

ABDOMINAL TRAUMA

Primary Care Paramedicine

Module: 17

Section: 06



- Introduction
- Pathophysiology
- Assessment
- Management

- One of body's largest cavities
- Multiple vital organs
- Large volumes of blood can be lost before signs and symptoms manifest
- Bordered by muscles not skeletal structures
 - Forces transmitted to structures underneath
 - Must be alert for signs of transmitted injury
 - Deformity, swelling and bruising

- Energy transmitted to surrounding tissue
- Projectile cavitation, pitch and yaw
- Most frequently involves liver and small bowel
- Consequences
 - Uncontrolled hemorrhage
 - Organ damage
 - Spillage of hollow organ contents
 - Irritation and inflammation of abdominal lining
- Shotgun trauma
 - Multiple projectiles



- Produces least visible signs of injury
- Most frequently involves spleen and liver
- Causes
 - Deceleration
 - Contents damaged by change in velocity
 - Compression
 - Organs trapped between other structures
 - Shear
 - Part of an organ is able to move while another part is fixed
 - i.e. Ligamentum teres



- Blunt and penetrating mechanisms
- Irregular shaped shrapnel and debris
- Pressure wave
 - Compresses and relaxes air-filled organs
 - Contuse or rupture organs
- Abdominal injury is secondary concern during blast injury

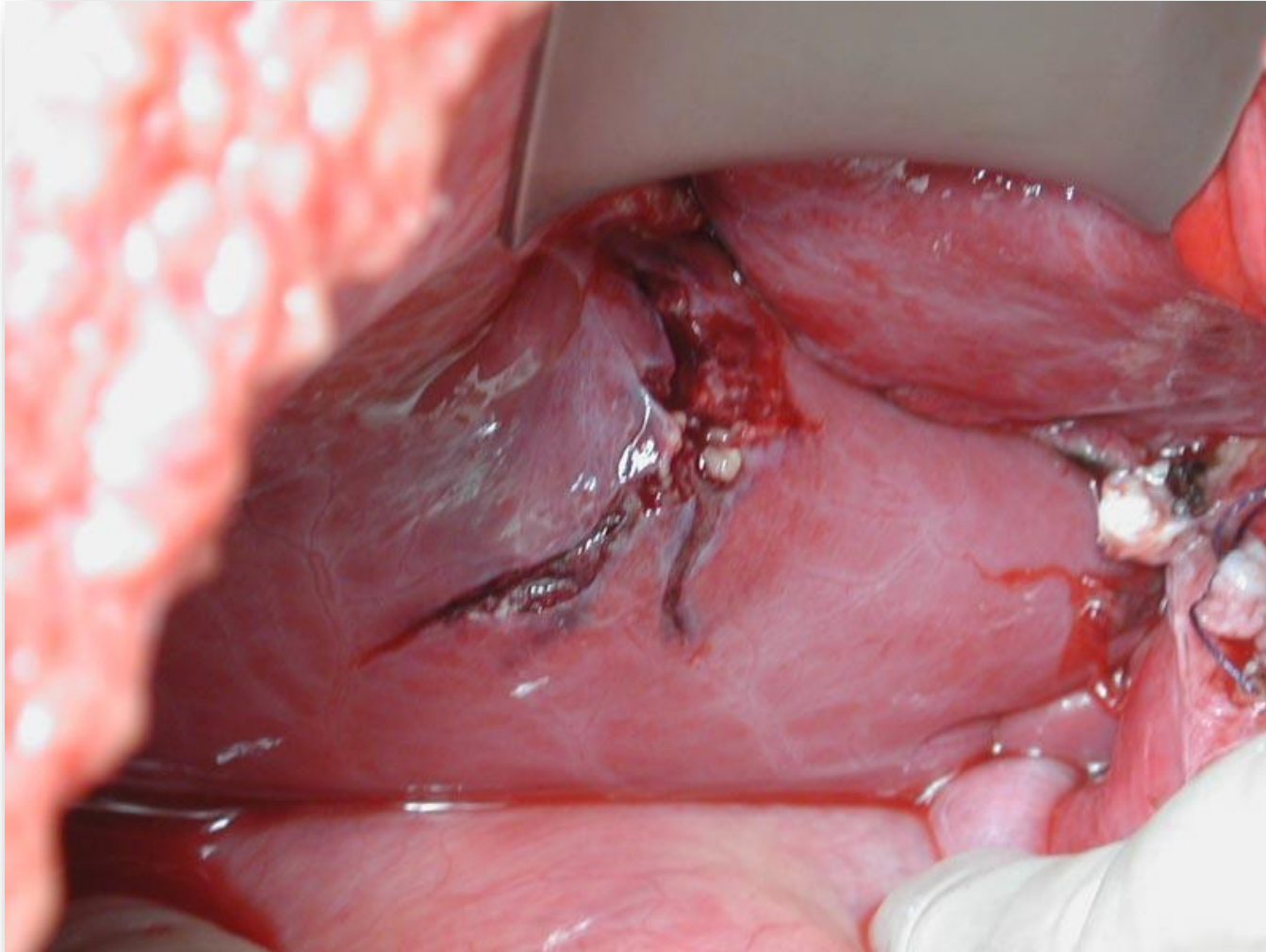
- Skin and muscles transmit blunt trauma to internal structures
 - Typically only show erythema
 - Visible swelling and ecchymosis occur over several hours
- Penetrating trauma may appear minimal externally in comparison to internal trauma
 - Muscle may mask the size of the external wound
 - Evisceration may be present
- Trauma to thorax, buttocks, flanks and back may penetrate abdomen
- Diaphragmatic tears
 - Herniation of abdominal contents into thorax

