Trauma

Basic Emergency Care Course
Objectives

• Recognize key history findings suggestive of high-risk trauma
• Recognize physical exam findings suggestive of high-risk trauma
• Perform trauma primary survey (ABCDE approach to trauma)
• Perform trauma secondary survey (head-to-toe trauma exam)
• Recognize life-threatening injuries
• Perform critical actions for high-risk conditions
Essential Skills

- Cervical spine immobilization
- Spine immobilization and log-roll manoeuvre
- Jaw-thrust manoeuvre
- Airway suctioning
- Insertion of oropharyngeal and nasopharyngeal airway
- Recovery position
- Oxygen delivery
- Bag-valve-mask ventilation
- Needle decompression for tension pneumothorax
- Three-sided dressing for a sucking chest wound
- Direct pressure for haemorrhage control, including deep wound packing
- Tourniquet for haemorrhage control
- IV line insertion
- IV fluid resuscitation
- AVPU and GCS assessment
- Pelvic binding
- Basic fracture immobilization
- Trauma secondary survey
- Basic wound management, including irrigation (washing)
- Burn management
• Early priorities for an injured person include:
  • Managing airway and breathing emergencies
  • Controlling bleeding
  • Treating shock
  • Immobilizing the spine if needed
Goals

The goal of initial assessment is to identify life-threatening injuries

The goal of acute management is to prevent secondary injury from poor oxygenation and decreased perfusion, to control pain and to plan ongoing care
The Approach to Trauma

Three phases:

• Trauma primary survey
  • The ABCDE approach

• SAMPLE history

• Trauma secondary survey
  • A complete head-to-toe examination looking for injuries not identified during the trauma primary survey

During assessment, if life-threatening problems are identified, stop and manage them
The ABCDE Approach

**REMEMBER ............**

People who initially appear uninjured may have hidden life-threatening injuries, such as internal bleeding. It is very important to re-assess trauma patients multiple times and, in particular, any time the patient’s condition worsens.
The Trauma Primary Survey
(ABCDE Approach to Trauma)
Introduction: Trauma Primary Survey

ABCDE Approach should be done within the first 5 minutes and repeated anytime the patient’s condition worsens

Always suspect head and spine injury in a patient with altered mental status
Airway Assessment

- **Look** for vomit, tongue or other objects obstructing the airway
- **Look** for burned nasal hairs or soot around the nose or mouth
- **Look** for head or neck trauma
- **Look** for expanding neck haematoma (bleeding under the skin)
- **Assess** for altered mental status
- **Listen** for abnormal airway sounds
  - Gurgling
  - Snoring
  - Stridor
  - Noisy breathing
Airway Management with Cervical Spine Immobilization

- STABILIZE the cervical spine
- Open airway using JAW THRUST (not head-tilt-chin lift)
- SUCTION airway secretions and remove any visible foreign objects
- Place ORAL/NASAL AIRWAY if necessary
  - Avoid nasal airway in facial trauma
- Plan for rapid HANDOVER/TRANSFER if:
  - Evidence of airway burns
  - Expanding neck haematoma
Breathing Assessment

• Look for increased work of breathing
• Look for abnormal chest wall movement
• Look for tracheal shift
• Look for sucking chest wounds
• Look for cyanosis
• Look for abrasions, bruising or other signs of injury to chest
• Look for circumferential burns to chest or abdomen
• Listen for absent/decreased breath sounds
• Listen for dull sounds or hyperresonance with percussion
• Feel for crepitus, cracking and popping with palpation
Breathing Management

- Give OXYGEN
- NEEDLE DECOMPRESSION, OXYGEN and IV FLUIDS for tension pneumothorax
- THREE-SIDED DRESSING for sucking chest wound
- If breathing is not adequate or patient is hypoxic on oxygen, assist breathing with BAG-VALVE-MASK VENTILATION
- For chest or abdomen burns restricting breathing, plan for rapid HANDOVER/TRANSFER for escharotomy
Circulation Assessment

- **Look** for capillary refill greater than 3 seconds
- **Look** for pale extremities
- **Look** for distended neck veins
- **Look** for external and internal bleeding
  - Common sites: chest, abdomen, pelvis, femur, amputations, large external wounds, burns
- **Look** for burns (size and depth)
- **Feel** for cold extremities
- **Feel** for weak pulse or tachycardia
Circulation Management

- Apply DIRECT PRESSURE or DEEP WOUND PACKING to control active bleeding
- Apply TOURNIQUET to amputated limbs or uncontrolled bleeding
  - Start IV and plan for urgent TRANSFER to a surgical unit
- If ongoing blood loss/poor perfusion, start 2 large IVs and give IV FLUID
- If burn injury, start IV FLUIDS according to burn size
- SPLINT suspected femur fracture
- BIND suspected pelvic fracture
- LEAVE penetrating objects; stabilize the object and prepare for TRANSFER
- Place pregnant patients on left side while maintaining spinal immobilization
Disability Assessment

- **Look** for confusion, lethargy or agitation
- **Look** for seizures/convulsions
- **Look** for unequal or poorly reactive pupils
- **Look** for deformities of the skull
- **Look** for blood or fluid from ears or nose
- **Check** AVPU or GCS
- **Check** movement and sensation in all extremities
- **Check** blood glucose in the confused or unconscious patient

Source: WHO Pocket Book for Hospital Care of Children. 2nd Ed. 2013. P168
Disability Management

- If GCS < 9 (or children AVPU score P or U) plan for rapid HANDOVER/TRANSFER
- If patient is lethargic or unconscious, RE-ASSESS airway frequently
- THINK spine injury or closed head injury in any trauma patient with altered mental status
- Give OXYGEN
- If low blood glucose or unable to check, give GLUCOSE
- If seizing, give a BENZODIAZEPINE
Exposure Assessment

- Remove all clothing
- **Examine** entire body for evidence of injury
  - Including back, groin and underarms
- Assess the patient’s back and spine using the log-roll manoeuvre
Exposure Management

- If spinal injury is suspected, perform log roll manoeuvre to examine the back
- Remove restrictive clothing and all jewelry
- Remove any wet clothes and dry patient thoroughly
- Cover the patient as soon as possible to prevent hypothermia
- Respect the patient and protect modesty during exposure
Workbook Question 1

A middle-aged man is brought in after being hit by a car. List the immediate management for the assessment findings below:

<table>
<thead>
<tr>
<th>Primary Survey Finding</th>
<th>Immediate Management:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On airway assessment:</strong></td>
<td></td>
</tr>
<tr>
<td>Gurgling airway sounds and obvious head trauma</td>
<td></td>
</tr>
<tr>
<td><strong>On circulation assessment:</strong></td>
<td></td>
</tr>
<tr>
<td>Weak pulses and capillary refill &gt; 3 seconds</td>
<td></td>
</tr>
<tr>
<td>Evidence of pelvic fracture</td>
<td></td>
</tr>
</tbody>
</table>
Important Conditions to be Managed in the Trauma Primary Survey
## Critical AIRWAY Conditions: Airway Obstruction

