Pre course seriously injured child

Referring team
(A.T. M.I.S.T.E.R.)

- **T**ime of injury
- **M**echanism of injury
- **I**njuries found to date – Clinical & investigations
- **S**igns on initial presentation – A/B/C/D
- **T**reatment initiated and Progress to date (A/B/C/D/ or Systems approach – Resp, CVS, Neuro, Renal, Abdo, Sepsis, etc)
- **E**stimated time to readiness for transfer
- **R**equested assistance (What is being asked for specifically)
- **R**elatives present and understanding of situation

Primary Survey – Trauma patient

- **<C>ABCDE**
- <Catastrophic external haemorrhage>
- Airway (with cervical spine control)
- Breathing with ventilatory support
- Circulation with haemorrhage control
- Disability with prevention of secondary insult
- Exposure with temperature control

C	Direct pressure or Tourniquet for arterial bleed
A	Basic +/- Advanced airway procedures – Jaw thrust Clear secretions Oral airway if no gag reflex Maintain cervical immobilisation Remove the hard collar Apply soft collar or sand bags Clam down the child
B	High flow oxygen via face mask Examine for chest expansion – symmetrical or not Listen for Airentry on both sides Percussion note on both sides Check SpO2 Examine chest +/- needle decompression, +/- assist ventilation **Rule out Tension Pneumothorax or Haemothorax**
C	Assess perfusion, Pulse rate, volume, CRFT, Cold line, BP IVC x2, Request for O negative or group specific blood Tranexamic acid +/- Blood or IV fluid 10 ml/kg +/- 10ml/kg bolus **If hypotension is not corrected** Look for life threatening haemorrhage Examine for bruises over the abdomen Examine the abdomen for **liver rupture, spleen rupture, Pelvic fracture, upper thigh bleeding.** Do a fast scan /+ E-FAST ? Need to follow massive transfusion protocol Catheterise the bladder or apply pelvic binder **Look for chest injuries** ***Bruises / Burns over the neck or facial injury - Elective intubation*** ***Massive haemothorax, Tension pneumothorax***

	Open Pneumothorax - 3-sided dressing and Asherman Chest Seal ***Flail Chest – Analgesia, NIV, IPPV***
D	Assess conscious level (AVPU / GCCS) , pupils, posture Examine the head, face for obvious bleeding Examine the orifices – Ears, nose, mouth Assess voluntary limb movement and try detect any spinal cord injury Assess for limb injuries / open or close fractures Splint the fractures
E	Look for hypothermia and Keep warm **Check BGL and correct hypoglycaemia** Rapid head to toe examination Rapid head to toe examination, Re- assessment A-B-C-D-E ? Log Roll
Other actions	Bloods / XM, trauma imaging, **consider analgesia** **Use ISBAR and Notify surgeon,** Inter-facility transfer ?

Secondary Survey – Life threatening Diagnosis

A.	
Airway Obstruction • ? Stridor or noisy breathing • Anterior neck abrasions and swelling • ? Hypoxia • Tachypnoea • Tachycardia • USScan **O_2, Vascular access** **Prepare for 'difficult-airway' RSI** **Early intubation**	Tension Pneumothorax • Tachypnoea • Hypoxia • ? Distended neck veins • ? Tracheal deviation • Surgical emphysema • Ipsilateral decreased air entry • Ipsilateral hyperresonance • Tachycardia • ? Hypotension • E-FAST Scan **O_2,** **IV access and IV fluid** **Needle thoracocentesis,** **Chest drain insertion**
Massive Haemothorax • Respiratory distress • Chest pain • Hypoxia • Ipsilateral decreased air entry • Ipsilateral dullness to percussion • Tachycardia • Hypotension • E-FAST Scan **O_2** **Vascular access and Fluid resuscitation,** **Chest drain insertion**	Open Pneumothorax • Hypoxia • Tachypnoea • Sucking wound • Ipsilateral decreased air entry • Ipsilateral hyperresonance • Tachycardia • ? Hypotension • E-FAST Scan **O_2,** **Vascular access, Maintenance fluid** **3-way/Asherman seal,** **Chest drain insertion**

