

2025 Cardiac Arrest in in Special Circumstances

The Systemic Deviation Pathway

Synthesized from the

Synthesized from the 2025 Korean Guidelines
for Cardiopulmonary Resuscitation (Part 5)

Audience: Advanced Life Support (ALS) Providers / **Format:** Rapid-Response Visual Algorithms

Major
Updates

Respiratory/
Allergic

Toxicological/
Metabolic

Obstetric

Procedur
Environme

Acute Hyperkalemia

Action: Administer IV insulin + glucose.

- Nuance: Insufficient evidence to support/oppose IV bicarbonate or IV calcium.



[Weak Recommendation | Very Low Certainty]

Pulmonary Embolism (PE)

Action: Thrombolytics may be administered for suspected PE. For confirmed PE, consider thrombolytics, surgical embolectomy, or percutaneous mechanical thrombectomy.



[Weak Recommendation | Very Low Certainty]

Opioid Toxicity

Action: Naloxone is NOT supported as a routine addition to standard ALS in true cardiac arrest.

- **Nuance:** Administer naloxone only if unsure whether the patient is in true cardiac arrest.



[Good Practice Statement]

Prone CPR

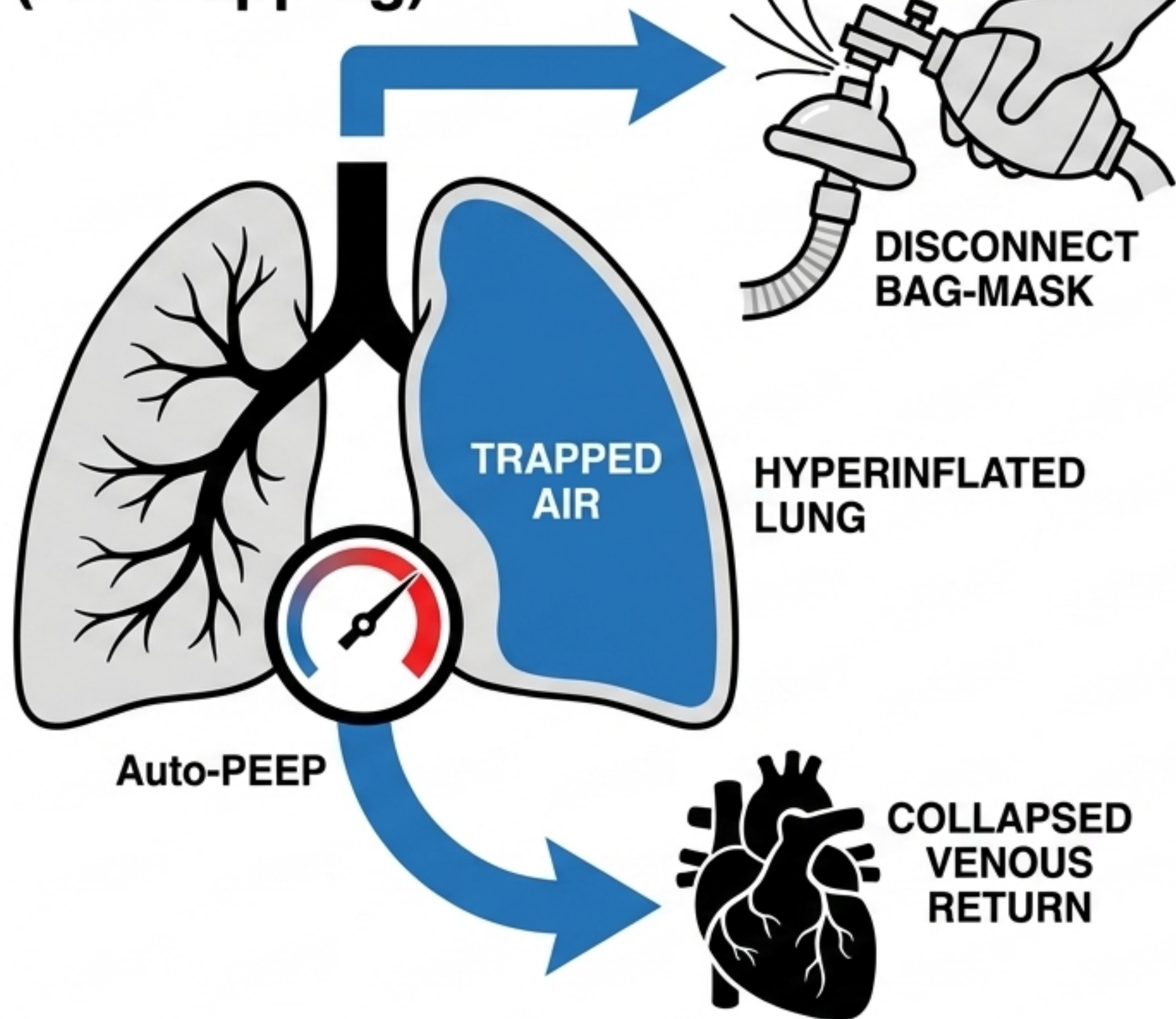
Action: Attempt prone CPR and defibrillation only if intubated and unsafe to turn. Use ETCO2/Arterial pressure to navigate.

