

Trauma

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*"The greatest
wealth is health."
— Virgil*




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Objectives & goals



- ★ 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).
- ★ management for the specific

- *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

” Traumatology

Is the study, diagnosis, and treatment of acute physical injuries sustained by individuals requiring immediate medical attention

”Trauma-the forgotten pandemic“?

3rd common cause of death

Trauma is a leading cause of mortality globally in young adultt



Etiology

There 2 types of injuries

A. Penetrating injury:

* low velocity → طعنة سكين → small area

* high velocity → بندقية → shock wave around the main track

B. Blunt injuries : (direct Trauma)

* Road traffic accident. (RTA)

* ضربة عصا.

* Falling from Hight.



Causes of trauma related injuries:

1: Motor vehicle accidents

2: Violence including gun shot wounds, Stabs

3: Falls

4: Others
Burn :Thermal, electrical, chemical corrosive
drowning
Blast



“

”



“Deaths from trauma”



Immediate death :(within few minutes) ABCD	Golden hour Early death :(within few hours)	Late death :(within few weeks)
massive obstruction of air way. (A) major damage (B) of respiratory tract. rupture heart or major B.V (C) major Brain + upper S.C injury (D)	Hemorrhage : 1. intracranial Hemorrhage 2. intrathoracic Hemorrhage 3. intraabdominal Hemorrhage - major Fracture Spine → Pelvis → Femur	sepsis: Multiple organ failure



Severity evaluation of trauma the risk factors:

RTA risk factors

- Car speed
- Rollover car
- Through out person
- Dead passenger
- Car indentation > 30Cm
- Extraction time > 20 minutes.

Falling down risk factors:

- The height
- The ground
- Way of fall

Burn risk factors:

- Flame with close space
- Associated with other trauma "falling down"



TRAUMA SYSTEM

A coordinated National approach to trauma care

optimal care of a trauma patient requires effective and efficient communication and teamwork among all members

1) Access to care

2) Pre hospital care

5) Injury prevention

3) hospital care

4) Rehabilitation



The approach to care of trauma patient

- 1) initial assessment
- 2) Primary Survey
simultaneous assessment and Management
Identify & treat what is lethal
- 3) sample history
- 4) secondary survey
Proceed to identify all other injuries
- 5) Definitive management
The definitive management plan



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**

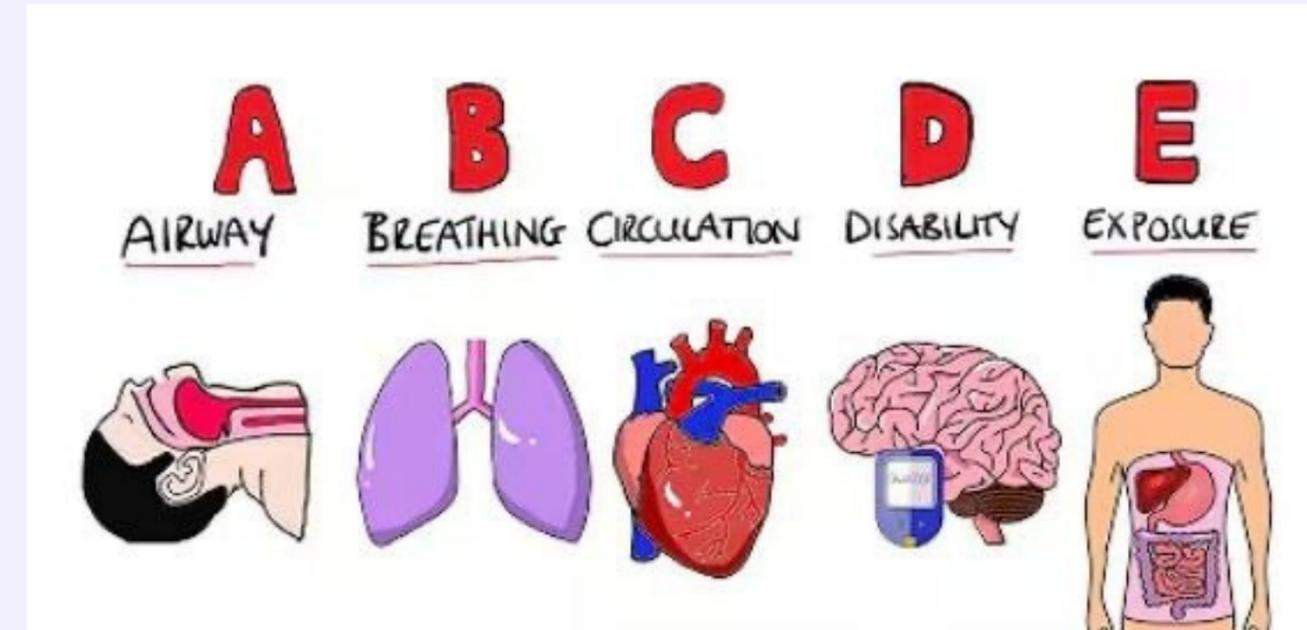
Primary Survey

- 1) The aim of the primary survey is to detect and immediately treat life threatening problems**
- 2) Do not proceed to Secondary Survey until.
ABC's are stable**
- 3) The primary survey must be repeated any time a patient's status changes, including changes in mental status, changes in vital signs**

