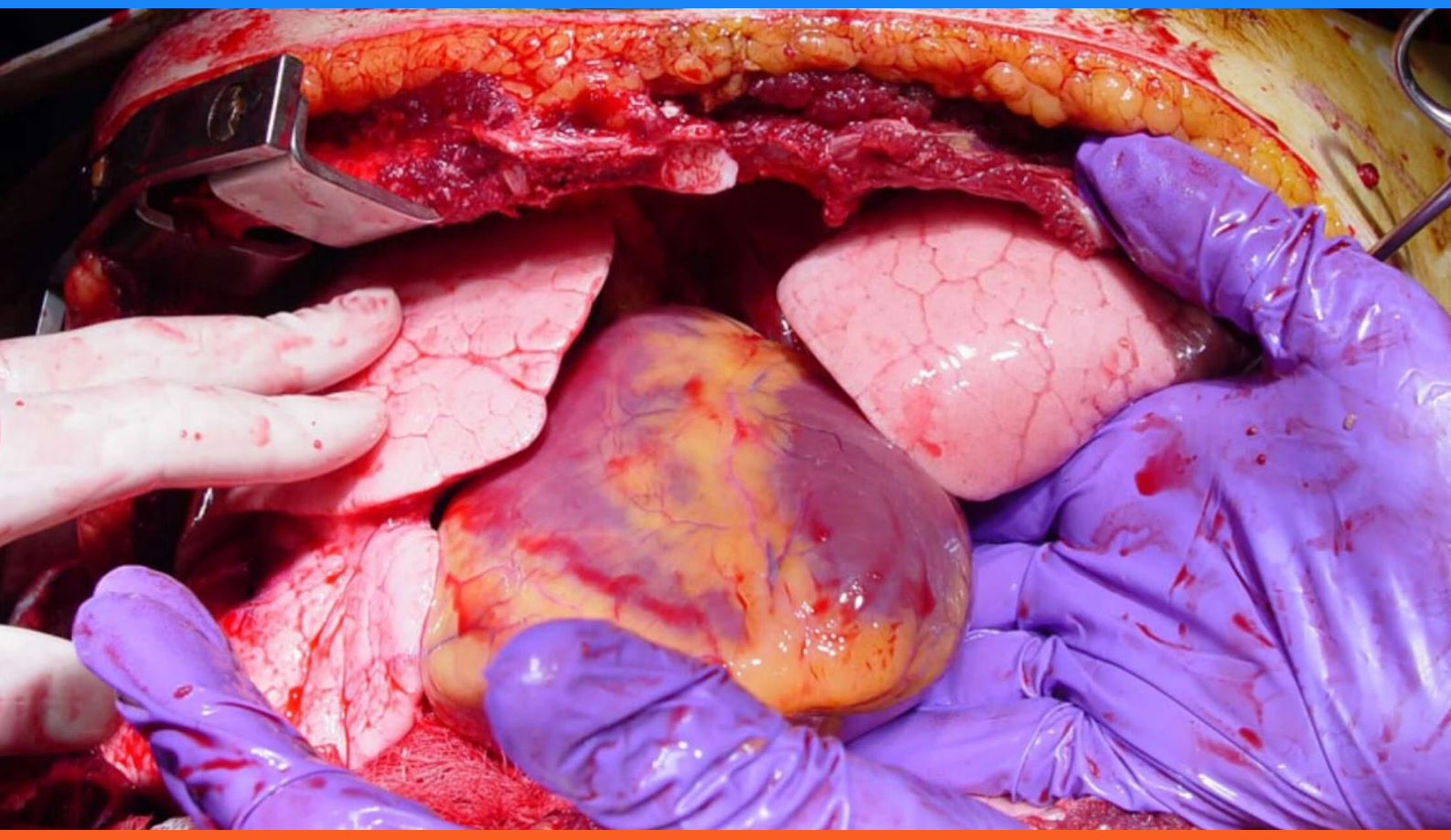
RESUS DRILLS



THORACOTOMY FOR TRAUMA #2

Thoracotomy for Trauma

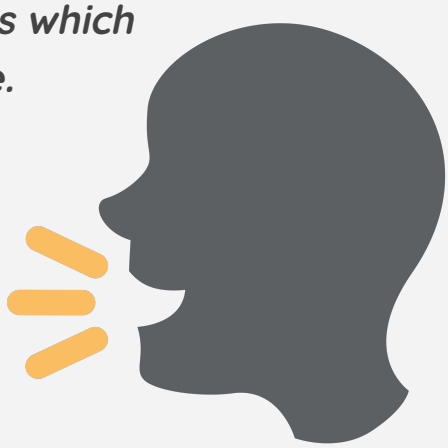
Drill #2

Pre-brief

Instructor to read out this section

"Welcome to this Resus Drill. Drills are for situations which are not common, and need a time-critical response. This is not a Simulation. Drills are a rehearsal for practising teamwork and speed.

