

06 • Emergency treatment guidelines

06.a • Traumatic cardiac arrest (TCA)

Historically, reported survival from traumatic cardiac arrest (TCA) was extremely low. More recent publications have recorded survival to discharge of up to 8% – comparable to outcomes in medical cardiac arrest. TCA should be aggressively managed using a standardised approach that rapidly addresses reversible causes in order of priority.

Definition

A trauma patient with agonal or absent spontaneous respiration and the absence of a central pulse.

Patients in arrest secondary to medical causes, asphyxiation, drowning, electrocution and burns should be managed according to the ALS algorithm.

06.a.i • Management of TCA

Step 1

The primary objective is to concurrently manage hypoxia, tension pneumothorax and hypovolaemia – described as ‘oxygenate, decompress and fill’:

- **Oxygenate** – endotracheal intubation + ventilation with 100% oxygen
- **Decompress** – bilateral finger thoracostomies
- **Fill** – high volume intravascular filling (≥ 2000 ml of crystalloid / blood products)

Activate massive blood loss protocol.

Step 2

Once the secondary objectives have been commenced, control ongoing haemorrhage:

- **Check / apply** combat application tourniquets
- **Check / apply** pelvic binder
- **Control** haemorrhage:
 - straighten long bone deformities
 - apply pressure bandages / haemostatic dressings
 - address MAXFAX injury

Step 3

Once the secondary objectives have been commenced, consider further interventions:

- **Resuscitative thoracotomy**
- **Resuscitative hysterotomy**
- **Chest compressions**

Early communication with NCS will facilitate activation of additional resources and expertise.

> Section 6.b.iv
Massive blood loss protocol

> Section 6.b.ii
Use of tourniquets



> Section 6.a.ii

Traumatic cardiac arrest

> Section 6.i

Obstetric trauma

> Section 6.j

End of life care

Resuscitative thoracotomy (RT)

RT in penetrating TCA (in order to relieve a cardiac tamponade) is a well-proven lifesaving intervention and should be undertaken in Step 1 if chest decompression has not resulted in a return of spontaneous circulation (ROSC). RT may be successful up to 15 minutes after arrest, but earlier intervention is associated with better outcomes.

RT in blunt TCA (in order to manually compress the thoracic descending aorta) is not a well-proven lifesaving intervention, but should be considered by senior providers in Step 3 if other measures have not resulted in a ROSC. The group of patients who are most likely to benefit are those in pulseless electrical activity secondary to isolated haemorrhagic injury to the abdomen and or pelvis.

Resuscitative hysterotomy (RH)

Females with a gravid uterus palpable above the umbilicus (≥ 20 weeks gestation) may benefit from RH in TCA. This intervention can be successful up to 15 minutes after arrest, but earlier intervention is associated with better outcomes. Additional teams from obstetrics / gynaecology and neonatology / paediatrics should be alerted to assist subsequent management, but RH should not be delayed until their arrival.

Chest compressions

TCA is fundamentally different to medical cardiac arrest with different causes and underlying pathophysiology. Chest compressions are of little value in TCA and are potentially detrimental to achieving ROSC by delaying the primary objective of 'oxygenate, decompress and fill'. Once other interventions have been completed (Step 1 & 2) chest compressions may be considered as a method to provide some blood flow to vital organs.

Return of spontaneous circulation (ROSC)

ROSC in TCA is defined as the presence of a palpable central pulse. These patients should be considered as 'peri-arrest', and the following actions undertaken:

- Review Steps 1, 2 & 3
- Aliquots of warmed crystalloid / balanced blood products to maintain a central pulse. If traumatic brain injury is considered to be the dominant condition use a less restrictive fluid resuscitation approach. Invasive blood pressure monitoring will improve awareness of the patient's cardiovascular status.
- Plan for immediate definitive haemorrhage control (damage control surgery +/- interventional radiology)
- Sedation and paralysis as indicated
- Pre-hospital teams should alert the receiving hospital and specifically request activation of the major haemorrhage protocol and a senior surgical team.