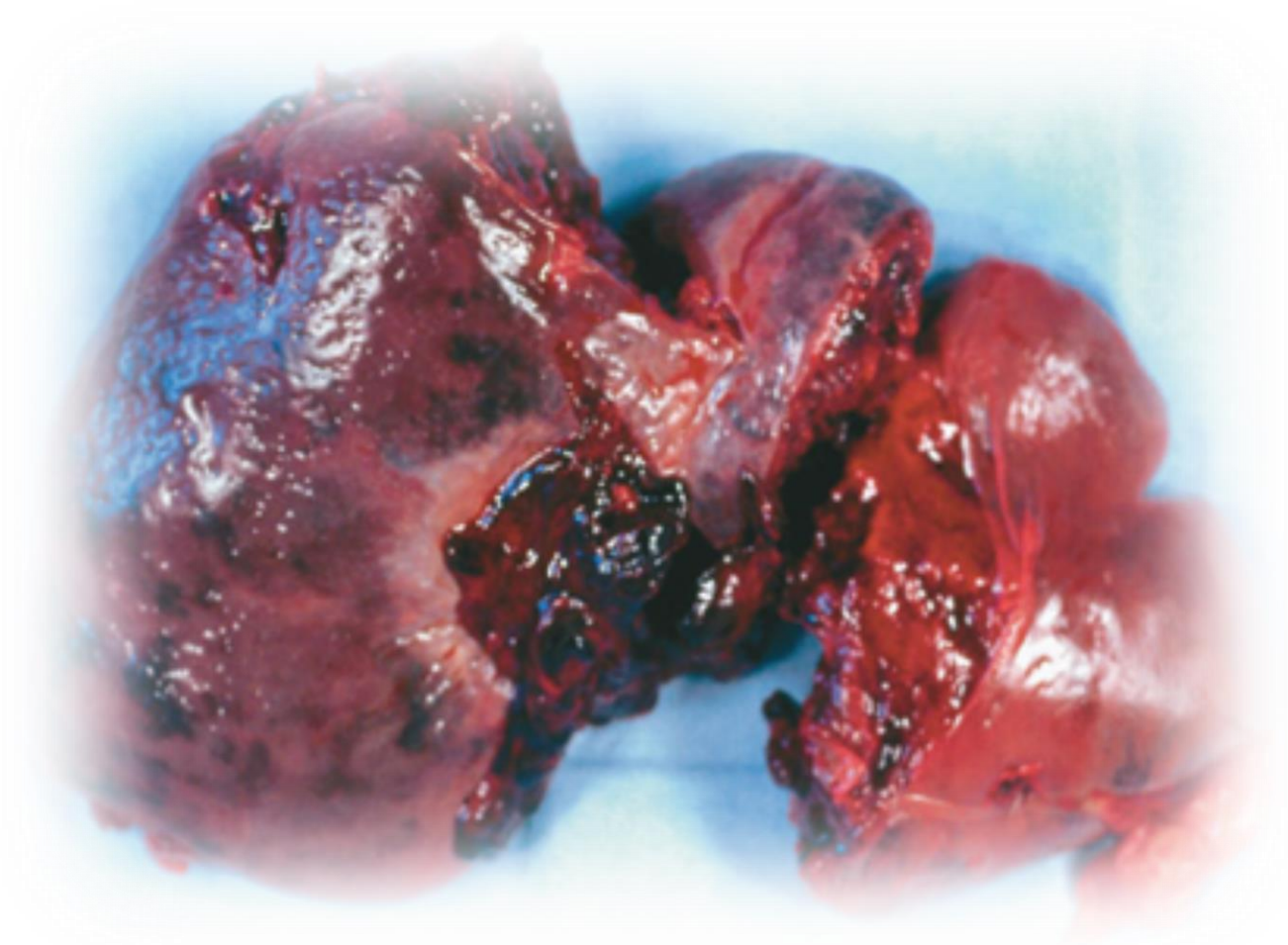
- May rupture with compression from blunt forces
- May tear due to penetrating trauma
- Spillage of contents
 - Retroperitoneal space
 - Peritoneal space
 - Pelvic space
- Intestines have a large amount of bacteria
 - Leakage can result in sepsis