- **Nuance:** If no advanced airway, turn supine immediately.



[Strong Recommendation | Low Certainty
(for supination without airway)]

Dynamic Hyperinflation (Air Trapping)



The Auto-PEEP Relief Mechanism

Context: In asthma/COPD arrest, dynamic hyperinflation generates auto-PEEP, severely impeding venous return and causing cardiac arrest.

Clinical Trigger: If dynamic hyperinflation is suspected during CPR, air trapping must be relieved.

Intervention: Disconnect the bag-mask. Perform chest compressions **ONLY** to force trapped air out.

Ventilator Setting: If using mechanical ventilation, mandate lower respiratory rate and tidal volume (6–8 mL/kg).

Asthma & COPD Deviation Profile



Pathophysiology & Risk

Hypoxia-driven. High risk of gastric inflation and regurgitation due to lower esophageal sphincter pressure drop. Tension pneumothorax risk.



Modified Airway Strategy

- Endotracheal intubation immediately (to protect against regurgitation).
- High-concentration oxygen.
- If ventilation is difficult:
Consider tension pneumothorax (needle decompression may fail; tube thoracostomy may be required).



Modified Circulatory Strategy

- Standard Epinephrine (1 mg every 3-5 mins).
- Fluid therapy recommended (patients often dehydrated from insensible loss).
- Consider Extracorporeal CPR (ECPR) for refractory cases.

Anaphylaxis Deviation Profile



Modified Airway Strategy

Early advanced airway crucial. Hoarseness, tongue edema, or **stridor** = impending difficult airway. Prepare surgical airway backup immediately.



Modified Circulatory Strategy

- **Epinephrine Early:** 0.2-0.5 mg IM (1:1,000) every 5 mins. Or 0.05-0.1 mg IV. (Avoid SubQ due to delayed absorption in shock).
- **Aggressive Fluid Resuscitation:** Anaphylaxis causes massive vasodilation/redistribution (sepsis-like shock). Minimum 500 mL balanced crystalloid/saline rapidly within 5-10 mins.



Specific Adjuncts

- **Refractory shock:** Norepinephrine, vasopressin, or phenylephrine.
- **Ineffective:** Routine antihistamines and steroids have no distinct effect in initial treatment (steroids only for persistent asthma-like symptoms).

The Electrolyte Derangement Matrix

Electrolyte Disturbance	ECG Signatures	Immediate Intervention	Dosage Details
Hypokalemia (<3.5 mmol/L)	U waves, flattened T waves. Torsades de pointes.	Infuse potassium. If accompanied by hypomagnesemia, give Magnesium first.	2 mmol/min for 10 mins if imminent arrest.
Hypermagnesemia (>1.1 mmol/L)	Prolonged PR/QT, peaked T waves, AV block.	Calcium chloride or Calcium gluconate.	5-10 mL of 10% (Chloride) or 15-30 mL of 10% (Gluconate) over 2-5 mins.
Hypomagnesemia (<0.6 mmol/L)	Polymorphic VT, prolonged PR/QT, ST depression.	Magnesium sulfate IV.	50% solution (2g / 4mL / 8mmol) over 10-15 mins (1-2 mins if Torsades).
Calcium Abnormalities	-	Empirical IV calcium considered, but efficacy in arrest is unproven.	-

Acute Hyperkalemia Evidence Scorecard (2025 Update)



APPROVED INTERVENTION

Recommended Intervention

IV Insulin (8-12 IU) + Glucose.

Effect: Mean reduction in serum potassium of -0.7 mmol/L.