The primary survey[♥]

consists of the following steps:

1. **A**irway assessment and protection (maintain cervical spine stabilization when appropriate)
2. **B**reathing and ventilation assessment (maintain adequate oxygenation)
3. **C**irculation assessment (control hemorrhage and maintain adequate end-organ perfusion)
4. **D**isability assessment (perform basic neurologic evaluation)
5. **E**xposure, with environmental control (undress patient and search everywhere for possible injury, while preventing hypothermia)



A: Airway

Assessment:

- * Begin by asking the patient a simple question (eg, "What is your name?"). A clear accurate response verifies the patient's ability to mentate, phonate
- * Observe the face, neck, chest, for signs of respiratory difficulty, including tachypnea, accessory or asymmetric muscle use, abnormal patterns of respiration, and stridor.
- * Inspect the oropharyngeal cavity for disruption, injuries to the teeth or tongue blood, vomitus, or pooling secretions.
- * Inspect and palpate the anterior neck for lacerations, hemorrhage, swelling or other signs of injury

The possible causes of air way obstruction

- o Vomitus
- o Bleeding
- o Loose or missing teeth
- o Dentures
- o Facial trauma
- o backward tongue displacement

airway tools can be helpful when managing a trauma patient

- * Remove 1st any tight clothes at the neck

- * Suction :To clear the oropharynx of blood,mucus and foreign bodies

- * Bag-valve mask attached to high flow oxygen

- * Cricothyrotomy kit

- * Endotracheal tubes in a range of sizes.

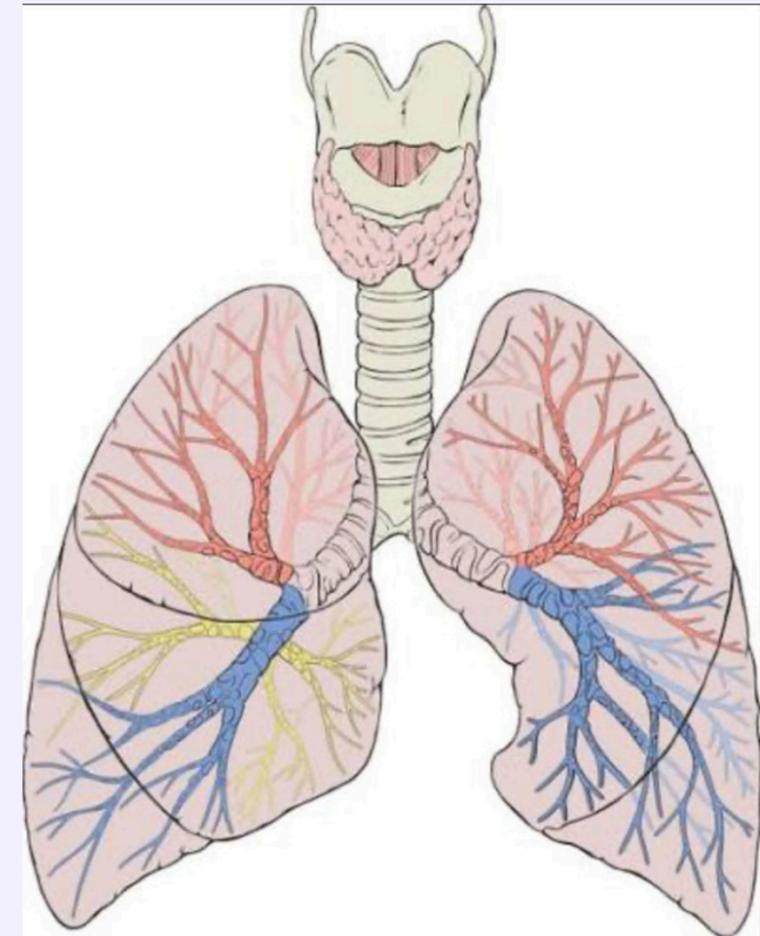
Airway Management with Cervical Spine Immobilization

- 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

B. BREATHING AND VENTILATION

assessing the adequacy of oxygenation and "ventilation"

- 1) Inspect for symmetrical chest movements
- 2) Palpate for the trachea for deviation
the chest wall for bone crepitus "fractures" or
".air crepitus " surgical emphysema
- 3) Auscultate for breath sounds bilaterall



problems to be identified The life-threatening



1) Tension pneumothorax: Initial decompression with needle insertion through the 2nd or 3rd intercostal space anteriorly, mid-clavicular line or Thoracostomy tube

2) massive haemo-thorax : Thoracostomy tube

3) Flail chest
- Monitor pulse oximetry and blood gases -
intubate and ventilate if there is hypoxia or respiratory distress.
- Consider early intubation in elderly or severe multitrauma patients