- Hematochezia
 - Blood in stool
- Hematemesis
 - Blood in emesis
- Hematuria
 - Blood in the urine

- Dense and less strongly held together
- Prone to contusion
 - Bleeding
 - Fracture (rupture)
- Unrestricted hemorrhage if organ capsule is ruptured
- Specific Organs
 - Spleen: pain referred to left shoulder
 - Pancreas: pain radiate to back
 - Kidneys: pain radiate from flank to groin and hematuria
 - Liver: pain referred to the right shoulder

Penetrating Trauma to Spleen





- Abdominal aorta and vena cava
 - Prone to direct blunt or penetrating trauma
 - May be injured in deceleration injuries
- Blood accumulates beneath diaphragm
 - Irritation of muscular structures
 - Produces referred pain in the shoulder region
 - Greater volume of blood can be lost
 - Presence of blood in abdomen, stimulates vagus nerve resulting in slowing of heart rate
- Blood can isolate in any of the abdominal spaces

- Provides bowel with circulation, innervation, and attachment
- Disrupt blood vessels supplying the bowel
 - Lead to ischemia, necrosis or rupture
- Blood loss minimal
 - Peritoneal layers contain hemorrhage
- Tear of mesentery may rupture bowel
- Penetrating trauma to the lateral abdomen likely to injure large bowel