Evidence Badge:
**[Weak Recommendation |
Very Low Certainty]**



CONTESTED INTERVENTIONS (INSUFFICIENT EVIDENCE)

Contested Interventions

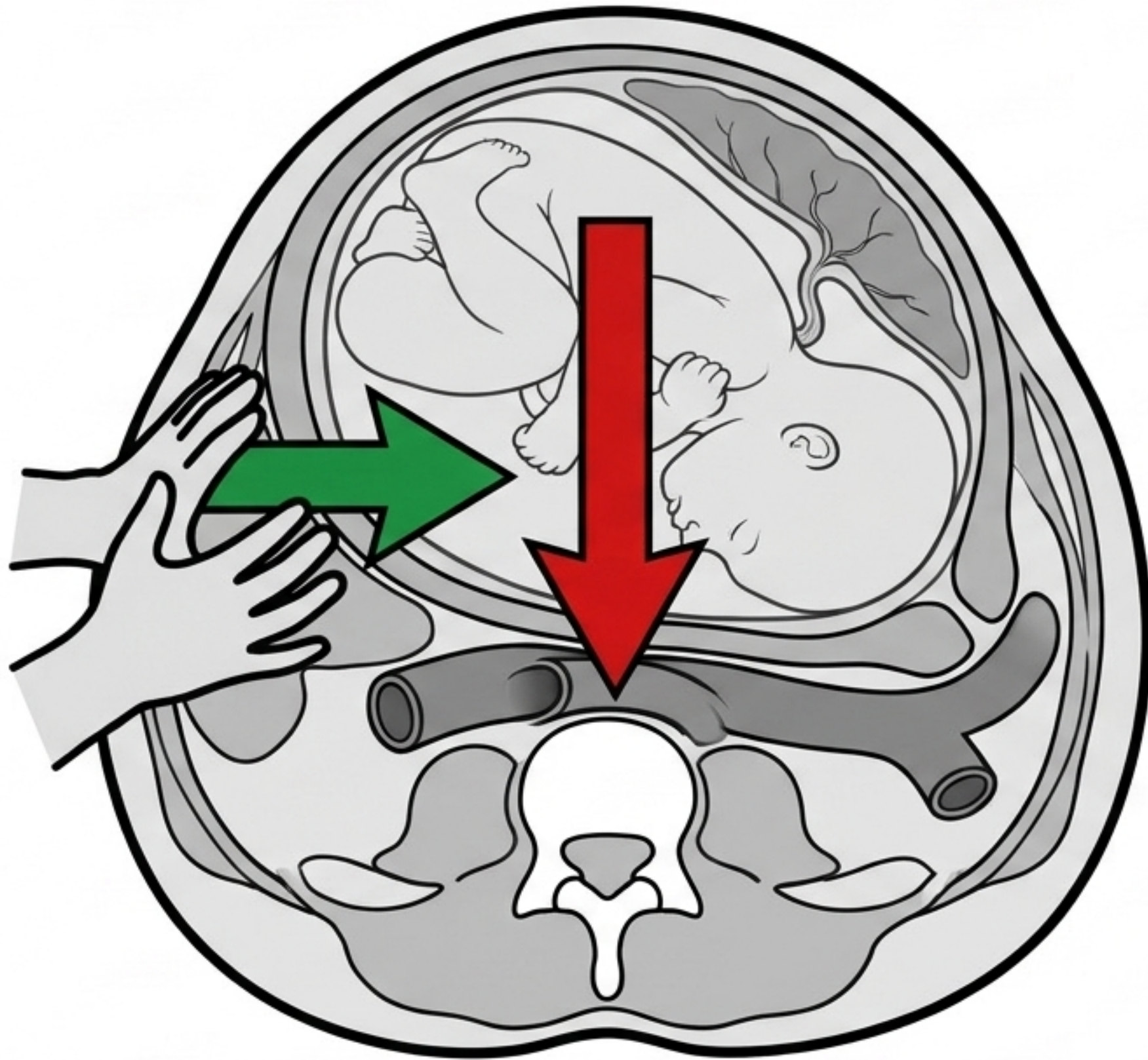
IV Bicarbonate: Studies show negligible mean change (-0.1 mmol/L). Neither supported nor opposed.

IV Calcium: Retrospective studies show no statistically significant improvement in arrhythmias; one study associated it with higher mortality. Neither supported nor opposed.

Combination Therapy: Insulin + Salbutamol (Beta-2 agonist) reduces potassium slightly more than insulin alone, but evidence is very low certainty.