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visible blood, secretions, vomit, tongue, foreign body in airway</td>
<td>• Monitor altered patients for potential aspiration</td>
</tr>
<tr>
<td>• Changes in voice</td>
<td>• SUCTION airways as needed</td>
</tr>
<tr>
<td>• Abnormal airway sounds (stridor, snoring, gurgling)</td>
<td>• Open the airway using JAW THRUST</td>
</tr>
<tr>
<td>• Neck haematoma</td>
<td>• Maintain CERVICAL SPINE IMMOBILIZATION</td>
</tr>
<tr>
<td>• Burns to head and neck</td>
<td>• Plan for rapid HANDOVER/TRANSFER for advanced airway management</td>
</tr>
<tr>
<td>• Mental status changes</td>
<td></td>
</tr>
<tr>
<td>• Poor chest rise</td>
<td></td>
</tr>
<tr>
<td>• Injury causing airway swelling</td>
<td></td>
</tr>
</tbody>
</table>

Head and neck injuries may result in airway obstruction by blood, secretions, vomit, foreign body or swelling

Penetrating neck wounds can cause expanding haematomas

Inhalation injuries from burns can cause airway swelling
Critical **BREATHING** Conditions: Tension Pneumothorax

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
</table>
| • Hypotension **with** difficulty breathing and any of the following:  
  • Distended neck veins  
  • Absent breath sounds on affected side  
  • Hyperresonance with percussion on affected side  
  • May have tracheal shift away from affected side | • Perform NEEDLE DECOMPRESSION, give OXYGEN and IV FLUIDS  
• Plan for HANDOVER/TRANSFER  
  • Patient needs chest tube |

Any pneumothorax can become a tension pneumothorax
## Critical BREATHING Conditions: Sucking Chest Wound

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
</table>
| • Open wound to chest wall with air passing through.  
  • Bubbling or sucking noises  
  • Difficulty in breathing  
  • Chest pain | • Give OXYGEN  
• Place a THREE-SIDED DRESSING  
  • Observe continuously to prevent dressing occlusion (tension pneumothorax)  
• Plan for rapid HANDOVER/TRANSFER for placement of a chest tube |
### Critical BREATHING Conditions: Flail Chest

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Difficulty breathing</td>
<td>• Give OXYGEN and pain control</td>
</tr>
<tr>
<td>• Chest pain</td>
<td>• MONITOR for difficulty breathing and hypoxia</td>
</tr>
<tr>
<td>• Part of chest wall moving in the opposite direction of the rest of the chest when breathing</td>
<td>• Plan for rapid HANDOVER/TRANSFER to provider capable of chest tube placement and advanced airway.</td>
</tr>
</tbody>
</table>

Flail chest segments occur when ribs are broken in multiple places

The free section moves abnormally with breathing and prevents the lung from expanding

Likely damage to underlying lung tissue
Flail VS. Normal Fracture

A. Blunt Force Trauma

B. Blunt Force Trauma

● = Area of Fracture
Critical **BREATHING** Conditions: Haemothorax

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Difficulty breathing</td>
<td>• Give OXYGEN and IV FLUIDS</td>
</tr>
<tr>
<td>• Decreased breath sounds on affected side</td>
<td>• Plan for rapid HANDOVER/TRANSFER to centre capable of surgery</td>
</tr>
<tr>
<td>• Dull sounds with percussion on affected side</td>
<td></td>
</tr>
<tr>
<td>• Large haemothorax may cause shock</td>
<td></td>
</tr>
</tbody>
</table>

Haemothorax occurs when there is blood in the space between the lungs and the chest wall.
## Critical CIRCULATORY Conditions: Hypovolaemic Shock

### Signs and Symptoms

- Tachycardia
- Tachypnoea
- Pale skin
- Cold extremities
- Slow capillary refill
- May have dizziness/confusion/ altered mental status
- External or internal bleeding (chest, abdomen, pelvis, femur, blood vessels)

### Management

- **CONTROL BLEEDING**
  - Direct pressure
  - Deep wound packing if wound is deep, open (gaping wound)
  - Tourniquet (Uncontrolled bleeding)
  - Splint fractures, bind pelvis as needed
- Start 2 large IVs, give IV FLUIDS
- Plan for rapid HANDOVER/TRANSFER if large haemothorax/internal haemorrhage

Shock can result from rapid blood or fluid loss (burns)

A patient in shock may have a normal blood pressure for a long time before decompensating.

Suspect hypovolaemic shock if there is severe bleeding and signs of poor perfusion.
## Critical Circulatory Conditions: Pericardial Tamponade

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Signs of poor perfusion</td>
<td>• Give IV fluids to improve heart filling</td>
</tr>
<tr>
<td>• Tachycardia, tachypnoea, hypotension, pale skin, cold extremities, capillary refill &gt;3 seconds</td>
<td>• Plan for rapid HANDOVER/TRANSFER for provider capable of draining the fluid</td>
</tr>
<tr>
<td>• Distended neck veins</td>
<td></td>
</tr>
<tr>
<td>• Muffled heart sounds</td>
<td></td>
</tr>
<tr>
<td>• Dizziness, confusion, altered mental status</td>
<td></td>
</tr>
</tbody>
</table>

Pericardial tamponade occurs when fluid builds up in the sac around the heart. Can collapse the chambers -> prevent heart from filling.
# Critical DISABILITY Conditions: Severe Head Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visual changes</td>
<td>• IMMOBILIZE the spine, use LOG-ROLL technique to examine the back</td>
</tr>
<tr>
<td>• Memory loss</td>
<td>• Use GCS (AVPU in children) to assess</td>
</tr>
<tr>
<td>• Seizures/convulsions</td>
<td>• Frequently reassess ABCDE</td>
</tr>
<tr>
<td>• Vomiting</td>
<td>• If concern for open skull fracture, give IV ANTIBIOTICS per protocol</td>
</tr>
<tr>
<td>• Headaches</td>
<td>• CHECK glucose, give as needed</td>
</tr>
<tr>
<td>• Altered mental status or other neurologic deficit</td>
<td>• Do not give food/drink by mouth</td>
</tr>
<tr>
<td>• Scalp wound and/or skull deformity</td>
<td>• Plan for rapid HANDOVER/TRANSFER</td>
</tr>
<tr>
<td>• Bruising to head (especially around eyes or behind ears)</td>
<td></td>
</tr>
<tr>
<td>• Blood or fluid from ears or nose</td>
<td></td>
</tr>
<tr>
<td>• Unequal pupils</td>
<td></td>
</tr>
</tbody>
</table>
Severe Head Injury

**REMEMBER ........**

The skull is rigid and bleeding will cause increased pressure on the brain. Once the pressure is too high, it will prevent blood from entering the skull and perfusing the brain. Eventually it will squeeze part of the brain through the base of the skull, causing death.
People who initially appear uninjured may have hidden life-threatening injuries such as internal bleeding.

