

APPROACH TO PATIENT WITH ABDOMINAL TRAUMA

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**Before we start our lecture
We affirm our prayers and our standing with our
people in Palestine**

Free Palestine



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INTRODUCTION

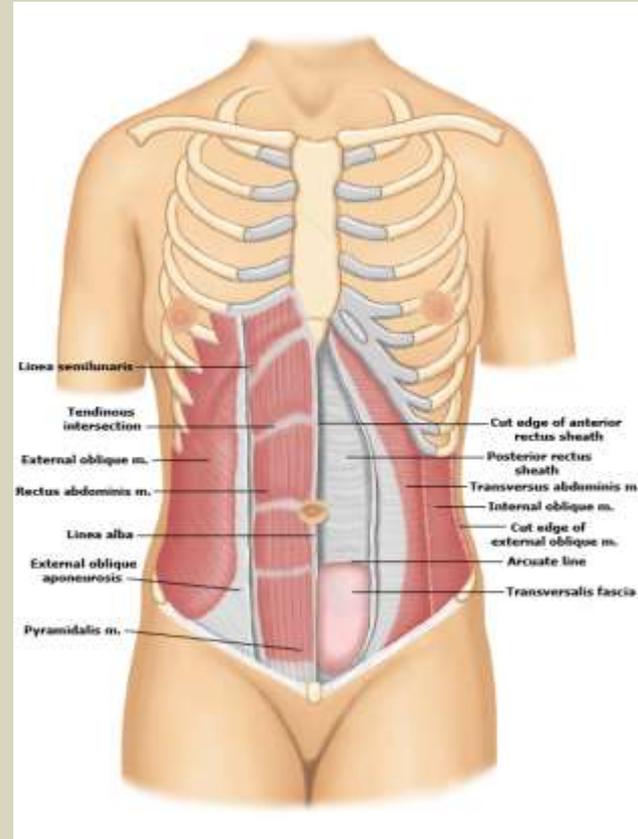
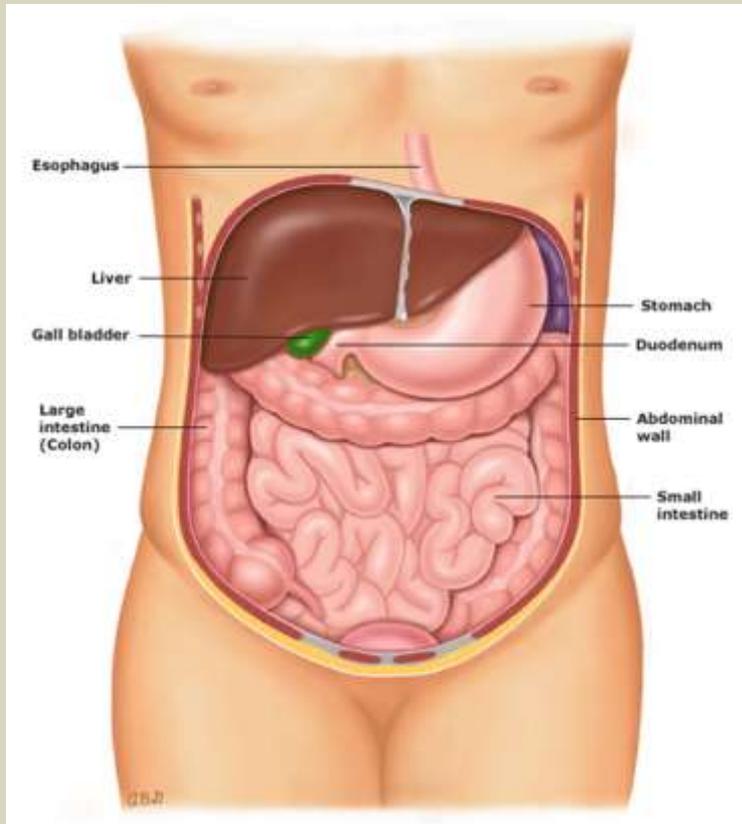
- Trauma originates from the Greek Word meaning 'Wound'.
- It implies that a physical force exerted on a person has led to a physical injury.
- External energy forms and forces that can lead to injury include chemical, thermal, ionizing radiation and, most frequently, those of mechanical origin.
- The degree and severity of trauma sustained can vary substantially and depend upon the magnitude of force exerted.

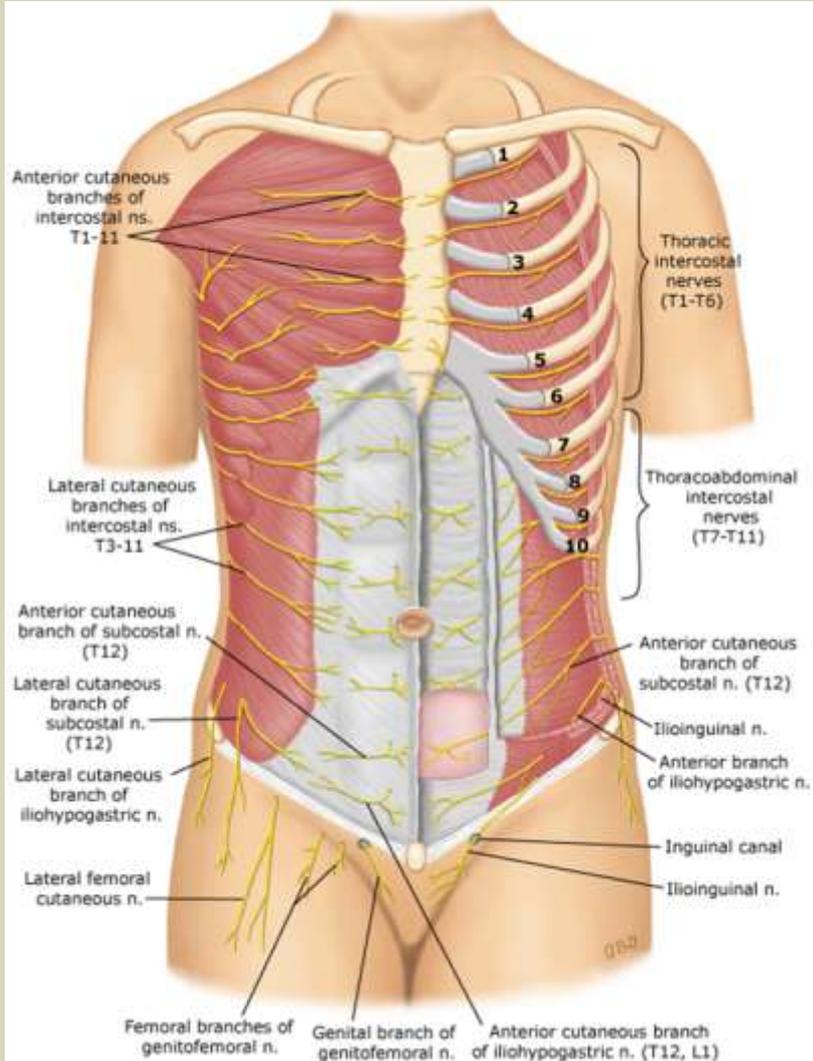


EPIDEMIOLOGY

- 3rd leading cause of traumatic death after head and chest injuries
- 25% require surgical intervention
- Peak incidence 15-30 yrs.
- Causes immediate death by hemorrhage mostly and delayed mortality by sepsis

