

Lecture 3 : Critical Care Nursing

Abdominal trauma:

- Abdomen is a black box for the body .
- Abdominal trauma is regularly management in the emergency department
- One of the leading cause of death and disability
- Identification of serious intra-abdominal injuries is often difficult
- Many injuries may not manifest during the initial assessment and treatment period .
- Crushing: Intra abdominal contents are crushed between the anterior abdominal wall & the vertebral column or posterior thoracic cage. This produces a crushing effect, to which solid viscera (eg. spleen, liver, kidneys) are especially exposable.
- Injury accounts for 10% of all deaths.

pathophysiology of abdominal Injury:

- Rapid physical speedy impact causes differential movement among near structures . As a result, opposite forces are created & cause hollow, solid, visceral organs & vascular to injury, especially at relatively fixed points of attachment.

Abdomen can be classified to the four areas:

Upper right quadrant :

Liver ,gallbladder , Duodenum ,head of Pancreas, hepatic flexure of colon

Upper left quadrant:

Stomach, Spleen, left lobe Liver, left kidney , left adrenal gland, Splenic flexure of colon, part of Transverse and Descending colon .

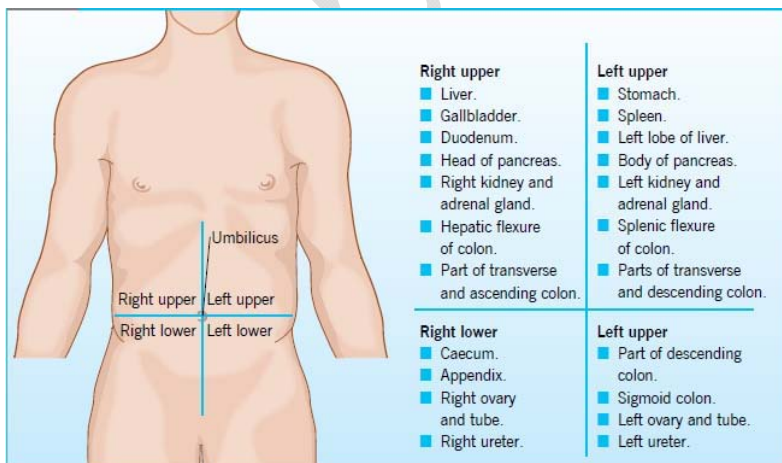
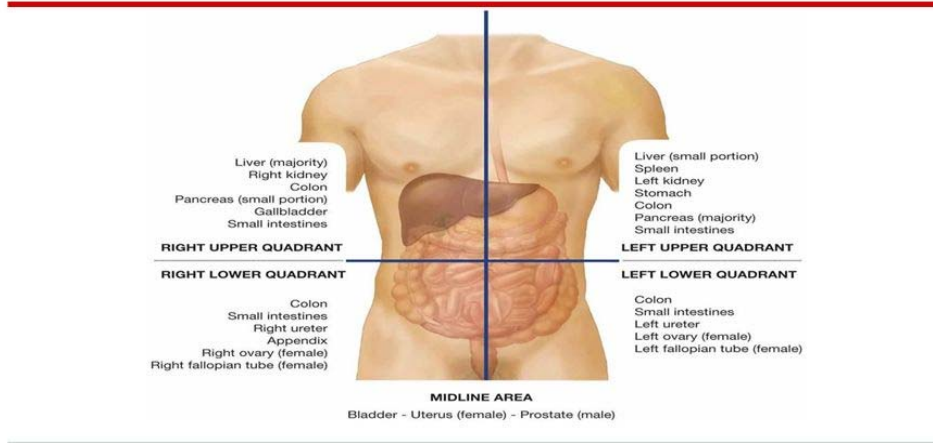
lower right quadrant:

cecum , appendix , Ascending colon, right ovary and fallopian tube, right ureter

lower left quadrant:

Descending colon, Sigmoid colon, left fallopian tube, left uterine tube.

