



Approach To Trauma

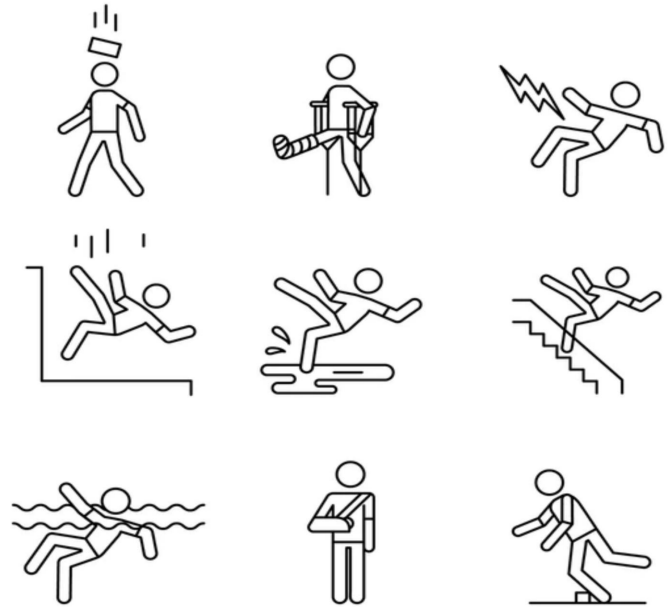
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In this lecture we will discuss:

- *Trauma*
- *ATLS*
- *Primary survey*
- *Labs & diagnostic testing*
- *Secondary survey*

Trauma

Trauma is physical injury to the person's body caused by an external source. Many patients will present with abnormal vital signs, neurological deficits, or other gross evidence of injury. Non-specific symptoms such as tachycardia, tachypnea, or mild alterations in consciousness must be presumed to signify serious injury until proven otherwise.





ATLS

ATLS -advanced trauma life support-

1. Primary survey : ABCDE
2. Secondary survey : head-toe examination
3. Lab & diagnostic testing



Primary Survey

A

AIRWAY

B

BREATHING

C

CIRCULATION

D

DISABILITY

E

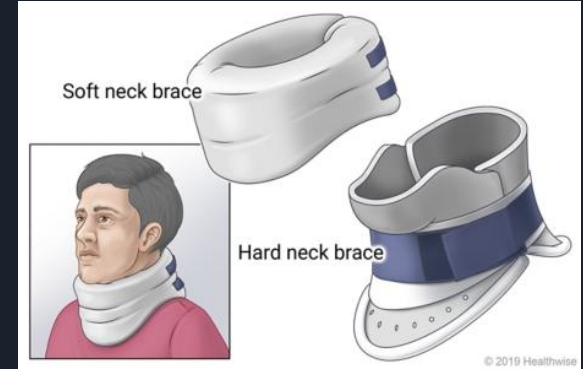
EXPOSURE

Airway

- The first & most important priority is to secure the airway.

How to secure airway ?

1. Jaw thrust / head tilt-chin lift.
2. Suction
3. Oral/nasal airway insertion
4. BVM



- In cervical spine injury we should immobilize the neck using collar (soft/hard).



Airway

- Some cases may require ETT intubation:
 1. Inability to protect the airway (e.g. GCS < 8).
 2. Inadequate oxygenation with spontaneous respiration.
 3. Profound shock.
 4. Anticipated transfer of critically ill patients.
 5. trauma/CHF/asthma/COPD

Airway

-if there is significant bleeding or obstruction (unable to ventilate or intubate using oral/nasal) we should create surgical airway by cricothyroidotomy(needle/ surgical)





Airway

Causes of airway obstruction:

1. Fallen back tongue.
2. Foreign body.
3. Direct damage of the airway.
4. Vomit.
5. Blood.

Signs of airway obstruction:

- 1.confusion, universal choking sign.
2. Respiratory distress.
3. Failure to speak.
4. Cyanosis.