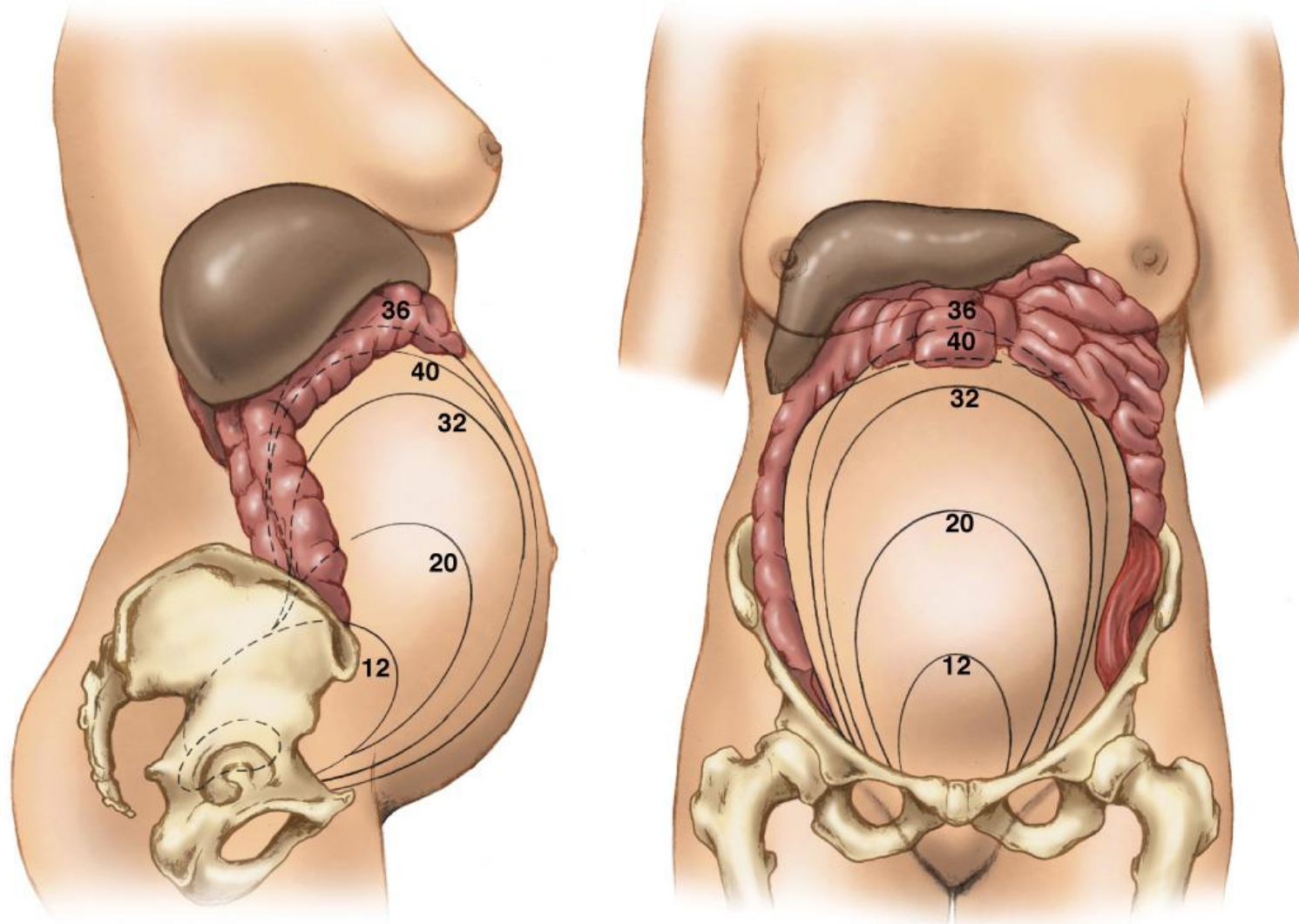
- Delicate and sensitive lining of anterior abdomen
- Peritonitis
- Inflammation of the peritoneum
 - Bacterial irritation
 - Due to torn bowel or open wound
 - Chemical irritation
 - Caustic nature of digestive enzymes
 - Urine initiates inflammatory response
 - Blood does not induce peritonitis

- Progression
 - Slight tenderness at location of injury
 - Rebound tenderness
 - Guarding
 - Rigid, board-like feel

- Serious skeletal injury
 - Life threatening hemorrhage
- Potential injury to pelvic organs
 - Ureters
 - Bladder
 - Urethra
 - Female genitalia
 - Prostate
 - Rectum
 - Anus

