Abdominal and Genitourinary Trauma
PFN: SOMEML02
Hours: 3.0
Instructor:

Terminal Learning Objective

- Action: Communicate knowledge of abdominal and genitourinary trauma
- Conditions: Given a lecture in a classroom environment
- Standards: Received a minimum score of 75% on a written exam IAW course standards

References

- Tactical Emergency Medical Protocols (TMEPS) 9th Edition
- Principles of Advanced Trauma Care 2002
- Tintinalli’s Emergency Medicine 7th Edition
- Tactical Trauma Protocols 9th Edition
Reason

Agenda

- Identify the common types of injury in abdominal and genitourinary trauma
- Identify key factors in solid organ trauma
- Identify key factors in hollow organ trauma
- Identify key factors in diaphragmatic trauma

Agenda

- Identify key factors in genitourinary trauma
- Identify key factors in colorectal trauma
- Identify key factors in assessing and managing abdominal and genitourinary trauma
- Identify the diagnostic tools and adjuncts for abdominal and genitourinary trauma
Identify the Common Types of Injury in Abdominal and Genitourinary Trauma

Introduction to Abdominal Trauma

- Accounts for 15% to 20% of all trauma death
- Hemorrhage (early) and sepsis (late)
- Many organs receiving *substantial* blood flow
- Often more than one organ involved
- Potential spaces that can hide hemorrhage
- >30% do not present with specific signs
- Signs can be delayed or indeterminate

Introduction to Abdominal Trauma

- Focus on the general condition of the PT
- Trending of vitals is key for assessment/tx
- Specific diagnosis less important than transport decision
- Peritonitis (generalized)/Peritoneal abscess (localized) (can be delayed 2 hours)
  - Infectious vs non-infectious
  - Peritonitis > Sepsis > Septic Shock
Introduction to Abdominal Trauma

- Wounds often beyond capabilities of a SOCM
- Wounds often require surgical exploration
- Mechanism of injury:
  - Blunt
    - Compression - The reduction in volume of a space causing an increase in pressure.
    - Crush - Reduce (something) to a powder or pulp by exerting strong pressure on it (i.e. crushing tissue)
    - Deceleration/shearing force - Differential movements of fixed and non-fixed structures

Introduction to Abdominal Trauma

- Penetrating:
  - Gunshot wounds (GSW) - 80% penetrate the peritoneum. 90% cause organ injury
  - Stab wounds - 2/3 of stab wounds violate the peritoneum. 1/2 of these require operative intervention
  - Flying projectiles/Fragmentation
- Both:
  - MVCs - Subjects patient to multiple MOIs. A good recipe for poly-trauma.
  - Blast trauma: Primary, secondary, tertiary, and quaternary phases.

Blunt Trauma of Abdomen

- Most common cause of blunt trauma is motor vehicle collisions (MVC)
  - Steering wheel
  - Seat belts
  - Dashboard
- Falls
  - Hollow visceral injuries most common
  - Retroperitoneal injuries (axial loading)
  - Solid organs (lands/truck in the flank)
- Deformation of solid or hollow organs leads to organ rupture
Penetrating Trauma of Abdomen

- What object(s) were involved?
- Path of the penetrating object?
- What anatomical cavities did the wound penetrate?
- What is the depth of penetration?
- How many wounds?
- What is the underlying anatomy?

Blunt and Penetrating Trauma of Abdomen

- MVC
  - Speed of the object(s) in question
  - Collision type: Frontal/lateral/rotational/rear/rollover
  - Vehicle intrusion into passenger compartment
  - Restraints/air bags/patient's position in vehicle

Blunt and Penetrating Trauma of Abdomen

- Blast injury
  - Bombs and explosions can cause unique patterns of injury seldom seen outside combat
  - Several organs involved at once
    - Gas-containing sections of the GI tract are most vulnerable to primary blast effect.
    - Clinical findings may be absent until the onset of complications (peritonitis/sepsis)
**Gunshot Wounds**