Specific Pharmacotherapy During Active CPR

Thromboembolic Arrest (PE)	Intervention during active ALS?	Toxicological Arrest (Opioids)
Drug: Thrombolytics. 2025 Stance: Permitted. Text: May be administered if PE is suspected. Rationale: ILCOR notes very low certainty, but potential benefit for ROSC and 30-day survival in specific cohorts over standard CPR alone.		Drug: Naloxone. 2025 Stance: Not Supported. Text: Existing evidence does NOT support adding naloxone to standard ALS if true cardiac arrest has occurred. Rationale: Observational data is highly conflicted. Naloxone reverses respiratory depression to prevent arrest, but offers no proven benefit once cardiac arrest physiology is established. Exception: Administer if unsure if it is true cardiac arrest.



Aortocaval Compression (>20 Weeks Gestation)

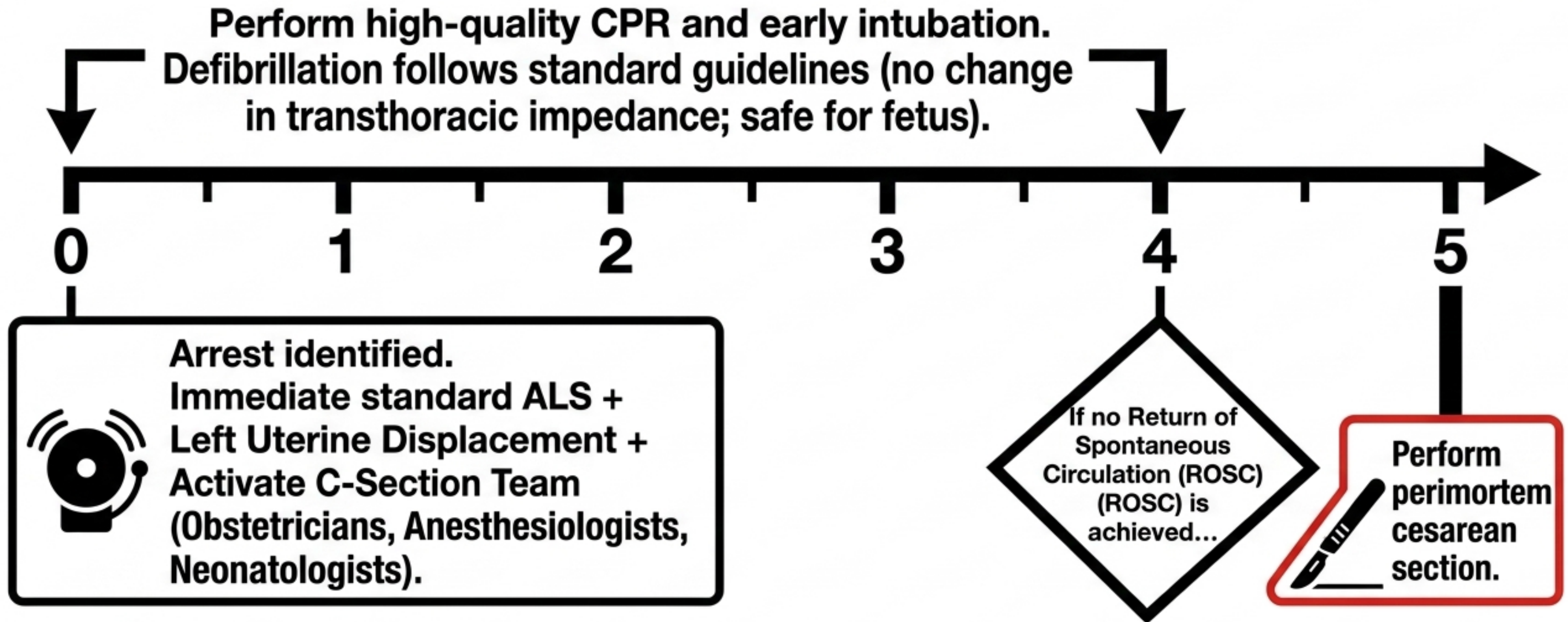
Context: The gravid uterus decreases cardiac output by 30-40% by occluding venous return. Standard chest compressions are ineffective against this mechanical block.

Primary Modification: Continuous Left Uterine Displacement (LUD).