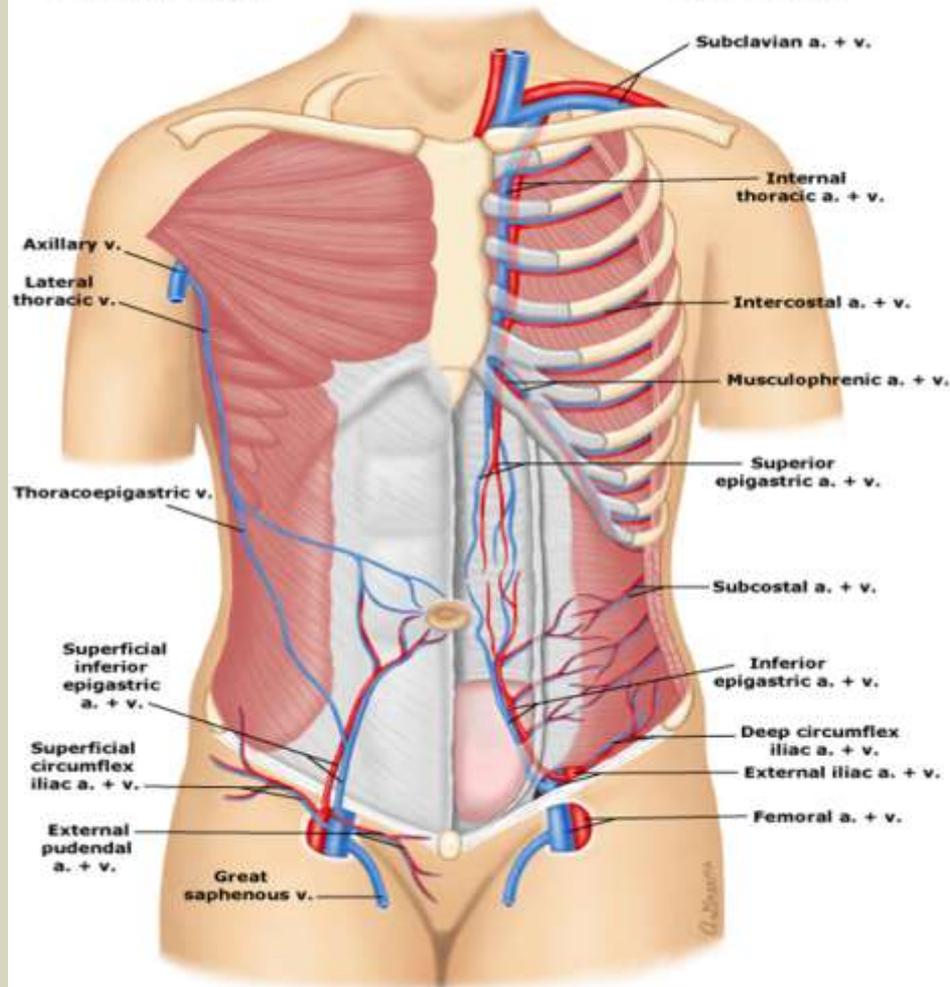
NORMAL ANATOMY OF ABDOMINA



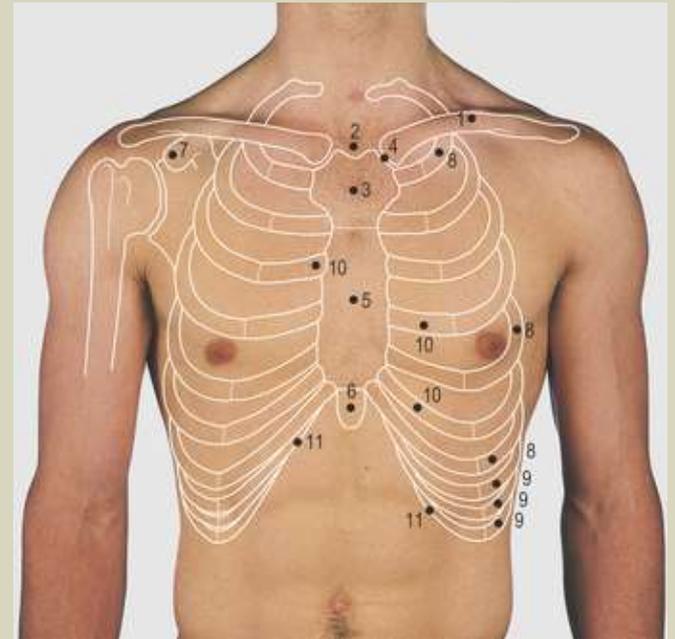


Superficial vessels

Deep vessels



- The abdomen extends from the diaphragm to the pelvic floor, corresponding to the space between the nipples (4th intercostal space) and the inguinal creases on the anterior aspect of the torso
- Any penetrating injury in the thorax below the 4th intercostal space (level of the nipples) has potential to also involve the abdomen through the diaphragm and is assumed to involve both compartments until proven otherwise

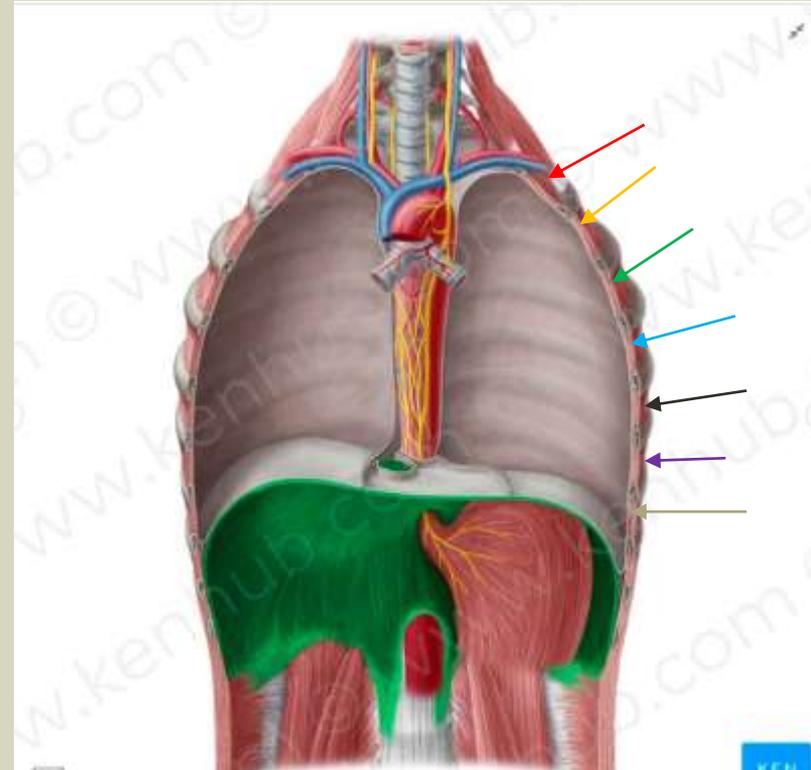


I know that there is question
in your mind why we say

that "The abdomen extends from the
diaphragm to the pelvic floor, corresponding to
the space between the nipples (4th intercostal
space) and the inguinal creases"

As we see in the picture the abdomen extend
from the 7th intercostal space to inguinal creases
?

Answer.... Because the diaphragm moves up
and down with respiration so we don't know
the position during the trauma so we need
to consider the notes in previous slides



ANATOMIC ZONES

The abdominal cavity is divided into four anatomic zones :

ANTERIOR ABDOMEN

The anterior abdomen is bound by the anterior axillary lines extending from the costal margins to the groin creases.

THORACOABDOMINAL REGION

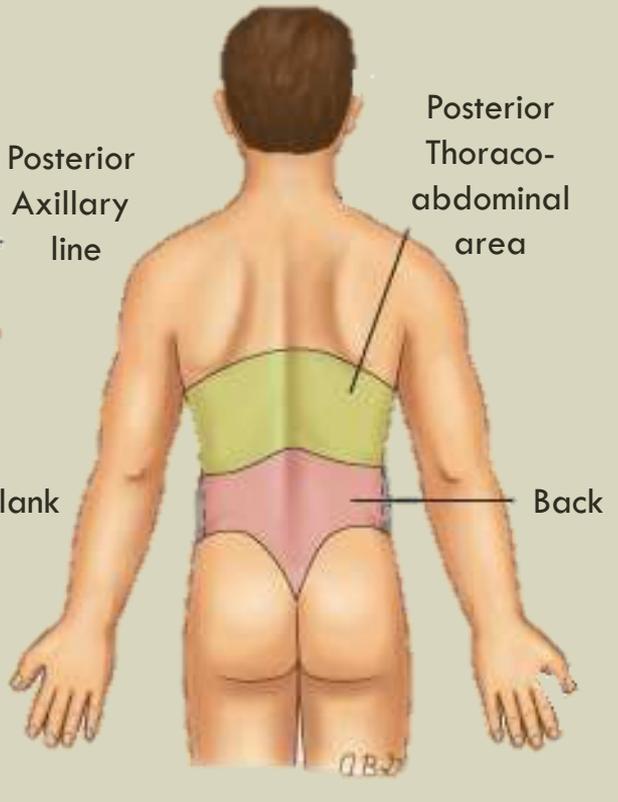
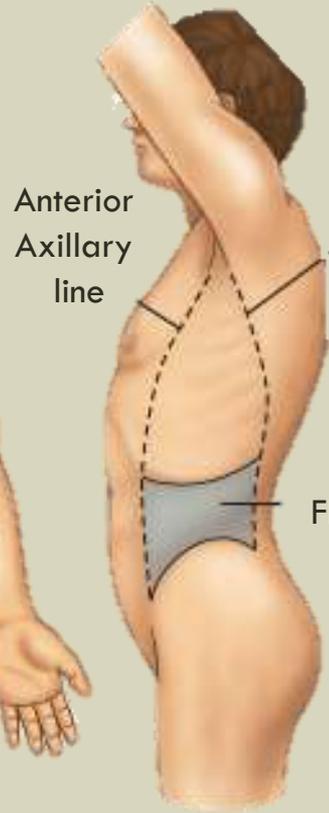
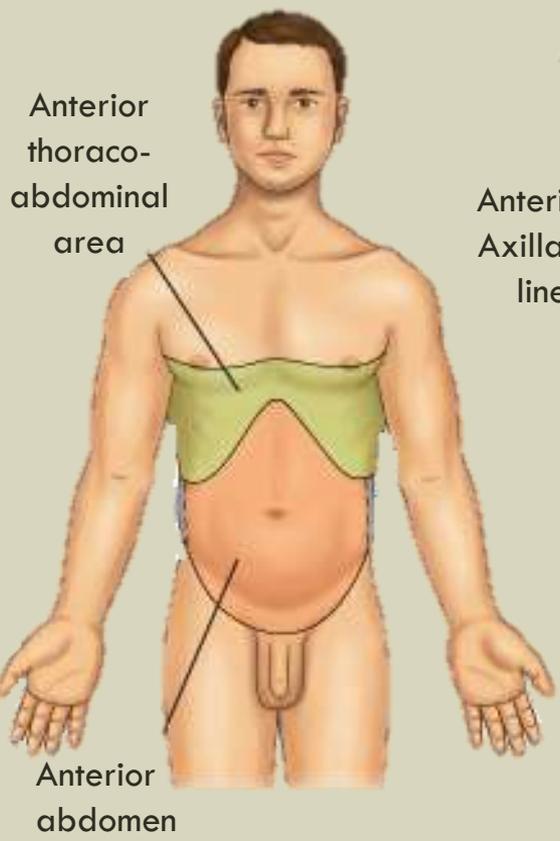
The nipple line (fourth intercostal space) anteriorly and the tips of the scapulae (seventh intercostal space) and the inferior costal margin posteriorly demarcate the cephalad portion of the thoracoabdominal area. The caudad portion is bound by the inferior costal margin. Wounds in this general region pose significant threat, as injury to the chest, mediastinum, and abdomen are all possible because of the path of the weapon and movement of the diaphragm.

