

FINAL SIMULATION 4

Simulation focus (Traumatic Cardiac Arrest)

Expected outcomes

Team Leader - Perform initial ABCDE assessment, direct team and lead care – taking over skills as and when appropriate. Manage uncontrolled bleeding secondary to traumatic injury. Recognise massive haemorrhage and initiate massive haemorrhage algorithm.

Team/More experienced candidate - Recognise the traumatic cardiac arrest and manage according to Paediatric Traumatic Cardiac Arrest algorithm.

For the candidate who needs a reassessment

This simulation can be used to reassess a candidate who needs to lead a trauma simulation. In this case the candidate is expected to direct an ABCDE primary survey, identify massive haemorrhage with shock as the diagnosis and manage with fluid / blood resuscitation and chest drain. The patient will then stabilise.

History

All staff:

You are in ED. Alex, a 14-year-old, has been rushed to ED by a bystander, who witnessed Alex being stabbed by another teenager. Alex is brought into Resus by the triage nurse who tells you Alex is complaining of pain and difficulty breathing.

Immediately apparent

Please ensure that the card with global overview is placed on the manikin for the start of the sim.

The child looks pale and is breathing fast. There is blood around the left side of the chest but no active bleeding.

Clinical course (to be given as the simulation progresses)

Assess	Features	Action	Key treatment points
<c>	There is blood around the left side of the chest but no active bleeding	Assess	
A	Patent	Assess, give oxygen	
B	RR 30 with shallow breaths. SpO₂ 92% in air Reduced air entry on left, no additional noises. Percussion note: dull on left, resonant on right.	Assess including auscultation and SpO ₂ Recognise increased effort with signs of haemothorax	High flow oxygen via non-rebreathe face mask Insert chest drain Activate major trauma team
C	HR 135, CRT 4, BP 86/66 Weak but palpable radial pulses Pale with cool peripheries	Assess and recognise compensated shock Trauma bloods to include crossmatch, clotting, lactate, glucose.	Immediate IV/IO access Bloods Fluid/blood bolus 10ml/kg and reassess Further 10ml/kg bolus required
D	Responds to voice, GCS 12 (E3V4M5). Pupils 4mm, reflexes brisk	Recognise lowered level of consciousness and escalate concern	
E	Wound on left chest wall near to the nipple which is oozing blood slowly	Assess for open pneumothorax Apply an appropriate dressing.	

Reassessment or weaker candidate or group Use the guidance in blue box below

Strong confident group or candidate Use the guidance in yellow box below

Reassessment candidate

This can be a massive haemothorax scenario where the candidate is expected to direct an ABCDE primary survey, identify massive haemorrhage with shock as the diagnosis and manage with fluid / blood resuscitation and chest drain. The patient will then stabilise and can be handed over to forward care.

Team learning scenario

If the team do not manage haemothorax the patient progresses to hypovolaemic traumatic cardiac arrest. If the team successfully manage the haemothorax, there is persistent heavy bleeding from the chest drain and the patient goes into traumatic cardiac arrest. The team should declare the need for resuscitative thoracotomy and describe how to proceed.

The scenario can then be stopped.

Diagnosis: penetrating injury with cardiac tamponade and ventricular laceration.

Reassessment (For team learning scenario only – KPTs in italics)

As candidate starts their reassessment the child becomes much less responsive.

Assess	Features	Action	Key treatment points
A	Patent	Assess	
B	RR 10 with shallow breaths. SpO₂ 86% in 15l/min oxygen . Reduced air entry on left, no additional noises. Percussion note dull on left, resonant on right.	Assess including auscultation and SpO ₂	<i>BVM ventilation</i> <i>Prepare for intubation and ventilation</i>
C	HR 80, CRT 10, BP 50/30 (or not recordable) . Radial pulse no longer palpable. Pale with cold peripheries	Assess, recognise non-responsive / decompensated shock	<i>Activate massive haemorrhage protocol</i> <i>Declare need for resuscitative thoracotomy</i>
D	Responds to pain, GCS 3 (E1V1M1). Pupils 4mm,	Assess	
E	Wound left chest wall near to the nipple no longer bleeding.		

Debrief

Using the learning conversation, discuss the technical and non-technical elements of the simulation

- Ensure discussion of indications for finger thoracostomy, particularly in traumatic cardiac arrest
- Rationale for preference for thoracostomy over needle decompression in trauma
- Confirm knowledge of procedure including landmarks.

Assessment

This station makes up part of the continuous assessment process, therefore candidates need to know whether they are meeting the standard.