Method: Manually displace the uterus leftward while the patient remains supine. This is superior to tilting the patient, which compromises chest compression quality.

Note: Mechanical CPR is NOT recommended. Endotracheal intubation is a priority due to high aspiration risk and hypoxia.

The 5-Minute Resuscitative Hysterotomy Pathway



Physiological Rationale: Early delivery dramatically improves maternal resuscitation outcomes by immediately relieving aortic and vena cava compression.

Prone CPR Action Algorithm

Patient arrests in the prone position
(e.g., during spinal neurosurgery).

[Strong Recommendation]
Turn patient to **supine** position
IMMEDIATELY for standard CPR.

NO

Question 1:
Is an advanced airway
already in place?

YES

Turn to supine
position safely.

NO

Question 2:
Is it difficult or dangerous to
turn the patient immediately?
(e.g., surgical equipment,
head fixation)

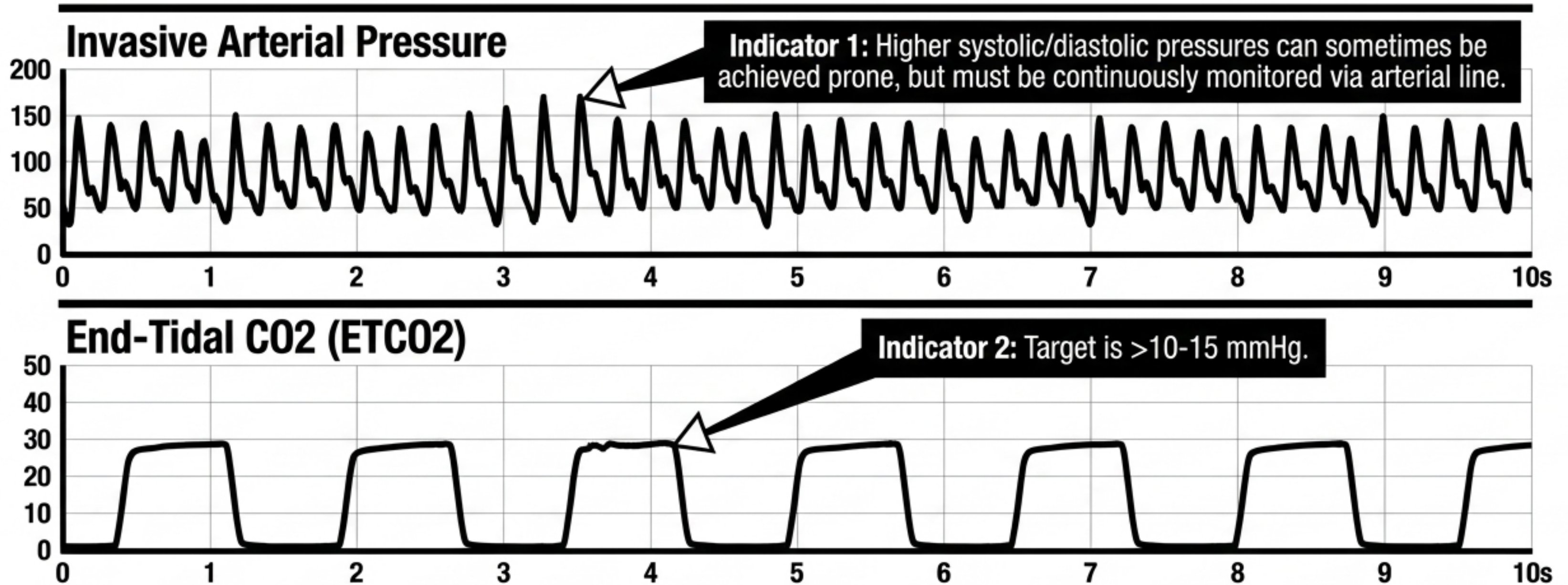
YES

Defibrillation: If required and patient cannot be turned,
defibrillation may be performed in the prone position.

[Good Practice]
Initiate Prone CPR.

Hemodynamic Navigation During Prone CPR

Efficacy of prone compressions is highly variable. The clinical team must continuously evaluate perfusion to determine if/when an emergency repositioning to supine is mandatory.



Clinical Protocol: Use these dual indicators to judge perfusion pressure. If metrics crash or fail to indicate adequate perfusion, the risk calculus changes: the patient must be turned to the supine position regardless of surgical barriers.

