Chapter 26 Abdominal Trauma

Introduction to Abdominal Injury

• One of body’s largest cavities
• Multiple vital ____________________________
• Large volumes of blood can be lost before signs and symptoms manifest
• Must be alert for signs of transmitted injury
  - Deformity, swelling, & ____________________________

Abdominal Anatomy and Physiology (1 of 2)

Boundaries:
• Superior: ____________________________
• Inferior: ____________________________
• Posterior: vertebral column and posterior and inferior ribs
• Lateral: muscles of the flank
• Anterior: ____________________________ muscles

Abdominal Anatomy and Physiology (2 of 2)

Three specific spaces
• ____________________________ space
  - Organs covered by abdominal (peritoneal) lining
• ____________________________ space
  - Organs posterior to the peritoneal lining
• ____________________________ space
  - Organs contained within pelvis

Organs by Abdominal Quadrant

Penetrating Trauma

• Energy transmitted to surrounding tissue
• Projectile ____________________________, pitch & yaw
• Results in
  - Uncontrolled hemorrhage
  - Organ damage
  - Spillage of ____________________________ organ contents
  - Irritation & Inflammation of abdominal lining
• Liver most commonly affected organ
• Shotgun trauma results in multiple ____________________________

Blunt Trauma

• Produces least ____________________________ signs of injury
• Causes
  - ____________________________ : Contents damaged by change in velocity
  - ____________________________ : Organs trapped between other structures
  - ____________________________ : Part of an organ is able to move while another part is fixed

Blast Injuries

• Blunt & Penetrating MOI’s
• Irregular shaped ____________________________ and debris
  - ____________________________ wave
- Compresses and relaxes air-filled organs
- Contuse or ____________________________ organs

• Abdominal injury is secondary concern during blast injury

9 [ ] Injury to the Abdominal Wall (1 of 2)
• Skin and muscles transmit blunt trauma to internal structures
  - Typically only show ____________________________ (red skin)
  - Visible swelling and ecchymosis occur over several hours
• Penetrating trauma may appear minimal ____________________________ in comparison to internal trauma
  - Muscle may mask the size of the external wound
  - ____________________________ may be present

10 [ ] Injury to the Abdominal Wall (2 of 2)
• Trauma to thorax, buttocks, flanks & back may penetrate abdomen
  - Lower chest may injure ____________________________ , liver, stomach or gallbladder
  - ____________________________ tears
  - Herniation of abdominal contents into thorax

11 [ ] Injury to the Hollow Organs (1 of 2)
• May rupture with compression from blunt forces
• May tear due to penetrating trauma
• Spillage of contents into
  Retroperitoneal space (behind abdominal cavity)
  - ____________________________ space (abdominal cavity)
  - ____________________________ space
• Intestines have a large amount of bacteria
  - Leakage can result in ____________________________

12 [ ] Injury to the Hollow Organs (2 of 2)
• Manifestations of Blood Loss
  - ____________________________ : Blood in stool
  - ____________________________ : Blood in emesis
  - ____________________________ : Blood in the urine

13 [ ] Injury to the Solid Organs (1 of 2)
• Dense and less strongly held together
• Prone to ____________________________
  - Bleeding
  - ____________________________ (rupture)
• Unrestricted hemorrhage if organ capsule is ruptured

14 [ ] Injury to the Solid Organs (2 of 2)

Pain patterns of specific organs:
• ____________________________ : pain referred to left shoulder
• ____________________________ : pain radiate to back
• ____________________________ : pain radiate from flank to groin & hematuria
• ____________________________ : pain referred to the right shoulder

15 [ ] Injury to the Vascular Structures
• Abdominal ____________________________ & Vena Cava
  - Prone to direct blunt or penetrating trauma
  - May be injured in ____________________________ injuries
• Blood accumulates beneath diaphragm
  - Irritation of muscular structures
  - Produces referred pain in the ____________________________ region
  - Greater volume of blood can be lost
  - Presence of blood in abdomen, stimulates vagus nerve resulting in ____________________________ of heart rate
• Blood can isolate in any of the abdominal spaces

