AAST Acute Care Surgery Didactic Curriculum

Traumatic Cardiac Arrest

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Highlights:

- Reversible causes of traumatic arrest include hypovolemia/hemorrhage, hypoxia, cardiac tamponade, and tension pneumothorax.
- The majority of survivable traumatic cardiac arrest cases is due to PEA arrest, predominantly from a low-flow state due to hemorrhage/hypovolemia.
- The use of chest compressions has only been validated in non-traumatic cardiac arrest, and may be counter-productive in the setting of hypovolemic arrest. Chest compressions should not hinder or delay critical interventions such as large bore central access, thoracic decompression, drainage of tamponade, and intubation unless an underlying medical cause of arrest is expected.
- Ultrasound is a quick and helpful diagnostic tool for the evaluation of cardiac activity, tamponade, intraabdominal hemorrhage, and pneumothorax.
    - Ultrasound may have a false positive for pericardial blood in the presence of hemopneumothorax.
    - Ultrasound may not identify pericardial tamponade or pericardial blood if the patients does not have cardiac motion (hence blurring the interface of blood in the cardiac chambers vs blood in the pericardial sac).
- Resuscitative thoracotomy (RT) has been shown to be effective in resuscitation of the appropriate patient with survival of <1 to 16% reported.
- RT indications:
    - Penetrating injury:
        - Hemodynamically unstable with concern for imminent demise
        - Torso injury, pulseless for <15 minutes with ongoing CPR
        - Extremity injury, pulseless < 5 minutes with ongoing CPR
    - Blunt injury:
        - Hemodynamically unstable with concern for imminent demise
        - Pulseless for <10 minutes with ongoing CPR
    - Resources for definitive injury repair must be available
    - Identifying cardiac motion on ultrasound before RT is performed should be seriously considered
- RT provides access for pericardial decompression, direct treatment for intrathoracic bleeding, direct treatment for cardiac injury, hilar cross clamping and aortic/cardiac

aspiration for air emboli, and aortic cross-clamping for temporary control of bleeding below the diaphragm.

- REBOA has been shown to have similar outcomes to RT in select patients in equipped centers and should be considered if RT indications exist in patients with abdominal trauma.
- Treatment of reversible causes of traumatic arrest:
    - Tension pneumothorax: bilateral thoracostomy decompression (place a chest tube if easily and quickly accessible) through the 4th/5th intercostal space in the mid-axillary line
    - Hemorrhage/hypovolemia: control of external source of catastrophic hemorrhage (ie tourniquet or direct pressure), multiple sites of IV access, rapid resuscitation (whole blood, packed red blood cells, balanced/targeted transfusion with MTP), control of internal hemorrhage (RT with aortic cross clamp/pulmonary hilar cross clamp)
    - Cardiac tamponade: RT with anterior pericardiotomy for pericardial decompression
    - Air embolus: Trendelenburg position, pulmonary hilar cross-clamping, aspiration of cardiac apex/coronaries/aortic root as indicated
    - Hypoxia: oxygenate (intubate)
- There is no evidence that epinephrine improves long-term outcomes or survival in traumatic cardiac arrest, with some data suggesting worse outcomes with epinephrine bolus use.
- Rule out underlying medical causes for arrest.