- GSWs can take unpredictable paths and involve several organs
- Factors that determine wound severity
  - Location of the injury
  - Size of the projectile
  - Speed of the projectile
- All abdominal GSWs should be inspected to see if the bullet has been introduced into the thorax

**Stab Wounds**

**Fragmentation and Shotgun Wounds**

- Shotgun injuries depend on the load (birdshot/buckshot/slug)
- Potential for lower or higher incidence of visceral injury
- There is increased potential for peritonitis from the multiple lead pellets in the viscera
- Fragmentation wounds can present as varied patterns/injuries as well.
Identify Key Factors in Solid Organ Trauma

Abdominal Trauma Organs of Concern
- Solid organ injuries
- Hollow visceral injuries
- Retroperitoneal injuries
- Diaphragmatic injuries

Key Factors in Solid Organ Injuries
- Rate of injury
  - Spleen (40% to 55%)
  - Liver (35% to 45%)
  - Kidneys
  - Pancreatic
- Hemorrhage mainly governs signs and symptoms in solid organ injuries
  - Hypotension
  - Tachycardia
  - Confusion (seen with > 30% blood loss)
Spleen Trauma
- Most commonly injured organ in blunt abdominal trauma
- Fracture of ribs 9 through 10 on the left of torso
- Hypotension from hemorrhage is common presenting finding
- LUQ tenderness and tachycardia present
- Kehr's sign
- Peritoneal signs maybe delayed

Liver Trauma
- Fracture of ribs 7 through 9 overlying the liver
- Morison's pouch is common site of blood collection
- Signs and symptoms
  - RUQ tenderness and tachycardia
- Peritoneal signs may be delayed
- Blood supply of 1500 ml/min
- Major site of synthesis of all the coagulation factors except factor VIII
- High mortality without surgical intervention
  - 20% to 44%

Renal Injuries
- Causes
  - 90% due to blunt force
  - 10% due to penetrating force
- Avulsion injuries to the Renal Pedicle (central fissure), and pelvicalyceal (urinary collecting) system
- Most common injured organ in children due to its intra-abdominal location.
- Lower rib fx, and Contusions/hematomas penetrating wounds in the flanks are indications of renal injury.
Pancreatic Trauma

- History
  - Rapid deceleration
- Often slow onset of initial signs and symptoms
- Signs and symptoms
  - Vague upper and mid-abdominal pain that radiates into the back
  - Transection of mid-body when displaced against vertebral column
  - Retroperitoneal autodigestion possible
  - Retroperitoneal abscess possible

Uncommon

- 0.4% overall incidence
- 1.1% incidence in penetrating trauma and only
- 0.2% in blunt trauma

“Package injury”

- Rarely an isolated injury (several organs injured simultaneously)

Identify Key Factors in Hollow Organ Injuries
Key Factors in Hollow Organ Injuries

- Most common mechanisms
  - Seat belt related injuries
  - Direct trauma
  - Handlebar injuries
  - Penetrating trauma
- The most commonly injured GI organs
  - Small intestine (jejunum and duodenum)
  - Large Intestine (ileum and cecum)

Key Factors in Hollow Organ Injuries

- Major concern is perforation with bowel spillage
- Initial signs and symptoms of GI perforation may be so mild that there may be a delay of 12 to 18 hours before the diagnosis is made.
- Peritoneal signs initially present in only 30% to 38% of patients with bowel injury (far fewer have evidence of pneumoperitoneum).