16  Injury to the Mesentery and Bowel
  • ____________________________ : double fold of tissue in the peritoneum that supports the major portion of the small bowel, suspending it from the posterior abdominal wall
  • Provides bowel with circulation and attachment
  • Blood loss ____________________________
  • Tear of mesentery may rupture bowel
  • Penetrating trauma to the lateral abdomen likely to injure ____________________________ bowel

17  Injury to the Peritoneum (1 of 2)
  • Delicate & sensitive lining of anterior abdomen
  • ____________________________ : inflammation of the peritoneum due to:
    - ____________________________ irritation: due to torn bowel or open wound
    - ____________________________ irritation
      - Caustic nature of digestive enzymes
      - Urine initiates inflammatory response

18  Injury to the Peritoneum (2 of 2)
  • ____________________________ does not induce peritonitis
  • Progression
    - Slight ____________________________ at location of injury
    - ____________________________ tenderness
    - Guarding
    - ____________________________ , board-like feel

19  Injury to the Pelvis
  • Serious skeletal injury
  • Life threatening hemorrhage
  • Potential injury to pelvic organs
    - ____________________________
    - Bladder
    - ____________________________
    - Female Genitalia
    - ____________________________
    - Rectum
    - Anus

20  Injury During Pregnancy (1 of 4)
  • Trauma is the number one killer of pregnant females
-Penetrating abdominal trauma accounts for 36% of maternal mortality
  - ___________________________ 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
  - ___________________________ abdominal organs
  - Endangers ____________________________ & fetus

### Changing Dimensions of the Pregnant Uterus

### Injury During Pregnancy (2 of 4)
Maternal Changes:
• Increasing size & weight of uterus
  - Compression of ___________________________ vena cava
• Reduced venous return to heart
• Uterus is thick and muscular
  - Distributes forces of trauma ___________________________ to fetus
  - ___________________________ chances for injury

### Injury During Pregnancy (3 of 4)
Maternal Changes:
• Increasing maternal blood volume
  - Protect mother from ___________________________
  - ___________% of blood less necessary before signs of shock
• Risk of uterine & fetal injury increases with the length of gestation
  - Greatest risk during ____________ Trimester

### Injury During Pregnancy (4 of 4)
• Penetrating trauma may cause fetal and maternal blood
  - ___________________________
• Blunt trauma complications
  - ___________________________ rupture
  - ___________________________ placenta
  - Premature rupture of ___________________________ sac

### Injury to Pediatric Patients
• Children have poorly developed ___________________________ musculature & smaller diameter
• Rib cage has more cartilage
  - Transmits injury to organs beneath easier
• Increased incidence of injury to the liver, kidneys, and spleen
• Shock
  - ___________________________ well for blood loss
  - May not show signs and symptoms until ___________% of blood is lost

### Evaluation of MOI (1 of 4)
• Must evaluate ___________________________ to assess seriousness of injury
• Identify strength and direction of forces
  - ___________________________ of impact
  - Focus observations and ___________________________ on that site
- Develop a mental list of possible organs involved
  - If auto crash
  - Determine if ____________________________ used properly
  - Interior signs of impact
    - Steering wheel & ____________________________ deformity

27 Evaluation of MOI (2 of 4)
Auto Crash Injury Patterns:
  - ____________________________ Impact
    - Compress abdomen
    - Liver, spleen, and rupture of hollow organs
  - ____________________________ Impact
    - Liver, ascending colon, & pelvis
  - ____________________________ Impact
    - Spleen, descending colon and pelvis

28 Evaluation of MOI (3 of 4)
Auto Crash Injury Patterns (Cont’d):
  - Children & Pedestrians
    - ____________________________ injuries common
Gunshot Wounds:
  - Type & ____________________________ of weapon
  - Distance
  - Is assailant still on scene???