Quadrants of Abdomen



Classification of the abdominal trauma:

1-Blunt abdominal trauma: is physical trauma to a body part, either by impact, injury or physical attack.

Etiology:

The chief cause of blunt abdominal trauma is car accidents. Other causes include the falls from heights, bicycle injuries, injuries during sporting activities, and industrial accidents. In children, the most common causes are due to car injuries and bicycle accidents.

Pathophysiology:

Blunt abdominal trauma can cause damage to the internal organs, resulting in internal bleeding, cause contusions (bruising), or injuries to the bowel, spleen, liver, and intestines.

Symptoms and signs of Blunt Trauma:

1. Abdominal pain tenderness
2. Distension
3. Discoloration of abdomen
4. Shock
5. May cause bruising
6. Rigidity to the touch

2-Penetrating abdominal trauma.

•Results in- uncontrolled hemorrhage , Organ damage , & Inflammation of abdominal lining .

•Liver most commonly affected organ

- Common causes of Penetrating trauma □ Stab wound □ gunshot

Stab wounds : Knives are not only equipment are used in stabbings, pens, coat hangers, screwdrivers, and broken bottles.

- Most commonly in the upper quadrants, the left more commonly than the right.
- The liver, followed by the small bowel, is the organ most often damaged by stab wounds.
- Penetrating Abdominal Trauma is usually diagnosed based on clinical signs .

Symptoms and signs of Penetrating Trauma:

1. Abdominal pain
2. Bleeding
3. Shock
4. Evisceration (protrusion of internal organs out of a wound)

Types of Abdominal injuries Blunt trauma :

I. Diaphragmatic injuries description : Diaphragmatic injuries are difficult to diagnose. Diaphragmatic Injury “inward movement of abdomen during Inspiration.

II. Liver injury description :

- Most commonly injured organ; blunt injuries (70% of total) usually occur from car crashes and car wheel trauma
- Highest mortality from blunt injury and gunshot wound
- Hemorrhage is most common cause of death from liver injury; overall mortality 10%–15%.

Clinical manifestations of Liver injury:

1. Persistent hypotension
2. Right upper or lower quadrant; abdominal tenderness .
3. Dullness to percussion (dull sound indicates the presence of a solid mass under the surface).
4. Abdominal distention and peritoneal irritation
5. Persistent thoracic bleed.

III. Spleen injury description :

- Most commonly injured organ with blunt abdominal trauma
- Injured in penetrating trauma of the left upper quadrant .

Clinical manifestations of Spleen injury :

1. Hypotension, tachycardia, shortness of breath
2. Peritoneal irritation
3. Abdominal wall tenderness
4. Left upper quadrant pain
5. Dullness to percussion in left flank.

IV. Pancreas injury descriptions:

- Most often penetrating injury (gunshot wounds at close range)
- Blunt injury; injury from car wheel
- Often associated (40%) with other organ damage (liver, spleen, vessels)

Clinical manifestations of Pancreas injury:

1. Pain over pancreas
2. Paralytic ileus
3. Symptoms may occur late (after 24 hr); epigastric pain radiating to back; nausea, vomiting
4. Tenderness to deep palpation.

V. Small intestines injury descriptions:

- Duodenum, ileum, and jejunum; most often injured by penetrating trauma
- Gunshot wounds account for 70% of cases
- When small bowel ruptures from blunt injury, rupture occurs most often at proximal jejunum

Clinical manifestations of Small intestines injury :

1. Testicular pain
2. pain in shoulders, chest, back
3. Mild abdominal pain
4. Peritoneal irritation
5. Fever, jaundice, intestinal obstruction

VI. Large intestines injury descriptions:

- One of the more lethal injuries because of fecal contamination; occurs in 5% of abdominal injuries
- More than 90% of incidences are penetrating injuries

Clinical manifestations of Large intestines injury :

1. Pain, muscle rigidity
2. Tenderness
3. Blood on rectal examination
4. Fever

Primary survey Identification & treatment of life threatening conditions

Primary survey

A Airway maintenance with cervical spine protection

B Breathing and ventilation

C Circulation with hemorrhage control

D Disability : Neurological status

E Exposure/Environmental control

Airway :

During any severely injured patient, the initial priorities are to ensure a clear, secure airway and to maintain adequate oxygenation.