4) Open pneumothorax, a sucking wound in the chest wall

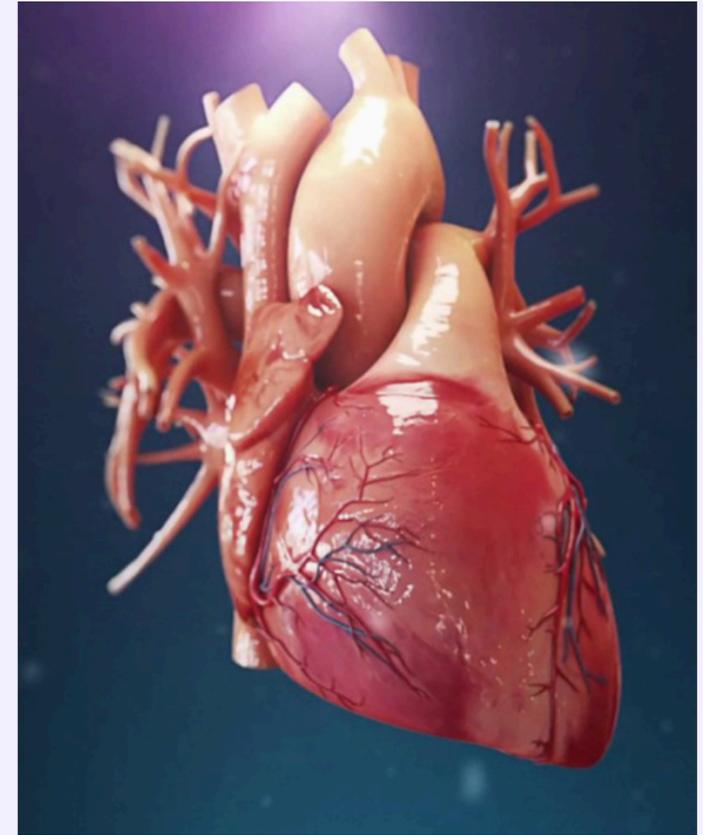


C. CIRCULATION AND HEMORRHAGE CONTROL

1) Assess BP, heart rate and evidences of bleeding or signs of shock

2) Control any external bleeding

3) If there is shock, insert one or two large intravenous lines and start fluid resuscitation and prepare blood



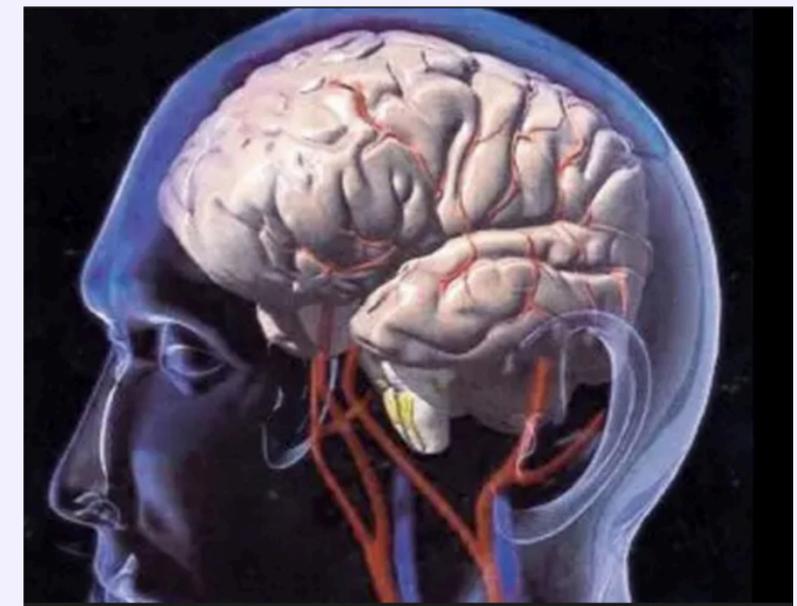
D: Disability and neurologic evaluation

1) include a description of the patient's level of consciousness using the APVU ,or Glasgow Coma Scale (GCS) score



3) gross motor function and sensation , the level of sensation if a spinal cord injury is present

2) assessments of pupillary size, equality and reactivity



LEVEL OF CONSCIOUSNESS ASSESSMENT

LEVEL OF CONSCIOUSNESS ASSESSMENT "AVPU"

ADULT BEHAVIOR

A **ALERT**
Eyes open spontaneously.

V **VOICE**
Eyes do not open spontaneously but open to verbal stimuli.

P **PAIN**
Does not respond to questions but painful stimuli such as pinching the skin or earlobe.

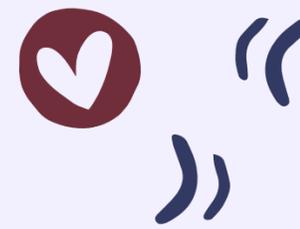
Pediatric Behavior

A Child is active and responds appropriately to SO and other external

V Responds only when his or her name is called by SO.

P **PAIN**
Responds only when painful stimulus is received such as pinching the nail bed.

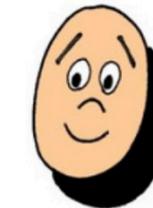
UNRESPONSIVE
No response at all.



