ADULT POLYTRAUMA PATIENT

MODULE: Intensive Care Medicine / Trauma

TARGET: ALL ANAESTHETISTS, INTENSIVISTS & ED PHYSICIANS

BACKGROUND:

Anaesthetists form an integral part of the trauma team, and must have the skills to perform primary surveys and lead the trauma team in addition to airway management. Difficult airways are more common in trauma patients.

This scenario presents three separate challenges which are (in order of management during the scenario):

1. Management of tension pneumothorax
   – in which a part task chest drain trainer could also be used in scenario.
2. Management of concealed major haemorrhage
   – which is poorly responsive to fluid resuscitation will require surgical management.
3. Airway management in the C-Spine immobilised patient.
### RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

| AM_BS_04 | Demonstrates effective pre-oxygenation, including correct use of the mask, head position and clear explanation to the patient. |
| IG_BS_04 | Demonstrates the ability to recognise a deteriorating situation early through careful monitoring |
| IG_BS_05 | Demonstrates the ability to lead a multi-disciplinary trauma team, co-ordinating and delivering the early hospital care of all types of complex multiply injured patients including the primary survey, resuscitation and secondary survey, plus appropriate HDU/ICU admission. |
| IG_BS_08 | Demonstrates correct securing and protection of LMAs/tracheal tubes during movement, positioning and transfer. |
| MT_BS_01 | Demonstrates effective non-technical skills such as: effective communication, team-working, |
Demonstrates the ability to lead and/or deliver the safe perioperative anaesthetic care to all multiply injured patients including HDU/ICM admission if required for continued care.

Demonstrates good communication skills with all members of the trauma team when leading the clinical care of the multiply injured patient and seeks prompt and active advice from specialties not involved in the initial resuscitation, when needed.

INFORMATION FOR FACULTY

LEARNING OBJECTIVES:

• Initial, structured assessment of the trauma patient.
• Recognition and management of tension pneumothorax
• Recognition and management of unrevealed major haemorrhage

SCENE INFORMATION:

• Location: Resuscitation Room

ED is extremely busy. They are short-staffed and have asked the ICU / Anaesthetic team to manage this patient who has presented with a low GCS following a head injury. Both the junior and senior anaesthetic trainees commence this scenario together.

EQUIPMENT & CONSUMABLES

Anaesthetic Junior Trainee
Anaesthetic Senior Trainee
Anaesthetic assistant
ED Resus nurse
Paramedic for initial handover (Optional)
Foundation/ED Trainee (Optional)
Outreach nurse (Optional)

• Mannequin: On ED trolley, with full O2 cylinder
  Collar, blocks and tape on
  Pelvic stabilizer T-POD (if available)
  Right leg splint (if available)
• Stocked airway trolley
• Portable monitor
• Portable ventilator
• Infusion pump(s)
• Syringes, IV fluid and giving sets
• Simulated units of O ve- and X-matched blood
• Part task chest drain trainer (optional)

PARTICIPANT BRIEFING: (TO BE READ ALOUD TO PARTICIPANT)

Handover from Paramedic or ED Nurse (ATMIST style):

This is a 24 year old woman. 45 minutes ago she was struck by a car when crossing a road. The driver was speeding at around 40-50mph according to witnesses. She bullseyed the windscreen and was thrown around 20 feet. Her obvious injuries were a head injury, bruising down the right side of her chest and abdomen and an obviously fractured right femur. Witnesses reported that she lost consciousness briefly but came around fully within a minute or so. When the ambulance arrived on scene she was maintaining her own airway, had breath sounds which were slightly reduced on the right side with sats of 95% on air. She was tachycardic at 110bpm, with BP 110/70 with a tender abdomen. A T-POD and right femoral splint have been applied. Her GCS was 14 out of 15 (E3V5M6) on initial assessment but has fallen to 13/15 (E3V4M6). The accident occurred about 25 minutes ago.
‘VOICE OF MANIKIN’ BRIEFING:

Initial confused speech with no memory of the accident, but enough to provide basic medical history of no medical problems and no allergies. Finding it difficult to breathe. Fairly rapidly her speech stops and she starts to moan with single words occasionally only.

‘VOICE OF TELEPHONE HELP BRIEFING’:

There will be delay before help arrives. If surgeons called, advise is to perform CT prior to going to theatre.