It is very important to reassess trauma patients frequently using the primary survey (repeat frequently).

Vital signs should be checked at the end of the primary survey but do not delay interventions for vital signs.
Workbook Question 2

Using the workbook section above, list five important conditions to recognize in the primary survey:

1.
2.
3.
4.
5.
The SAMPLE History
S: Signs and Symptoms

• **ASK:**
  - Are there changes in the person’s voice such as a hoarse or raspy voice?
  - Does the person have any difficulty with breathing?

• **THINK**
  - Changes in voice in association with injury to the head, neck or with burns may suggest airway swelling
  - Problems with breathing may develop over time and may not be obvious in the ABCDE survey
    - May suggest injury to lungs, ribs, muscles, chest wall or spinal injury
S: Signs and Symptoms

• ASK:
  • About any previous bleeding before arrival
  • How long has there been bleeding?
  • How many bandages have been soaked?
  • Is the bleeding getting better or worse?

• THINK
  • Patients may have a difficult time estimating blood loss so using length of time or bandages soaked may be more useful
S: Signs and Symptoms

• ASK:
  • Is there any confusion or unusual sleepiness?

• THINK
  • This may be a sign of head injury
  • A head injury can cause bleeding or increased pressure on the brain leading to confusion, lethargy and coma
  • Shock causes decreased blood flow to the brain
S: Signs and Symptoms

• **ASK:**
  - Is there any pain?
  - Where is the pain?
  - What does it feel like and how severe is it?

• **THINK**
  - Pain is a sign of underlying injury
  - Headache may suggest the person has an injury to the skull or brain
  - Pain along the spine may suggest injury that could damage the spinal cord
  - Pain in the chest or abdomen may suggest damage to heart, lungs or organs
  - Pain in the pelvis or hips may suggest a fracture (bleeding)
  - Pain may be the first suggestion of injury even if there is no external sign
S: Signs and Symptoms

• **ASK:**
  - Is there nausea or vomiting?
  - Is there reported numbness or weakness?
  - Any vision changes?

• **THINK**
  - Nausea and vomiting may indicate a head or abdominal injury
  - Numbness and weakness may indicate a spinal injury
  - Vision changes can be caused by direct trauma to the eye, fractures around the eye or head injuries
A: Allergies

• **ASK**
  • Are there any allergies to medications?

• **THINK**
  • Patient may require medications
M: Medications

• **ASK**
  • Currently taking any medications?
  • Any new medications or recent dose changes?
  • Obtain a full list of medications

• **THINK**
  • Medications that affect blood clotting can make bleeding more difficult to control and increase the risk of delayed bleeding
  • Blood pressure medications can make it difficult to manage shock
P: Past Medical History

• **ASK**
  - Is the patient pregnant?
  - Ask women of childbearing age the date of their last menstrual period

• **THINK**
  - Pregnancy causes some of the organs to be moved out of their usual position
  - Pregnancy changes the body’s response to trauma
  - If more than 20 weeks gestation place on left lateral side while maintaining c-spine immobilization
    • This ensures blood can flow from lower body back to heart
P: Past Medical History

• **ASK**
  • When was their last tetanus vaccination?

• **THINK**
  • If the person has not had a tetanus vaccination within the past five years and has a skin penetrating injury they need an updated vaccination
P: Past Medical History

• **ASK**
  • About previous medical history that puts patients at a higher risk for poor outcomes.

• **THINK**
  • Some conditions put patients at a higher risk for poor outcomes after an injury:
    • Age less than 5 years or greater than 55 years
    • Heart or lung disease
    • Diabetes
    • Liver failure (cirrhosis)
    • Severely overweight
    • Pregnant
    • Immunosuppression (including HIV)
    • Bleeding disorders or taking blood thinners
L: Last Oral Intake

• **ASK**
  • When did the patient last eat or drink?

• **THINK**
  • A full stomach increases the risk of vomiting and possible choking
  • This is very important when intubation is possible
E: Events Surrounding Illness

• **ASK**
  • About the mechanism of injury
  • Ask about seatbelts in road traffic accidents
  • For assaults ask about the type of weapon(s)
  • Was there drugs or alcohol involved?
  • For burns ask about the type of burn (fire, scalding, chemical...)

• **THINK**
  • Certain mechanisms are a high risk even if the patient does not appear to be significantly injured or ill; consider hidden injuries
E: Events Surrounding Illness

• **ASK**
  - Was there a fall from 3 meters or more?
  - Or twice the height in children?

• **THINK**
  - A greater distance fallen increases the chance of serious injury
  - Falls in adults are often associated with older age, alcohol intoxication, or failure of workplace equipment
  - Falls in children are often from trees, windows or balconies
E: Events Surrounding Illness

**ASK**
- Was a pedestrian or cyclist hit by a vehicle?
- Were they on a motorcycle?
  - Were they thrown? How far?
  - Were they wearing a helmet?

**THINK**
- Pedestrian or cyclists are always at high risk for serious injury
- Young children may be less able to report events
- Always consider possible unwitnessed trauma in young children
- Consider multiple injuries from direct impact and secondary impact if they are thrown
- Common injury sites for motorcycle collisions are head, spine, chest, abdomen and pelvis, (rider hitting handlebars) limbs and skin (rider hitting road)
E: Events Surrounding Illness

• **ASK**
  - Was there a road traffic crash at high speed?
  - Was the person thrown from or trapped inside a vehicle?
  - Did any occupants die in the crash?
  - Was the person wearing a seatbelt?

• **THINK**
  - In higher-speed crashes, greater force is transmitted increasing injury risk
  - Injury may occur from impact with the windscreen or steering wheel
  - Injury may occur from sudden stopping of the vehicle
  - A person thrown is at high risk for injury
  - If a person was trapped, find out what part was trapped and for how long. Consider crush injury
  - A death at the scene suggests significant force
  - Consider types of injuries more common if a person was or was not wearing a seatbelt
E: Events Surrounding Illness

• **ASK**
  - Was a weapon used?
  - What type of weapon?

• **THINK**
  - A gunshot or stab wound patient may have multiple wounds
  - Always check the entire body for wounds
    - A bullet may not follow a direct path in the body
    - Many internal organs can be injured by one bullet
    - Consider length of blade used for stab wound
  - Injuries from blunt objects can cause damage to organs as well as bruises, lacerations and fractures
E: Events Surrounding Illness

• **ASK**
  • Was there a burn?
  • What type of burn was it?
  • Was first aid provided at the scene?