LEVELS OF CONSCIOUSNESS

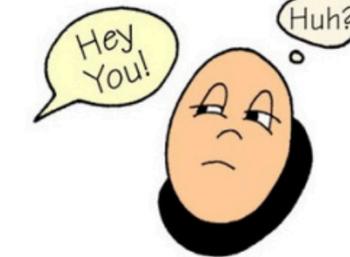
A

Alert



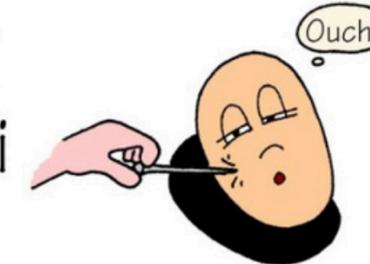
V

Verbal Stimuli



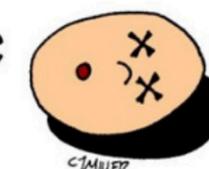
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Painful Stimuli



U

Unresponsive



©SMILET

TABLE 160-1 Glasgow Coma Scale for All Age Groups

	4 Years to Adult	Child <4 Years	Infant
Eye opening			
4	Spontaneous	Spontaneous	Spontaneous
3	To speech	To speech	To speech
2	To pain	To pain	To pain
1	No response	No response	No response
Verbal response			
5	Alert and oriented	Oriented, social, speaks, interacts	Coos, babbles
4	Disoriented conversation	Confused speech, disoriented, consolable, aware	Irritable cry
3	Speaking but nonsensical	Inappropriate words, inconsolable, unaware	Cries to pain
2	Moans or unintelligible sounds	Incomprehensible, agitated, restless, unaware	Moans to pain
1	No response	No response	No response
Motor response			
6	Follows commands	Normal, spontaneous movements	Normal, spontaneous movements
5	Localizes pain	Localizes pain	Withdraws to touch
4	Moves or withdraws to pain	Withdraws to pain	Withdraws to pain
3	Decorticate flexion	Decorticate flexion	Decorticate flexion
2	Decerebrate extension	Decerebrate extension	Decerebrate extension
1	No response	No response	No response
3-15			



E : Exposure and environmental control



1) Be certain that the trauma patient is completely undressed and that his or her entire body is examined for any sign of injury

2) Regions often neglected include "the scalp" posterior scalp

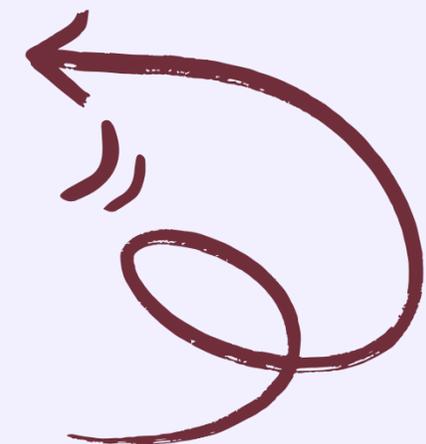
,the gluteal fold, axillary folds, perineum

abdominal folds in obese patients

Penetrating wounds may be present anywhere

3) While maintaining spine precautions examine the patient's back

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APPROACH TO THE PATIENT WITH TRAUMA

Key findings from the Trauma Primary Survey [see also ABCDE card]

	ASSESSMENT FINDINGS	IMMEDIATE MANAGEMENT
Airway 	Not speaking, with limited or no air movement	Use jaw thrust with c-spine protection. Suction if needed, remove visible foreign objects. Place OPA to keep the airway open.
	Signs of possible airway injury (neck haematoma or wound, crepitus, stridor)	Give oxygen. Monitor closely-- swelling can rapidly block the airway. -->Will need advanced airway management.
	Signs of possible airway burns (soot around the mouth or nose, burned facial hair, facial burns)	Give oxygen. Monitor closely-- swelling can rapidly close the airway. -->Will need advanced airway management
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	
Circulation 	Signs of shock (capillary refill >3 sec, hypotension, tachycardia)	Give oxygen, IV fluids, control external bleeding, splint femur/pelvis as indicated.
	Uncontrolled external bleeding	Apply pressure, deep wound packing or tourniquet as indicated.
Disability 	Signs of tamponade (poor perfusion, distended neck veins, muffled heart sounds)	Give IV fluids, oxygen.
	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
	Signs of open skull fracture (as above, with blood or fluid from the ears/nose)	As above, and give IV antibiotics per local protocol.

REMEMBER: INJURED PATIENTS WITH ABNORMAL ABCDE FINDINGS MAY NEED RAPID HANDOVER/TRANSFER TO A SURGICAL SERVICE. PLAN EARLY.

Quick medical history (AMPLE)

Allergy

Medication

Past Medical History (health problems,
previous surgery)