Airway Management Clear the airway Suction Finger sweep –
 Heimlich's manoeuver Head tilt and chin lift Endotracheal tube.

Breathing and ventilation:

Do not confuse airway problem for ventilation problem .

Need good gas exchange (Oxygen in, CO2 out)

Rapid assessment of

- RR(Respiration Rate)
- Trachea
- Chest expansion
- percussion
- auscultation

Circulation with hemorrhage control: Assess-

Pulse rate and character

Skin color and temperature

Conscious level(GCS)

Capillary refill time

Decreased urine output

- Hypotension -a late sign when $\geq 30\%$ blood volume lost.
- Stopping the bleeding : most important priority.

Management of Circulation :

- Control bleeding with direct pressure
- Splint limb fractures
- Insert 2 large IV cannulas line in adults .
- Sendoff blood-cross match, coagulation screen, Hb, biochemistry, blood alcohol level .

Disability : Neurological status:

Disability assessed by AVPU scale

- A. Alert i.e. obeys commands
- V. Vocalizes-inappropriate or incomprehensible
- P. Responds to pain
- U. Unresponsive
- Glasgow Coma Score

Exposure/Environmental control :

- completely undress the patient, but prevent hypothermia .

Secondary survey : Secondary survey does not begin until the primary survey (ABCDEs) is completed.

Secondary Survey

- General & Systemic Examination-to identify all disappeared injuries .
- Vital Signs

• Abdominal findings: Inspection : For abdominal distension, Bowel, and Lumbar spine injuries .

• Special attention to Back, Axilla.

• Consider possible internal injuries eg: liver ,spleen and kidney.

• Palpation : For tenderness severe tenderness: a sign of internal bleeding. , rigidity.

• Percussion : Dullness/ shifting dullness Intraabdominal collection

• Auscultation : Where to auscultate & What to listen for??? All four quadrants for the +/- nce of bowel sounds

• Foley's catheter- monitor urine out put

• Nasogastric tube

• **AMPLE History :**

• A: Allergy • M: Medications • P: Past medical history • L: Last meal

• E: Event - What happened.

Examination Wounds Involvement chest & Head injury
Laceration Abrasion Contusions .

Examination Cullen's Sign: Bluish discoloration around umbilicus spread of blood along periumbilical tissues or Hemoperitoneum (is the presence of blood in the peritoneal cavity) .

Examination Grey-Turner's Sign: Bluish discoloration of the flanks Retroperitoneal Hematoma hemorrhagic pancreatitis.

Kehr's sign : Referred pain in left shoulder irritation of the diaphragm (Splenic injury, intra-abdominal bleeding).

- **Examination Balance's Sign:** Dullness on percussion of the left upper quadrant ruptured spleen, Labia , and Scrotum : collecting of blood from abdominal and pelvic cavities.



Investigations: Diagnostic studies

(A) Blood Tests :

1. Hb : - quantity of blood to replace.
2. WBCs : - indicate sepsis or reactive leucocytosis.
3. Serum createnin: - pre-renal shut down.
4. Glucose and electrolytes .
5. Amylase: - gut injury or pancreas .
6. Urine analysis: - if RBCs $>30 - 50$ /mm, radiographic evaluation of kidneys and urinary bladder is a must.
7. Blood grouping typing & cross matching
8. Blood glucose determination
9. Coagulation profile
10. Arterial blood gas analysis .

(B) Radiological Studies (Abdominal X-ray, CXR)

(C) Peritoneal lavage (DPL)

Diagnostic peritoneal lavage (DPL) :

□ Indications: - (DPL)

1. Unconscious trauma patient with signs of abdominal injury.
2. Patient with suspected intra-abdominal injury and not visible physical findings.
3. Patients with multiple injuries and shock.
4. Patients with spinal cord injury.

