TRAUMA SIMULATION 4

Simulation focus – Splenic laceration (Analgesia – discussion)

Expected outcomes

Team Leader - Perform initial ABCDE assessment, direct team and lead care – taking over any skills as necessary. Identify that the child has suffered a likely splenic injury and will need analgesia, would benefit from TXA and possibly blood products.

Team/More experienced candidate -The role of imaging in such a case – POCUS will not rule out a splenic injury and there will be need for definitive imaging with a CT scan. Awareness that a balanced approach to blood and blood products is needed and that many cases can be managed conservatively.

Assessment

This simulation allows for discussion around major haemorrhage and analgesia.

History

Emergency staff

Pre-alert from a private ambulance crew has been received from a mountain bike competition. They are en-route with a Sam, a 9-year-old who has come off his bike earlier today. Initially was fine on scene and up and walking around but is now complaining of abdominal pain, he thinks he may be unwell.

Ward staff

Sam, a 9-year-old, has just been transferred from ED/ trauma unit directly to the ward for the surgical team to review. He came off a bike earlier today and is now complaining of abdominal pain. As you move him onto the bed he collapses in pain so you think he may be unwell.

Immediately apparent

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

As you approach the child you notice he looks pale, is moaning in pain and holding the left side of his abdomen.

Clinical course *(to be given as the simulation progresses)*

Assess	Features	Action	Key treatment points
<c>	No signs of external bleeding	Assess	
A	Child is moaning in pain	Establish airway patency	**MILS** (cannot clear the neck as in pain) **Apply high flow O_2**
B	**RR 30, SpO_2 90%** (poor trace), symmetrical air entry, splinted pattern, no increased WOB	Recognise abnormal "**B**" likely secondary to circulation issue	Full breathing assessment **Apply high flow O_2 via non breathe mask.**
C	**HR 130, CRT 3, BP 100/60** Bruised and tender left upper quadrant	Look for sites of bleeding	**IV access** Bloods **Fluid bolus** **Analgesia** - IV morphine (caution with CRT) or IV ketamine or intranasal opioids **Consideration of TXA**
D	**GCS 15**, PEARL**, BM 8.2**	Assess	

E	Bruising noted to left upper quadrant if not stripped previously. **Temp 36** Minor abrasions to limbs Pain score 9/10	Assess level of pain	Pain score

Reassessment

NB	• **If the candidate does not give a fluid bolus on the first assessment the child's circulatory numbers should worsen slightly to prompt them that the child has a splenic laceration.** • **The child requires IV or IN analgesia in the form of opiates or ketamines as per local severe pain protocols** • **If analgesia not given at the end of primary survey the child should become more agitated and hypo ventilate with corresponding drop in SpO_2**

With fluid bolus:

Assess	Features	Action	Key treatment points
A	Patent, states pain has improved (if analgesia has been given)	Reassess	MILS continued
B	**RR 25, SpO_2 98%** (good trace), chest examination normal	Reassess	Oxygen to remain at 15L
C	**HR 110, CRT 2, BP 105/62**	Recognise response to fluid bolus	No further fluid required **Analgesia** - IV morphine (caution with CRT) or IV ketamine or intranasal opioids
D	**GCS 15**, PEARL, **BM 8.2**		
E	No further findings. **Temp 36** **Pain score 4/10**	Pain score repeated	Pain score repeated prior to further analgesia

Without fluid bolus:

Assess	Observation	Action	Key treatment points
A	Intermittently moaning in pain		**MILS continued**
B	**RR 32, SpO_2 89%** trace intermittent. Chest examination normal, splinting abdomen a lot when he breathes	Recognise abnormal "**B**" likely secondary to circulation issue	**Oxygen to remain at 15l**
C	**HR 140, CRT 3, BP 96/62** Bruised left upper quadrant	Look for sites of bleeding Recognise need for fluid bolus and analgesia	**Fluid bolus** **Analgesia** - IV morphine (caution with CRT) or IV ketamine or intranasal opioids **Consideration of TXA**
D	**GCS 15**, PEARL, **BM 8.2**		
E	No further findings. **Temp 36**		

