

N04: Traumatic Cardiac Arrest

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Introduction

A traumatic cardiac arrest is a cardiac arrest that occurs secondary to either blunt or penetrating trauma. The most common cause of traumatic cardiac arrest is hemorrhage; other causes include tension pneumothorax, cardiac tamponade, and hypoxemia. Although traumatic cardiac arrest has a high mortality rate, the neurological outcomes are better in those who survive compared to other causes of cardiac arrest; patients who have some signs of life upon the arrival of paramedics, or who initially present in pulseless electrical activity, and who subsequently achieve a return of spontaneous circulation have the greatest probability of survival to hospital discharge.

Successful resuscitation requires simultaneous attention to assessment, airway management, and control of hemorrhage.

Essentials

- Consider underlying medical causes of the cardiac arrest
- Prioritize treatment of reversible causes over chest compressions, and in order of clinical need
- Simultaneously attempt to identify and treat
 - Hypovolemia
 - Hypoxemia
 - Tension pneumothorax
- Consider special circumstances
- Consult with CliniCall to discuss treatment plan or early transport options
- Consider discontinuing resuscitation efforts if interventions do not result in a return of spontaneous circulation

Additional Treatment Information

- Interventions in traumatic cardiac arrests should be prioritized based on clinical relevance. Paramedics should focus initially on controlling major hemorrhage through the appropriate use of direct pressure, tourniquets, and wound packing.
- Advanced airway management should not delay transport in urban areas, where the traumatic arrest is the result of penetrating chest trauma, the presenting rhythm is PEA, and the time from loss of pulses to a trauma center is less than 15 minutes (20 minutes in the Vancouver Coastal-Urban region).
- Bilateral needle thoracentesis (or finger thoracostomy) should be performed on all traumatic arrests with blunt or penetrating chest trauma. The preferred site for needle thoracentesis is the 5th intercostal space in the mid-axillary line. An alternative site is the 2nd intercostal space on the mid-clavicular line, although this requires catheters longer than 5 cm.
- Obtain large-bore intravenous (or intraosseous) access and administer a bolus of 20 mL/kg.
- In blunt force cardiac arrest, a pelvic binder may be applied after addressing other reversible causes. If a pelvic fracture is suspected of being a significant contributing factor, the binder should be placed earlier.

General Information

- The primary etiologies targeted by prehospital treatments include hypoxia, obstructive shock (specifically tension pneumothorax) and hypovolemia.
- Patients frequently present in an organized electrical rhythm on the monitor with no palpable pulses. It has been shown that in these situations there is often a low perfusion state due to hypovolemia or vascular and cardiac obstruction preventing adequate perfusion. Management of major hemorrhage, volume replacement with large NS bolus or bilateral chest decompression may result in ROSC.
- Traumatic cardiac arrests with an initial rhythm of asystole, or wide complex PEA of less than 40 beats per minute

are generally associated with poor survival. It is reasonable to consider early discontinuation of resuscitation if there is no response to treatment.

Interventions

First Responder

- Simultaneous on-scene correction of reversible causes:
 - Hypovolemia: control external hemorrhage, splint pelvis/fractures
 - Oxygenation: consider appropriate airway adjunct. Maximize oxygenation
 - → [A07: Oxygen and Drug Administration](#)
- High quality CPR when practical:
 - → [PR06: High Performance CPR](#)
 - Rate (100-120/min) Continuous Compressions
 - Depth: At least 2 inches [5cm]
 - Ensure full chest recoil
 - Minimize interruptions in compressions
 - Relieve compressor every 2 minutes, or sooner if fatigued

Emergency Medical Responder – All FR interventions, plus:

- Consider primary medical cause – see [CPG N02: Adult Cardiac Arrest](#)
- Prioritize treatment of reversible causes over chest compressions based on clinical need
- Consider recognition of life extinct – see [CPG R03](#)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Simultaneous on-scene correction of reversible causes:
 - Hypovolemia
 - Establish vascular access, consider 20 mL/kg fluid bolus
 - Oxygenation
 - Consider supraglottic device

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Simultaneous on-scene correction of reversible causes:
 - Oxygenation
 - Consider supraglottic device, endotracheal intubation, or surgical airway
 - Tension pneumothorax
 - [Bilateral needle or finger thoracostomy](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Simultaneous on-scene correction of reversible causes:
 - Hypovolemia
 - Consider blood product resuscitation
 - Consider resuscitative balloon for occlusion of the aorta
 - Tension pneumothorax
 - [Bilateral needle, finger, or tube thoracostomy.](#)
 - Pericardial tamponade
 - Pericardiocentesis

Evidence Based Practice

[Traumatic Arrest](#)

References

1. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [[Link](#)]
2. American College of Surgeons. Advanced Trauma Life Support Student Course Manual. 10th Edition. 2018. [[Link](#)]
3. Sinz E, et al. ACLS for Experienced Providers: Manual and Resource Text. 2015.