Breathing

- Goals in assessing breathing:
 - 1- Securing oxygenation and ventilation
 - 2- Treating life - threatening thoracic injuries
- Interventions :
 - 1-O₂ according to spo₂
 - 2-Pneumothorax therapy
 - 3-Ventilation therapy





Breathing

Examination

Inspection

Breathing, RR, cyanosis, JVD, symmetry, wounds, use of accessory muscles

Palpation

Subcutaneous emphysema, flail segments, tracheal deviation

Percussion

Hyperresonance
dullness

Auscultation

Breathing sounds

Respiratory function

ABG
Pulse oximetry
RR

Life-threatening conditions :

1-Pneumothorax : accumulation of air between the visceral and parietal pleura caused by injury to the lungs

Diagnosis and treatment of :

Tension pneumothorax : diagnosed clinically , symptoms like dyspnea , JVD , Tachypnea , anxiety , pleuritic chest pain, unilateral decrease or absent breath sound, tracheal deviation and hyperresonance in the affected side , treated by rapid thoracotomy or immediate decompression by needle thorough thoracostomy followed by chest tube.

Open Pneumothorax : usually obvious with air movement through a wall defect . It is treated by chest tube and occlusive dressing over the defect without closing it on all 4 sides.

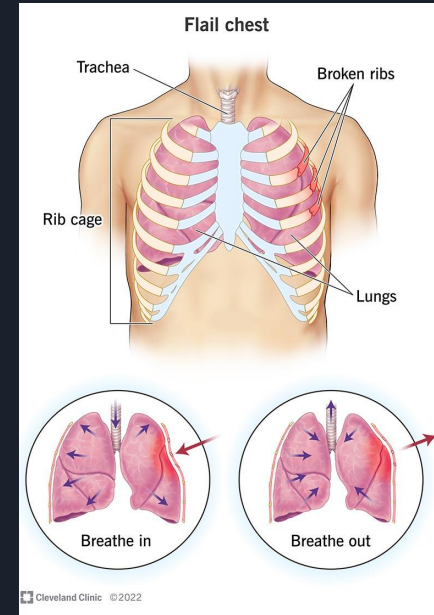


Tension pneumothorax

Life-threatening conditions (contd):

2-Flail chest is a traumatic disorder that happens when three or more ribs located next to each other are fractured in two or more places. This causes chest wall to become unstable, interfering with breathing

The flail segment of the chest wall will move paradoxically , means the injured section of the chest wall moves in an opposite direction when compared with the undamaged chest wall



Life-threatening conditions (contd):

3-Cardiac tamponade : bleeding into pericardial sac which compresses the heart causing decreased Output

- Sign and symptoms :

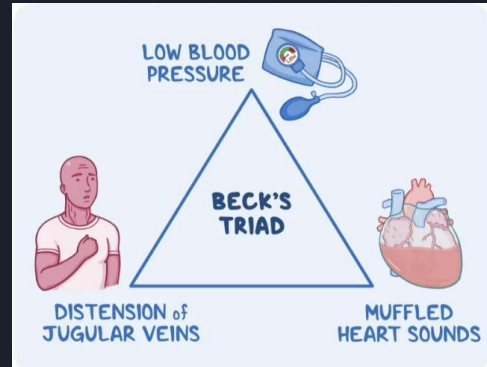
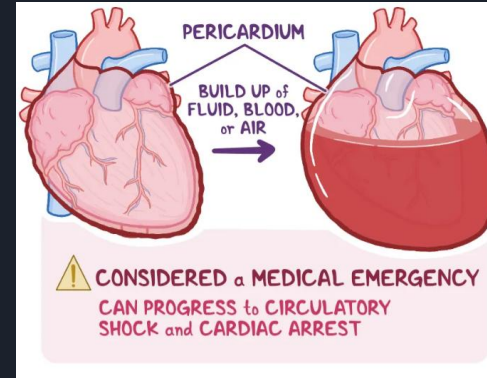
1-Tachycardia

2-Beck's Tad (hypotension, muffled heart sound , JVD)

3-Kussmaul's sign (JVD with inspiration)

- Diagnosis by echocardiogram

- Treatment : pericardial window if the blood return then median sternotomy to rule out and treat cardiac injury



Life-threatening conditions (contd):