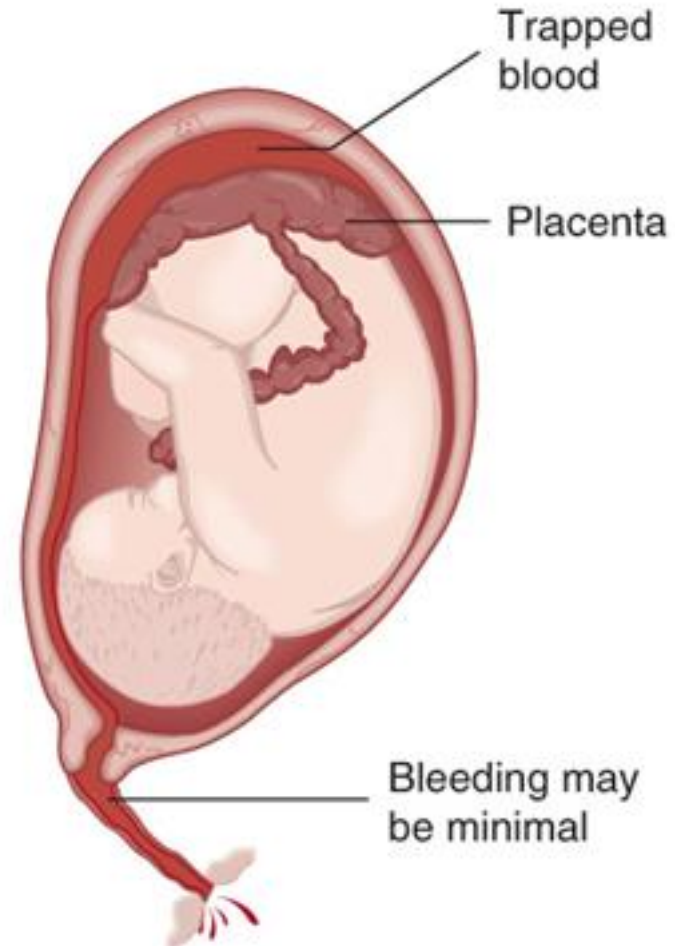
- Trauma is the number one killer of pregnant females
 - Penetrating abdominal trauma accounts for 36% of maternal mortality
 - GSW account for 40-70% of penetrating trauma
 - Blunt trauma due to improperly worn seatbelts
 - Auto collisions are leading cause of mortality
- Changing dimensions of uterus
 - Protects abdominal organs
 - Trauma endangers uterus and fetus

Changing Dimensions of the Pregnant Uterus



- Maternal Changes
 - Increasing size and weight of uterus
 - Compression of inferior vena cava
 - Reduce venous return to heart
 - Increasing maternal blood volume
 - Protect mother from hypovolemia
 - 30-35% of blood loss necessary before signs of shock
 - Uterus is thick and muscular
 - Distributes forces of trauma uniformly to fetus
 - Reduces chances for injury

- Risk of uterine and fetal injury
 - Increases with the length of gestation
 - Greatest risk during third trimester
- Penetrating trauma may cause fetal and maternal blood mixing
- Blunt trauma complications
 - Uterine rupture
 - Abruptio placenta
 - Premature rupture of amniotic sac



- Children have poorly developed abdominal musculature and smaller diameter
- Rib cage more cartilaginous
 - Transmits injury to organs beneath easier
- Increased incidence of injury
 - Liver
 - Kidney
 - Spleen
- Shock
 - Compensate well for blood loss
 - May not show signs and symptoms until 50% of blood is lost

- Scene assessment
 - Must evaluate MOI to assess seriousness of injury
 - Identify strength and direction of forces
 - Velocity of impact
 - Focus observations and palpation on that site
 - Develop a mental list of possible organs involved



FIGURE 26-7 Use the mechanism of injury to identify where signs of injury might be found—for example, contusions resulting from compression by a seat belt.

- Determine if seatbelts used properly
- Interior signs of impact
 - Steering wheel and dashboard deformity
- Frontal Impact
 - Compress abdomen
 - Liver, spleen and rupture of hollow organs
- Right Impact
 - Liver, ascending colon and pelvis
- Left Impact
 - Spleen, descending colon and pelvis

- Scene assessment
 - Gunshot Wounds
 - Safety (patient and assailant)
 - Type and caliber of weapon
 - Internal damage does not correlate well with the appearance of entry/exit wounds

FIGURE 26-8 Analyze the mechanism of a penetrating trauma in an attempt to determine the probable angle and depth of the wound.