Last food and drink

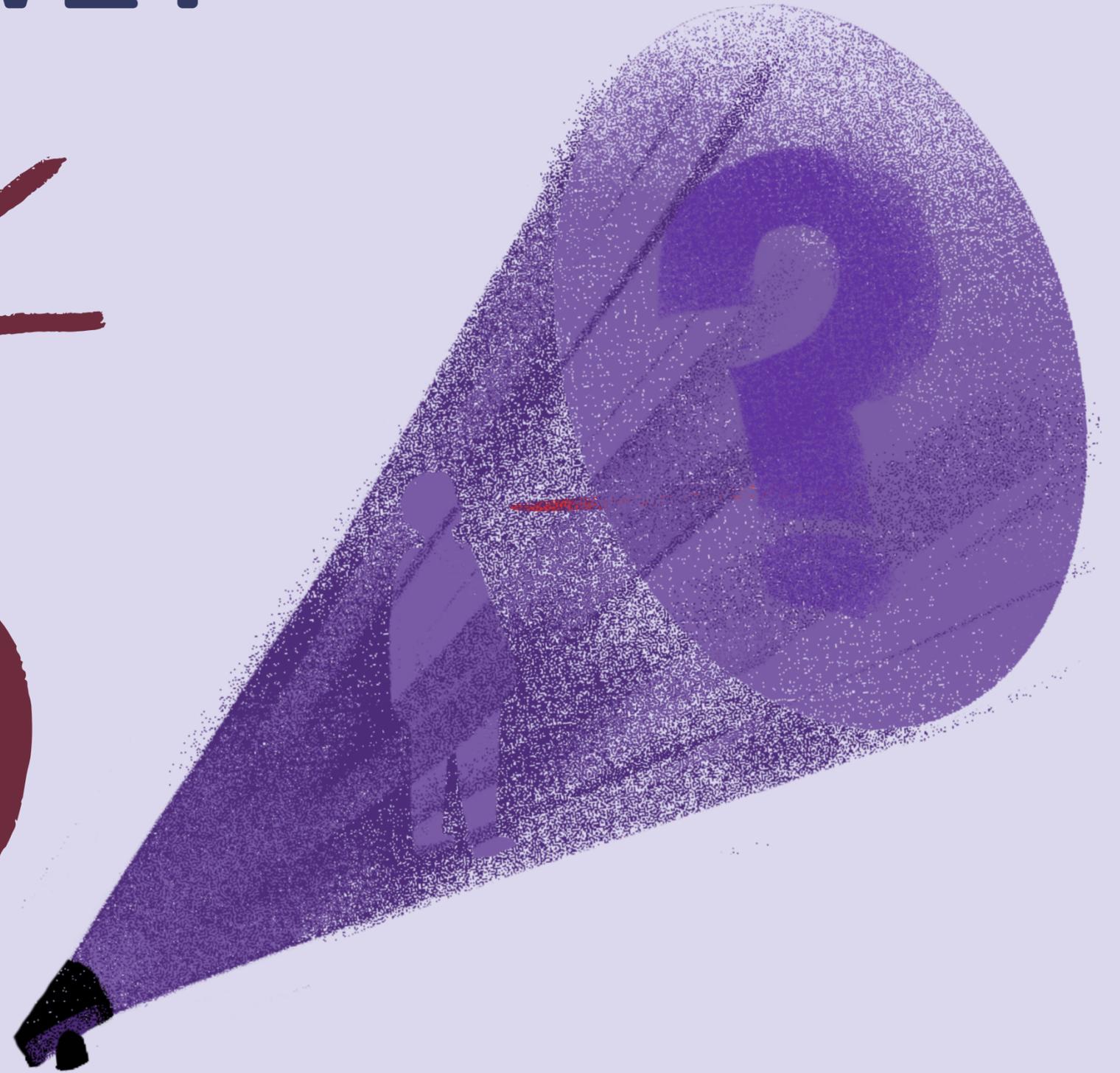
Events leading up to the situation



SECONDARY SURVEY

• The secondary survey aims to detect and treat any other trauma injuries the secondary survey should not be started until the primary survey is complete

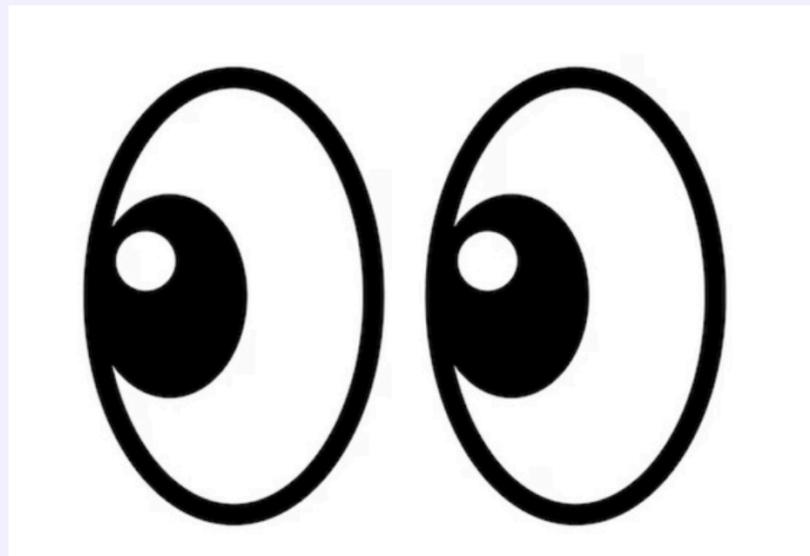
* It is a head-to-toe examination
Specialized diagnostic tests are performed when indicated
These tests include, extremity radiography, ultrasonography
CT scanning



TOP-TO-TOE

01.

*look



02.

*listen

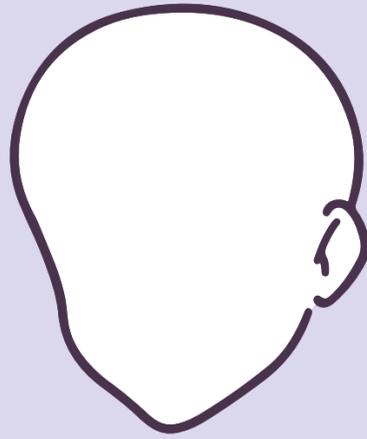


03.