FLANK REGION

The flanks are separated on each side by the inferior costal margins and iliac crests, and the anterior and posterior axillary lines.

BACK REGION

The back is defined as the area between the posterior axillary lines, costal margin, and the iliac crest.



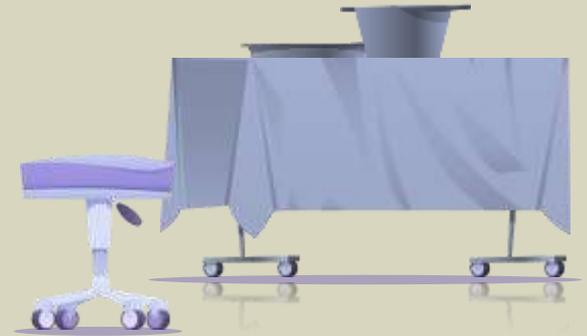
MECHANISM OF INJURY

Abdominal injury is classified according to the mechanism of injury into :

1) penetrating trauma (increasing in incidence)

- gunshot wounds
- stab wounds

2) Blunt trauma (most common)

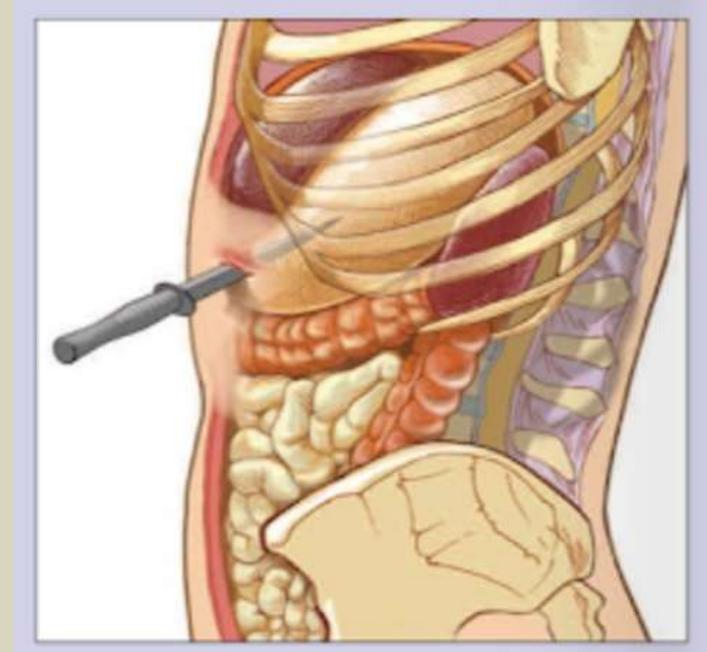


MECHANISM OF INJURY

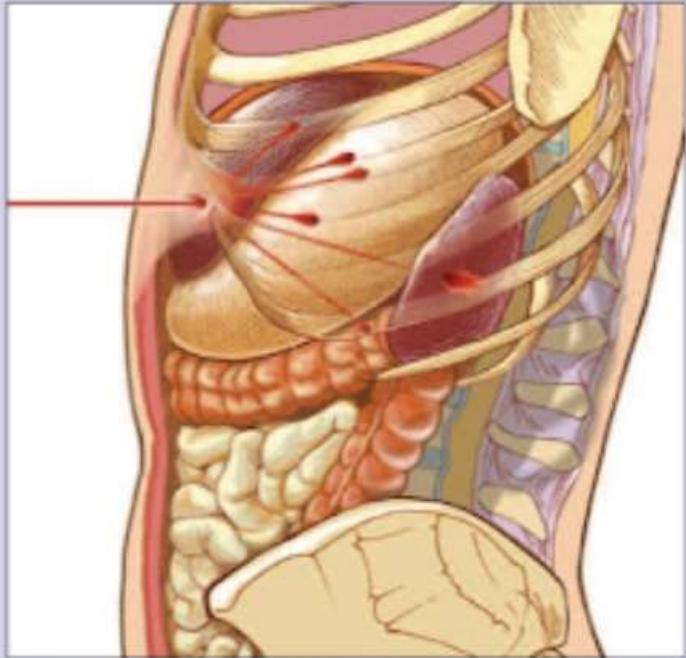
1) Penetrating Trauma

A. Stab Wounds

- Only one-third of stab wounds to the anterior abdomen penetrate the peritoneal cavity and cause significant injury.
- Options to evaluate for injuries include local wound exploration, laparoscopy or laparotomy, computed tomography (CT), Focused Abdominal Sonography for Trauma (FAST), diagnostic peritoneal lavage (DPL), and admission with observation.



B. Gunshot Wounds



- Have a high probability of causing a significant intra-abdominal injury and therefore traditionally require immediate laparotomy
- but this imperative has been challenged for those patients with stable hemodynamics and no peritoneal signs on physical examination.
- In a large retrospective study of patients with abdominal GSWs, selective nonoperative management was reported to result in a significant decrease in the percentage of unnecessary laparotomies
- Current recommendations for nonoperative management of penetrating trauma include the use of triple-contrast CT (which accurately predicts the need for laparotomy) and serial examination
- The majority of these patients can be discharged after 24 hours of observation .

2) Blunt Trauma

- Blunt injury: A direct blow, such as in a motor vehicle crash or a fall , it can cause compression and crushing injuries to abdominal viscera and pelvis. Such forces deform solid and hollow organs and can cause rupture, with secondary hemorrhage, contamination by visceral contents, and associated peritonitis.
- Blunt abdominal injuries often managed conservatively, though interventional radiology and surgery are indicated for severe injuries
- Common mechanisms include road traffic crashes, falls, sports injuries and assaults
- Organs most affected are : spleen > liver > small and large intestine



PRE-HOSPITAL CARE

- assessment of the injury scene
- Call for help
- stabilization and monitoring of injured patients
- securing an airway, providing adequate ventilation, assessing and supporting circulation, and stabilizing the spine
- safe and rapid transportation of critically ill patients to the appropriate trauma center.



HOSPITAL CARE

1. Primary Survey

2. Secondary Survey



PRIMARY SURVEY

1) Primary survey : is a systematic, rapid evaluation for immediate threats to life, following the mnemonic ABCDE (**A**irway with cervical spine control, **B**reathing and ventilation, **C**irculation and haemorrhage control, **D**isability, **E**xposure and environmental control).

AIRWAY

Establishing a patent airway is the highest priority in order to prevent irreversible brain damage and should always be secured under cervical spine control

The first step in the evaluation of trauma is airway assessment and protection:

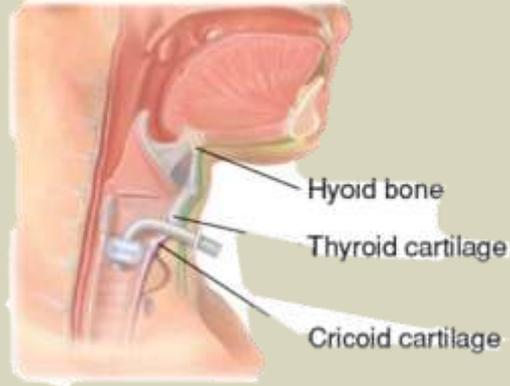
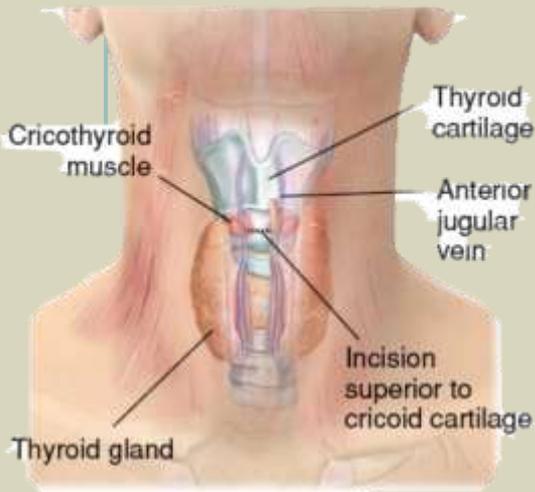
- An airway is considered protected if the patient is conscious and speaking in a normal tone of voice.
- An airway is considered unprotected if there is an expanding hematoma or subcutaneous emphysema in the neck, noisy or “gurgly” breathing, or a Glasgow Coma Scale <8.