- Closely examine regions with a high index of suspicion
- Expose and examine for DCAP-BTLS
- OPQRST Assessment
 - Characteristics of pain
- SAMPLE History
- Vital signs assessment

Examine for signs of injury



- Signs of shock
 - Pretreat: signs may not develop until 30% of blood volume is lost
 - Body begins shunting blood from GI/GU to primary organs
- Supine hypotensive syndrome
- Premature contractions
- Vaginal hemorrhage
 - Uterine rupture versus abruptio placenta
- Uterus development
 - Abnormal asymmetry

- Trend vital signs
 - Every 5 minutes for critical patients
- Evaluation
 - Progressive peritonitis
 - Progressive hemorrhage
 - BP and capillary refill
 - Pulse rate and pulse oximetry
 - Mental status
 - Skin condition
 - Ineffective aggressive fluid resuscitation

Management

- Position Patient
 - Position of comfort unless spinal injury
 - Flex knees or left lateral recumbent
- Ensure oxygenation and ventilation
- Control external bleeding
- Be prepared for fluid resuscitation
- Specific injury care
 - Impaled objects
 - Eviscerations



Management

- Positioning
 - Left lateral recumbent
 - If on backboard tilt backboard
 - Facilitates venous return
- Oxygenation
 - High flow O₂
 - Consider PPV by BVM if hypoxia ensues
- Maintain high index of suspicion for intra-abdominal bleeding

- Kidney
 - Seen in less than 5% of all trauma patients
 - Generally require large forces
 - Blunt renal trauma
 - Contact sports, “kidney punch”
 - Presentation
 - Penetrating renal trauma
 - External or internal hemorrhage
 - IV fluids indicated if resuscitation required



- Ureter
 - Difficult, if not impossible, to identify in the prehospital setting
 - Rarely leads to an immediate life-threatening condition

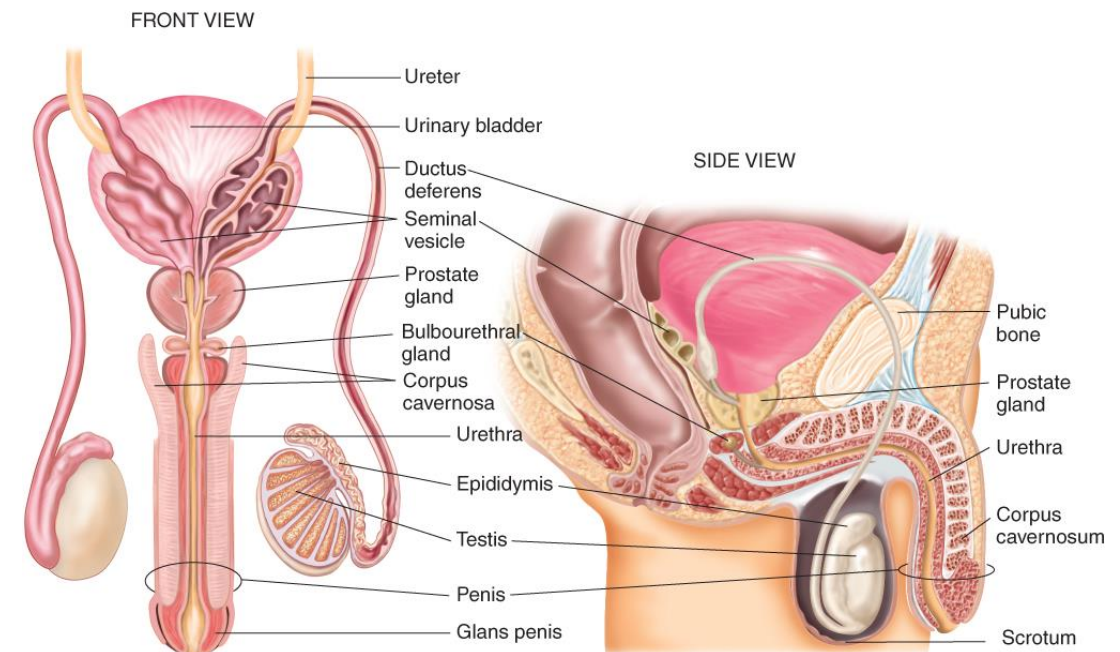
- Bladder and urethra
 - Often associated with other significant injuries
 - Injury to the bladder is often due to blunt forces and may result in bladder rupture or laceration.
 - Suspect bladder injury in any patient with trauma to the lower abdomen or pelvis.
 - Bladder rupture
 - Inability to urinate
 - Blood noted or reported at the penile opening.
 - Tenderness on palpation of the suprapubic region

