Adult Emergency Resuscitative Thoracotomy (ERT) Algorithm

Prehospital arrest and/or arrives pulseless with CPR in progress?

Yes → Continue CPR, Airway/Oxygenation, Access, Transfusion, Thoracostomies, External Hemorrhage Control

No → Profound Shock?

Yes → Airway/Oxygenation, Access, Transfusion, Thoracostomies, External Hemorrhage Control, Pelvic Binder

No → Improvement / ROSC?

Yes → Signs of Life (SOL) on arrival?

Yes → Only cardiac electrical activity/PEA?

No → Blunt trauma with CPR < 10 minutes, penetrating trauma with CPR < 15 minutes

Yes → Cardiac motion on US?

No → Emergency Resuscitative Thoracotomy (go to ERT procedure guide)

Penetrating or Blunt Thoracic Injury

Penetrating or Blunt Abdominal/Pelvic Injury

Emergency Resuscitative Thoracotomy (go to ERT procedure guide)

Penetrating or Blunt Head, Neck / Extremity Injury

Emergency Resuscitative Thoracotomy (go to ERT procedure guide)

Tamponade?

Yes → Consider ERT or REBOA

No → Improvement / ROSC?

Yes → Consider Zone 1 REBOA

No → Continue resuscitation, external hemorrhage control, and adjuncts

Emergency Resuscitative Thoracotomy (go to ERT procedure guide)

Terminate resuscitation and pronounce dead

Notes:
1. Rapidly establish definitive airway if not done in the field, continue CPR (interruptions in CPR to facilitate resuscitation procedures are acceptable), obtain vascular access, transfusion, external hemorrhage control, and therapeutic adjuncts when indicated while assessing for signs of life. Do not delay ERT in injury patterns likely to benefit.
2. Signs of life: Pupillary response, spontaneous ventilation, presence of pulse or measurable blood pressure, extremity movement, electrical cardiac activity.
3. Profound Shock: SBP < 60 mmHg.
4. ROSC = Organized cardiac rhythm and SBP > 70 mmHg
5. At surgeon discretion and where available REBOA may be considered as an alternative for aortic occlusion when no concern for thoracic aortic injury.
Adult Emergency Resuscitative Thoracotomy (ERT) Procedure Guide

Meets criteria for ERT

Yes → Left anterolateral thoracotomy & right tube thoracostomy

Yes → Large left hemothorax?

No → Evacuate hemothorax, control hemorrhage, clamp hilum if necessary

Open pericardium and assess heart

Tamponade and/or cardiac injury?

Yes → Repair or temporary control of injury

No → Organized cardiac activity?

Yes → CLAMP descending aorta and continue resuscitation

SBP < 70

Yes → Large HTX or active bleeding from right chest?

No → No

Yes → Organized cardiac activity?

Yes → Control site of air entry / Hilar clamp, Trendelenberg, Aspirate Heart

No → Organized cardiac activity?

Yes → Large HTX or active bleeding from right chest?

No → Evaluation for abdominal, pelvis, or extremity hemorrhage and continue resuscitation

ROSC

Yes → Move to OR for injury specific management

No → Terminate resuscitation efforts

Simultaneously Performed

Notes:
1. May consider initial bilateral anterolateral clampshell thoracotomy to facilitate exposure and therapeutic maneuvers.
2. If non perfusing rhythm begin/continue open cardiac massage and ATLS/ACLS resuscitation to evaluate for response.
3. If no cardiac activity may consider a brief period of open cardiac massage, ATLS resuscitation, and aortic occlusion to improve coronary circulation.
4. Treat for air embolism if warranted
5. ROSC = organized cardiac rhythm with SBP > 70 mmHg
6. Aspiration of heart may include, left ventricle, aortic outflow tract, pulmonary outflow tract, or right coronary artery.