An airway should be secured before the situation becomes critical

1. Basic maneuvers. Simple suctioning can remove blockages caused by mechanical obstruction. In the semiconscious or unconscious patient, the tongue itself can occlude the airway and the jaw-thrust maneuver displaces the tongue anteriorly from the pharyngeal inlet.

2. Tracheal intubation is indicated in any patient in whom concern for airway integrity exists. The preferred method of intubation is via the orotracheal route using rapid sequence induction (RSI) Once the airway is secured. Additional placement of an orogastric tube can also help prevent subsequent emesis and aspiration.

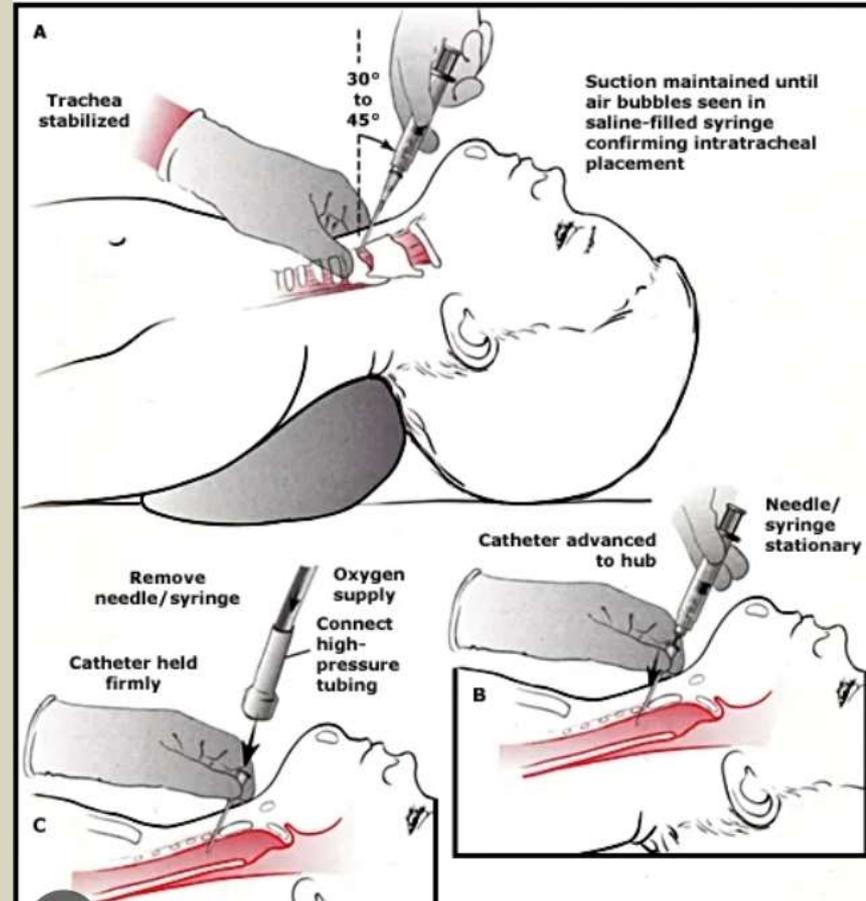
3. Cricothyrotomy: is the method of choice for establishing a surgical airway in adults after unsuccessful orotracheal attempts or with massive facial trauma.



- The cricothyroid membrane is easily palpated between the cricoid cartilage and the larynx. Being both superficial and relatively avascular, it provides rapid, easy access to the trachea.
- A 1.5-cm longitudinal skin incision is made over the membrane and after spreading of the soft tissues, a small transverse incision is made in it. The hole is expanded using a scalpel handle or tracheal spreader.
- A 6.0-mm endotracheal or tracheostomy tube is inserted into the trachea through the cricothyrotomy, the balloon is inflated, and the tube sutured into place
- Cricothyrotomy is contraindicated in children younger than 12 years of age because of their small cricothyroid membranes and proximity to the vocal cords. In this situation, percutaneous transtracheal ventilation is an alternative.

4. Percutaneous transtracheal ventilation can provide a temporary Airway until a formal surgical airway can be obtained, especially in young children.

- A small cannula (usually a 14-gauge intravenous catheter) is placed through the cricoid membrane.
- The cannula is connected to oxygen tubing containing a precut side hole.
- Temporary occlusion of the side hole provides passage of oxygen into the lungs via the cannula.
- Exhalation occurs passively through the vocal cords.
- Alveolar oxygen concentrations are transiently maintained for approximately 30 to 45 minute



BREATHING

- Securing oxygenation and ventilation

What comprises adequate assessment of breathing?

- **Inspection**—for air movement, respiratory rate, cyanosis, tracheal shift, jugular venous distention (JVD), asymmetric chest expansion, use of accessory muscles of respiration, open chest wounds
- **Auscultation**—for breath sounds
- **Percussion**—for hyperresonance or dullness over either lung field
- **Palpation**—for presence of subcutaneous emphysema, flail segments



▪ **Breath sounds indicate satisfactory ventilation:**

- Absence or decrease of breath sounds may indicate a pneumothorax and/or hemothorax and necessitate chest tube placement.

▪ **Pulse oximetry indicates satisfactory oxygenation:**

- Hypoxia may be secondary to airway compromise, pulmonary contusion, or neurological injury impairing respiratory drive and necessitate intubation.



CIRCULATION

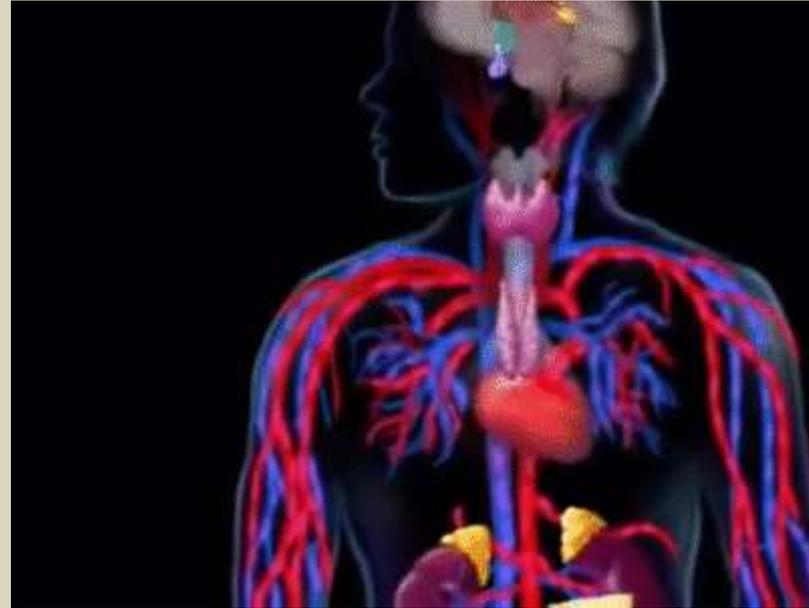
Securing adequate tissue perfusion; treatment of external bleeding

- What is the initial test for adequate circulation?

Palpation of pulses: As a rough guide, if a radial pulse is palpable, then systolic pressure is at least 80 mm Hg; if a femoral or carotid pulse is palpable, then systolic pressure is at least 60 mm Hg

- What comprises adequate assessment of circulation?