- Testicle and scrotal sac
 - Testicles have two layers of covering.
 - Severe injuries rare
 - Blunt trauma
 - Present following trauma to the thighs, buttocks, penis, lower abdomen, and pelvis
 - Do not ignore testicular complaints even in the face of other trauma.
 - Penetrating trauma

- Penis
 - Vital for both proper urination and reproductive and sexual function
 - Blunt or penetrating trauma
 - Also from sexual behaviour and self-mutilation
 - Becomes erect when blood fills the corpus cavernosa
 - Priapism
 - Fractured penis

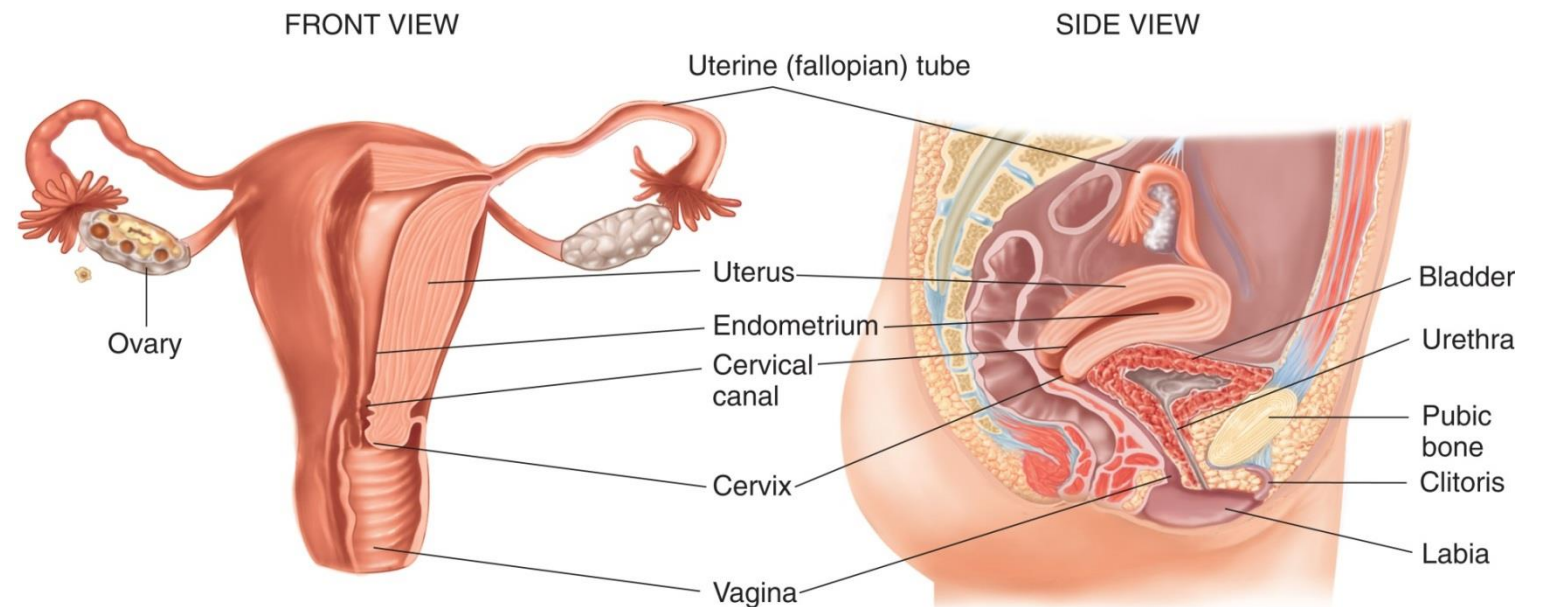
Injuries to the Male Genitalia

- Pediatric population
- Self-mutilation or amputation of the penis
- Objects placed around the penis, testicles, or both



Injuries to the Female Genitalia

- Uterus
 - Behind the bladder
 - Well protected within the pelvis



- Vaginal trauma
 - Blunt or penetrating trauma, assault, or self-inflicted injuries
 - May produce contusions to the vulva or labia
 - Signs and symptoms
 - Penetrating trauma
 - Self-inflicted trauma reported in young girls and in psychiatric patients; lacerations can occur in reproductive age women (foreign bodies for sexual purposes or devices/tools to remove materials).

- Pathophysiology
- Assessment
- Management