*Feel



Head (HEENT)



Look for :* Observe and palpate skull (anterior and posterior) for signs of trauma

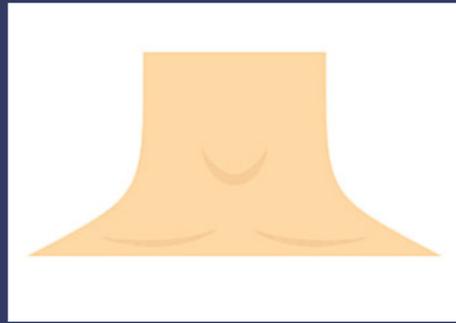
*deformity, Wounds - bruising/bleeding , lacerations
Panda eyes/Battle's sign
Check the face for deformity

* Check eyes for: equality and responsiveness of pupils, movement and size of pupils foreign bodies, discoloration, contact lenses, prosthetic eye

* Check nose and ears for bleeding, CSF leaks

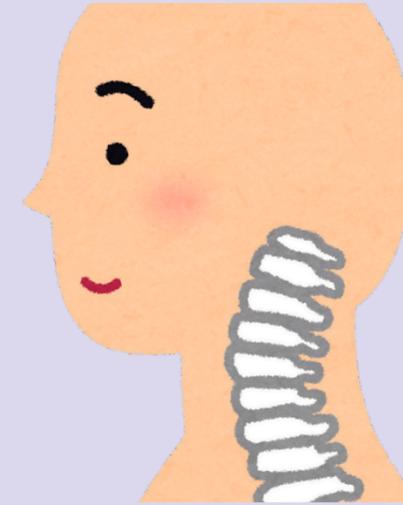
- **Listen for**
- Stridor which could indicate airway obstruction
- Gurgling indicating fluid in the airway

Neck



look for:any Swelling or Wounds
jugular venous distention, use of.
neck muscles for respiration, tracheal shift

- **Feel for:**
- Air in the skin or soft tissue (concern for pneumothorax)
- Tenderness or deformity along the spine

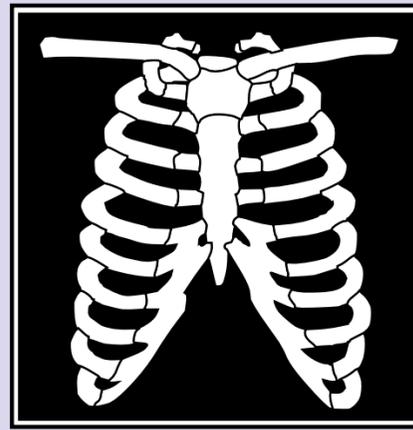


cervical spine

Bruise, swelling, tenderness,
wound

If concern for spinal injury,
check and document the level
where the findings start

Chest

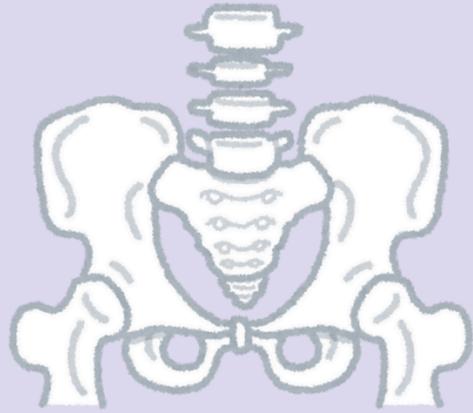


- **Look for:**
 - Bruising, deformity or wounds
 - Uneven chest wall movement (concern for pneumothorax or flail chest)
 - Burns around the entire chest (circumferential) which can cause difficulty breathing
- **Listen for:**
 - Breath sounds (decreased, unequal, absent, wheezing or rhonchi)
 - Muffled heart sounds (concern for pericardial tamponade)
- **Feel for:**
 - Tenderness
 - Crepitus (concern for fracture or pneumothorax)

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



Pelvis/Genito-urinary

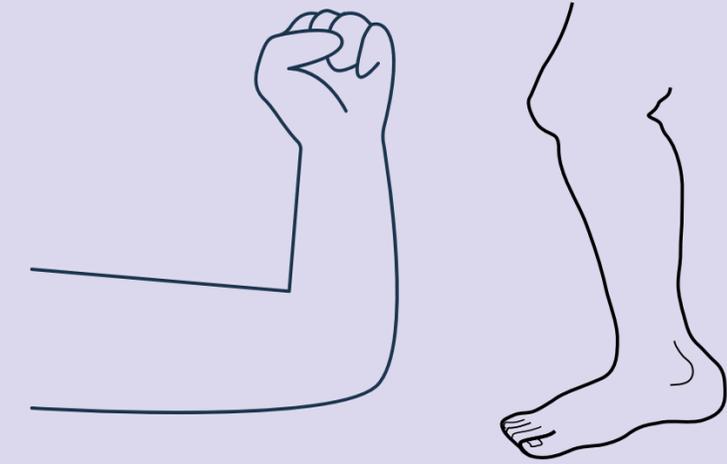
Look for : deformity, Bruise
:scrotal or perineal
bleeding per urethra