Jejunum and Duodenum Injuries

- Generally from sudden deceleration and tearing near fixed points of ligamentous attachment
- A bruise from a lap belt is a potentially ominous finding. This raises your suspicion of intra-abdominal injury!
  - Often associated with seat belt sign
  - Chance fracture - Thoraco-lumbar junction (T12-L2) distraction fracture
Identify Key Factors in Diaphragmatic Trauma

Key Factors in Diaphragm Injuries
- A history of blunt abdominal MOI, dyspnea, related pulmonary symptoms
  - Bowel sounds in the thoracic cavity
- Presents in 1 to 6 percent of patients in blunt trauma
- Diaphragmatic tears rarely occur in isolation.
  - Pelvic fractures 40%
  - Splenic rupture 25%
  - Liver laceration 25%
  - Thoracic aortic tear 5-10%

Diaphragm Trauma
- Chest radiography is the single most important diagnostic study.
- The initial chest radiograph is non-diagnostic in 10-40% of patients
- Repeated chest radiograph may be necessary.
- Radiographic findings may be masked if the patient is being positive-pressure ventilated (intubated) because this may reduce any herniation.
Identify Key Factors in Genitourinary Trauma

- Pelvis (pelvic injuries often = GU injury)
- Renal (discussed)
- Ureter
- Bladder
- Urethra
- Male/Female genitalia (external)

Genitourinary trauma occurs:
- 2% to 5% of all trauma patients
- 10% abdominal trauma cases

Pelvic Trauma

- Youth versus elderly
- Represent 3% of all skeletal fractures
- MVC - 50% to 60%
- Auto/pedestrian - 10% to 20%
- Motorcycle - 10% to 20%
- Force required to break the pelvis usually produces other injuries.
- Widely vascular!!
- Neuro/emboli/wound care
**Pelvic Trauma**

- Significant association with intraperitoneal and retroperitoneal organs and vascular structures
- Mortality rates at ED:
  - 3.4% Normotensive
  - 42% Hypotensive
- Unstable Types:
  - Rotational
  - Anterior/posterior
  - Vertical shear

- 90% of hemorrhage in pelvic fractures involve venous bleeding from the disrupted bone surface.
- Blood often pools in the retroperitoneum (holds up to four liters in an adult)
- Concomitant neurological injury is possible (especially with sacral disruption)

**S/S:**
- Pain
- Abrasions
- Contusions
- Assymetry (shape, limb length)
- Isolated limb rotation
- Unstable on palpation
- Close the book
- Pubic symphysis
- Gently rock open (A&P)
- Pain elicitation when squeezing knees together

**Tx:**
- Defer log rolls
- Stabilize pelvis (TPID, Sam pelvic splint, MAST
- Fluid challenge/TXA
- Pain med selection (is your patient hypotensive?)
- Rule out urethral rupture before inserting Foley

**Pelvic Binders** - Applied for cases of suspected pelvic fractures 2° severe blunt force trauma or blast injury AND at least one of the following:
- Pelvic Pain
- Lower limb complete / partial amputation
- Physical Exam suggests pelvic fracture
- Unconsciousness
- Shock

THINK M.O.I
Ureter Trauma
- Isolated injury is rare because it is well protected in the retroperitoneum
- Occurs in 1% of blunt trauma, and 4% of penetrating abdominal trauma
- 90% of ureteral trauma is penetrating
- Diagnose by suspicion
  - Often time missed (scant bleeders)
  - 70% will present with gross/microscopic hematuria
  - Absence of hematuria is not a rule out

Bladder Trauma
- Occurs in 2% of blunt trauma
- Causes
  - Sudden compression of a filled bladder
  - Shear forces
  - Penetration of lower abdomen/rectum/buttocks
  - Pelvic rupture - Bladder trauma in 80% of cases
- Findings
  - Lower abdominal pain/tenderness/bruises
  - Gross hematuria (95% of cases) Hallmark sign
  - Distension (urinary ascites)
  - Perineal/scrotal hematoma
  - Inability to void

Urethra Trauma
- Rarely isolated, associated with poly-trauma
- Anterior - Genitals to anus
  - Straddle, injury, impalement, GSW, instrumentation (self and iatrogenic)
- Posterior - Travels inside the body
  - Pelvic trauma
  - Bladder rupture more common in posterior urethral injury
Urethra Trauma - Straddle Injury

- Most common cause
  - Blunt trauma
    - Fall onto a bicycle frame top tube
    - Playground equipment
    - Rodeo
    - Toilet seat
- Treatment...if STABLE!!
  - Supportive cold packs, elevation, rest, and analgesics
  - If unable to void, the patient may require catheterization