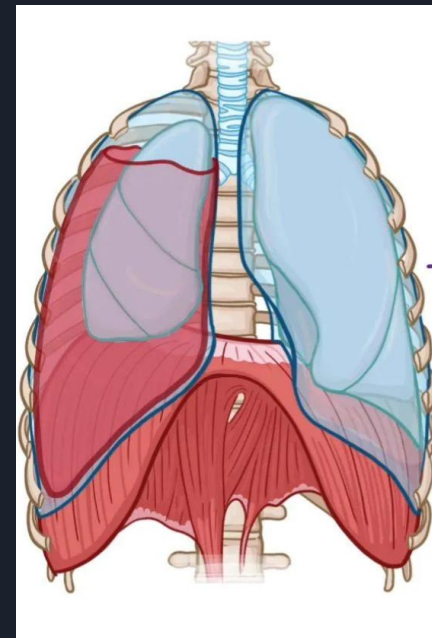
4-massive hemothorax : diagnosed by unilateral decreased or absent breath sound, dullness on percussion , CXR , CT scan, chest tube output.

Treatment

- 1- volume replacement
- 2- Chest tube
- 3- removal of the blood

Indication for emergent thoracotomy

- 1- > 1500 cc of blood on initial placement of just tube
- 2- Persistent > 200 cc of bleeding via chest tube per hour* 4 hours



Circulation

Circulation is essential for delivering oxygen and nutrients to the body and maintaining homeostasis.

In emergencies, assessing circulation helps identify shock, control hemorrhage, and ensure proper blood flow.

Quick intervention is crucial to prevent life-threatening conditions like hemorrhagic shock or cardiac tamponade.



Circulation

- The evaluation of circulation includes both pulse assessment and hemorrhage control.
- Two primary causes of circulatory compromise (shock) are :
 1. Hemorrhage (assume shock is hemorrhagic until proven otherwise).
 2. Cardiac Tamponade (obstructive shock).
- Key aspects to inspect:
 - External bleeding.
 - Arterial bleeding: characterized by a pulsatile stream of bright red blood.
 - Venous bleeding: dark, continuous flow.
 - Internal bleeding: harder to detect and often requires surgical consultation, commonly occurring in the pleural or abdominal cavities.



Circulation

- *Clinical signs of shock include :*

1. Tachypnea, tachycardia
2. Narrow pulse pressure
3. Reduced capillary refill
4. Cool extremities
5. Reduced CVP
6. Late signs : hypotension, altered mental state & Reduced urine output

- *Always monitor:*

1. Pulse rate(using carotid/femoral – 10 seconds)
2. Document radial, ulnar, carotid pulses
3. capillary refill (< 2 s)
4. Blood pressure
5. JVP
6. Respiratory rate

External Bleeding

- For external bleeding :

(Start by checking the surroundings, gaining consent and exposing the wound)

1. Manual compression directly over the wound or proximal to the point of bleeding
2. Tourniquets should be used to stop limb bleeding
3. Venous bleeding responds to simple pressure



For Circulatory compromise

If blood loss is severe....

- For circulatory compromise:
 1. Insert 2 large bore IV cannula
 2. Lost blood should be replaced with crystalloid solution first then with blood as soon as possible
 3. For each ML of blood loss, 3 ML of crystalloid solution is given
 4. Blood samples should be taken for urgent blood group and cross match as well
 5. toxins CBC, pregnancy and chemistry





Primary Survey - Disability

healthcare providers often start with the AVPU scale to get a quick assessment and then use the GCS for a more thorough evaluation if the patient's condition warrants it

AVPU scale

A

= Alert

- **Alert** and Conscious

V

= Verbal

- Responds to **Verbal** stimulus

P

= Pain

- Responds to **Painful** stimulus

U

= Unresponsive

- **Unresponsive** to any form of stimulus

Primary Survey - Disability

Neurological evaluation using the Glasgow Coma Scale (GCS). A decrease or alteration in the level of consciousness may **indicate cerebral injury or the need for immediate reevaluation of oxygenation and perfusion.**

GSC includes the 3 following things:

1. The eyes 2. The verbal response 3. The motor response

13-15: Mild Injury

9-12: Moderate Injury

8 Or <8:Sever Injury:The Patient Is Comatose And Needs

Intubation.

- pupils:

- assess equality, size, symmetry, reactivity to light.