• **THINK**
  • Flame burns in an enclosed space may cause inhalation or airway injury
  • Scald burns are common in children
  • Injuries from electrical burns may appear small but can cause extensive tissue and muscle damage
  • For chemical burns, it is important to learn the specifics to remove it properly
  • Consider if the burning process was stopped and if decontamination was performed
  • For burns <3 hours old, wash the burn to stop the burning process
  • Protect yourself from chemical exposure
E: Events Surrounding Illness

• **ASK**
  • Did the person sustain a crush injury?
    • Is there pain or numbness?
    • Is there dark urine?
    • How long was the body part crushed?
  • Did the person sustain a blast injury?

• **THINK**
  • Crush injuries damage skin, muscle, blood vessels and bone
  • Dark urine can signify dangerous amounts of myoglobin released from the muscle
  • Swelling can build up pressure limiting blood flow to the muscles and nerves (compartment syndrome)
  • Blast injuries can involve all body systems, especially hollow organs
    • Common sites include the lungs, intestines and ears
  • For blast injuries, consider foreign body injuries, burns, chemical injury, toxin or radiation exposure
Workbook Question 3

Using the workbook section above, list five questions you would ask when taking a SAMPLE history from a person injured in a road traffic crash

1.
2.
3.
4.
5.
Trauma Secondary Survey

Look, listen and feel

*Remember you should have ALREADY completed the ABCDE Exam and treated life-threatening conditions BEFORE doing this extensive examination

*Perform a detailed head-to-toe examination of the patient

*Remember that very painful or frightening injuries may distract from others

*If the secondary exam identifies an ABCDE condition, STOP AND RETURN IMMEDIATELY TO ABCDE to manage it.
Secondary Exam Survey: Head, Eyes, Ears, Nose, Throat (HEENT)

• **Look for:**
  - Scalp wounds or bruising
  - Skull deformities
  - Blood in the mouth or throat
  - Unequal or unresponsive pupils indicating head injury
  - Vision loss or changes and eye injuries
  - Any problems with eye movements
  - Blood or fluid from ear or nose indicating injury or open skull fracture
  - Tooth injury or poor alignment
  - Signs of airway burns: ash, singed nasal hairs or new or worsening lip or mouth swelling

• **Listen for**
  - Stridor which could indicate airway obstruction
  - Gurgling indicating fluid in the airway
  - Changes in voice, which can indicate airway or vocal cord injury

• **Feel for**
  - Tenderness or abnormal movement of facial bones
  - Loose teeth that could accidently be inhaled
  - Defects or crepitus in the skull or facial bones suggesting fracture
Secondary Exam Survey: Neck

• Look for:
  • Reduced ability to move neck or pain on movement
  • Bruising, bleeding or swelling
  • Haematoma that may eventually cause airway obstruction
  • Penetrating neck wounds
  • Distended neck veins (may indicate tension pneumothorax or tamponade)

• Feel for:
  • Air in the skin or soft tissue (concern for pneumothorax)
  • Tenderness or deformity along the spine
Secondary Exam Survey: Chest

• **Look for:**
  - Bruising, deformity or wounds
  - Uneven chest wall movement (concern for pneumothorax or flail chest)
  - Burns around the entire chest (circumferential) which can cause difficulty in breathing

• **Listen for:**
  - Breath sounds (decreased, unequal, absent, wheezing or rhonchi)
  - Muffled heart sounds (concern for pericardial tamponade)

• **Feel for:**
  - Tenderness
  - Crepitus (concern for fracture or pneumothorax)
Secondary Exam Survey: Abdomen

• **Look for**
  - Abdominal distension
  - Visible wounds, bruising or abrasions
  - Bruising on back or sides which may indicate bleeding into the abdomen
  - Circumferential burns to the abdomen (concern for breathing problems)

• **Feel for**
  - Rebound tenderness or guarding
  - Abdominal tenderness in all quadrants which may indicate organ or blood vessel injury
Secondary Exam Survey: Pelvis and Genitourinary

• Look for
  • Bruising/lacerations to pelvis
  • Blood at the opening of the penis or vagina
  • Vaginal lacerations or bleeding
    • May indicate pelvic fracture, injury to uterus or a source of blood loss, or sign of sexual assault
  • Penile lacerations
  • Priapism (can indicate spinal injury)
  • Urine colour changes (dark or obvious blood) that may indicate muscle breakdown or kidney injury

• Feel for
  • Tenderness or abnormal movement in pelvis
Secondary Exam Survey: Extremities

**Look for**
- Swelling or bruising
- Deformity
- Open fractures
- Amputations
- Circumferential burns
- Pale skin (could indicate loss of blood flow)

**Feel for**
- Absent or weak pulses
- Cold extremities (could indicate loss of blood flow)
- Tenderness
- Abnormally firm, painful muscular compartments (could indicate compartment syndrome)
Secondary Exam Survey: Spine

LOG ROLL the person with assistance, then:

• **Look for:**
  • Bruising
  • Deformity

• **Feel for:**
  • Tenderness, crepitus and alignment along the entire spine (upper neck to lower back)
  • Tenderness, crepitus or misalignment over any other areas with visible evidence of trauma

If concern for spinal injury, check and document the level where the findings start
Secondary Exam Survey: Skin

• Look for:
  • Bruising
  • Abrasions
  • Lacerations
  • Burns
    • Circumferential burns on the chest can cause difficulty in breathing
    • Extremity burns can cause compartment syndrome

• Feel for:
  • Peripheral pulses in all extremities
Secondary Exam Survey: Neurologic

• Check for
  • Decreasing level of consciousness (AVPU or GCS)
  • Agitation or seizures/convulsions (consider serious head injury)
  • Movement and strength in each limb
  • Sensation on face, chest, abdomen and limbs. If there is deficit, identify the level it begins
  • Priapism (consider spinal injury)
  • Decreased sensation, decreased strength or priapism (consider spinal injury)
Workbook Question 4

Using the workbook section above, list one way that you ASSESS the following systems

<table>
<thead>
<tr>
<th>Listen for</th>
<th>Look for</th>
<th>Feel for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head/ eyes/ ears/ nose/ throat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pelvis and Genitourinary</td>
<td><strong>Listen for</strong></td>
<td></td>
</tr>
</tbody>
</table>
Important Conditions to Recognize and Manage Based on History and Secondary Survey
# Head Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Headache</td>
<td>• MONITOR level of consciousness using GCS</td>
</tr>
<tr>
<td>• Altered mental status</td>
<td>• IMMOBILIZE SPINE (any patient with significant head injury is at risk for spine injuries)</td>
</tr>
<tr>
<td>• Abnormal pupils</td>
<td>• MONITOR for vomiting and possible aspiration</td>
</tr>
<tr>
<td>• Scalp lacerations and/or skull fractures</td>
<td>• If there is concern for open skull fracture, give ANTIBIOTICS</td>
</tr>
<tr>
<td>• Bruising around eyes or behind ears</td>
<td>• Check blood glucose and give GLUCOSE if less than 3.5mmol/L or unable to measure</td>
</tr>
<tr>
<td>• Blood or clear fluid from nose or ears</td>
<td>• Any patient with GCS less than 9 should have a CT scan within two hours of injury</td>
</tr>
<tr>
<td>• Weakness on one side of the body</td>
<td></td>
</tr>
<tr>
<td>• Seizures</td>
<td></td>
</tr>
<tr>
<td>• Visual changes</td>
<td></td>
</tr>
<tr>
<td>• Loss of memory</td>
<td></td>
</tr>
<tr>
<td>• Vomiting</td>
<td></td>
</tr>
</tbody>
</table>