Urethra Trauma

Clinical Findings

- Male
  - Blood at the urinary meatus
  - Inability to void
  - Perineal hematoma
  - Inability to feel prostate on rectal exam
- Female
  - Vaginal bleeding
  - Labial edema
  - Voiding difficulty
  - Blood at the meatus
  - Hematuria
  - Urinary leak per rectum

Urethra Trauma

- Treatment
  - Stop bleeding
  - Bandage wounds
  - Treat associated injuries
  - High priority for evacuation
  - Rule out rupture w/retrograde urethrogram
  - May need suprapubic bladder tap
  - Candidate for CT scan
Male External Genitalia
- Poorly protected outside the body
- Mobility can mitigate damage
- Accidental or intentional injury
- Highly vascular/sensory nerve supply
  - Pain (mask more serious injuries)
  - Hemorrhage
  - Nausea
  - Psychological issues
  - Bloody meatus
  - Scrotal or perineal ecchymosis
  - Hematocele

Male External Genitalia
- Penile/Scrotal
  - Zipper
  - Foreign body
  - Avulsion-amputation (self harm-accident)
  - Fracture
  - Crush
- Scrotal/Testicular
  - 85% of injuries from blunt trauma
  - Blunt trauma (commonly unilateral)
  - Penetrating trauma (1/3 bilateral)
  - Present with obvious physical deformity

Penis Fracture
- Medical emergency 30% to 50% of cases due to intercourse
  - Taqaandan - Middle east/western Iran
- Signs and symptoms
  - Cracking sound is heard
  - Penile pain/immediate/rapid swelling
  - Discoloration/visible deformity
- Treatment
  - Ice/support/Evacuation
Male External Genitalia
- Management
  - Control bleeding
  - Indirect ice q 3-4 hours
  - Analgesia
  - Anti-biotic therapy when appropriate
  - Follow up imaging (ultrasound w/doppler)
  - Potential surgical exploration
  - Address psychological and modesty concerns

Female External Genitalia
- Primarily soft tissue injury
  - Hemorrhage likely
  - Check for associated injuries
- Usually intentional (2nd assault)
- Sexual assault
  - Emotional state is an added challenge
- Genital mutilation
- Childbirth
- Accidental (straddle)

Female External Genitalia (Complications)
- Infection
- Hematoma in the perimetrium
- Vulval hematomas
- Rectovaginal fistula - Large intestine > rectum > vagina
- Sexual dysfunction, dyspareunia
- Urinary obstruction
Female External Genitalia

- Managed as other soft tissue bleeding
  - Hem-control, irrigate lacerations
    - Deep lacerations - absorbable suture w/o tension. Superficial lacerations - non-absorbable suture
  - Antibiotic therapy
  - Catheterization if required
  - If sexual assault refer for
    - STD/pregnancy tests
    - Counseling, law enforcement referrals

Identify Key Factors in Colorectal Trauma

Colon Trauma

- Firearms account for approximately 75% of these injuries and stab wounds for 20% of the injuries
- Majority of blunt injuries to the colon are secondary to motor vehicle accidents
- Slightly higher prevalence of left sided penetrating injuries
- Colon injuries present late, and is caused by septic sequelae of fecal spillage
Colon Trauma

- As an isolated colon injury is the exception rather than the rule
- Management
  - "Damage control" to include ligation/cross stapling of colon injuries w/abdominal
  - Aggressive resuscitation to support A/B/Cs
  - Broad spectrum parenteral antibiotics in anticipation of peritonitis
  - Transport

Trans-anal Rectal Trauma

- Rectal injuries often associated w/pelvic fractures
- Diagnosis of trans-anal rectal injuries frequently delayed
  - Patient’s denials due to shame/embarrassment
  - Self-inflicted/caused by criminal assault