Behaviour	Response
 Eye Opening Response	4. Spontaneously 3. To speech 2. To pain 1. No response
 Verbal Response	5. Oriented to time, person and place 4. Confused 3. Inappropriate words 2. Incomprehensible sounds 1. No response
 Motor Response	6. Obeys command 5. Moves to localised pain 4. Flex to withdraw from pain 3. Abnormal flexion 2. Abnormal extension 1. No response



Primary survey – Environment/exposure

- ✓ Are there any obvious injuries (holes, bruises, deformities)

**Assessment

- ✓ undress patient completely and assess entire body for injury
- ✓ examine back
- ✓ digital rectal exam: to check if there is **Pelvic Fractures Rectal Bleeding**
- ✓ keep patient warm with a blanket $\pm$ radiant heaters; avoid hypothermia
- ✓ warm IV fluids/blood

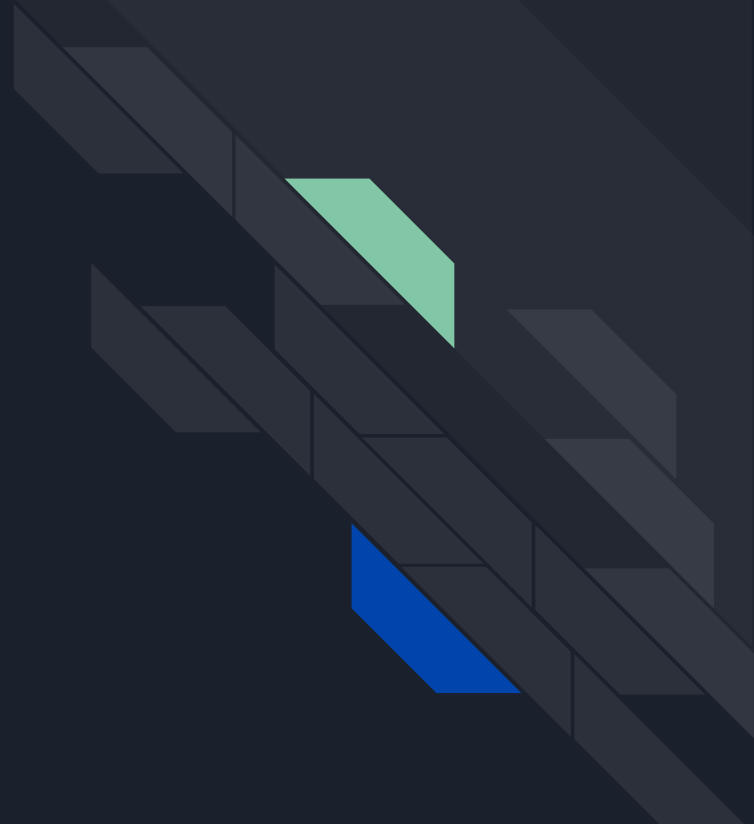
***Always Inspect the back!

Adjunct to primary survey

- ✓ ECG
- ✓ Pulse oximetry
- ✓ Arterial blood gas
- ✓ Blood tests: full blood count, urea and electrolytes, clotting , screen , glucose, toxicology , cross-match.
- ✓ Urinary and gastric catheters (foley's and nasogastric tube).
 - A gastric tube is indicated to decompress stomach distention, reduces the risk of aspiration, but does not prevent it entirely.
- ✓ Radiographs of cervical spine, chest and pelvis.



Secondary Survey



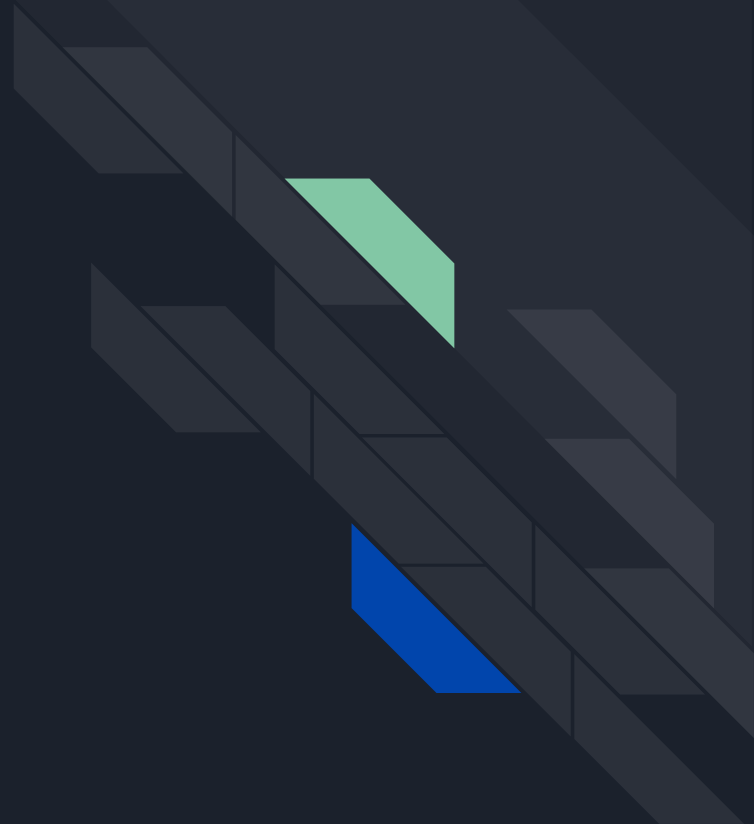
-The secondary survey does not begin until the primary survey has been completed