Because the brain is encased in the rigid skull, any swelling or bleeding caused by brain injury can become life-threatening.
## Facial Fractures

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Deformities or unusual movements in the facial bones</td>
<td>• Give ANTIBIOTICS for open facial fractures</td>
</tr>
<tr>
<td>• Jaw not closing properly</td>
<td>• Update TETANUS vaccination if needed</td>
</tr>
<tr>
<td>• Problems with eye movement</td>
<td>• Suspect head injury or c-spine injury and IMMOBILIZE the c-spine</td>
</tr>
<tr>
<td></td>
<td>• Position patient to keep blood from entering airway</td>
</tr>
<tr>
<td></td>
<td>• Avoid nasal airways and nasogastric tubes if suspected facial fracture</td>
</tr>
</tbody>
</table>
## Penetrating Eye Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Object stuck in the eye</td>
<td>• Do <em>not</em> push on the eye</td>
</tr>
<tr>
<td>• Painful red eye or a reported feeling of something in eye</td>
<td>• Do <em>not</em> remove objects penetrating the eye</td>
</tr>
<tr>
<td>• Problems with vision</td>
<td>• Give ANTIBIOTICS</td>
</tr>
<tr>
<td>• Abnormally shaped pupil</td>
<td>• Update TEATANUS vaccination if needed</td>
</tr>
<tr>
<td>• Clear liquid draining from the eye</td>
<td>• Elevate the head of the bed and place a patch over <em>both</em> eyes</td>
</tr>
<tr>
<td>• Signs of trauma around the eye</td>
<td>• Plan for HANDOVER/TRANSFER</td>
</tr>
</tbody>
</table>

- Update TEATANUS vaccination if needed
- Elevate the head of the bed and place a patch over both eyes
- Plan for HANDOVER/TRANSFER
## Penetrating Neck Wound

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
</table>
| - Lacerations or punctures to the neck  
- Swelling (suggesting haematoma)  
- Look carefully | - Maintain CERVICAL SPINE PRECAUTIONS  
- Stabilize but do not remove object  
- APPLY firm pressure to bleeding sites (do not block airway)  
- Do not insert anything into the wound  
- Plan for rapid HANDOVER/TRANSFER to a centre with advanced airway management and surgical capabilities |

Patients with penetrating neck wounds are at risk of airway obstruction

Neck wounds may cause significant bleeding
## Chest injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty in breathing</td>
<td>For patients with pneumothorax, give OXYGEN and monitor for signs of tension pneumothorax</td>
</tr>
<tr>
<td>Crepitus or tenderness with palpation to the ribs</td>
<td>If suspected rib fractures (crepitus or tenderness), consider underlying chest or abdominal injury</td>
</tr>
<tr>
<td>Uneven chest wall movements or unequal breath sounds</td>
<td>Plan for rapid HANDOVER/TRANSFER for chest tube in pneumothorax or advanced airway and breathing management</td>
</tr>
</tbody>
</table>

Difficulty in breathing due to lung injury can develop over time, monitor closely

Simple pneumothorax can develop into a tension pneumothorax over time
# Abdominal Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Abdominal pain or vomiting</td>
<td>• If you suspect abdominal injury, give IV FLUIDS</td>
</tr>
<tr>
<td>• Tender, firm or distended abdomen</td>
<td>• Do <strong>not</strong> give food or drink</td>
</tr>
<tr>
<td>• Strong abdominal wall muscle contractions when touched (guarding)</td>
<td>• If bowel is visible</td>
</tr>
<tr>
<td>• Few or no bowel sounds</td>
<td>• Leave outside the body</td>
</tr>
<tr>
<td>• Rectal bleeding</td>
<td>• Cover with STERILE GAUZE soaked in sterile saline</td>
</tr>
<tr>
<td>• Obvious injury or exposed bowel</td>
<td>• Give ANTIBIOTICS</td>
</tr>
<tr>
<td>• Bruising around umbilicus or over flanks (suggest internal bleeding)</td>
<td>• If there is concern for any abdominal injury plan for HANDOVER/TRANSFER to surgical centre</td>
</tr>
</tbody>
</table>

Severe pain or bruising is concerning for organ injury and internal bleeding
# Spinal Cord Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Midline spinal pain/tenderness</td>
<td>• Provide SPINAL IMMOBILIZATION if there is a history of trauma and the patient is unconscious or is conscious and has neck pain, cervical spine tenderness, numbness or weakness</td>
</tr>
<tr>
<td>• Movement problems</td>
<td>• Use a rolled sheet or neck collar to IMMobilize the cervical spine</td>
</tr>
<tr>
<td>• Paralysis</td>
<td>• Keep the patient lying flat</td>
</tr>
<tr>
<td>• Weakness</td>
<td>• Use LOG-ROLL MANOEUVRE when examining or moving</td>
</tr>
<tr>
<td>• Decreased reflexes</td>
<td>• Give IV FLUIDS</td>
</tr>
<tr>
<td>• Sensation problems “pins and needles”</td>
<td>• Plan for rapid HANDOVER/TRANSFER</td>
</tr>
<tr>
<td>• Loss of control of urine or stool</td>
<td></td>
</tr>
<tr>
<td>• Priapism</td>
<td></td>
</tr>
<tr>
<td>• May have hypotension or bradycardia</td>
<td></td>
</tr>
<tr>
<td>• Crepitus to spinal bones</td>
<td></td>
</tr>
<tr>
<td>• Spinal bones not aligned</td>
<td></td>
</tr>
<tr>
<td>• Difficulty in breathing (upper c-spine injury)</td>
<td></td>
</tr>
</tbody>
</table>
• Spinal trauma is not always obvious. Fractured bones can injure the spinal cord, causing paralysis
  • Always document exam findings so future providers can evaluate for changes

• Spinal injuries can cause shock. Risk is higher if there is also blood loss

• Spinal boards are only to move patients. Do not leave patients on spinal boards. It can cause pressure sores
## Internal Bleeding (not seen on primary survey)