ADDITIONAL INFORMATION

![Blood Gas Values](image)

- **pH**: 7.42
- **pCO2**: 4.3 kPa
- **PO2**: 14 kPa
- **pO2(A-a)e**: kPa

**Blood Gas Values**

- **pH**: 7.42
- **pCO2**: 4.3 kPa
- **PO2**: 14 kPa
- **pO2(A-a)e**: kPa

**Oximetry Values**

- **sO2**: 94.9%
- **fO2/Hb**: %
- **fCOHb**: %
- **fHHb**: %
- **fHb**: %
- **Hct**: 0.32%

**Electrolyte Values**

- **cK+**: 4.5 mmol/L
- **cNa+**: 137 mmol/L
- **cCa2+**: 1.16 mmol/L
- **cCl-**: 98 mmol/L

**Metabolite Values**

- **cGlu**: 8.6 mmol/L
- **cLac**: 2.1 mmol/L

**Acid Base Status**

- **cBase(Ecf)c**: -4.2 mmol/L
- **cHCO3-(P,st)c**: 18 mmol/L
CONDUCT OF SCENARIO

INJURIES
- LHS Tension Pneumothorax (+/- Flail Chest)
- Liver laceration + major haemorrhage
- Minor head injury

INITIAL SETTINGS
A: Own. Collar, blocks and tape applied.
B: SpO2 94% on O2. RR 32/min. Absent LHS Breath sounds.
C: HR 125 (Sinus), BP 90/60.
D: Eyes half open. Pupils equal. AVPU.
E: Evidence of wounds to RHS head, thorax, abdo, RHS leg. T-POD & RHS leg splint

EXPECTED ACTIONS
- Team leader/assign roles
- <C>ABCDE Primary Survey
- AMPLE history
- Identify Tension Pneumo.
- Needle decompression
- IV access & Bloods
- Monitoring
- IV fluid resuscitation

EXPECTED ACTIONS
- Complete Primary survey
- Take steps to insert chest drain.
- Consider possible bleeding sites and methods to confirm – CXR, FAST, CT
- Consider resuscitation with O ve- blood

AFTER NEEDLE DECOMPRESSION
A: Own.
B: SpO2 97% on O2. RR 24/min
C: HR 110 (Sinus), BP 98/65.
D: Eyes half open. AVPU.

WITHOUT NEEDLE DECOMPRESSION
A: Own.
B: SpO2 80% on O2 over 3 mins. RR 40/min.
Absent LHS Breath sounds
C: HR 160 (Sinus), BP 60/40.
D: Eyes closed.

*Cardiac arrest ensues if not addressed*

ONGOING BLEEDING
A: Own.
B: SpO2 97%. RR 30/min over 3 mins.
C: HR140 and BP 80/55 over 4 mins.
D: Eyes closed. AVPU.

EXPECTED ACTIONS
- Commence fluid resuscitation with O ve- blood
- Arrange for urgent x-match >6 units and consider activating major haemorrhage protocol
- Contact surgeons and liaise with CT.
- Commence Tranexamic acid therapy

EXPECTED ACTIONS
- Cardiovascular status and GCS improves with adequate resuscitation: BP 95/70, HR 95. Safe for transfer to CT,

LOW DIFFICULTY

NORMAL DIFFICULTY
- Mild improvement in cardiovascular status and GCS, despite resuscitation: BP 85/60, HR 115. Needs airway control prior to potential transfer.

HIGH DIFFICULTY
- Continuing deterioration despite resuscitation: BP 70/50, HR 140.
- Needs intubation – difficult.
- Needs theatre for damage control surgery – surgeons insist on need for CT prior the theatre,
- Participants need to communicate appropriately with surgical colleagues to avoid dangerous CT transfer.

RESOLUTION
Scenario ends when patient is stabilised for transfer to CT or theatre

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Editor: Dr Andrew Darby Smith
Original Author: Dr P Shanmuha
DEBRIEFING

POINTS FOR FURTHER DISCUSSION:

Technical:
- Initial Assessment of the trauma patient
- Airway management in the brain-injured patient
- Management of major haemorrhage secondary to trauma
- Management of the tension pneumothorax
  - Part-task training: Insertion of a chest drain

Non-technical:
- Based on established non-technical frameworks e.g. ANTS, NOTECHS etc

DEBRIEFING RESOURCES

INFORMATION FOR PARTICIPANTS

KEY POINTS:
- Initial assessment and management of the trauma patient.
- Recognition and management of tension pneumothorax.
- Recognition and management of unrevealed major haemorrhage.

RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

<table>
<thead>
<tr>
<th>IG_BS_07 AM_BS_04</th>
<th>Demonstrates effective pre-oxygenation, including correct use of the mask, head position and clear explanation to the patient.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG_BS_08</td>
<td>In respect of intravenous induction:</td>
</tr>
<tr>
<td></td>
<td>• Makes necessary explanation to the patient</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates satisfactory practice in preparing drugs for the induction of anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates proper technique in injecting drugs at induction of anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Manages the cardiovascular and respiratory changes associated with induction of general anaesthesia.</td>
</tr>
<tr>
<td>IG_BS_10 AM_BS_05</td>
<td>In respect of airway management:</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates optimal patient position for airway management.</td>
</tr>
<tr>
<td></td>
<td>• Manages airway with mask and oral/nasopharyngeal airways</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates hand ventilation with bag and mask</td>
</tr>
<tr>
<td></td>
<td>• Able to insert and confirm placement of a Laryngeal Mask Airway</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates correct head positioning, direct laryngoscopy and successful nasal/oral intubation technique(s) and confirms correct tracheal placement.</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates appropriate use of bougies.</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates correct securing and protection of LMAs/tracheal tubes during movement, positioning and transfer.</td>
</tr>
<tr>
<td>CI_BK_02</td>
<td>Unexpected fall in SpO2 with or without cyanosis.</td>
</tr>
<tr>
<td>CI_BK_08</td>
<td>Unexpected hypotension.</td>
</tr>
<tr>
<td>CI_BK_20</td>
<td>Pneumothorax and tension pneumothorax.</td>
</tr>
<tr>
<td>4.3</td>
<td>Administers blood and blood products safely.</td>
</tr>
<tr>
<td>4.4</td>
<td>Uses fluids and vasoactive / inotropic drugs to support the circulation.</td>
</tr>
<tr>
<td>5.2</td>
<td>Performs emergency airway management</td>
</tr>
<tr>
<td>CI_BS_01</td>
<td>Demonstrates good non-technical skills such as: [effective communication, team-working, leadership, decision-making]</td>
</tr>
<tr>
<td>CI_BS_02</td>
<td>Demonstrates the ability to recognise a deteriorating situation early through careful monitoring</td>
</tr>
<tr>
<td>CI_BS_05</td>
<td>Demonstrates ability to recognise when a crisis is occurring</td>
</tr>
<tr>
<td>CI_BS_06</td>
<td>Demonstrates how to obtain the attention of others and obtain appropriate help when a crisis is occurring</td>
</tr>
<tr>
<td>MT_BS_01</td>
<td>Demonstrates how to perform the Primary Survey in a trauma patient</td>
</tr>
<tr>
<td>MT_BS_02</td>
<td>Demonstrates correct emergency airway management in a trauma patient including those with actual or potential cervical spine damage [S]</td>
</tr>
<tr>
<td>MT_BS_03</td>
<td>Demonstrates how to manage a tension pneumothorax</td>
</tr>
<tr>
<td>MT_BS_06</td>
<td>Demonstrates the initial resuscitation of patients with trauma and preparation for further interventions including emergency surgery</td>
</tr>
<tr>
<td>CI_IS_01</td>
<td>Demonstrates leadership in the resuscitation room/simulation when practicing response protocols with other healthcare professionals</td>
</tr>
<tr>
<td>CI_IS_02</td>
<td>Demonstrates appropriate use of team resources when practicing response protocols with other healthcare professionals</td>
</tr>
<tr>
<td>GU_IS_03</td>
<td>Demonstrates the ability to manage the effects of sudden major blood loss effectively</td>
</tr>
<tr>
<td>RC_IS_05</td>
<td>Demonstrates leadership during resuscitation, including supporting less experienced members of</td>
</tr>
</tbody>
</table>

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Editor: Dr Andrew Darby Smith
Original Author: Dr P Shanmuha
### the team

- **MT_IS_04**
  Demonstrates safe perioperative anaesthetic management of patients with multiple injuries requiring early surgery, including the management of major blood loss and associated coagulopathy, hypothermia and acidosis.

- **1.5**
  Assesses and provides initial management of the trauma patient.

- **6.5**
  Manages the pre- and post-operative care of the trauma patient under supervision.

- **MT_HS_01**
  Demonstrates the ability to lead a multi-disciplinary trauma team, co-ordinating and delivering the early hospital care of all types of complex multiply injured patients including the primary survey, resuscitation and secondary survey, plus appropriate HDU/ICU admission.

- **MT_HS_02**
  Demonstrates the ability to lead and/or deliver the safe perioperative anaesthetic care to all multiply injured patients including HDU/ICM admission if required for continued care.

- **MT_HS_05**
  Demonstrates good communication skills with all members of the trauma team when leading the clinical care of the multiply injured patient and seeks prompt and active advice from specialties not involved in the initial resuscitation, when needed.

### DEBRIEFING RESOURCES


4. [http://www.east.org/resources/treatment-guidelines](http://www.east.org/resources/treatment-guidelines)


PARTICIPANT REFLECTION:

What have you learnt from this experience? (Please try to list 3 things)

How will your practice now change?

What other actions will you now take to meet any identified learning needs?
PARTICIPANT FEEDBACK

Date of training session:..............................................................................................................................................

Profession and grade:........................................................................................................................................................

What role(s) did you play in the scenario? (Please tick)

Primary/Initial Participant

Secondary Participant (e.g. ‘Call for Help’ responder)

Other health care professional (e.g. nurse/ODP)

Other role (please specify): Observer

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found this scenario useful</td>
<td></td>
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</tr>
<tr>
<td>I understand more about the scenario subject</td>
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<tr>
<td>I have more confidence to deal with this scenario</td>
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</tr>
<tr>
<td>The material covered was relevant to me</td>
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</tr>
</tbody>
</table>

Please write down one thing you have learned today, and that you will use in your clinical practice.

How could this scenario be improved for future participants?

(This is especially important if you have ticked anything in the disagree/strongly disagree box)
What went particularly well during this scenario?

What did not go well, or as well as planned?

Why didn’t it go well?

How could the scenario be improved for future participants?