-After dealt with life threatening conditions and the patient became stable we start to take history and do general examinations

-Head to toe examination

HISTORY

{AMPLE history}



General examination

Head :

- A) scalp : must be inspected and palpated for lacerations, swellings, bony depression and distortion
- B) Orbit : Palpate the margins of the orbits for depressions or irregularities
- C) eyes : examine the eyes for pupil size, red reflex. Test the eye movements and visual acuity





intracranial hemorrhage: is a serious condition where bleeding occurs within the skull, leading to potential brain damage. The signs and symptoms can vary depending on the location and severity of the bleeding but generally include

- 1.unequal pupil size
- 2.Deterioration of the patient's score on the Glasgow Coma Scale
- 3.Loss of upwards gaze
- 4.Cushing triad
- 5.Headache
- 6.Nausea and vomiting

General examination

The face :

Asymmetry / palpation of cheekbone / missing teeth

The nose ;

The nose should be palpated to exclude a fracture and detect the presence of any bloody or clear fluid discharge of cerebrospinal fluid which would suggest the presence of a fracture in the anterior cranial fossa.

The ears :

Blood or fluid coming from the ear suggests the presence of a posterior fossa fracture. The tympanic membrane must be examined with an auriscope. Bruising behind the ear (Battle's sign) suggests a fracture in the posterior cranial fossa



Examination in secondary survey :

The neck:

Inspection, looking for bruising , wounds , deformity , also inspecting the trachea noting any deviation.

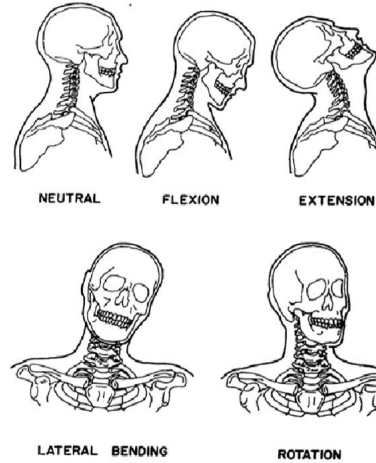
Palpate the trachea to make sure it is in midline .

Auscultation : Carotid artery , larynx.

Cervical spine : looking for any tenderness or any movement restriction .



Trail sign: Sternomastoid prominence on the side of tracheal shift



The Cervical Spine Range of Motions correspond to motions of the head, although the range of head movement bears little relation to the cervical ROM and that the total range is the sum of both the head and the neck ROMs.

Cervical Spine Range of Motion

The Chest :

Inspection : looking for bruises, lacerations, or penetrating wounds on the chest wall.

Inspect for flail chest segment , if present look for associated hemothorax, pneumothorax, and contusions