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bruising around umbilicus or over flanks</td>
<td>• STOP THE BLEEDING if possible</td>
</tr>
<tr>
<td>• Pelvic fracture</td>
<td>• BIND pelvis fracture</td>
</tr>
<tr>
<td>• Femur fracture</td>
<td>• SPLINT femur fracture</td>
</tr>
<tr>
<td>• Decreased breath sounds on one side of the chest</td>
<td>• Give IV FLUIDS</td>
</tr>
<tr>
<td>• Signs of poor perfusion</td>
<td>• Plan for rapid HANDOVER/TRANSFER for ongoing surgical management and blood transfusion if needed</td>
</tr>
<tr>
<td>• Hypotension</td>
<td></td>
</tr>
<tr>
<td>• Tachycardia</td>
<td></td>
</tr>
<tr>
<td>• Pale skin</td>
<td></td>
</tr>
<tr>
<td>• Diaphoresis</td>
<td></td>
</tr>
</tbody>
</table>
# Pelvic Fracture

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
</table>
| - Pain with palpation of the pelvis  
- Instability or abnormal movement of the bones in the pelvis  
- Blood at the opening of the penis or rectum | - Give IV FLUIDS  
- Give PAIN CONTROL  
- COMPRESS pelvis gently to check for stability  
- Do **not** open and rock the pelvis or perform repeat exams on pelvis  
- STABILIZE the pelvis with a sheet or binder  
- Plan for rapid HANDOVER/TRANSFER for blood transfusions |

![Pelvic Immobilization](https://via.placeholder.com/150)
## Extremity Fracture with Poor Perfusion

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Deformity or crepitus of the bone</td>
<td>• <strong>Look</strong> for signs of poor perfusion beyond the fracture</td>
</tr>
<tr>
<td>• Absent pulses beyond the fracture</td>
<td>• <strong>Feel</strong> the pulse, <strong>check</strong> capillary refill and <strong>observe</strong> skin colour/pallor</td>
</tr>
<tr>
<td>• Capillary refill time of greater than 3 seconds beyond fracture</td>
<td>• If weak pulses or poor perfusion, <strong>REDUCE</strong> and <strong>SPLINT</strong> the fracture</td>
</tr>
<tr>
<td>• Cold extremities with blue or gray coloration of skin beyond the fracture</td>
<td>• <strong>Always check</strong> pulses, capillary refill and sensation before and after any reduction</td>
</tr>
<tr>
<td></td>
<td>• <strong>Give PAIN MEDICATIONS</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>Plan for rapid HANDOVER/TRANSFER</strong> to specialized unit</td>
</tr>
</tbody>
</table>
## Open Fracture

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Deformity or crepitus of the bone with overlying laceration or abrasion</td>
<td>• Control bleeding with DIRECT PRESSURE</td>
</tr>
<tr>
<td></td>
<td>• Perform immediate REDUCTION and SPLINTING if there is poor perfusion</td>
</tr>
<tr>
<td></td>
<td>• IRRIGATE the wound well</td>
</tr>
<tr>
<td></td>
<td>• Dress the wound</td>
</tr>
<tr>
<td></td>
<td>• Give ANTIBIOTICS and TETANUS vaccination</td>
</tr>
<tr>
<td></td>
<td>• SPLINT the wound</td>
</tr>
<tr>
<td></td>
<td>• Plan for rapid HANDOVER/TRANSFER to a specialized unit</td>
</tr>
</tbody>
</table>

Consider it an open fracture if there is a wound (more than a skin abrasion) near a fracture site

Open fractures are emergencies as they can lead to severe bone infections
# Open Wound

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lacerations</td>
<td>• Control bleeding with DIRECT PRESSURE</td>
</tr>
<tr>
<td>• Abrasions</td>
<td>• CLEAN wounds with soap and water or antiseptic</td>
</tr>
<tr>
<td>• Check for blood pooling under patient around axillae, genital area, buttocks or back</td>
<td>• Remove any debris</td>
</tr>
<tr>
<td>• Pumping or squirting blood suggests arterial bleeding</td>
<td>• DRESS wounds with sterile gauze</td>
</tr>
<tr>
<td></td>
<td>• <strong>Check</strong> perfusion beyond the wound before and after dressing wounds</td>
</tr>
<tr>
<td></td>
<td>• SPLINT large lacerations to help with healing</td>
</tr>
<tr>
<td></td>
<td>• Stabilize but do <strong>not</strong> remove penetrating objects</td>
</tr>
<tr>
<td></td>
<td>• For snake bites, IMMOBILIZE extremity</td>
</tr>
<tr>
<td></td>
<td>• For animal bites, consult expert for risk of infection and rabies exposure</td>
</tr>
<tr>
<td></td>
<td>• Give TETANUS vaccination if needed</td>
</tr>
</tbody>
</table>
# Crush Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fractures</td>
<td>• MONITOR urine output for red-brown colour</td>
</tr>
<tr>
<td>• Bruising</td>
<td>• Give IV FLUIDS to help maintain urine output</td>
</tr>
<tr>
<td>• Soft tissue injury</td>
<td>• SPLINT fractures to reduce further damage</td>
</tr>
<tr>
<td>• Evidence of compartment syndrome</td>
<td>• Plan for rapid HANDOVER/TRANSFER if compartment syndrome is suspected</td>
</tr>
<tr>
<td>• Small amounts of red-brown urine</td>
<td>• May have systematic problems related to muscle damage</td>
</tr>
</tbody>
</table>

Compartment syndrome is a build-up of pressure within the muscle compartments that can limit blood supply to muscles and nerves and cause kidney damage due to byproducts of muscle injury
## Blast Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
</table>
| • Injuries to gas-filled organs  
  • Lung, stomach and bowel  
  • Delayed symptoms of cough (with or without blood), tachypnoea, hypoxia or chest pain  
  • Abdominal pain, nausea or vomiting (with or without blood)  
  • Tympanic membrane rupture, hearing loss, ringing in ears, pain or ear bleeding  
  • Burns  
  • Exposure to toxins  
  • Other injuries | • Examine carefully for pneumothorax  
• Give OXYGEN if there is difficulty breathing  
• Update TETANUS if needed  
• Manage IV FLUIDS for burns by calculating burn area  
• Dress burns  
• If the patient has abdominal pain, consider bowel perforation  
  • Give IV FLUIDS  
  • Plan for rapid HANDOVER/TRANSFER for surgery |
An explosive blast causes injuries in three ways:

1. Visible injuries from shrapnel or burns from heat or chemicals released

2. Internal injuries from the change in pressure caused by the blast.
   • Commonly the stomach, bowel, lungs and ears

3. Additional blunt injuries that result when the body is thrown from the blast
# Burn Injury

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Skin colour can range from pink, red, pale or black depending on depth of burn</td>
<td>• MONITOR for airway obstruction</td>
</tr>
</tbody>
</table>
| • Signs of inhalation injury:  
  • Soot (ash) or signed (burned) nasal hairs  
  • Swelling to lips or mouth  
  • Voice changes | • Give IV FLUIDS according to burn area and depth |
| | • Give TETANUS |
| | • Give PAIN RELIEF |
| | • Remove all jewelry |
| | • CLEAN and DRESS all wounds carefully  
  • Burns are high risk for infection |
| | • Plan for rapid HANDOVER/TRANSFER if the following:  
  • Serious burns to >15% of the body  
  • Burns to hands, face, groin, joints or circumferential burns  
  • Inhalation injury  
  • Burns with other trauma  
  • Burns in very young or elderly  
  • Significant pre-burn illness |
Workbook Question 5

Using the workbook section above, list what you would DO to manage the following injuries

1. Pelvic Fracture

2. Burn injury in an adult

3. Abdominal injury
Special Considerations: Pregnant Trauma

• Any female trauma patient between the ages of 10-50 years old should have a pregnancy test
• Pregnancy causes many changes in maternal physiology
  • Even minor trauma may result in harm to the mother and fetus
  • Women in their third trimester are at risk for placental abruption, uterine rupture and premature labour
• Keeping the mother alive is the best way to keep the baby alive
• When taking your SAMPLE history ask about gestational age and any pregnancy complications
Special Considerations: Pregnant Trauma

Primary Survey
• Airway: Pregnancy makes airway obstruction more likely
• Breathing: Diaphragm is pushed up by the uterus, leaving less lung space
• Circulation: Check vaginal bleeding. Place patient in LEFT LATERAL POSITION
• Disability: Always consider eclampsia if seizures
• Exposure: Keep the patient warm

Plan for early HANDOVER/TRANSFER to a specialist centre with obstetric care
Special Considerations: Pregnant Trauma

Common conditions caused by trauma

• Preterm (early) labour
  • With or without premature rupture of membranes (loss of fluid surrounding the baby)
• Placental abruption or uterine rupture causing blood loss and shock
• Seizures/convulsions
Special Considerations: Pregnant Trauma

Special management considerations

• Plan for early HANDOVER/TRANSFER to a specialized unit with obstetric care

• If the uterus can be felt at the level of the umbilicus this generally indicates that the patient is at least 20 weeks pregnant

• If greater than 20 weeks, place patient on the left side to prevent compression of inferior vena cava

• Prepare for neonatal resuscitation as well when trauma occurs in late pregnancy
Workbook Question 6

Using the workbook section above, list the common conditions in pregnant woman that can be caused by trauma

1.
2.
3.
4.
5.
Special Considerations: Paediatric Trauma

• Children can look well for a long time before deteriorating quickly
• They have different injury patterns
  • Can have serious internal organ injuries without overlying skull or rib fractures
• Common management problems
  • Over- or under-resuscitation
  • Medication errors
  • Failure to recognize hypothermia or hypoglycemia
Paediatric AIRWAY Considerations

• When neck trauma or cervical spine injury is suspected, use JAW THRUST to manually open the airway while maintaining cervical spine immobilization.

• Children have relatively big heads and large tongues and may obstruct their airways more easily.

• Young children and infants may require a pad under their shoulders to align the airway and create a neutral position.

Neutral position in infants
Paediatric BREATHING Considerations

• If the child is not breathing adequately after opening the airway, assist breathing with BAG-VALVE-MASK with OXYGEN if available
• Give a breath every 4 seconds in older children
• Give a breath every 3 seconds in infants

<table>
<thead>
<tr>
<th>Age</th>
<th>Respiratory Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 months</td>
<td>40-60 breaths per minute</td>
</tr>
<tr>
<td>2-12 months</td>
<td>25-50 breaths per minute</td>
</tr>
<tr>
<td>1-5 years</td>
<td>20-40 breaths per minute</td>
</tr>
</tbody>
</table>
Paediatric **CIRCULATORY** Considerations

- For ongoing blood loss or evidence of poor perfusion in children with normal nutritional status
  - Establish IV ACCESS
  - Give IV FLUIDS
  - REASSESS immediately after fluids
  - If no improvement, repeat IV FLUIDS
- For malnourished children fluids must be adjusted
- For severe burn injury initial bolus is with dextrose-containing fluids
- For significant haemorrhage plan for rapid HANDOVER TRANSFER to a specialized unit for possible BLOOD TRANSFUSION
Paediatric DISABILITY Considerations

• Monitor a child’s level of consciousness with the AVPU scale
  • Alert
  • Response to verbal stimuli
  • Response to painful stimuli
  • Unresponsive

• Assess for and manage convulsions/seizures

• Assess for and manage hypoglycaemia (low blood sugar)
Paediatric EXPOSURE Considerations

• Undress completely but watch for hypothermia
• Protect the child’s modesty
• Use log-roll to assess remainder of child’s back and head

<table>
<thead>
<tr>
<th>Estimate weight in children based on age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight in kilograms = [age in years + 4] x2</td>
</tr>
<tr>
<td>(or use weight-estimation tools such as PAWPER tape, Mercy tape, Broselow tape, etc)</td>
</tr>
</tbody>
</table>
Special Considerations: Paediatric Trauma

• Head injuries
  • Common cause of death in children from trauma
  • If a paediatric patient has signs of brain injury, plan for rapid HANDOVER/TRANSFER

• Chest injuries
  • Children require less force for more serious internal injuries
  • Ribs are more flexible than in adults so there can be underlying trauma without fractures

• Abdominal injuries
  • Abdomen is relatively larger and commonly injured
  • Splenic injuries from blunt trauma and liver injuries from penetrating trauma are common
  • Abdomen injuries should be considered in all paediatric traumas

• Burns
  • Require close observation for fluid resuscitation and ongoing airway swelling
  • Ongoing pain relief from dressing changes
  • Plan for early HANDOVER/TRANSFER to specialized unit
Workbook Question 6

Using the workbook section above, list the circulation considerations in children who suffer trauma

1.
2.
3.