29 Evaluation of MOI (4 of 4)
For the patient who has sustained ____________________________ injury, the
analysis of the mechanism of injury is the most important element of the scene size-up and
possibly of the entire assessment

30 Assessment of Abdominal Injuries (1 of 4)
Scene Size-up
  - Safety
  - Evaluation of MOI
Primary Assessment
  - ____________________________
  - Drug or alcohol use
  - Evaluate ABC’s and ____________________________ threats

31 Assessment of Abdominal Injuries (2 of 4)
Rapid Trauma Assessment (Scan):
  - Rapid & Full Trauma Assessment
  - Closely examine regions with a high index of ____________________________
  - Expose & Examine for ____________________________
    - If suspected pelvic injury DO NOT test ____________________________
    - Palpate ____________________________ abdomen
    - Evaluate for entrance & exit wounds

32 Assessment of Abdominal Injuries (3 of 4)
  - ____________________________ Assessment
    - Characteristics of pain: Tenderness versus Rebound tenderness
Assessment of Abdominal Injuries (4 of 4)

Reassessment:
- Trend vital signs: every 5 minutes
- Evaluate for:
  - Progressive __________________________
  - Progressive hemorrhage
  - BP & Capillary Refill
  - Pulse rate & Pulse _________________________
  - Mental Status
  - Skin condition
  - Ineffective aggressive ____________________ resuscitation

Pregnant Patients (1 of 2)

Be observant for signs of __________________________:
- signs may not develop until 30% of blood volume is lost
- Body begins shunting blood from GI/GU to primary organs
- Supine ____________________ syndrome

Pregnant Patients (2 of 2)

Be observant for:
- __________________________ contractions
- __________________________ hemorrhage
- Uterine rupture versus abruptio placentae
- Uterus development
- Abnormal __________________________

General Management of Abdominal Injuries

- Position Patient
  - Position of __________________________ unless spinal injury
  - Flex __________________________ or left lateral recumbent
- General shock care
- ____________________________________ application
- Specific injury care
  - Impaled Objects or Eviscerations
- Fluid Resuscitation

Fluid Resuscitation of Abdominal Injuries

- Large bore IV with __________________________ solution
  - Consider 2nd line
- Fluid challenge ______ ml or ______ ml/kg
  - Limit to ______ L
  - Titrate to SBP of ______ mmHg

Abdominal Evisceration Care

- Clean of __________________________
- Do not reinsert organs
- Cover with __________________________ , sterile dressing
• Secure with ___________________________ tight covering

39 Evisceration Care

40 PASG Use in Abdominal Injuries

1 Contraindications:
• Concurrent penetrating ___________________________ trauma
• Abdomen inflation contraindicated in pregnancy
  - Inflate legs only

2 Indications:
• Evisceration
  - If BP<___________
• Intra-abdominal bleeding
• ___________________________

41 Management of a Pregnant Patient With Abdominal Injury

• Positioning
  - Left Lateral Recumbent
  - If on backboard tilt ___________________________ slightly
    - Facilitates ___________________________ return
• Oxygenation by NRB or BVM
• Maintain high index of suspicion for intra-abdominal bleeding
• Consider IV and ___________________________
## Organs by Abdominal Quadrant

<table>
<thead>
<tr>
<th>Upper</th>
<th>Right</th>
<th>Upper Right Quadrant</th>
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<tbody>
<tr>
<td></td>
<td>Liver, Gallbladder, Stomach (Small Part) Small and Large Intestine Head of Pancreas Upper Part of Kidney</td>
<td>Stomach, Tail of Pancreas Tail of Liver Small and Large Intestine Upper Part of Kidney</td>
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<tr>
<td>Lower</td>
<td>Small and Large Intestine Lower part of Kidney Half of Bladder, Appendix, Female Reproductive Organs</td>
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