Debrief

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

Discussion Points

- Use of TXA will cause no harm and may well be beneficial.
- Child may only need one fluid bolus and given numbers would benefit from point of care testing such as ROTEM to establish any need for clotting factors rather than a major haemorrhage approach.
- Limitations of POCUS in encapsulated splenic lacerations and also abdominal trauma in children in general as may well be falsely reassuring. CT scan is definitive diagnosis.
- Disposition; child may well need transfer to paediatric MTC even just for monitoring as all relevant services readily available.

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.

Props to print and laminate

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

The child looks pale.

He is moaning in pain.

He is holding the left side of his abdomen.

Trauma 4 - Results Information:

VBG

pH	7.28
pCO_2	3.2
pO_2	8.0
HCO_3-	22
BE	-4.5
Lactate	3.6
Potassium	4.1

Glucose 8.2

Faculty helper information – Trauma 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>	No signs of external bleeding	Assess
A	Child is moaning in pain	"What was the mechanism" – for MILS
B	**RR 30, SpO_2 90%** (poor trace), symmetrical air entry, splinted pattern, no increased WOB	"His hands are cold when I put saturation probe on" "Should we give something to help his breathing"
C	**HR 130, CRT 3, BP 100/60** Bruised and tender left upper quadrant	"He keeps saying his tummy hurts" "His hands are still cool" "What's his pain score?"
D	**GCS 15**, PEARL**, BM 8.2**	"Do you want a gas?"
E	Bruising noted to left upper quadrant if not stripped previously Minor abrasions to limbs **Pain score 9/10**	"Does he have any injuries we can see?" "What's his pain score?"

Reassessment

Assess	Observation	Example prompt
A	Patent, states pain has improved (if analgesia has been given)	
B	**RR 25, SpO_2 98%** (good trace), chest examination normal	
C	**HR 110, CRT 2, BP 105/62**	"Why are we giving more fluid?"
D	**GCS 15**, PEARL**, BM 8.2**	"Do you want the venous gas"
E	No further findings **Pain score 4/10**	"What's his pain score now?"

If the candidate does not give a fluid bolus on the first assessment the child's circulatory numbers should worsen slightly to prompt them that the child has a splenic laceration. Numbers below are for this situation.

Assess	Observation	Example prompt
A	Intermittently moaning in pain	"Do you think he is more settled or getting worse?"
B	**RR 32, SpO_2 89%** trace intermittent. Chest examination normal, splinting abdomen a lot when he breathes	"His breathing appears to be getting worse but he's not got any recession"
C	**HR 140, CRT 3, BP 96/62** Bruised left upper quadrant	"What could he have injured to cause bruising here?"
D	**GCS 15**, PEARL**, BM 8.2**	
E	No further findings	

Algorithms:

Analgesia and pain scores

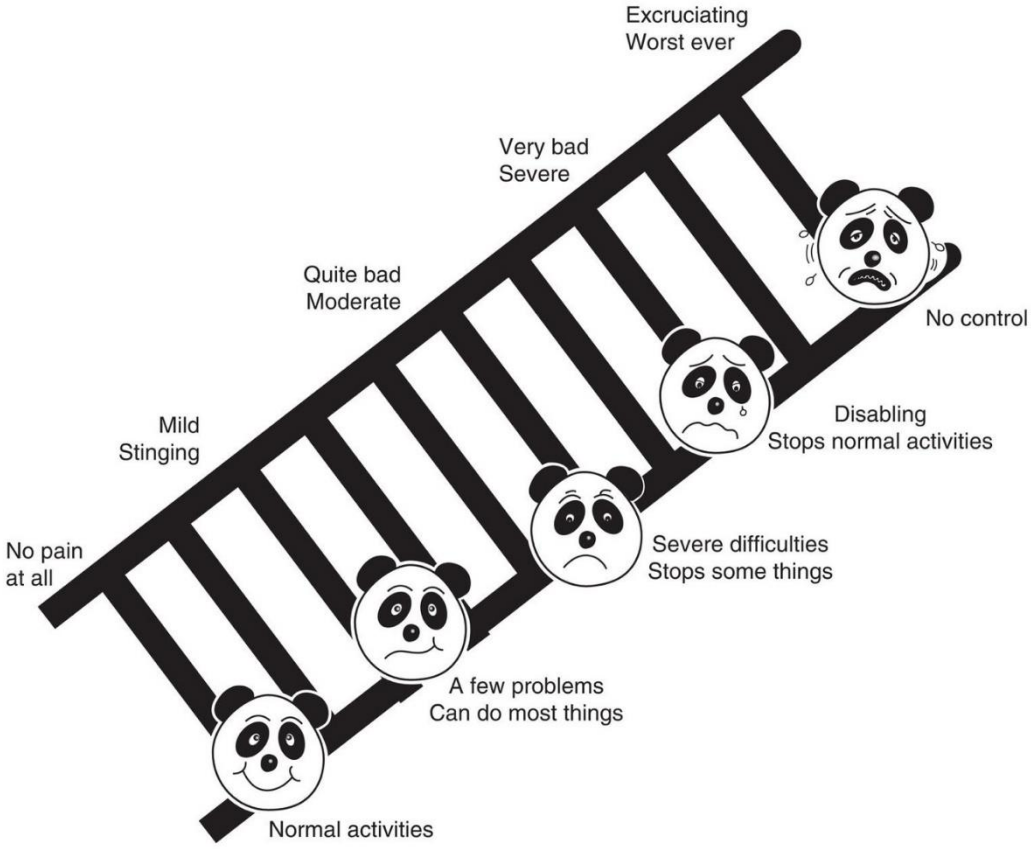

Figure 7.1 Faces scale and pain ladder

Table 7.1 The Alder Hey Triage Pain Score: reference scoring chart

Response	Score 0	Score 1	Score 2
Cry/voice	No complaint/cry	Consolable	Inconsolable
	Normal conversation	Not talking/negative interaction	Complaining of pain
Facial expression	Normal	Short grimace or similar less than 50% of time	Long grimace more than 50% of time
Posture	Normal	Touching/rubbing/sparing	Defensive/tense
Movement	Normal	Reduced or restless	Immobile or thrashing
Colour	Normal	Pale	Very pale/'green'

Morphine and intranasal fentanyl

FENTANYL		From 7 kg to 18 years	
Acute management of pain	IN	1.5 micrograms /kg	Single dose
		Notes: Prepare using 100 micrograms/2 ml (Minimum of 0.2 ml due to atomiser)	
Induction of anaesthesia	IV	1 microgram/kg repeated as necessary	

MORPHINE		Birth to 1 month	1 month to 2 years	2–12 years	12–18 years	
Control of severe pain	IV infusion	Preterm: 25–50 micrograms/kg	–	–	–	Single dose Loading dose
		Then: 5 micrograms/kg/h	–	–	–	Continuous
		Term: 50 micrograms/kg	–	–	–	Single dose Loading dose
		Then: 10–20 micrograms/kg/h	–	–	–	Continuous
	IV bolus	–	100 micrograms/kg		5 mg every 4 hours adjusted according to response	<6 months: up to 4 times in 24 hours >6 months: up to 6 times in 24 hours
		Notes: Respiratory monitoring is mandatory Give IV over at least 5–10 minutes <1 year: use the lower stated dose and consider oxygen saturation monitoring				
	IV infusion	–	10–30 micrograms/kg/h			Continuous
			<6 months: initial rate is 10 micrograms/kg/h			
			>6 months: initial rate is 20 micrograms/kg/h			
		Notes: Use IV bolus as starting dose first 1 mg/kg body weight in 50 ml saline, infused at 1 ml/h = 20 micrograms/kg/h				