Procedural & Environmental Directives



Severe Hypothermia ($<30^{\circ}\text{C}$)

HR/RR drops rapidly; arrest is difficult to confirm. Continue BLS/ALS until normal body temp is restored. Utilize aggressive invasive rewarming (extracorporeal, thoracic/peritoneal lavage).



Cath Lab (PCI) / Post-Surgery

Mechanical CPR is recommended during PCI. For post-cardiac surgery arrest, perform emergency sternotomy/open-chest CPR if in an equipped ICU; otherwise, standard CPR without delay.



Drowning

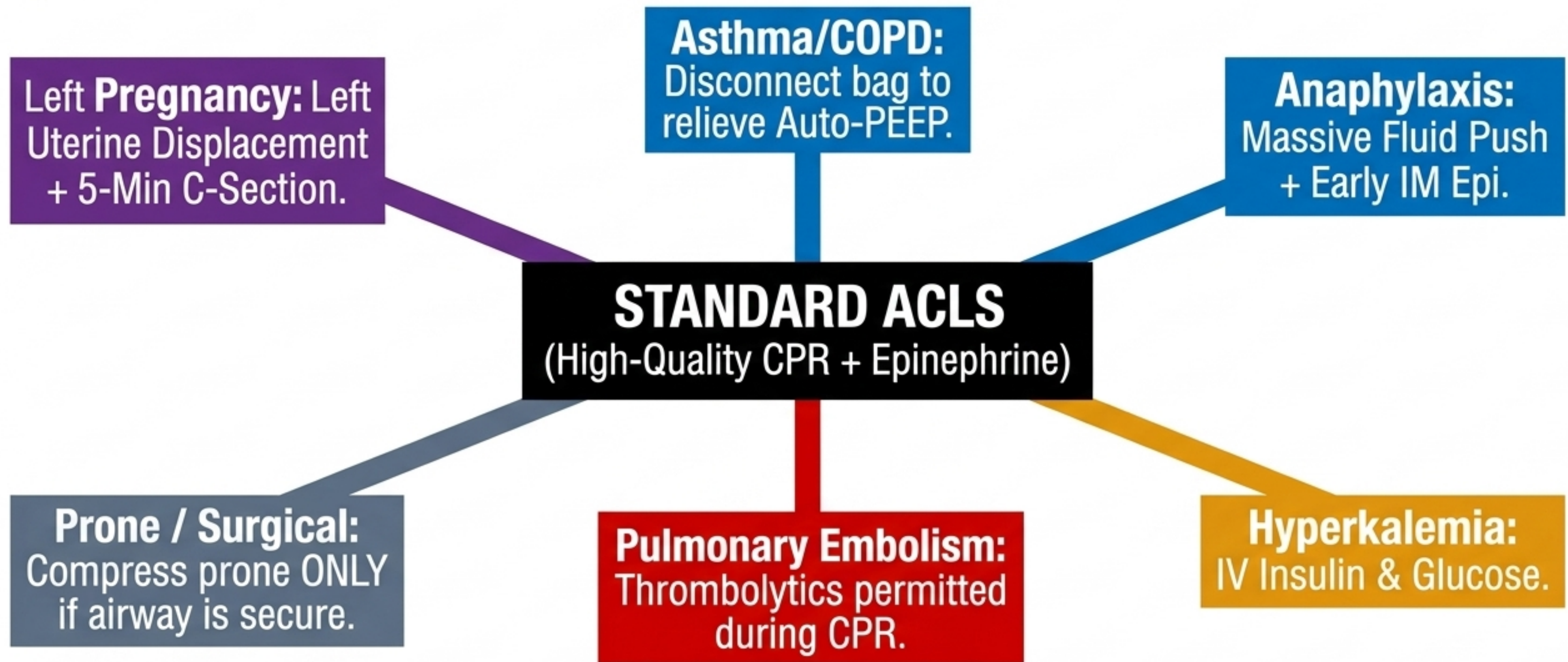
Focus on reversing hypoxia. Maintain SpO₂ $>94\%$. Endotracheal intubation if needed. Noninvasive ventilation is an alternative for moderate/severe acute lung injury if GCS >12 and hemodynamically stable.



Electricity & Lightning

Prioritize victims in cardiac/respiratory arrest (reverse triage). Lightning causes prolonged respiratory arrest via center suppression; immediate airway support prevents hypoxia.

The 2025 Deviation Master Map



Standard ACLS is your **baseline**. Modify instantly upon identifying the etiology.