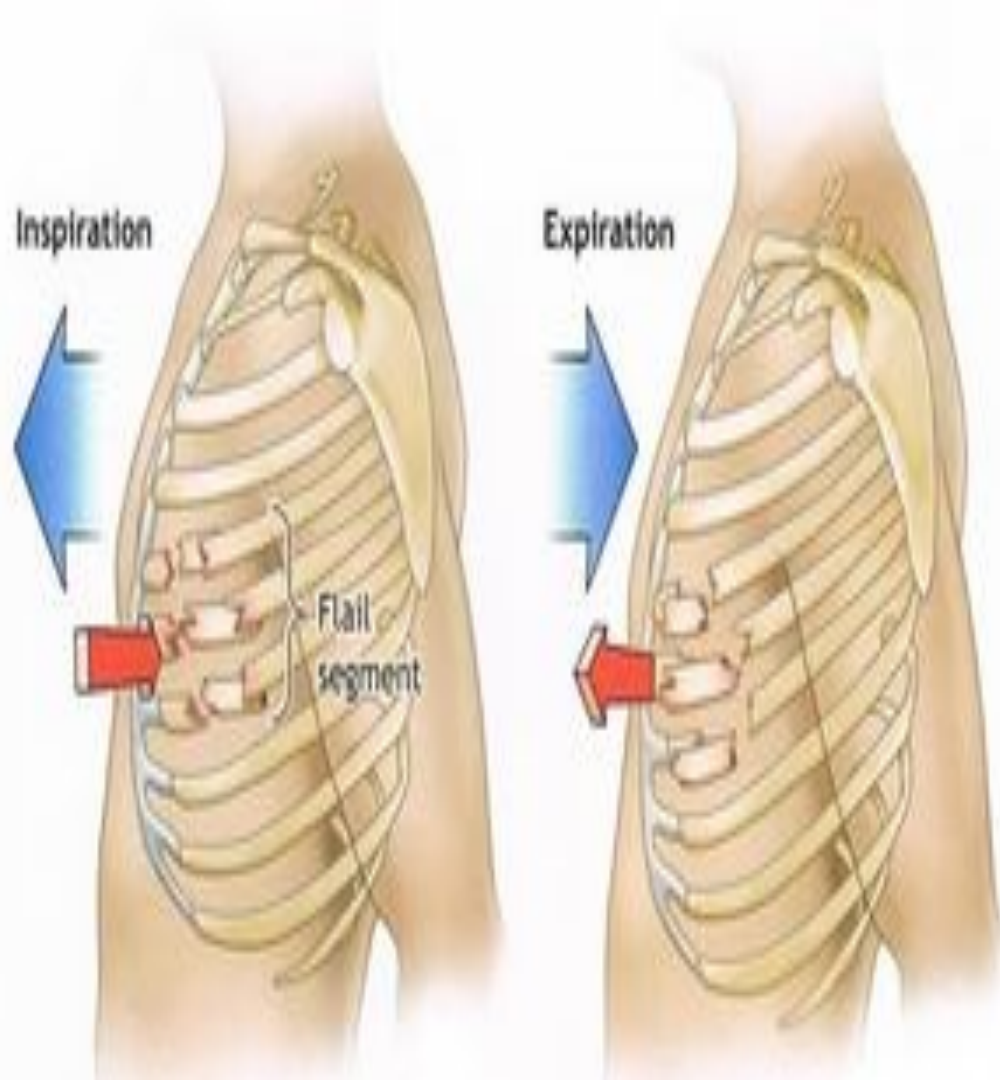
Palpate for subcutaneous emphysema.

Auscultate looking abnormal breath sound .

Flail chest segment :

Two or more contiguous rib fractures with two or more breaks per rib.