Heart rate, blood pressure, peripheral perfusion, urinary output, mental status, capillary refill (normal <2 seconds), exam of skin: cold, clammy = hypovolemia



DISABILITY

- The goal of this phase of the primary survey is to identify and treat life-threatening neurologic injuries, and priority is given to evaluating level of consciousness and looking for lateralizing neurologic signs.
- The level of consciousness is quickly assessed using the **AVPU** system (ascertaining whether the patient is **A**wake, opens eyes to **V**oice, opens eyes to **P**ainful stimulus, or is **U**narousable) and the Glasgow Coma Scale score

POSTURING

DECORTICATE

(Flexor)

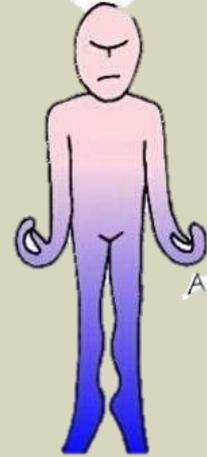


Arms are like

"C's"
Moves in toward the "Cord"

DECEREBRATE

(Extensor)



Arms are like

"e's"

Box 15.3 The Glasgow Coma Scale (GCS)

Eye opening

- 4 Spontaneously
- 3 To speech/command
- 2 To pain
- 1 None

Best verbal response

- 5 Orientated – knows who he or she is and where he or she is
- 4 Confused conversation – disorientated; gives confused answers to questions
- 3 Inappropriate words – random words; no conversation
- 2 Incomprehensible sounds
- 1 None

Best motor response

- 6 Obeys commands
- 5 Localizes pain
- 4 Flexes to pain – flexion withdrawal of limb to painful stimulus
- 3 Abnormal (decorticate) flexion – upper limb adducts, flexes and internally rotates so that it lies across chest; lower limbs extend (Figure 15.2)
- 2 Extends to pain (decerebrate) – painful stimulus causes extension of all limbs
- 1 None

When assessing the GCS, it is very important that an adequate stimulus is applied.

EXPOSURE

- Its purpose is to allow for complete visual inspection of the injured patient while preventing excessive heat loss.
- The patient is disrobed and visually inspected, including logrolling to examine the back, splaying of the legs to examine the perineum, and elevation of the arms to inspect the axillae.
- Rectal examination should be performed to assess for rectal tone and blood.
- Additionally, all penetrating wounds should be counted and marked with a radio-opaque marker on the skin. The exposed patient loses heat rapidly,
- so the resuscitation room should be kept warm and the patient promptly covered with warm blankets. All resuscitation IV fluids should be warmed.

HISTORY

- History should be gathered from the patient if possible, available eye-witnesses, and emergency medical service (EMS) providers. In addition to standard information that may be helpful in the management of any trauma patient
- EVALUATION AND RESUSCITATION OF A TRAUMA PATIENT OCCUR SIMULTANEOUSLY. IN GENERAL, DO NOT OBTAIN A DETAILED HISTORY UNTIL LIFE-THREATENING INJURIES HAVE BEEN IDENTIFIED AND THERAPY HAS BEEN INITIATED. THE INITIAL ASSESSMENT BEGINS AT THE SCENE OF THE INJURY, WITH INFORMATION PROVIDED BY THE PATIENT, FAMILY, BYSTANDERS, OR PARAMEDICS, OR POLICE.

-IMPORTANT ELEMENTS OF THE HISTORY INCLUDES

- The mnemonic AMPLE (Allergy, Medications, Past medical history, Last meal, Events leading to presentation) is often useful as a means of remembering key elements of the history.
- A history of hypotension is a predicator of more significant intra-abdominal injuries.

1) GUNSHOT WOUNDS

The following items may be particularly useful when managing the patient with a GSW to the abdomen.

Prehospital vital signs

These are particularly helpful if they were abnormal at any point, suggesting significant injury.

Number of shots heard

The number can provide a warning of possible missed injuries.

Blood loss at the scene

This may be substantial and is not always obvious once the patient is in the emergency department.

Position of the patient when shot

This may provide clues to possible injuries.

2) STAB WOUNDS

Answers to the following questions help to guide the clinician in assessing potential injuries from abdominal stab wounds:

- What instrument was used?
- How long and how wide was the instrument?
- How was the patient positioned during the stabbing?
- What path (or paths in the event of multiple wounds) did the instrument travel?
- Was there substantial blood loss at the scene?

3)BLUNT TRAUMA

Historical features related to motor vehicle collisions (the cause of most blunt abdominal trauma [BAT]) to consider include the following:

- Fatality at the scene
- Vehicle type and velocity
- Whether the vehicle rolled over (rollover mechanism is associated with increased risk of serious injury)
- Patient's location within the vehicle (seat position on the side of impact is associated with serious thoracoabdominal injury in side-impact crashes)
- Extent of intrusion into the passenger compartment (intrusion into passenger space >6 inches [15 cm] is associated with increased risk of injury)
- Extent of damage to the vehicle
- Steering wheel deformity (associated with increased risk of thoracoabdominal injury for front seat passengers)
- Whether seatbelts were used and, if so, what type (eg, use of lap belt alone increases risk for Chance fracture)
- Whether front or side air bags deployed

SECONDARY SURVEY

It is a complete head-to-toe examination of the patient designed to find all injuries and not to miss any.

Head. (Glasgow Coma Score (GCS))

The **face** should be inspected for lacerations, hematomas, asymmetry, and deformities

The **neck** should be inspected and palpated to exclude cervical spine, vascular injury

Thorax. Significant pulmonary, cardiac, or great-vessel injury may result from both penetrating and blunt trauma

The **abdomen** examining the abdomen to determine the presence of an intra-abdominal injury

The **pelvis** should be assessed for stability by palpating (not rocking) the iliac wings

The **back** should be inspected for wounds and hematomas

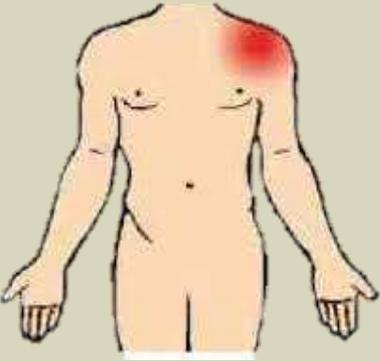
The **genitalia** and **perineum** should be inspected closely for blood, hematoma, and lacerations.

The **extremities** should be inspected and palpated to exclude the presence of soft tissue and orthopedic, vascular, or neurologic injury

SPECIAL SIGNS YOU WILL LOOK FOR:

Kehr's sign

is the occurrence of acute pain in the tip of the shoulder due to the presence of blood or other irritants in the peritoneal cavity when a person is lying down and the legs are elevated. Kehr's sign in the left shoulder is considered a classic symptom of a ruptured spleen. (splenic injury, intra-abdominal bleeding, free air)



A

B

Grey-Turner sign

Bluish discoloration of lower flanks, lower back; associated with retroperitoneal bleeding of pancreas, kidney, or pelvic fracture



C

D

Cullen sign

Bluish discoloration around umbilicus, indicates peritoneal bleeding.



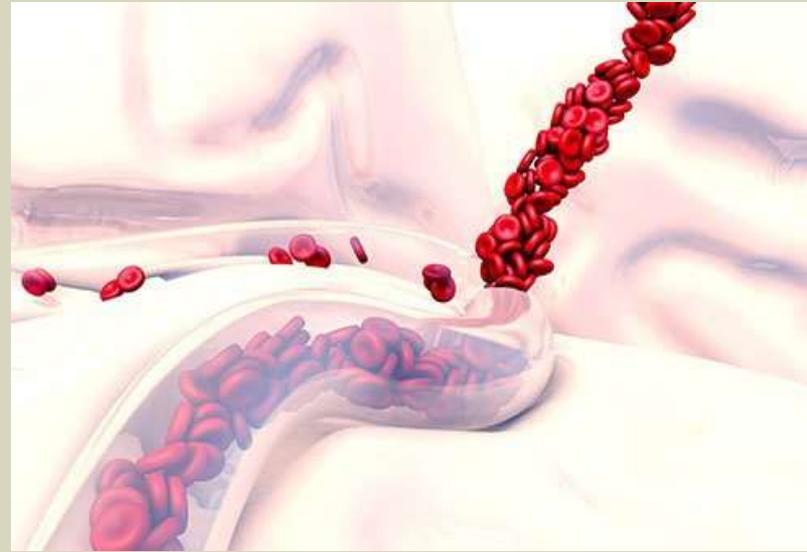
seat belt sign

contusion or abrasion across the lower abdomen, highly correlated with intraperitoneal injury.



SIGNS OF INTERNAL BLEEDING:

- Signs of internal bleeding include a drop in BP, a fast and/or thready pulse, a low CVP, and low urinary output.
- Patients tend to be cold, pale, anxious, shivering, and thirsty.
- These signs of shock occur when 25-30% of blood volume is acutely lost, ~1,500 ml in the average-size adult.



There are few places in the body that this volume of blood can be lost without being obvious on physical or radiographic exam:

- The head is too small without causing a lethal degree of intracranial pressure.
- The neck could contain a significant amount of blood, but such a hematoma would be obvious on physical exam.
- The pericardial sac cannot contain a significant amount of blood loss without resulting in pericardial tamponade and rapid clinical deterioration.
- The pleural cavities could easily accommodate several liters of blood, with relatively few local symptoms, but that significant a hemothorax would be obvious on chest x-ray, which is routinely performed in the secondary survey of a trauma patient.
- The arms and legs would also be obviously deformed by a large hematoma if present.

-
- That leaves the abdomen, retroperitoneum, thighs (secondary to a femur fracture), and pelvis as the only places where a volume of blood significant enough to cause shock could “hide” in a blunt trauma patient that has become unstable. The femurs and pelvis are always checked for fractures in the initial survey of the trauma patient by physical exam and pelvic x-ray.
 - So, a patient who has experienced blunt trauma who has become hemodynamically unstable with normal chest and pelvic x-rays likely has intra-abdominal bleeding.