Flail Chest • Chest pain • Hypoxia • ? Abnormal chest movement • Crepitus on antero-lateral chest • Tachycardia O_2, Vascular access Opioid analgesia May need NiPPV, Intubation		Cardiac Tamponade • Stabbed in the epigastrium • Tachypnoea • ? Distended neck veins • Tachycardia • Hypotension • ? Muffled heart sounds • FAST Scan **O_2, Vascular access and Fluid resuscitation, Needle pericardiocentesis, Thoracotomy**
C	Bowel perforation	Repeated abdominal examination (Tenderness / Rebound tenderness), CXR & Abdominal erect X-ry.
C	Ruptured spleen	Repeated abdominal examination (for Tenderness / Rebound tenderness) in left hypochondrium, High degree of suspicion. Shifting dullness. FAST scan.
C	Ruptured liver	Repeated abdominal examination (for Tenderness / Rebound tenderness) in right hypochondrium, High degree of suspicion. Shifting dullness. FAST scan.
	Retro-peritoneal haemorrhage	Severe tenderness in the loin area
	Pelvic fracture	Tenderness in supra-pubic area
	Upper thigh haemorrhage	Severe tenderness Increase in the girth of the thigh
D	Progressive head injury	Bleeding / CSF leak from ears, nose Haematomas on the scalp Deterioration of GCCS Pupillary abnormalities Postural changes Signs of raised ICP
E	Hypothermia,	Rectal temperature / Axillary temperature

Massive Transfusion Protocol

	Intervention	Investigations for monitoring
First aliquot	10ml/kg 0.9% warm Normal Saline bolus Blood products if available	
Second aliquot	10ml/kg 0.9% warm Normal Saline bolus Blood products if available	
Plan for haemorrhage control	5 ml/kg boluses of WARMED packed red cells or FFP Aim for 1:1 ratio of red cells:FFP; reassess	Monitor blood gases Treat potassium level above 6 mmol/ litre with bolus 0.1 units/kg insulin actrapid and 10 ml/kg 10% dextrose Monitor haemoglobin on blood gases, do not push higher than 12 g/dl Keep platelets above 100 × 109
Major haemorrhage	5 ml/kg boluses of WARMED packed red cells or FFP	**Consider** Platelet count needs to be > 50 × 109/l and fibrinogen at least 1 g/l

pack	Aim for 1:1 ratio of red cells:FFP; reassess. After 20ml/kg blood product, give 10ml/kg Platelet and 0.1ml/kg 10% Calcium Chloride	Monitor blood gases Treat potassium level above 6 mmol/ litre with bolus 0.1 units/kg insulin actrapid and 10 ml/kg 10% dextrose Monitor haemoglobin on blood gases, do not push higher than 12 g/dl Keep platelets above 100 × 109 Major haemorrhage pack contains packed red cells, FFP and platelets Arrange anaesthetic assessment for intubation and ventilation Keep ionised calcium level above 1 mmol/litre with 0.1 ml/kg of 10% calcium chloride Consider 10 ml/kg cryoprecipitate to keep fibrinogen at least 1 g/l Discuss with consultant haematologist Consider activated factor VII (Novoseven) after 2 cycles if continued bleeding

	Trauma call & Call for imaging
	Arrest life threatening bleeding – apply pressure bandage
Airway	Stabilise and protect C-spine
	Assess and maintain airway
	Pass ETT and ventilate manually
	High-flow oxygen by face-mask
	Ventilate with 100% oxygen
	Needle thoracocentesis
	Chest Drain
	Close the open wound
Circulation	Two wide-bore IV cannulae, & DT
	10ml/kg boluses of N Saline
	Look for liver, spleen, pelvis, upper thigh bleeding
	5mls/kg of blood
	15 mg/kg Tranexamic acid
	Consider pain relief
	Massive Transfusion Protocol
Disability	GGCS
	Posture
	Pupils
Exposure	Orifices
	Fractured areas & Splinting
	Abdominal ex & e-FAST scan
	Pelvic bones & Pelvic binder
	Temp