At the end give the opportunity for candidates to ask questions, answer these and then summarise the key points.

Algorithms:

Fluid resuscitation in trauma
Massive haemorrhage in trauma
Paediatric traumatic cardiac arrest

Faculty helper information – Final 4

When candidate requests information regarding observations please give the following in “real-time” (e.g., wait for blood pressure to cycle, saturation trace to be achieved). If key treatment points are not undertaken, consider a “prompt” that would be visible in a child.

Assess	Observation	Example prompt
<c>	There is blood around the left side of the chest but no active bleeding	Assess
A	Patent	
B	RR 30 with shallow breaths. SpO₂ 92% in air Reduced air entry on left, no additional noises. Percussion note: dull on left, resonant on right.	If no oxygen applied prompt that sats trace is alarming and child looks pale Keep checking and emphasising chest signs. Follow up with “I’m worried there is something going on, on this left side, what do you think?”
C	HR 135, CRT 4, BP 86/66 Weak but palpable radial pulses Pale with cool peripheries	If IO is requested state you have not performed before/are unsure If “bloods” prompt and ask which ones “I can barely feel this pulse” Cycle and communicate blood pressure: “Is that ok for this age?”
D	Responds to voice, GCS 12 (E3V4M5). Pupils 4mm, reflexes brisk	“They’re moaning a lot. Do you think that is pain, or something else?” “Do you want a blood glucose?”
E	Wound on left chest wall near to the nipple which is oozing blood slowly	

Reassessment – Final 4

Assess	Observation	Example prompt
A	Patent	
B	RR 10 with shallow breaths. SpO₂ 86% in 15l/min oxygen . Reduced air entry on left, no additional noises. Percussion note dull on left, resonant on right.	If no oxygen applied prompt that sats trace is alarming and child looks pale Keep checking and emphasising chest signs. Follow up with “I’m worried there is something going on, on this left side, what do you think?”
C	HR 80, CRT 10, BP 50/30 (or not recordable) . Radial pulse no longer palpable. Pale with cold peripheries	“They look really bad” “I’ve rechecked the BP and it is [read our result]”
D	Responds to pain, GCS 3 (E1V1M1). Pupils 4mm,	“They’re not making any sounds anymore” “They didn’t react as much to a painful stimulus”
E	Wound left chest wall near to the nipple no longer bleeding.	“There’s not a lot of blood from this wound now. I wonder where they are bleeding?”

Final 4 - Global overview (to be placed on SIM manikin)

The child looks pale and are breathing fast.

There is blood around the left side of the chest but no active bleeding.

Final 4 - Results Information

Initial blood results			
Hb	10.8	pH	7.2
Hct	0.35	pCO ₂	6.0
Platelets	182	pO ₂ (if ABG)	8.0
PT ratio	1.3	HCO ₃	20
APTT ratio	1.2	BXS	-3
Fibrinogen	1.2	Lactate	5.7
		Ca (ionised)	1.3
Na	137		
K	4.9		
Cl	110		
Ca (total)	2.6		
Glu	6.4		

Final 4 - Results Information

After O Neg			
Hb	10.5	pH	7.26
Hct	0.32	pCO ₂	7.1
Platelets	196	pO ₂ (if ABG)	13.3
PT ratio	1.4	HCO ₃	19
APTT ratio	1.5	BXS	-2.4
Fibrinogen	1.2	Lactate	4.9
		Ca (ionised)	1.3
Na	144		
K	5.3		
Cl	113		
Ca (total)	2.6		
Glu	4.4		

Final 4 - Results Information

After MHP 1			
Hb	10	pH	7.3
Hct	0.35	pCO ₂	5.3
Platelets	146	pO ₂ (if ABG)	13.3
PT ratio	1.3	HCO ₃	22
APTT ratio	1.3	BXS	-1
Fibrinogen	0.8	Lactate	2.4
		Ca (ionised)	1.1
Na	144		
K	5.9		
Cl	116		
Ca (total)	2.2		
Glu	3.1		

Final 4 - Results Information

If no blood			
Hb	8.4	pH	6.9
Hct	0.28	pCO ₂	10
Platelets	124	pO ₂ (if ABG)	
PT ratio	1.8	HCO ₃	12
APTT ratio	1.7	BXS	-8
Fibrinogen	0.7	Lactate	8.4
		Ca (ionised)	1.3
Na	148		
K	4.1		
Cl	120		
Ca (total)	2.6		
Glu	2.9		