SPECIFIC ABDOMINAL ORGANS' INJURIES

- **Stomach:** usually due to penetrating trauma S&S peritonitis, air under diaphragm, bloody NG aspirate. treatment: debridement and primary closure (resection if severe). Complications: abscess and fistula.
- **Pancreas:** due to blunt trauma in epigastric region, investigations: serum amylase. Management: distal pancreatectomy. complications/: fistula.
- **Liver:** most common injured intra-abdominal organ (injury doesn't always intra-operative intervention.
- **Non-operative management indications:** hemodynamically stable, constant pain, less than 4 unit transfusion, CT less than 500ml of blood in peritoneum.
- **Spleen:** most commonly injured in blunt trauma. Left upper quadrant bruising/ abrasions. Lower rib fracture, shoulder tip pain.

METHODS OF EVALUATION

1) Blunt trauma

BAT can manifest a wide range of presentations, from a patient with normal vital signs and minor complaints to an obtunded patient in severe shock. The initial presentation may be benign despite the presence of significant intra-abdominal injury. If evidence of extra-abdominal injury exists, the emergency clinician must assess for intra-abdominal injury, even in hemodynamically stable patients without abdominal complaints. In the hemodynamically unstable patient, concurrent resuscitation and assessment are paramount. The absence of abdominal pain or tenderness does not rule out the presence of significant intra-abdominal injury.

According to a systematic review of 12 studies involving 10,757 patients, the physical examination findings most strongly associated with intra-abdominal injury following BAT are the following :

- Seatbelt sign (subsequent observational evidence supports the association of the seatbelt sign with intra-abdominal injury)
- Rebound tenderness (uncommon but substantially increases risk when present)
- Hypotension (defined as systolic blood pressure <90 mmHg)
- Abdominal distension
- Abdominal guarding
- Concomitant femur fracture (femur fractures are significant distracting injuries and may indicate BAT among pedestrians stuck by automobiles)

2)stab wounds

It is important to completely undress the patient who sustains a stab wound. Stab wounds can often be obscured by body habitus, clothing, or bleeding, or be "hidden" in the scalp, axilla, perineum, or groin. Examine the patient carefully for evidence of more than one stab wound. Remember that the greatest danger may not be from the most obvious or immediately apparent injury. Clinicians should be wary of lacerations reported to be, or that appear to be, from blunt trauma; such wounds may represent penetrating trauma associated with significant internal injury.

PATIENTS WITH ANY OF THE FOLLOWING TYPICALLY GO IMMEDIATELY TO THE OPERATING THEATER FOR LAPAROTOMY:

- Hemodynamic instability
- Peritonitis
- Impalement
- Evisceration
- Blood from a nasogastric tube or on rectal examination

3) gunshot wounds

The management of patients whose abdomen cannot be examined reliably (eg, unresponsive, intoxicated, or intubated patient) will vary depending on local expertise and resources, and the preference of the attending trauma surgeon. Immediate laparotomy and diagnostic laparoscopy are both reasonable options. The stable patient with mild alteration in mental status (eg, mildly intoxicated) may be a candidate for nonoperative management based on computed tomography (CT) scanning. GSWs to the right upper quadrant with isolated liver injuries are favorable candidates for observation.

All patients must be completely undressed and systematically examined. A patient with what appears to be an isolated abdominal GSW may have additional wounds in the axilla, groin, perineum, scalp, or skin folds. A rectal examination should be performed in all patients with a GSW involving the lower abdomen, and a genitourinary examination should be performed in all patients with a GSW involving the pelvis. All patients must be log-rolled to evaluate for exit wounds and wounds to the back. Depending on bullet trajectory, ricochets, and associated shrapnel, abdominal GSWs may raise concern for intrathoracic injury.

INDICATIONS FOR IMMEDIATE LAPAROTOMY INCLUDE THE FOLLOWING :

- Signs of peritonitis (eg, rigid abdominal wall, rebound tenderness)
- Hypotension or hemodynamic instability
- Evisceration of abdominal contents (bowel or omentum)
- Hematemesis or gross blood per rectum

LABORATORY TESTS IN THE **BLUNT** ABDOMINAL TRAUMA PATIENT

- Routine laboratory tests are generally of limited value.
- Clinicians should consider laboratory tests as part of diagnosis and not substitutes for clinical assessment.

1) Hematocrit:

A hematocrit below 30 percent increases the likelihood of intra-abdominal injury in the setting of BAT .Anemia must be interpreted considering the clinical context, including the extent of hemorrhage, time since the injury, and the volume of exogenous fluid administration. The clinician should not be reassured by a normal hematocrit in the acute trauma patient with hypotension; internal hemorrhage should be assumed in such cases.



LABORATORY TESTS IN THE **BLUNT** ABDOMINAL TRAUMA PATIENT

2) **Leukocyte count:**

In BAT, the white blood cell count is nonspecific and of little value. The positive and negative predictive value of, respectively, an elevated or normal white blood cell count is poor. Catecholamine release due to trauma can cause demargination and may elevate the white blood cell count to 12,000 to 20,000/mm³ with a moderate left shift. Solid or hollow viscus injury can cause comparable elevations

3) **Pancreatic enzymes:**

Normal serum amylase and lipase concentrations cannot exclude significant pancreatic injury . While elevated concentrations raise the possibility of pancreatic injury, they may be caused by nonpancreatic abdominal injury as well and alone are nondiagnostic. If pancreatic injury is suspected, confirmatory studies (eg, CT scan) are needed.

LABORATORY TESTS IN THE **BLUNT** ABDOMINAL TRAUMA PATIENT

4) Urinalysis:

Gross hematuria suggests serious renal injury and mandates further investigations.

5) Liver function test:

Hepatic injury is associated with elevations in liver transaminase concentrations, and there is some evidence that higher elevations increase the odds for injury and the likelihood of severe injury.

In a retrospective study of 676 adult patients who underwent CT imaging within three hours of BAT, of whom 64 were diagnosed with hepatic injury, a threshold of 109 units per liter for aspartate aminotransferase (AST) and 97 units per liter for alanine aminotransferase (ALT) showed 84 percent sensitivity and 98 percent negative predictive value for the detection of hepatic injury [35]. However, patients with comorbidities such as alcohol-induced liver disease or hepatitis may have elevated transaminase concentrations at baseline.

RADIOLOGIC STUDIES

- X-Ray
- FAST
- Diagnostic peritoneal lavage (DPL)
- CT scan
- Laparoscopy



X-RAY

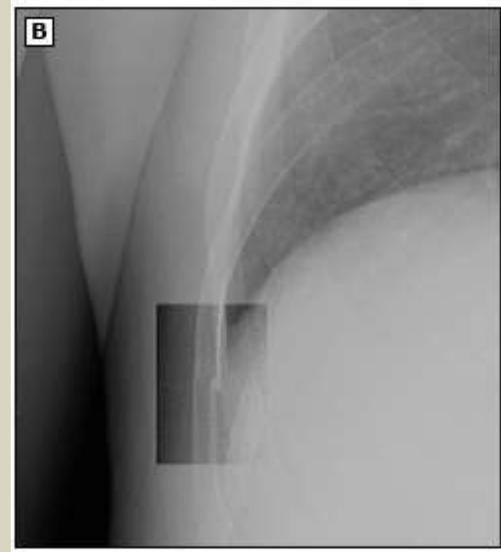
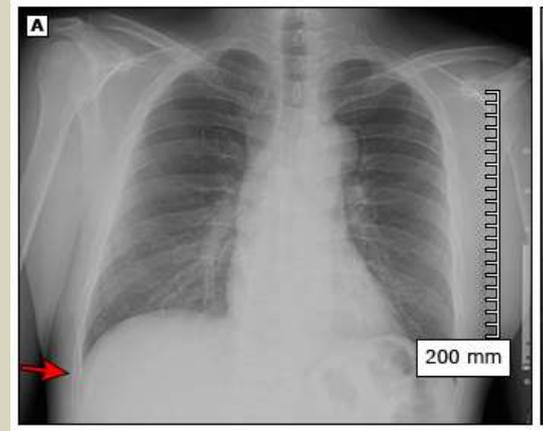
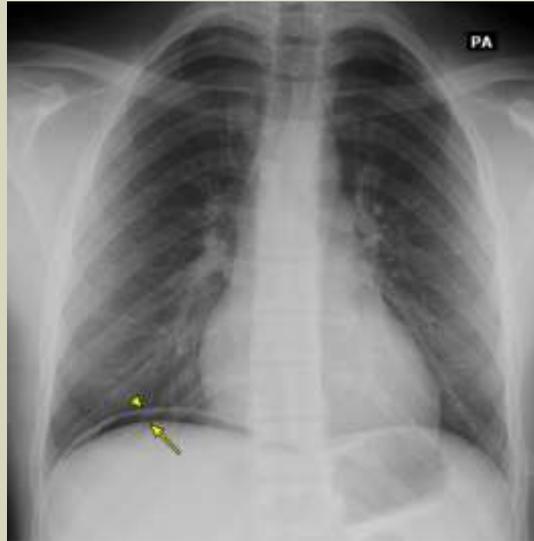
- Pneumothorax , Hemothorax
- Free air under the diaphragm
- Bowel loops in chest
- Elevation of the both or single diaphragm
- Fracture in ribs especially lower ribs which may cause injury to liver and spleen.
- Check vertebra
- obliteration of Psoas shadow – retroperitoneal bleeding.
- Ground glass appearance – massive hemoperitoneum.



