CG002 Traumatic Cardiac Arrest

1. Key Recommendations for operational use		
For use by: Pre-hospital teams**: Internet:** Yes		
1	Assess	• Trauma patient in cardiac arrest or peri-arrest • Blunt vs penetrating • Consider primary event may have underlying medical cause
2	Medical cause suspected	• Follow ALS guidelines
3	Loss of vital signs > 20 minutes	• Consider stopping resuscitation
4	Penetrating trauma (Chest or epigastrium)	• Commence IPPV via BVM / ETT / Supraglottic airway (LMA) • Perform bilateral open thoracostomies or bilateral needle decompression as dictated by clinician skill set (injured side first) • Consider resuscitative thoracotomy
5	Blunt trauma	• Simultaneously address reversible pathology: • Hypovolaemia: - control external haemorrhage - splint pelvis and fractures - blood or fluid bolus (preferably via IV/IO above diaphragm) - blood is preferred fluid but if not available administer 250ml 0.9% saline boluses and monitor $ETCO_2$ for response • Oxygenation: - IPPV via BVM / ETT / Supraglottic airway (LMA) • Tension pneumothorax: - perform bilateral open thoracostomies or bilateral needle decompression dictated by clinician skillset • Ultrasound: - should not delay completion of above interventions - may be applicable on case-by-case basis with individual clinician judgment paramount
6	CPR	• CPR may not be effective until the reversible cause is addressed. • Addressing reversible causes takes priority over CPR
7	ROSC	• If ROSC achieved transport immediately to appropriate hospital • Pre-alert with activation of Code Red protocol. • If no ROSC after reversible causes addressed consider termination of resuscitation

2. Document History			
Reference Number	CG002		
Version	2		
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Date issued	18th January 2021	V1 October 2017-January 2021	
Date for review	January 2024		
Distribution	BASICS Scotland		✓
	Medic 1		✓
	Referring centres via service websites		✓
	Rural GPs Association of Scotland		✓
	SAS	Air Ambulance	✓
		Specialist Services Desk	X
	ScotSTAR	EMRS West	✓
		EMRS North	✓
		Paediatric	X
		Neonatal	X
	Tayside Trauma Team		✓

3. Scope and purpose

- Overall objectives:

Traumatic cardiac arrest should be considered as a symptom of an underlying disease process. The management of traumatic cardiac arrest is predicated upon the rapid identification and reversal of the underlying disease process. The aim of this guideline is to summarise an incremental management strategy to rapidly assess and deliver interventions to patients in traumatic cardiac arrest or those that are peri-arrest.

- Statement of intent:

This guideline is not intended to be construed or to serve as a standard of care. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan.

- Feedback:

Comments on this guideline can be sent to: sas.cpg@nhs.scot

- Equality Impact Assessment:

Applied to the ScotSTAR Clinical Standards group processes.

- Guideline process endorsed by the Scottish Trauma Network Prehospital, Transfer and Retrieval group.

4. Explanatory Statements		
4.1 Assessment	**Authors' recommendation**	**Level [Reference]**
• *Trauma patient in cardiac arrest or peri-arrest* • *Blunt vs penetrating* • *Consider primary event may have underlying medical cause*	Good practice point	
4.2 Medical cause suspected		
• *Follow ALS guidelines* If traumatic event precipitated by underlying medical cause then establish early monitoring and treat as per Resuscitation Council Guidelines	Strong	Guideline [3]
4.3 Loss of vital signs > 20 minutes		
• *Consider stopping resuscitation* If patient in established traumatic cardiac arrest with vital signs lost for > 20 minutes or with injuries incompatible with life consider stopping resuscitation	Conditional	3 [1,2]
4.4 Penetrating trauma		
• *Commence IPPV via BVM / ETT / Supraglottic airway (LMA)* • *Perform bilateral open thoracostomies or bilateral needle decompression as dictated by clinician skill set (injured side first)* • *Consider resuscitative thoracotomy* Where possible and when skillset allows the above interventions should be performed simultaneously with the thoracostomy incisions being extended across the chest wall to allow thoracotomy if no ROSC after placement	Strong	3 [1,4]

4.5 Blunt trauma	**Authors' recommendation**	**Level [Reference]**
Simultaneously address reversible pathology: *Hypovolaemia* • *Control external haemorrhage* • *Splint pelvis/fractures* • *Blood/fluid bolus (preferably via IV/IO sited above level of diaphragm* • *Blood is preferred fluid but if not available administer 250ml 0.9% saline boluses and monitor ETCO2 for response* *Oxygenation* • *IPPV via BVM / ETT / Supraglottic airway (LMA)* *Tension pneumothorax* • *Perform bilateral open thoracostomies if within clinician skillset or bilateral needle decompression* *Ultrasound* • *Should not delay completion of above interventions* • *May be applicable on case-by-case basis with individual clinician judgment paramount*	Strong	3 [4,5,6]
4.6 CPR		
• *CPR may not be effective until the reversible cause is addressed.* • *Addressing reversible causes takes priority over CPR* Hand placement on the chest may impede the placement of thoracostomies and will render performing thoracotomy impossible.	Good practice point	
4.7 ROSC		
• *If ROSC achieved transport immediately to appropriate hospital* • *Pre-alert with activation of Code Red protocol* • *If no ROSC after reversible causes addressed consider termination of resuscitation* If ROSC achieved the patient should be transported to a facility that has the expertise to manage major trauma patients. Continue resuscitation with fluid/blood en route to hospital.	Good practice point	

5 References

1. Davies GE, Lockey DJ. Thirteen survivors of prehospital thoracotomy for penetrating trauma: a prehospital physician-performed resuscitation procedure that can yield good results. J Trauma 2011; 70: E75–E78

2. Powell DW, Moore EE, Cothren CC et al. Is emergency department resuscitative thoracotomy futile care for the critically injured patient requiring pre-hospital cardiopulmonary resuscitation? J Am Coll Surg 2004; 199: 211–215

3. https://www.resus.org.uk/EasySiteWeb/GatewayLink.aspx?alId=6464

4. Lockey D, Lyon R, Davies G.E. Development of a simple algorithm to guide the effective management of traumatic cardiac arrest. Resuscitation. 2013 Jun;84(6):738-42

5. Childress K, Arnold K, Hunter C et al. Prehospital End-tidal Carbon Dioxide Predicts Mortality in Trauma Patients. Prehosp Emerg Care 2017; 25:1-5

6. Sherren PB, Reid C, Habig K, Burns BJ. Algorithm for the resuscitation of traumatic cardiac arrest patients in a physician-staffed helicopter emergency medical service. Crit Care. 2013 Mar 12;17:308.