List the disability considerations in children who suffer trauma

1.
2.
3.
Disposition of the Patient

- Trauma patients can have complex injuries and get worse or die very quickly
- Consider early referral of critically ill trauma patients if:
  - There are airway problems that require intervention
  - The person is displaying signs of shock
  - Tension pneumothorax: perform a NEEDLE DECOMPRESSION prior to transfer
    - Needs chest tube
  - Pericardial tamponade: ensure IV FLUIDS are started and continued on transfer
  - There is altered mental status, drowsiness or lethargy
  - The patient is pregnant (place on her side for transport)
  - The patient is a child with ABCDE problem or a head, chest or abdominal injury
  - There is any serious burn injury: assess burn and begin fluid resuscitation
Disposition of the Patient

- Remember that if a patient required oxygen to arrange to continue it during transport and handover
- If an injured person is displaying signs of shock, ensure treatment with IV fluids is continued on transfer
- Ensure bleeding is controlled
- Communicate injuries, important medical problems and what has been done for the patient during handover/transfer
Questions
Quick Cards
## Key findings from the Trauma Primary Survey [see also ABCDE card]

<table>
<thead>
<tr>
<th><strong>ASSESSMENT FINDINGS</strong></th>
<th><strong>IMMEDIATE MANAGEMENT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway</td>
<td>Use jaw thrust with c-spine protection. Suction if needed, remove visible foreign objects. Place OPA to keep the airway open.</td>
</tr>
<tr>
<td>Not speaking, with limited or no air movement</td>
<td></td>
</tr>
<tr>
<td>Signs of possible airway injury (neck haematoma or wound, crepitus, stridor)</td>
<td>Give oxygen. Monitor closely-- swelling can rapidly block the airway. --&gt;Will need advanced airway management.</td>
</tr>
<tr>
<td>Signs of possible airway burns (soot around the mouth or nose, burned facial hair, facial burns)</td>
<td>Give oxygen. Monitor closely-- swelling can rapidly close the airway. --&gt;Will need advanced airway management</td>
</tr>
</tbody>
</table>
| Breathing | Signs of tension pneumothorax (hypotension with absent breath sounds/hyperresonance on one side, distended neck veins) | Perform needle decompression. Give oxygen, IV fluids.  
→ Will need chest tube |
|-----------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|           | Open (sucking) chest wound | Give oxygen, place 3-sided dressing, monitor for tension pneumothorax.  
→ Will need chest tube |
|           | Breathing not adequate | Give oxygen, assist ventilation with BVM. |
|           | Large burns of chest or abdomen (or circumferential burn to limb) | Give IV fluids per burn size, give oxygen, remove constricting clothing/jewelry.  
→ May need escharotomy |
|           | Signs of flail chest (section of chest wall moving in opposite direction with breathing) | Give oxygen.  
→ May need advanced airway management and assisted ventilation |
|           | Signs of haemothorax (decreased breath sounds on one side, dull sounds with percussion) | Give oxygen, IV fluids.  
→ Will need chest tube |

<table>
<thead>
<tr>
<th>Circulation</th>
<th>Signs of shock (capillary refill &gt;3 sec, hypotension, tachycardia)</th>
<th>Give oxygen, IV fluids, control external bleeding, splint femur/pelvis as indicated.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uncontrolled external bleeding</td>
<td>Apply pressure, deep wound packing or tourniquet as indicated.</td>
</tr>
<tr>
<td></td>
<td>Signs of tamponade (poor perfusion, distended neck veins, muffled heart sounds)</td>
<td>Give IV fluids, oxygen.</td>
</tr>
</tbody>
</table>

| Disability | Signs of brain injury (AMS with wound, deformity or bruising of head/face) | Immobilize cervical spine, check glucose, give nothing by mouth.  
→ Will need neurosurgical care |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Signs of open skull fracture (as above, with blood or fluid from the ears/nose)</td>
<td>As above, and give IV antibiotics per local protocol.</td>
</tr>
</tbody>
</table>

**REMEMBER:** INJURED PATIENTS WITH ABNORMAL ABCDE FINDINGS MAY NEED RAPID HANDOVER/TRANSFER TO A SURGICAL SERVICE. PLAN EARLY.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial fracture</td>
<td>Immobilize cervical spine if indicated, give IV antibiotics for open fractures, avoid nasal airway/ nasogastric tubes.</td>
</tr>
<tr>
<td>Penetrating eye injury</td>
<td>Avoid pressure on the eye, stabilize but do not remove foreign objects, give antibiotics and tetanus, elevate head of bed.</td>
</tr>
<tr>
<td>Open abdominal wound</td>
<td>Give IV fluids, nothing by mouth. Cover visible bowel with sterile gauze soaked in sterile saline, give antibiotics.</td>
</tr>
<tr>
<td>Pelvic fracture</td>
<td>Give IV fluids, stabilize with sheet or pelvic binder.</td>
</tr>
<tr>
<td>Fracture with poor limb perfusion</td>
<td>Reduce fracture, splint.</td>
</tr>
<tr>
<td>Open fracture</td>
<td>Irrigate well, dress wound, splint, give antibiotics, rapid handover for operative management.</td>
</tr>
<tr>
<td>Penetrating object</td>
<td>Leave object in place and stabilize it to prevent further injury.</td>
</tr>
<tr>
<td>Crush injury</td>
<td>Give IV fluids, monitor urine output, monitor for compartment syndrome.</td>
</tr>
<tr>
<td>Burn injury</td>
<td>Assess size and calculate fluid needs, give IV fluids and oxygen, monitor for airway oedema.</td>
</tr>
<tr>
<td>Blast injury</td>
<td>Give oxygen, treat burns as below, give IV fluids, monitor closely for delayed effects of internal injury.</td>
</tr>
</tbody>
</table>

**REMEMBER:** Injured patients with wounds, including burns and open fractures, need tetanus vaccination.
<table>
<thead>
<tr>
<th>High-Risk Mechanisms</th>
<th>High-Risk Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pedestrian or cyclist hit by a vehicle</td>
<td>• Penetrating injuries to head, neck or torso</td>
</tr>
<tr>
<td>• Motorcycle crash or any vehicle crash with unrestrained occupants</td>
<td>• Blast or crush injuries</td>
</tr>
<tr>
<td>• Falls from heights greater than 3 metres (or twice a child’s height)</td>
<td>• Flail chest</td>
</tr>
<tr>
<td>• Gunshot or stabbing</td>
<td>• Two or more large bone fractures, or pelvic fracture</td>
</tr>
<tr>
<td>• Explosion or fire in an enclosed space.</td>
<td>• Spinal injury</td>
</tr>
<tr>
<td></td>
<td>• Limb paralysis</td>
</tr>
<tr>
<td></td>
<td>• Amputation above wrist or ankle</td>
</tr>
</tbody>
</table>

**SPECIAL CONSIDERATIONS IN CHILDREN**

- Children can look well but then deteriorate quickly.
- Children have more flexible bones than adults and can have serious internal injuries with few external signs.
- Use caution when calculating fluid and medication dosages. Use exact weight whenever possible.
- Watch carefully for hypothermia and hypoglycaemia.
**DISPOSITION**

Conditions that require handover or transfer to a specialist unit include:

- ABCDE finding that has required intervention
- Evidence of internal bleeding
- Any pneumothorax or sucking chest wound
- Shock, even if treated successfully
- Altered mental status
- Trauma during pregnancy
- ABCDE abnormalities or any chest/abdomen injury in a child
- Significant burn injuries

**Considerations for transfer:**

- Any patient who has required oxygen should have oxygen during transport and after handover.
- For signs of shock, ensure IV fluid started and continued during transfer.
- Control any external bleeding and monitor site closely during transport.