X-RAY

Findings on chest radiograph that suggest intra-abdominal injury include:

- Lower rib fractures
- Diaphragmatic hernia
- Free air under the diaphragm



FAST (FOCUSED ABDOMINAL SONAR FOR TRAUMA)

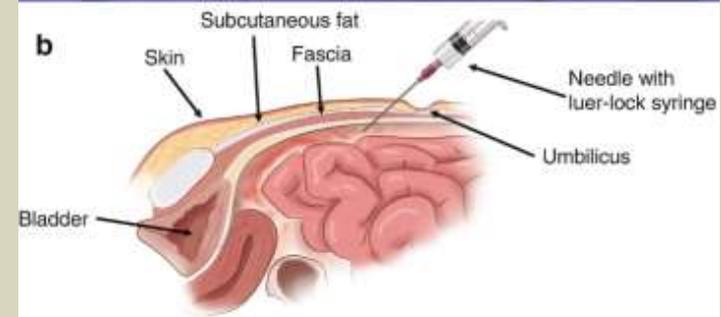
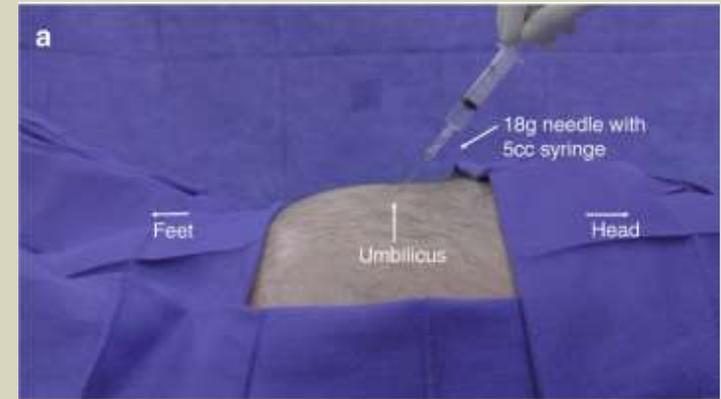
Is a technique used to assess the presence of free blood, either in the abdominal cavity or in the pericardium. The technique therefore focuses on six areas: the pericardium, the areas around the liver and the spleen, the left and right pericolic gutters, and the peritoneal space in the pelvis.



DIAGNOSTIC PERITONEAL LAVAGE (DPL)

Diagnostic peritoneal aspiration (DPA) is a surgical diagnostic procedure to determine if there is free floating fluid (most often blood) in the abdominal cavity.

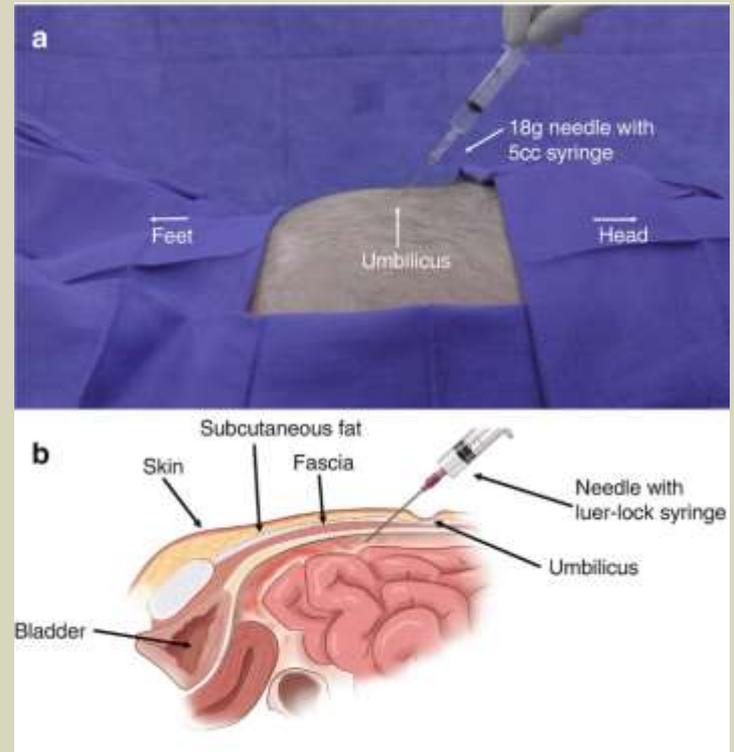
A gastric tube is placed to empty the stomach and a urinary catheter is inserted to drain the bladder.



DIAGNOSTIC PERITONEAL LAVAGE (DPL)

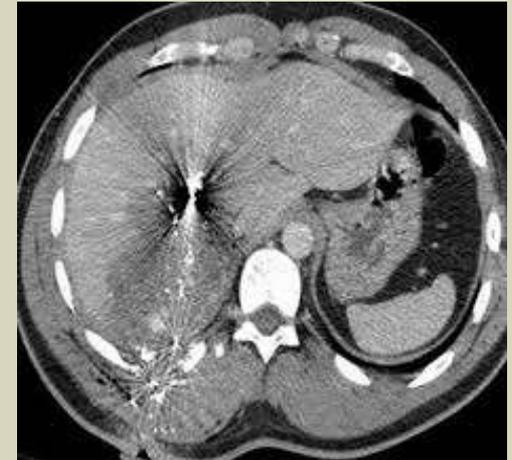
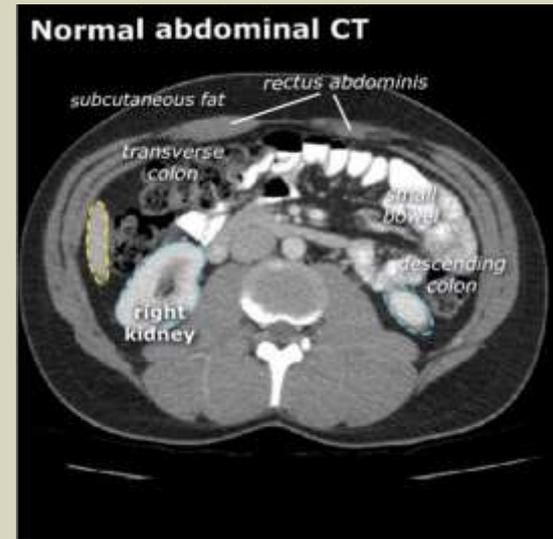
A cannula is inserted below the umbilicus, directed caudally and posteriorly. The cannula is aspirated for blood (>10 mL is deemed as positive) and, following this, 1000 mL of warmed Ringer's lactate solution is allowed to run into the abdomen and is then drained out.

The presence of $>100\ 000$ red cells/ μL or >500 white cells/ μL is deemed positive



CT SCAN

- CT has become the 'gold standard' for the intra-abdominal diagnosis of injury in the stable patient.
- The scan should be performed using intravenous contrast.
- CT is sensitive for blood, and individual organ injury, as well as for retroperitoneal injury.
- An entirely normal abdominal CT is usually sufficient to exclude injury.



CT SCAN

- Provides excellent imaging of pancreas, duodenum and Genitourinary system
- Standard for detection of solid organs injury.
- Determines the source and amount of bleeding.
- Good for retroperitoneal & vertebral column.
- Not operator dependent
- High Specificity-95%



DIAGNOSTIC LAPAROSCOPY (DL)

- May be valuable screening investigation in stable patients with penetrating trauma, to detect or exclude peritoneal penetration and/or diaphragmatic injury.
- evaluate organ injury
- it is difficult to exclude all intra-abdominal injuries laparoscopically.
- DL is not a substitute for open laparotomy, especially in the presence of haemo-peritoneum or contamination.