We will run a scenario for 5 minutes, chat and reflect on it, then run the same scenario again for another 5 minutes."



Assurances

Learning, NOT assessment: drills are for practice and for learning. We're concentrating on how fast you can think, and how well you work as a team.

Safe zone: lessons are shared here, not judged, not told as tales.

5-min reflection rules: please use the debrief to be positive about what you can all do better on the re-run. These are deliberately tough scenarios. That's the point of a drill.

Pretend it's real: although it's not real, we need you to help us by acting as you'd do in real life, in your normal role, and we'll try to run it in real-time.

Take-away pack: there is some information that you can take away for further learning. We recommend "spaced repetition" for the best learning!

- ➜ make some reflective notes while it's fresh in your mind
- ➜ make yourself read them again in a couple of weeks

How does it work?

Each Resus Drill pack follows a standard format.

The drill packs are laminated and available for teaching purposes, and can be downloaded from www.em3.org.uk

Our downloaded drills can be edited to suit local hospitals.

Thoracotomy for Trauma

Drill #2

S.E.T.U.P.

Instructor to read out before patient arrives

SELF... physical readiness (stay calm) & cognitive readiness (accept the challenge)

ENVIRONMENT... lighting, crowd control, appropriate equipment?

TEAM... initial briefing, identify Team Leader, allocate team roles

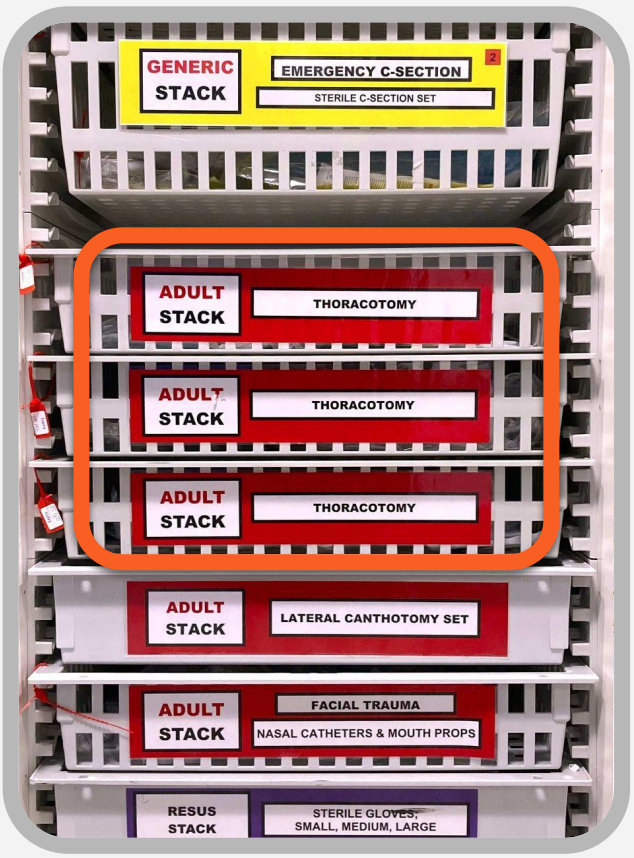
UPDATE... if possible, recap for the team (and yourself) before patient's arrival

PATIENT... the patient arrives

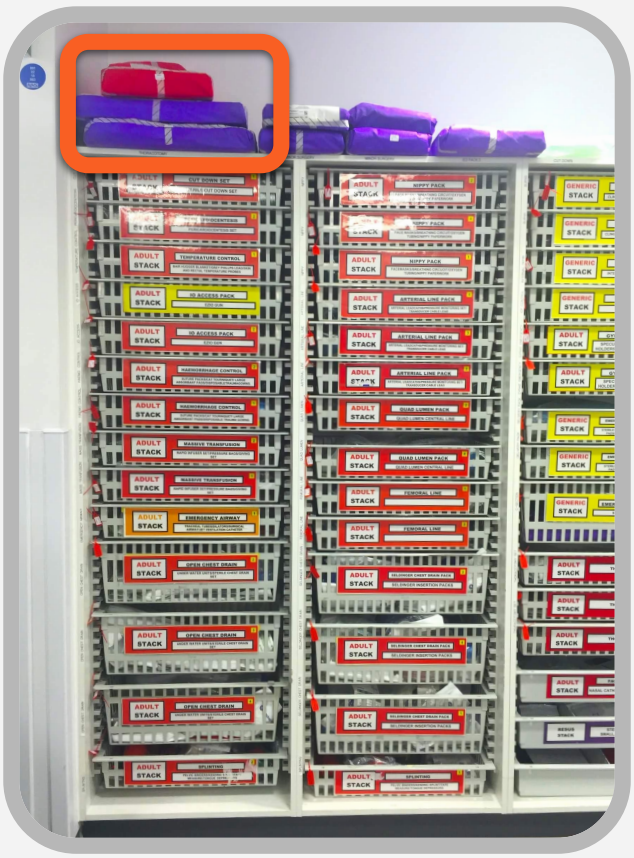
Location of Equipment

The **Thoracotomy kit** can be located inside *(and on top)* of the Resus/ER equipment stacks next to Bay 9 and opposite Bay 10.