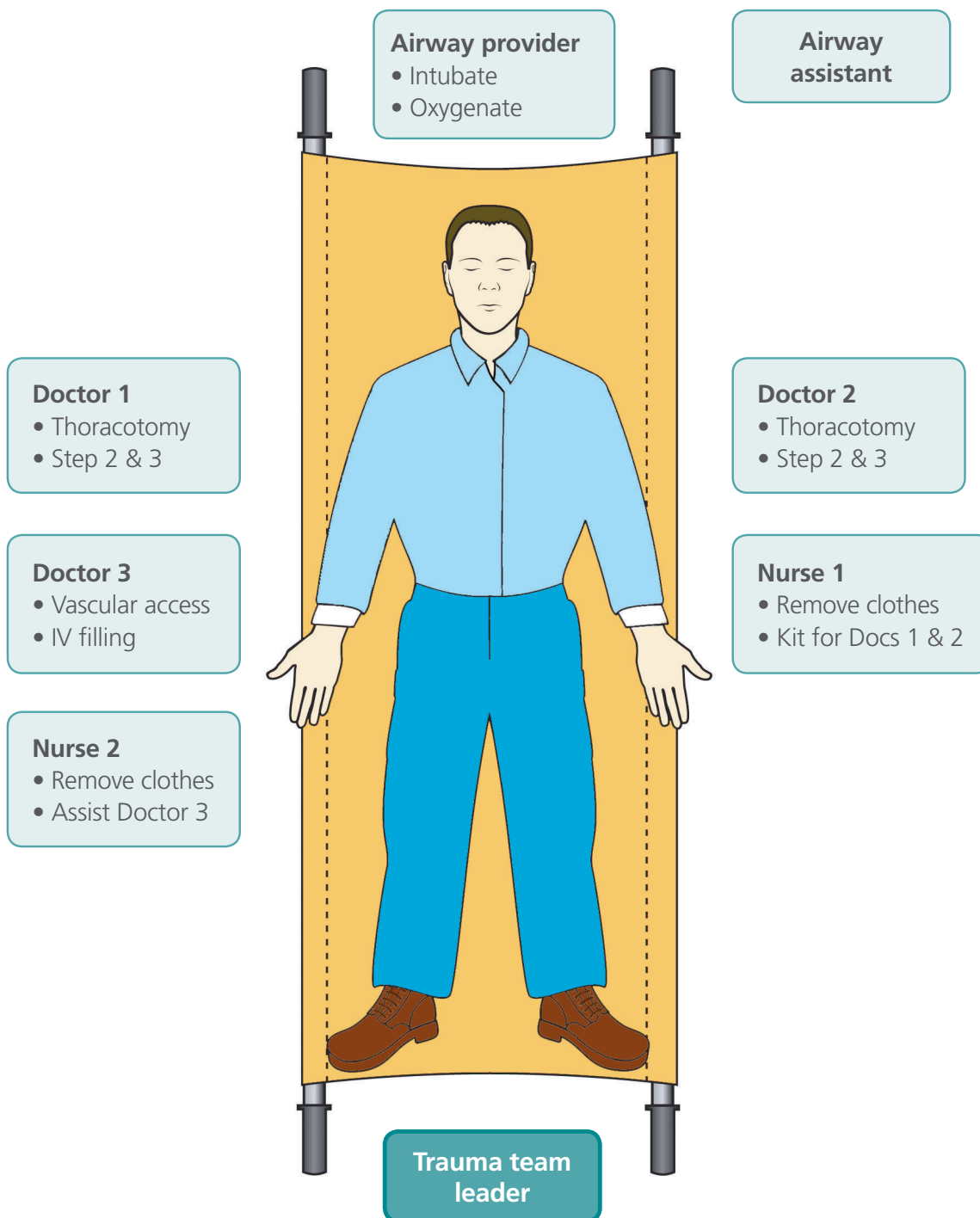
Terminating resuscitation

After 20 minutes (and completion of Steps 1, 2 & 3) without a ROSC, termination of resuscitation efforts should be discussed with the team. Asystole, failure to respond to Steps 1, 2 & 3 interventions, and external brain matter are all associated with a poor outcome. Organ donation may be considered after a decision is made to terminate resuscitation.

Team factors

TCA should be aggressively managed using a standardised approach that rapidly addresses reversible causes in order of priority. To achieve this providers must be familiar with the Step 1, 2, 3 principle and team roles allocated below.

TCA team roles



It is recognised that pre-hospital teams will make best use of available personnel to achieve the TCA objectives in the same priority order as in-hospital teams.

Follow-up

TCA is a rare and stressful event – extra attention should be paid to clinical and personal debriefing.

> Section 5.g
Trauma team debrief

Traumatic cardiac arrest treatment algorithm



Resuscitation Council (UK)

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