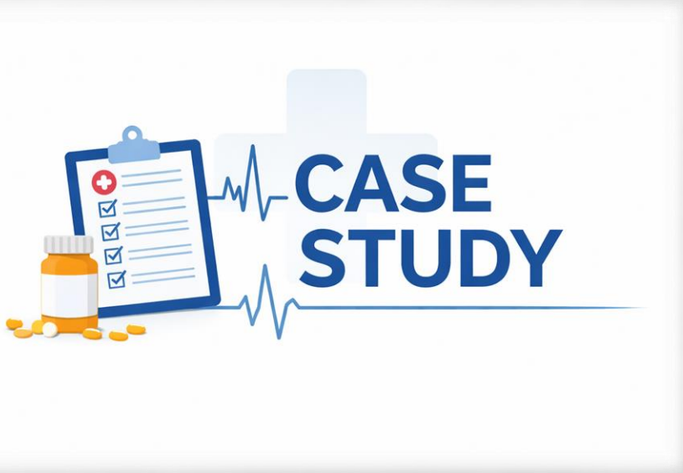
Points to Remember

- Repeat orders back to the team leader for clarity.
- Announce task completion aloud to maintain situational awareness.
- Keep tone calm and direct to sustain team focus.

Case Study

Scenario: During a rapid response, miscommunication causes delayed drug delivery.

- The RT initiates closed-loop communication and verifies orders.
- The team re-establishes rhythm and coordination.
- Post-event debrief highlights leadership as a critical skill.



Module 7 – Special Resuscitation Situations

- Adapt resuscitation for trauma, overdose, or hypothermia.
- Modify techniques for pregnancy and obesity.
- Prepare for airway obstruction or bronchospasm.

Points to Remember

- Use left uterine displacement in pregnant patients to relieve vena cava compression.
- Anticipate airway swelling and select smaller ET tubes if needed.
- Begin rewarming before declaring death in hypothermic arrest.

Case Study

Scenario: A twenty-eight-year-old pregnant woman collapses in the ED.

- The RT adjusts compression point slightly higher on the sternum.
- The team tilts the patient for uterine displacement.
- ROSC achieved; fetal monitoring continues post-resuscitation.

Module 8 – Post-Resuscitation Care

- Manage ROSC protocols and prevent secondary injury.
- Target SpO_2 ninety-four to ninety-nine percent and $ETCO_2$ thirty-five to forty.
- Stabilize blood pressure and temperature.

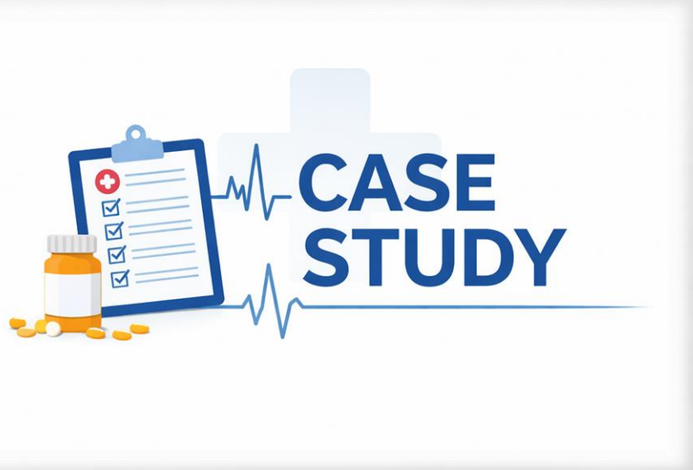
Points to Remember

- Avoid hyperoxia by titrating FiO_2 gradually.
- Maintain normocapnia to preserve cerebral perfusion.
- Continuously monitor for recurrent arrhythmias.

Case Study

Scenario: After ROSC, a patient is hyperventilated on hundred-percent oxygen.

- The RT reduces FiO_2 to ninety-five percent and slows ventilation rate.
- Capnography stabilizes and blood pressure improves.
- Normoxia and normocapnia restore neurologic stability.



Module 9 – Documentation and Debriefing

- Record timed interventions, drugs, and outcomes.
- Conduct debriefings for performance and resilience.
- Provide peer support after critical events.

Points to Remember

- Document precise times of drugs, shocks, and return of circulation.
- Encourage open discussion during debrief sessions.
- Identify strengths and areas for improvement constructively.

Case Study

Scenario: After a failed code, the RT leads a team debrief.

- Staff share observations and coping strategies.
- Documentation is reviewed for accuracy.
- Lessons learned enhance future code performance and team wellness.

Module 10 – Ethical and Legal Considerations

- Interpret DNR orders and advance directives accurately.
- Communicate with families compassionately during codes.
- Follow hospital and state policy for ethical withdrawal of care.

Points to Remember

- Always confirm authenticity of DNR documentation.
- Maintain transparency and respect when families are present.
- Protect yourself and your team through accurate records and policy adherence.

Case Study

Scenario: During resuscitation, family presents a valid DNR.

- The RT verifies document authenticity with the team leader.
- Efforts are discontinued respectfully per policy.
- The family is supported with clear and empathetic communication.

Course Wrap-Up

- Calm leadership and clear communication define successful resuscitation.
- Clinical precision and confidence save lives under pressure.
- "Breathe deep, stay steady, and lead the way."

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