□ **Contraindications: - (DPL)**

1. Patients with previous abdominal operations.
2. Pregnancy.
3. Over obesity.

(D) US of abdomen

□ **Advantages in US of abdomen: -**

1. Fast and non-surgical .
2. Bedside.
3. Portable

(E) CT abdomen : CT Scan

□ **Advantages in CT Scan of abdomen:**

- Provides excellent imaging of pancreas, duodenum and Genitourinary system
- Standard for detection of solid organs injury.
- Determines the source and amount of bleeding
- Can reveal other associated injuries e.g. Vertebral & Pelvic & injury in the thoracic cavity.

(F) Diagnostic laproscopy

Treatment / Management:

Emergency Care Management:

1. I V fluids
2. Control external bleeding
3. Dressing of wounds
4. Protect eviscerated organs with a sterile dressing
5. Stabilize an impaled object in place
6. Give high flow oxygen
7. Immobilize the patient with a fractured pelvis

8. Keep the patient warm
9. Analgesics

Common operative procedures :

1. Restrictive thoracotomy
2. Laparotomy (abdominal surgery)

Indications for laparotomy :

- Hypotension, with clinical evidence of intraperitoneal bleeding
- Hypotension with penetrating wounds
- Gunshot wounds traversing the peritoneal cavity or visceral/vascular .
- Evisceration(protrusion of internal organs out of a wound).
- Bleeding from the stomach, rectum or genitourinary tract following penetrating trauma.

Preparation for anesthesia and surgery:

- Establishing or Confirming Presence of Airway
- Intravenous Access.
- Evaluation of Preoperative Volume Status. A quick evaluation of the patient's volume status can be made by measuring the blood pressure, heart rate, palpating the peripheral pulse, skin color and turgor, and quality of mucous membranes.

Postoperative ICU Consideration:

1. Abdominal compartment syndrome (increase intra-abdominal pressure).
2. Deep venous thrombosis.
3. Sepsis (bacteremia).

Management based on organs :

I. Diaphragmatic injury: repaired surgically to prevent visceral herniation in later years.

II. Esophageal injury:

1. Gastric decompression with a nasogastric tube
2. Antibiotic therapy
3. Surgical repair of the esophageal tear.

III. Gastric injury: partial gastrectomy may be needed if extensive injury has occurred.

IV. Liver injury:

1. Managed nonoperatively or operatively, depending on the degree of injury and the amount of bleeding.
2. Albumin transfusion
3. Blood glucose regulation

V. Spleen injury: splenectomy is the treatment of choice when the patient is markedly hemodynamically unstable, or when the spleen is totally injured.

VI. Pancreatic injury: depends on the degree of pancreatic damage, but drainage of the area is usually necessary to prevent pancreatic fistula formation and surrounding tissue damage from pancreatic enzymes.

VII. Small and Large Bowel :

1. Perforation is managed by surgical exploration and repair.
2. Colostomy
3. Nutritional supplementation
4. Enteral feeding
5. Antibiotics
6. Intravenous fluid infusion
7. Blood components transfusion.

Nursing Management (Nursing diagnosis) :

1. Increased risk of hypovolemia and shock related to abdominal trauma and internal bleeding.
2. Increased risk of sepsis related to acute inflammatory process and peritonitis.
3. Increased risk of severe fluid, electrolyte, and metabolic imbalances related to injury or inflammation.
4. Pain and bowel distention , related to trauma.
5. Risk for imbalanced body temperature related to infection
6. Risk for impaired skin integrity related to bed rest, hemiplegia, immobility.
7. Impaired elimination due to abdominal & nerve injury.
8. Body image disturbance related to presence of colostomy bag, wound.
9. Deficient knowledge about abdominal injury, recovery, and the rehabilitation process
10. Anxiety related to the symptoms of disease and fear of death.

Complications of abdominal injury:

1. Hematoma rupture
2. Peritonitis
3. Intra-abdominal abscess
4. Bowel obstruction or ileus
5. Biliary leakage and/or biloma
6. increase intra-abdominal pressure