Paradoxical movement

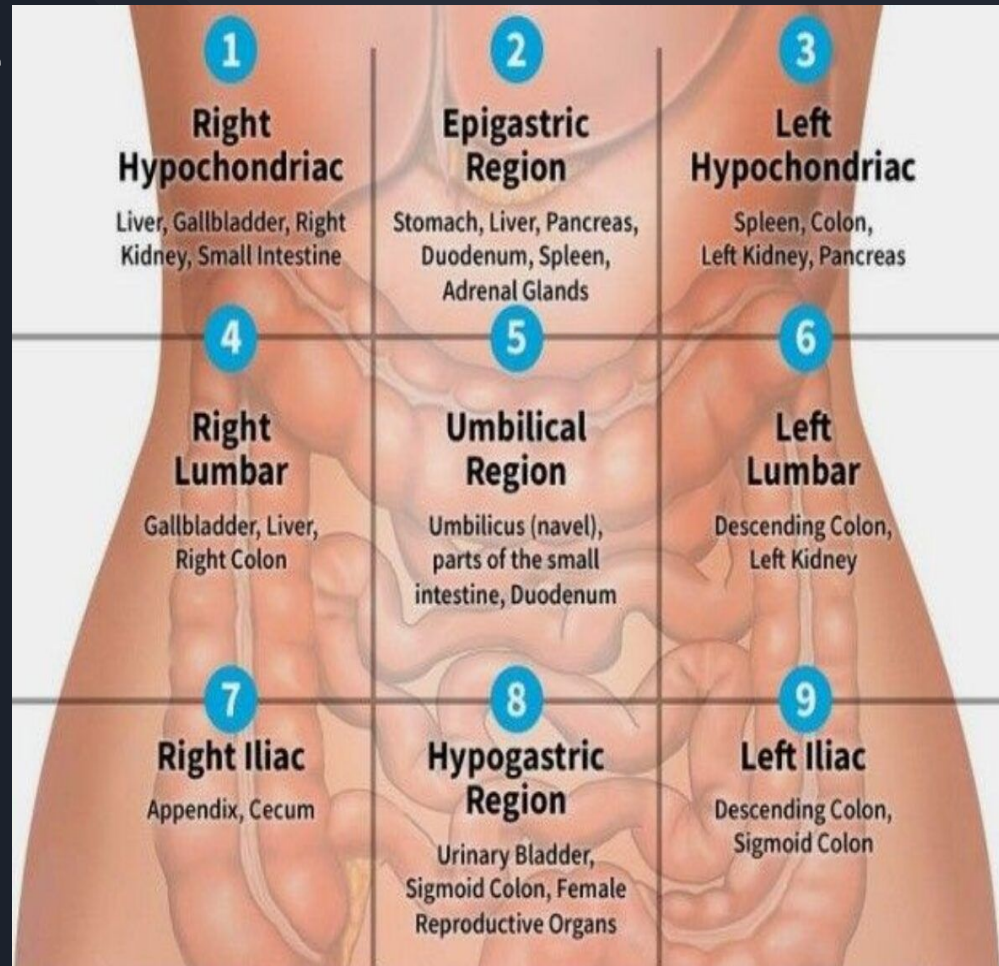


Abdomen :
looking for asymmetry , abdominal distension ,
evidence of intra abdominal bleeding : abdominal pain ,
increased heart rate , increased respiratory rate.

Organ assessment : liver , spleen , kidney looking for
enlargement , tenderness , masses.

Liver and spleen are the most common organ to be
injured.

Also we have to palpate all abdominal quadrant looking for tenderness or masses.



Examination in secondary survey:

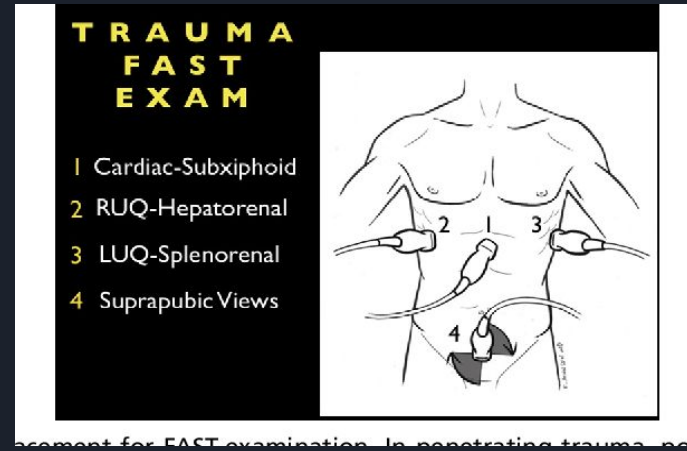
- **FAST** (*focused assessment with Sonography for Trauma*):- To look for blood in the peritoneal cavity looking at Morison's pouch, bladder, spleen, and pericardial sac.