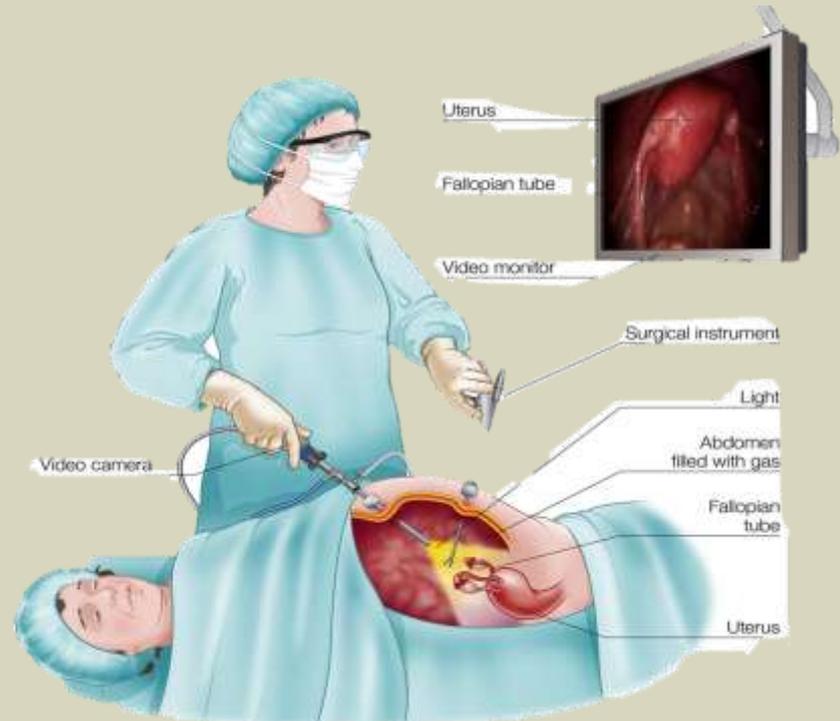
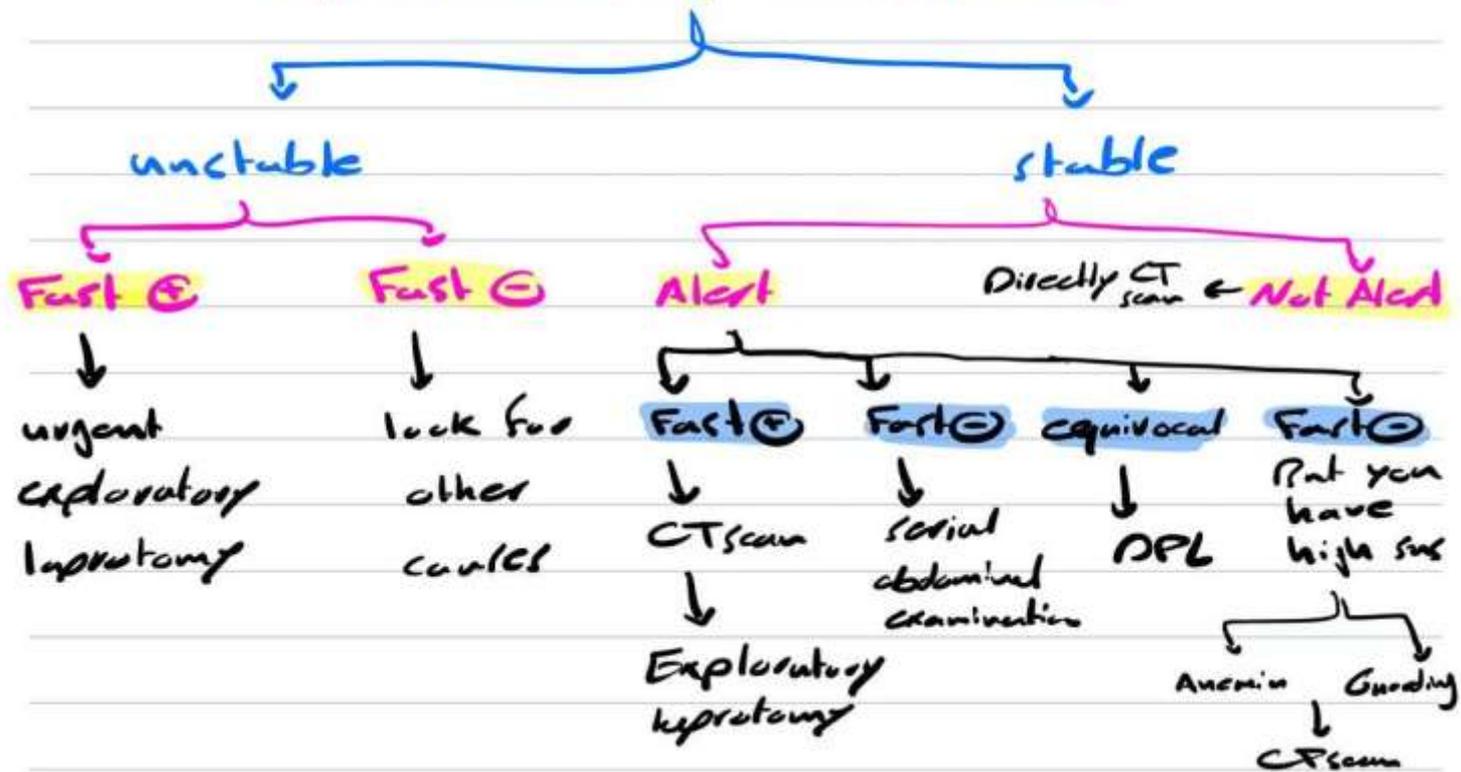


TABLE 5-2 ■ Comparison of DPL, FAST, and CT in Blunt Abdominal Trauma

	DPL	FAST	CT SCAN
Advantages	<ul style="list-style-type: none">• Early diagnosis• Performed rapidly• 98% sensitive• Detects bowel injury	<ul style="list-style-type: none">• Early diagnosis• Noninvasive• Performed rapidly• Repeatable	<ul style="list-style-type: none">• Most specific for injury• Sensitive: 92%–98% accurate
Disadvantages	<ul style="list-style-type: none">• Invasive• Low specificity• Misses injuries to diaphragm and retroperitoneum	<ul style="list-style-type: none">• Operator-dependent• Bowel gas and subcutaneous air distortion• Misses diaphragm, bowel, and pancreatic injuries	<ul style="list-style-type: none">• Cost and time• Misses diaphragm, bowel, and some pancreatic injuries• Transport required

Evaluation and management of Blunt abdominal trauma

"depend on the pt hemodynamic"





QUESTIONS

A 54-year-old man is brought to the emergency department 10 minutes after being involved in a motor vehicle accident. He was an unrestrained driver and hit a car while speeding on the highway. On arrival to the emergency department, he is spontaneously breathing and noncyanotic. His temperature is 37°C (98.6°F), blood pressure is 104/50 mm Hg, pulse is 122/min, and respirations are 16/min. Examination shows facial lacerations and multiple ecchymoses on the anterior chest and abdomen. He appears obtunded. **Which of the following is a component of the Glasgow coma scale (GCS) assessment for this patient?**

- A. Capillary refill
- B. Deep tendon reflexes
- C. Eye opening
- D. Gag reflex
- E. Pupillary reaction

A 34-year-old man is brought to the emergency department after a head-on motor vehicle collision. The patient was the restrained driver. At the scene of the collision, paramedics found him conscious with a blood pressure of 72/38 mm Hg and a pulse of 134/min. His cervical spine was immobilized, and an intravenous fluid infusion was started. Physical examination in the emergency department shows an awake and alert patient with diaphoresis and breath smelling of alcohol. He has several facial abrasions and lacerations that have stopped bleeding. Pupils are equal and reactive to light. Ecchymosis in the distribution of a seat belt is present over the chest and abdominal wall. The patient has chest wall tenderness and equal breath sounds bilaterally. The abdomen is distended and diffusely tender. Bowel sounds are decreased. Portable chest x-ray reveals multiple rib fractures without pneumothorax. Pelvic and cervical spine radiographs are negative for fractures or dislocations. Focused assessment with sonography for trauma reveals free intraperitoneal fluid but no pericardial fluid. After rapid infusion of 3 L of intravenous crystalloid, blood pressure is 82/51 mm Hg and pulse is 113/min. A blood transfusion is planned. Which of the following is the most appropriate next step in management of this patient?

- A. Contrast angiography
- B. CT scan of the abdomen
- C. Diagnostic peritoneal lavage
- D. Monitoring with serial examination
- E. Urgent laparotomy

A 34-year-old man is brought to the emergency department by paramedics after being shot in a street fight. The patient is obtunded and had an episode of vomiting en route. He receives 3 L of normal saline. His temperature is 37 C (98.8 F), blood pressure is 85/43 mm Hg, pulse is 126/min, and respirations are 21/min. The trachea is midline, and there are breath sounds bilaterally. Examination shows a gunshot entry wound in the left 6th intercostal space anteriorly lateral to the midclavicular line and an exit wound in the left seventh intercostal space posteriorly. The patient is intubated, and mechanical ventilation is initiated. Portable chest x-ray shows hazy opacities at the left lung base. Bedside ultrasound is limited due to body habitus but shows no definite pericardial or peritoneal fluid. Which of the following is the most appropriate next step in management of this patient?

- A. Chest tube placement
- B. Computed tomography scan of the abdomen
- C. Diagnostic peritoneal lavage
- D. Exploratory laparotomy
- E. Plain radiograph of the abdomen

THANKS

Do you have any questions?



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