ED simplified Thoracotomy kit



Surgical full Thoracotomy kit



Thoracotomy for Trauma

Drill #2

Location of Equipment ...continued

Thoracotomy for Trauma

Drill #2

Indications

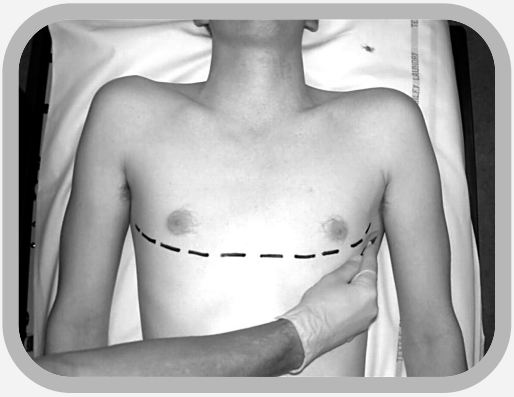
Cardiac arrest after a penetrating thoracic injury AND downtime of <15 minutes

Equipment

You will require a set for each doctor assisting

- ☑ Sterile scalpel blade size 22
- ☑ Spencer-Wells artery forceps 20 cm *(straight)*
- ☑ Spencer-Wells forceps 13 cm
- ☑ Sterile trauma scissors
- ☑ 10x10 cm Gauze *(to protect against sharp ribs)*
- ☑ Chloraprep applicator 10.5 cm
- ☑ Drugs for anaesthesia
- ☑ Full thoracotomy kit on standby *(including rib spreaders, Gigli saw)*

Landmarks and Techniques



1. Concurrent intubation and IV access
2. Thoracostomy incisions are made on both sides but extending to the posterior axillary line – confirm thoracostomies haven't achieved ROSC
3. A skin incision (down to muscles) is made across the anterior chest wall joining the 2 thoracostomy incisions, passing over the sternum
4. Intercostal muscles are divided using tough-cut shears +/- scalpel
5. The sternum should be divided using the tough-cut shears
6. The chest wall, if incised correctly, will open upwards exposing the internal organs
7. The pericardium is identified and an incision made vertically in the centre of the pericardium

8. Any clot of blood needs to be evacuated manually from the pericardial space
9. If there is no spontaneous cardiac activity, internal compressions should be commenced
10. Bleeding from wounds to the heart are usually stopped using thumb/finger pressure
11. Bleeding points from the chest wall may need to be tied by the second team member using the vicryl suture
12. Pre-alert the cardiothoracic team for immediate transfer

Thoracotomy for Trauma

Drill #2

Traumatic Cardiac Arrest Decision Algorithm

- ☑ Stab wounds to the chest or upper abdomen *(for penetrating injury)*
- ☑ Loss of detectable cardiac output

In parallel:

- Intubate

If enough staff:

- Activate major haemorrhage protocol
- Rapidly transfuse 4U O negative blood

Perform clamshell thoracotomy

Tamponade?

Evacuate clot & put finger in hole

Any cardiac activity?
ROSC?
Is the heart filling?

DEAD

Stop if no ROSC within 20 mins of original loss of output

Ensure anaesthesia is being given *or the patient will wake up!*

Get urgent specialist help

Focus on transfusion, start platelets, FFP

If someone with surgical skills present:

- Consider suture in RV
- Consider aortic clamp
- Clamp internal mammaries if spurting

Emergency Department: Pre-Hospital Pre-Alert Report Form

CALL SIGN OF THE VEHICLE / TEAM: 1234

Age *(and sex)*	AGE 19		SEX M	
Time *(of incident / onset of symptoms)*	<30 mins			
Mechanism of Incident *(injury / illness)*	Stabbing to abdomen			
Injuries / Symptoms *(suspected or present)*	Single wound			
Signs *(Observations, Clinical Stability)*	HR	140	GCS	15
	RR	20	BM	-
	BP	80/40	TEMP	-
	SPO_2	96% air	PEAK FLOW	-
NEWS score total		EMAS TRAUMA TRIAGE TOOL POSITIVE?		(YES) / NO
Red Flag Sepsis		CLINICAL CONDITION		STABLE / (UNSTABLE)
Treatment *(Given so far – In brief!)*	None			
ETA *(Time of arrival in ED)*	3 mins			