- **Indications for FAST**

- Abdominal and thoracic trauma
- Undifferentiated hypotension or shock

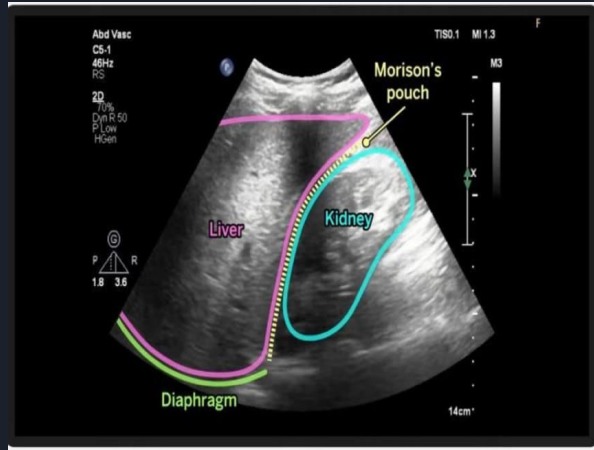
- **Assess four areas for free fluid:**

1. Perihepatic (RUQ)
2. Perisplenic (LUQ)
3. Pericardium (subcostal)
4. Suprapubic (pelvis)



acement for FAST examination. In penetrating trauma, no

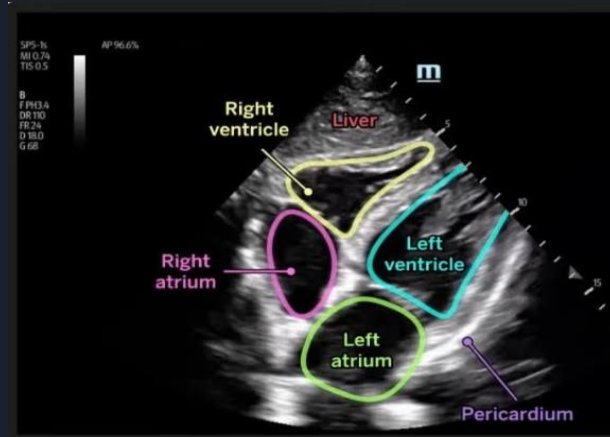
RUQ: perihepatic view



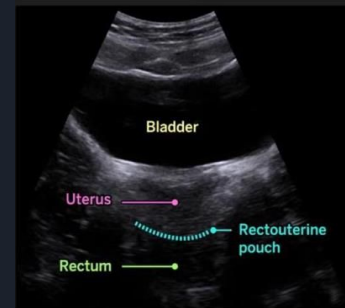
LUQ: perisplenic view



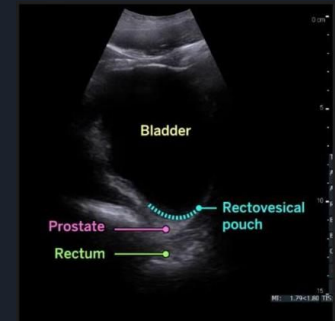
Subcostal: pericardium view



Pelvis: suprapubic view



Female.



Male

Examination in secondary survey:

The Pelvis :

1. Look for any visible signs of injury, such as bruising, deformities, or penetrating wounds in the pelvic area.
2. Gently palpate the pelvic bones and surrounding areas for tenderness, instability, or abnormal movements.
3. Apply gentle inward and outward pressure on the iliac crest to assess for pelvic stability.
4. Examine the genital area for signs of injury, bleeding, or trauma, especially in cases involving blunt force or direct impact to the pelvis.
5. Rectal Examination (if indicated): In some trauma cases, a rectal examination might be necessary to assess for rectal bleeding, sphincter tone, or signs of injury related to pelvic trauma



Examination in secondary survey:

-The Back :

1. The patient must then be carefully immobilized and 'log-rolled' by a team of staff to allow examination of the spine
2. Look for any visible signs of injury, such as bruising , wounds, or deformities on the back.
3. palpate the spine and surrounding soft tissues for tenderness, deformities, or abnormal movements
4. Assessment of Mobility and Neurological Function: Ask the patient to move their extremities and assess for any pain, weakness, tingling, or numbness. Check motor function and sensory capabilities in the extremities.





Examination in secondary survey:

-The upper and lower limbs:

1. Look for any visible signs of injury, such as swelling, deformities, bruising, or wounds over the affected area.
2. Assess the affected joint or limb for its range of motion. Observe for limitations, pain, or instability during movement .
3. Assess the sensation, circulation (pulses), and motor function of the affected limb.



Adjuncts to secondary survey (part of secondary survey):

- Any other specialized diagnostic test: Ct scans , bronchoscopy, endoscopy, angiography
- Transfer should be considered whenever the patient's treatment needs exceed the capability of the receiving institution .
- When it becomes mandatory to transfer the patients they must be hemodynamically and cardiovascularly stable.