- **Feel for**
- Tenderness or abnormal movement in pelvis

Back



Look for : Wounds/bruising or
swelling-
Tenderness-



Arms and Legs

Look for : Wounds-
Deformity-
Tenderness.
Movement-

Feel for : * absent or weak
pulses

* Sensation : Cold extremities

Mass casualty

The no. of casualties greatly exceeds the local resources and capabilities in a short time



Level 1 : mass casualties resulting in less than 10 surviving victims

Level 2 : 10-25 surviving victims



Level 3 : more than 25 surviving victims

TRIAGE

"sorting out patients"

1) Minor injury : conscious , can walk, i.e wounded

2) Can be delayed : potentially serious , not expected to deteriorate significantly over several hours: resp. rate < 30, capillary refill < 2 sec

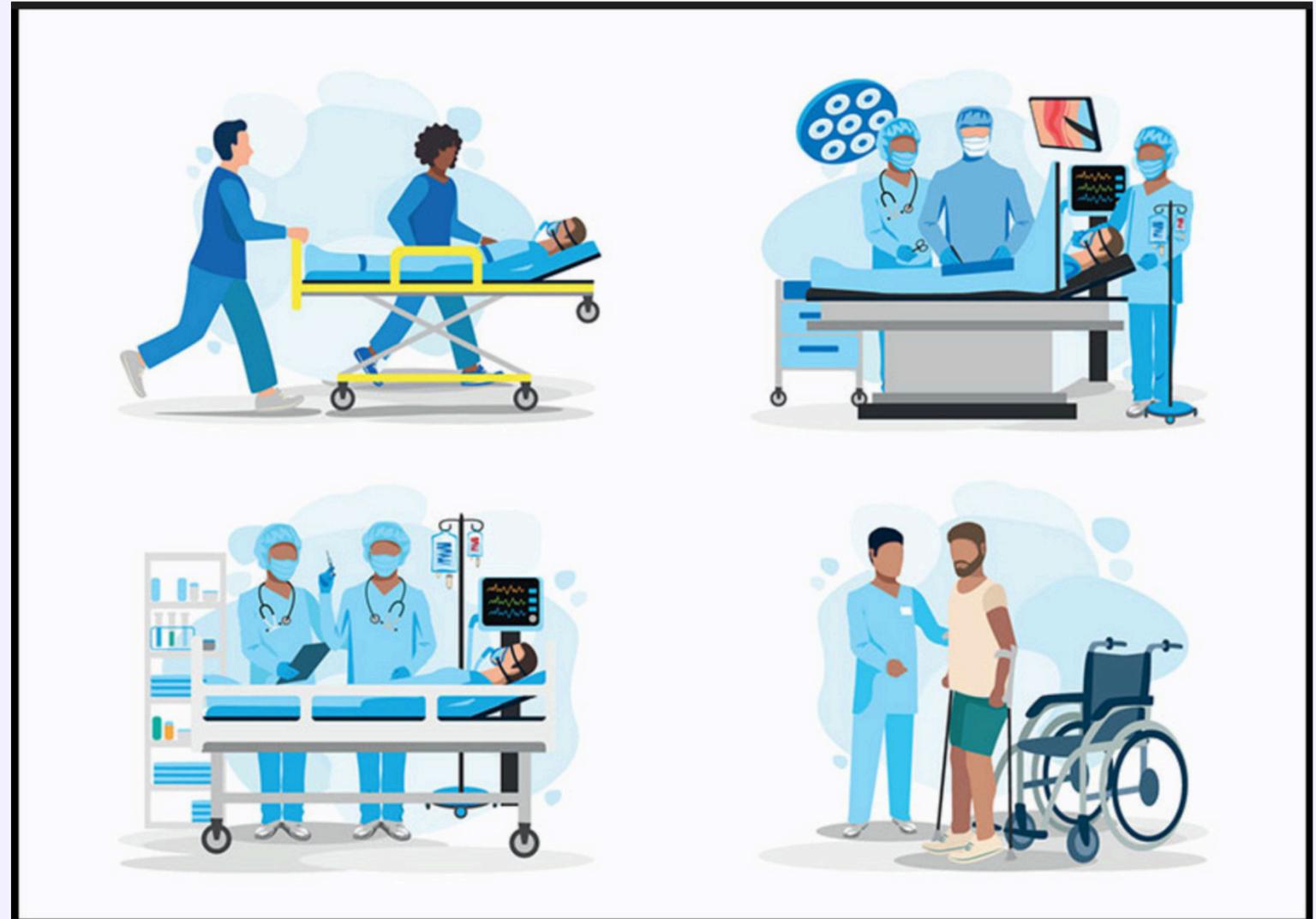
3) Immediate
needs immediate transportation and medical attention within minutes
altered consc., hypotensive capil.refil.>2sec., resp.rate >30

4) Expectant : dead or inevitably dying



Multidisciplinary Trauma Team

- Trauma surgeon
- Emergency physician
- Anesthesiologist
- Trauma nurse team
- Blood bank technician
- Radiological technologist
- Respiratory therapist
- Public relation officer
- Hospital security officer
- Physician specialist as necessary:
neurosurgeon,
orthopedic surgeon, urologic surgeon,
general
surgeon