Requirements *(Circle – specify where required)*	(TRAUMA)	MEDICAL
	MASSIVE BLOOD LOSS PROTOCOL	STROKE THROMBOLYSIS
	TRAUMA TEAM ACTIVATION	CARDIAC SPECIALIST NURSE
		SEPSIS PATHWAY

Call taken by;	T. Doctor	Date;		Time;	: HRS
Information passed to;	PRINT NAME	Date;		Time;	: HRS

Pátient Addressograph Label

(MUST BE ADDED ONCE PATIENT REGISTERED)

TURN FORM OVER AND COMPLETE CHECKLIST ON REAR

PLEASE ATTACH TO PATIENT NOTES – INSIDE FRONT SHEET

ADHESIVE STRIP - HERE

Thoracotomy for Trauma

Drill #2

Scenario Script

Instructor to read out this section

"The red phone has just rung with a 3-minute warning of a 19-year-old male stabbed in the epigastrium. Here is the ambulance pre-alert information." *(give Page 6 to Team Leader)*

Minutes One & Two

Team Leader designates team members and uses **S.E.T.U.P.** *(Self, Environment, Team, Update, Patient arrives).* Gloves, aprons, role badges, ED thoracotomy kit, O neg blood and rapid infuser fetched. Trauma alert activated (no-one arrives until scenario over).

Minute Three

Paramedics arrive stating that he's just lost his cardiac output. Decision to do clamshell needed. CPR/adrenaline should not be initiated – should be verbalised to team as deliberate decision. Arrest time should be noted. Team members allocated for: *thoracostomies (x2 senior doctors + assistant), intubation (x1 + assistant), IV / IO access (x2), activating massive haemorrhage protocol.*

Minute Four

Nursing staff should set up rapid infuser. Member of staff should be allocated to phone in cubicle, to liaise with transfusion and others. Thoracostomies performed – no rush of air, lungs are inflated. If intubation is attempted, it is easily achieved.

Minute Five

Team Leader should decide rapidly to perform full thoracotomy and allocate one senior doctor to each side of the chest.

Instructor announces that we have fast-forwarded three minutes and that the heart is empty, feeble beats, no pericardial tamponade or RV wound found.

Team Leader should review time since cardiac output was lost and verbalise and agree with team the decision to stop transfusion / resuscitation if no skilled help has arrived within 15 mins of onset of cardiac arrest.

Debrief and Feedback

You should aim to cover the following points within 5 minutes, then re-run the scenario:

1. Did the **Team Leader** allocate roles and tasks in a way that was clearly understood? Was **S.E.T.U.P** utilised?
2. Did team members do as allocated?
3. On arrival of patient did **Team Leader** maintain team control?
   a. Calm and clear speech?
   b. Closed loop communication when tasking?
   c. Decision to attempt thoracotomy taken quickly?
4. Key roles achieved?
   a. Correct (ED) thoracotomy kit fetched?
   b. Patient intubated?
   c. Two people allocated to perform thoracostomies then clamshell?
   d. Staff identified for transfusion (rapid fluid infuser, O-negative, massive haemorrhage protocol activation, team member to communicate with lab)?
5. Did the **Team Leader** sum up and decide appropriately to stop resuscitation?
6. Were there any instances of:
   a. Equipment issues?
   b. Human factors negatively impacting communication or patient care?

Additional Resources

- **Emergency thoracotomy: "how to do it"** (D. Wise et al.) https://bit.ly/emthoracotomy
- **Procedural Aide Memoires – PAMs: Resuscitative Thoracotomy** (MAGPAS) https://bit.ly/3x6HjRf
- **Crack the chest. Get crucified.** (J. Hinds) https://bit.ly/3YdnkMA
- **Epidemiology and aetiology of traumatic cardiac arrest in England and Wales** (E. Barnard et al.) https://bit.ly/2FeVHyH
- **DIY Thoracotomy Trainer** (SimGHOSTS) https://bit.ly/3Yky6AG
- **Low Cost, Low Fidelity Simulation Model for Teaching Thoracotomy** (A. O'Connell et al.) https://bit.ly/3xaunKk
- **Pre-hospital management of life-threatening chest injuries** (RCSED) https://bit.ly/2yZWzlo
- **Pre-hospital physician-performed resuscitation procedure that can yield good results** (G. Davies et al.) https://bit.ly/2QrnlcU
- **Thoracotomy** (PHEMcast) https://bit.ly/2zCA2KS