Trans-anal Rectal Trauma

- Obvious causes
  - Low/high velocity projectiles
  - Blast/over pressure injuries
  - Burns
- Non-obvious causes
  - Fall onto sharp object
  - Sexually assault
  - Pelvic trauma
  - Ingestion of a foreign body
  - Insertion of a foreign body
- Complications
  - Peritonitis
  - Shock
  - Bleeding per rectum
  - Weakened sphincter
  - Bowel-incontinent
  - Sepsis
Trans-anal Rectal Trauma

- Management
  - Control hemorrhage
  - Treat associated injuries
  - Manage sepsis
  - Initiate URGENT evacuation
  - DRE
  - Rigid sigmoidoscopy
  - Be sensitive to the patient

Identify Key Factors in Assessing and Managing Abdominal and Genitourinary Trauma

Assessing and Managing of Abdominal and Genitourinary Trauma

- Recognize and treat for shock early
- Less important to diagnose exact injury
  - Management the same regardless of specific organ injured
  - Treat clinical findings
    - Hemorrhage
    - Shock
    - Other conditions
  - More important to make TRANSPORT DECISION EARLY!
Assessment and management of Abdominal and Genitourinary Trauma

• Stable
  ➢ Evacuation decision
  ➢ Consider pain medication

• Unstable - Unconscious or decreased LOC
  ➢ Protect the bowel; treat for shock
  ➢ URGENT transport

• Conscious
  ➢ Abdominal pain or onset LOC = unstable → URGENT transport

Assessment and management of Abdominal and Genitourinary Trauma

• Suspect internal bleed with AB/GU injuries

• Extra precaution if children involved
  ➢ Occult injuries more likely than with adults

• Remove or loosen clothes to expose wound
  ➢ Privacy as possible - Hypothermia always

Assessment and management of Abdominal and Genitourinary Trauma

• IV Fluids per fluid resuscitation protocol
• PO Fluids
  ➢ Garrison or short transport - consider NPO
  ➢ TTPs: If not unconscious, in shock, and able to swallow, PO fluids permissible
  ➢ Weigh aspiration risk (LOC)
  ➢ Not recommended for patients with suspected injury to the GI tract unless no IV fluids available
Assessment and management of Abdominal and Genitourinary Trauma

- Pain management
  - TTP and TMPE protocols
  - LOC
  - Blood pressure
- Prophylactic antibiotics for all open combat wounds
- TXA administration may be key to controlling non-compressible bleeds

Scene Survey

- What is the MOI and what organs could be involved. Both abdominal and associated.
- C-spine precautions if indicated. If not allow patient to find position of comfort
  - Legs pulled up toward abdomen

Initial Assessment

- AVPU
- Assess for life threatening injuries
  - “Is it bleeding/bowel spillage?”
- Pain (Localized/generalized/referred)
- Elicit a history/SAMPLE/allergies while casualty is still conscious
Airway
- Abdominal pain can affect respirations
- Distension/ruptured diaphragm/pain may prevent adequate inhalation.
- When the patient’s breathing is affected, providing supplemental oxygen (non-rebreather/BVM per rate/rhythm/quality).

Breathing
- Inspect for communication between abdominal and thoracic cavities
- Manage injuries that could complicate breathing
  - Occlusive on wounds from the angle of the mandible to the umbilicus
- Bandage impaled objects (petroleum gauze/Halo)

Circulation
- Inspect for entrance/exit/downside wounds.
- Control injuries/improve bleeding stopgaps
  - Clamp and dress bleeding eviscerations in the initial
  - Support eviscerations without blood until the Rapid
- Trend indicators of hypotension/shock. Periodically the only finding - LOC, Pulse, CCT, BP/Palp
Security Halt
- Reassess and continue to trend vitals
- IAPP Chest
  - AB injury can affect respirations
  - Borborygmi in thorax = diaphragmatic injury
- Pain management as appropriate
  - Don’t exacerbate hypotension
  - Ensure adequate tidal volume