Management of specific conditions

Facial fracture	Immobilize cervical spine if indicated, give IV antibiotics for open fractures, avoid nasal airway/nasogastric tubes.
Penetrating eye injury	Avoid pressure on the eye, stabilize but do not remove foreign objects, give antibiotics and tetanus, elevate head of bed.
Open abdominal wound	Give IV fluids, nothing by mouth. Cover visible bowel with sterile gauze soaked in sterile saline, give antibiotics.
Pelvic fracture	Give IV fluids, stabilize with sheet or pelvic binder.
Fracture with poor limb perfusion	Reduce fracture, splint.
Open fracture	Irrigate well, dress wound, splint, give antibiotics, rapid handover for operative management.
Penetrating object	Leave object in place and stabilize it to prevent further injury.
Crush injury	Give IV fluids, monitor urine output, monitor for compartment syndrome.
Burn injury	Assess size and calculate fluid needs, give IV fluids and oxygen, monitor for airway oedema.
Blast injury	Give oxygen, treat burns as below, give IV fluids, monitor closely for delayed effects of internal injury.

REMEMBER: Injured patients with wounds, including burns and open fractures, need tetanus vaccination.



Special Considerations: Pregnant Trauma

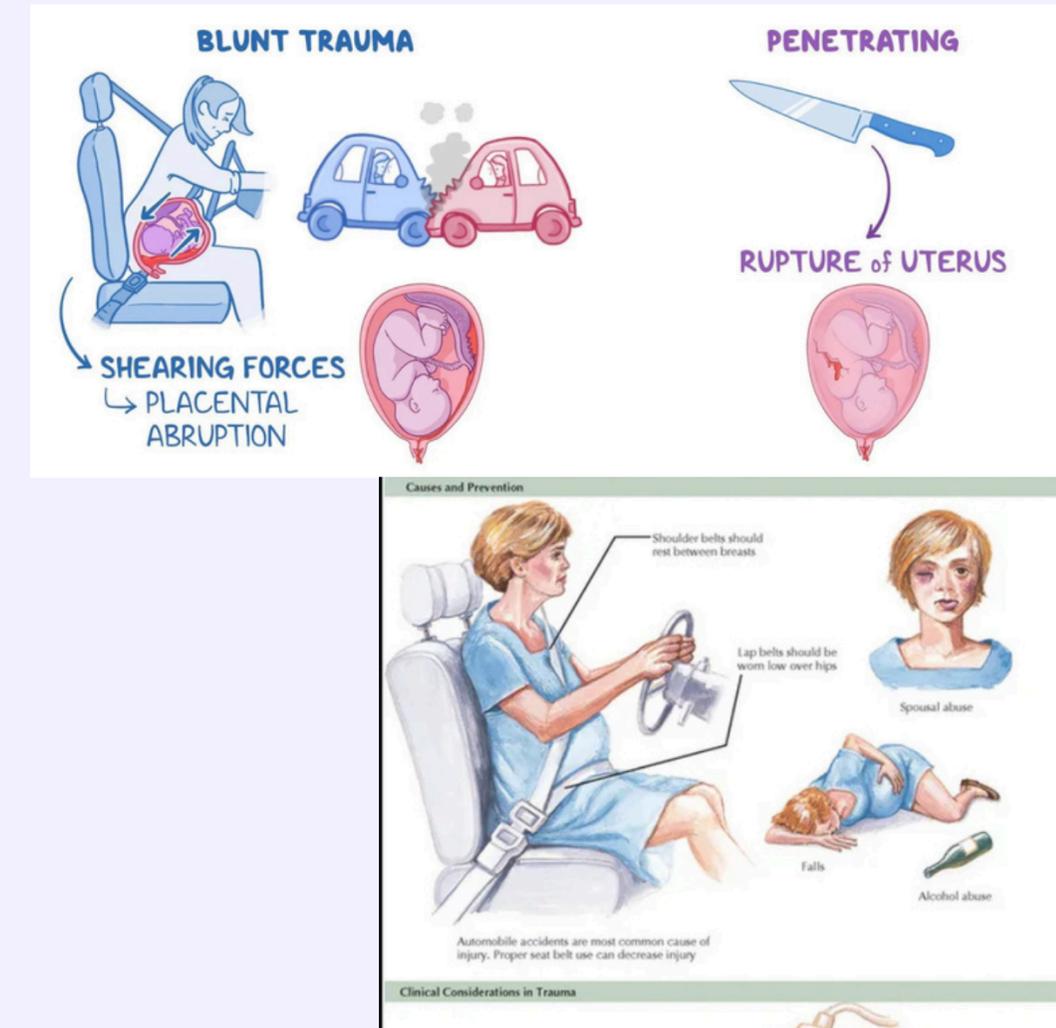


Primary Survey

- 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

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



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 Considerations³



- 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

Special Considerations: Paediatric Trauma



- 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

Normal Paediatric Respiratory Rate

Age	Respiratory Rate
< 2months	40-60 breaths per minute
2-12 months	25-50 breaths per minute
1-5 years	20-40 breaths per minute

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 hypoglycemia (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

Estimate weight in children based on age

Weight in kilograms= [age in years + 4] x2

(or use weight-estimation tools such as PAWPER tape
Mercy tape, Broselow tape, etc.)



Thank you

ازرع جميلاً ولو في غير موضعه،
فلا يضيع جميل أينما وُضع