Rapid Exam
- Reassess/monitor general condition/vitals
- Maintain high index of suspicion for internal hemorrhage
- Conduct multi-system rapid exam to diagnose/rule out associated injuries

Inspect
- External injury/obvious deformities
- Abdominal Distension
  - May take 1-2 liters of blood in the abdomen to visualize.
- Ecchymosis
  - Cullen’s/Grey Turner’s/Seat belt sign
- Abrasions/Contusion - direct trauma
Inspect

- Pain in left shoulder? Kehr’s sign!!
- Symmetry/Abdominal wall movement during respirations
- Bloody meatus - suspect pelvic and genitourinary trauma. DRE in the detailed.
- Scotal hematoma - Assess pt for abdominal/pelvic injury
- Priapism -

Kehr’s Sign

- Acute pain in the left shoulder tip while lying down with legs elevated. 15 minutes-48 hours
- Blood irritates the diaphragm signals the phrenic nerve
- Supraclavicular nerves have the same cervical nerves origin as the phrenic nerve, C3 and C4
- Often notes ruptured spleen, or diaphragmatic rupture
- Classic sign

Cullen’s Sign

- Superficial edema and bruising in the subcutaneous tissue around the umbilicus
- Typically retroperitoneal bleeding that has dissected through fascial planes to the skin
- Appears 24 to 72 hours after acute event
- Can predict acute hemorrhagic pancreatitis
Grey Turner’s Sign
- Local areas of discoloration on the flank like Cullen’s sign, but usually larger in area. Again, this typically represents a retroperitoneal bleed
- Indicative of a retroperitoneal bleed which may be hemodynamically significant
- Appears 24 to 72 hours after acute event
- May be accompanied by Cullen’s sign

Seat Belt Sign (Chance Fracture)
- Lap belt injury
- Seat Belt Sign with or w/o severe mid back pain, suspect a chance fracture and coinciding abdominal trauma
- Up to 50% associated intra-abdominal injuries, especially hollow organ trauma
- More common in children and obese
  - More likely to be lap belted

Priapism
- Erection that lasts for more than 4 hours and occurs without sexual stimulation
  - Usually painful
- Trauma MOI?
  - Can be an indicator of neurological trauma
- Treatment
  - Ice packs, surgical ligation, and/or drainage
Palpate
- Carefully palpate all four quadrants of the abdomen (light/deep) **TRDP**
  - Local/generalized tenderness
  - Rigidity (involuntary)/guarding (voluntary)
  - Rebound tenderness
- These symptoms could be diagnostic for peritoneal injury/irritation secondary to intestinal leakage or blood (can be delayed hours)

Palpate
- Abnormal masses, and deformities.
- Crepitus/instability of lower thoracic cage = potential splenic/hepatic injuries
- Pelvic assessment
  - Close book
  - Pubic symphysis
  - Open book
  - Splint if a positive finding or MOI is met IAW TCCC Guidelines (slide 39)

Impaled Objects of the Abdomen
- Leave impaled objects in place
- Occlusive/bandage/stabilize/minimize
- Abdominal impalements should be evaluated for entering the thoracic cavity.
- In the initial exam:
  - Assess suck and blow
  - Petroleum Gauze
  - Occlusive dressing (radial cut)
  - Reassess suck and blow
- Roll impairment up
Impaled Objects of the Abdomen

- In the Rapid exam:
  - Splint object with either kerlix/3" tape or
  - Shorten if necessary for transport
  - Leave part of the object exposed
  - Immediate surgical referral
- Impalements SHOULD be immobilized prior to log rolls or movements. NEED to be splinted prior to the end of the Rapid Assessment.
- Leave part of the object exposed
- Immediate surgical referral

Abdominal Evisceration

- In the Initial exam:
  - Determine location of bleed (wipe off)
  - Control any visible hemorrhage from bowel (have assistant hold pressure)
  - Finish initial, and clamp before rolling
- Control bowel when log rolling/moving patient
- Beware of hypothermia!!
- Do not impinge bowel in TPOD

Abdominal Evisceration

- In the Rapid exam SOF vs Civilian SOP
  - Put bowel (and clamps) in a plastic bag
  - Place abdominal dressing over plastic bag
  - Ace wrap/hour glass dressing to secure
  - ...or irrigate gross debris w/warm fluids
  - Reduce bowel into abdominal cavity
  - Suture/staple and cover with dressing
- Do not reduce if bowel is cold or perforated!!!!!
Traumatic Abdominal Hernia

- Herniation through disrupted musculature and fascia
- No skin penetration and no evidence of a prior hernial defect at the site of injury
- Most common causes
  - Seat belt injuries
  - Handlebar injuries

Rapid Exam

- Complete downside assessment
- Full assessment of vitals and treat for all conditions - Hypo × 3
- War wound therapy
- TXA
- Tourniquet conversion
- Fractures/burns/trend vital signs

Most Important Aspect of Treatment: "Transport! Transport!"

- En route
  - Treat shock
  - IV en-route
    - Titrate fluids to BP ~ 90 mm Hg
  - Indirect ice may be helpful in genitalia injury
    - Collect and package amputated genitalia
- Perform serial exams on patient
  - Watch for a rising pulse
  - Restlessness
  - Increase in abdominal girth
  - Deterioration in general condition
- Evacuation to higher care ASAP
Detailed Exam
- Complete detailed head to toe exam
- Abdominal:
  - IAPP
  - EFAST
  - DRE
  - Foley/Supra Pubic Bladder Tap
  - UA/Diagnostic Peritoneal Lavage
  - Retrograde Urethrogram/Cystogram
  - Radiograph
  - CT

Common AB Trauma Findings (Auscultate)
- Auscultation
  - Little value in the pre-hospital setting
  - Possibly absent
    - Free blood or gastric contents may cause ileus secondary to peritonitis, or direct trauma (The finding is non-specific)
  - Requires time for adequate assessment (2 minutes or longer!)
  - The time can be better spent doing more definitive exams (i.e. percussion, palpation, etc.).

Common AB Trauma Findings (Percuss)
- Lightly percuss the abdomen to:
  - Assess the distribution of tympany and dullness
  - Tenderness - Peritoneal sign
- Dullness over areas of tympany (potential hemorrhage)
- Tympany in areas of dullness could be shifting bowel
Common AB Trauma Findings (Percuss)

- May elicit peritoneal irritation
- Percussion sounds
  - Typanic - Drum like (hollow organs)
  - Hyperresonant - Pneumothorax
  - Resonant - Normal chest wall
  - Hyporesonant - Mass/consolidation
  - Dull - Liver, spleen
  - Stony dull - Pleximeter only
- Eliciting a fluid thrill

Ballance’s Sign

- Constant dullness to percussion in the left flank and shifting dullness, with movement, to percussion in the right flank
- Dullness is due to the presence of fluid blood on the right side but coagulated blood on the left.
- Seen with splenic rupture/hematoma

Digital Rectal Exam (DRE)

- Need for DRE and hemocult in all trauma patients may not be warranted
  - Any penetrating wound that may have injured the rectum should be evaluated, assess sphincter tone/gross blood
  - Need for DRE in blunt trauma is MOI dependent assess sphincter tone/gross blood/position of prostate/fracture of pelvic bones
- DREs for all pelvic injuries, looking for blood and bone fragments lacerating the rectal wall
Reassessment

- Be vigilant w/vital signs, LOC changes and pain increase
- Documentation of all care given or not given
- Comfort - Patient w/abdominal wounds often try to get into a position of comfort. Allow it unless it interferes w/airway, spinal immobilization, evacuation, etc.
- Talk to the patient
  - Explain the situation
  - Continue to gather information and

Identify the Diagnostic Tools and Adjuncts for Abdominal and Genitourinary Trauma

Diagnostic Tools and Adjuncts for Abdominal and Genitourinary Trauma

- E-FAST - Quick look for blood, fluids and air following abdominal trauma
- Computerized Tomography (CT)
  - Ultimate diagnostic tool for abdominal injuries
  - First level of care you will encounter CT capability
    - Combat Support Hospital/trauma center
    - USNS (Hospital) Ship
FAST Exam vs CT

- Only at the extremes
  - Unstable patient, (+) FAST → Surgery
  - Stable patient, (-) FAST → CT and observe for signs and symptoms
- CT is more sensitive than FAST
- FAST can be performed in the *during resuscitation*
- *Never* send unstable patients to CT

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FAST Exam vs CT

- Rapid (People die going to CT)
- Portable (CT is car sized)
- Inexpensive (Just add gel)
- Technically simple
- Guiding triage decisions
- Can be performed serially
- Sensitive
  - 100 ml in Morison's pouch
  - 250 ml in other spaces
- FAST exam won't find the source of a bleed
- Difficult to assess retro-peritoneum
- Limited in detecting < 250 ml of fluid
- Poor at detecting bowel and mesentery damage
- Limited by habitus in obese patients

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Diagnostic Tools and Adjuncts for Abdominal and Genitourinary Trauma

- Plain films
  - Chest and pelvis, abdomen films generally lower priority
- Diagnostic Peritoneal Lavage (DPL)
- Lab studies
  - Chem Panel, CBC, Coags, b-HCG, Amy/Lip, U/A, Tox screen, and T&C
- Skeletal survey: Associated fractures
Diagnostic Tools and Adjuncts for Abdominal and Genitourinary Trauma

- NG/OG Tube -
  - Relieve pressure/reduce bowel effort/pre-operatively
- Urinary catheter
  - Ins-outs/renal function/samples
- Retrograde urethrogram
  - Urethra trauma
- Cystogram
  - Bladder trauma

Urinary Catheterization

- DO NOT attempt bladder catheterization when you suspect a urethral injury
- Blood from the meatus of the penis is good indication of urethral/bladder injury
- Consider MOI
- Catheterizing a patient with a partial urethral rupture can result in a complete rupture.

Retrograde Urethrogram

- Insert a Foley catheter into the distal urethra and **minimally** inflate it
- Instill approximately 30mL of water soluble contrast and obtain a plain radiograph
- Insertion of a catheter may cause a partial tear to become a complete transection
- If a positive finding consider suprapubic catheter
Suprapubic Bladder Tap

- Insert a needle into the urinary bladder and aspirate urine
- Complications of a suprapubic catheter include bowel perforation and hematuria.
- If you cannot palpate the bladder, do not attempt a tap.
- Ultrasound can facilitate higher success rates of suprapubic aspiration

Bladder Trauma: Cystogram

- Cystography - A diagnostic procedure that uses x-rays to examine the urinary bladder.
- May indicate how well the bladder empties during urination, if urine backs up into the kidneys, and the presence of bladder/urethra damage
- This procedure is done ONLY AT A HOSPITAL, with the patient under anesthesia/sedation.

Questions?
Agenda

- Identify the common types of injury in abdominal and genitourinary trauma
- Identify key factors in solid organ trauma
- Identify key factors in hollow organ trauma
- Identify key factors in diaphragmatic trauma

Agenda

- Identify key factors in genitourinary trauma
- Identify key factors in colorectal trauma
- Identify key factors in assessing and managing abdominal and genitourinary trauma
- Identify the diagnostic tools and adjuncts for abdominal and genitourinary trauma

Reason
References

- Tactical Emergency Medical Protocols (TMEPS) 9th Edition
- Principles of Advanced Trauma Care 2002
- Tintinalli's Emergency Medicine 7th Edition
- Tactical Trauma Protocols 9th Edition

Terminal Learning Objective

- Action: Communicate knowledge of abdominal and genitourinary trauma
- Conditions: Given a lecture in a classroom environment
- Standards: Received a minimum score of 75% on a written exam IAW course standards

Abdominal and Genitourinary Trauma

PFN: SOMEML02

Hours: 3.0

Instructor: