


Sanders: Mosby's Paramedic Textbook, Revised 3rd Edition

PowerPoint Lecture Notes

Chapter 27: Abdominal Trauma

Chapter 27
Abdominal Trauma



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Objectives

- Describe mechanisms of injury, signs and symptoms, and complications associated with injuries of:
 - Abdominal solid organs
 - Hollow organs
 - Retroperitoneal organs
 - Pelvic organs

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Objectives

- Outline the significance of injury to intraabdominal vascular structures
- Describe assessment priorities for the patient suspected to have abdominal injury
- Outline the prehospital care of the patient with abdominal trauma

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Scenario

The size-up from the first unit on the scene said, "One vehicle into a tree, major damage." Your patient, an unrestrained male, is still seated in the front of an old pick-up truck, behind the severely bent steering wheel. He is pale, anxious and confused, and has a small head wound. You can't feel a radial pulse, but his carotid is fast and thready. His lungs are clear, but he moans when you touch the large reddened area over his upper abdomen. "Get a line set up," you shout to your partner as you apply a cervical collar and oxygen, and prepare for a rapid extrication. You can sense that time will be critical on this call.

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Discussion

- Was the mechanism of injury on this call suspicious for abdominal injury?
- Which abdominal organs may be injured?
- What signs and symptoms lead you to believe that an abdominal injury is likely?
- What are your priorities of care for this man?

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Abdominal Trauma

- Blunt or penetrating trauma
- MVC major cause of abdominal trauma
- Other
 - Blows to abdomen
 - Falls

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Abdominal Trauma

- Difficult to evaluate due to:
 - Wide spectrum of potential injuries to multiple organs
 - Physical findings sometimes lacking or exaggerated

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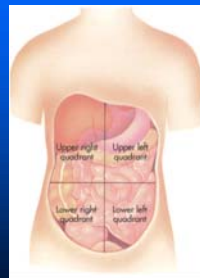
Abdominal Trauma

- Assessment may be compromised by:
 - Alcohol and/or recreational drugs
 - Injury to brain, spinal cord
 - Injury to ribs, spine, pelvis
- High degree of suspicion based on mechanism of injury and kinematics

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Boundaries of the Abdomen

- Diaphragm
- Anterior abdominal wall
- Pelvic bones
- Vertebral column
- Muscles of the abdomen and flanks



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Surface Anatomy of the Abdomen

- Quadrants
 - Upper—right, left
 - Lower—right, left
- Xiphoid
- Symphysis pubis
- Umbilicus



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Peritoneal Cavity

- “True” abdominal cavity
- Quadrants
 - Upper—right, left
 - Lower—right, left
- Liver, spleen, stomach, small intestine, colon, gallbladder, female reproductive organs

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Pelvic Cavity

- Surrounded by pelvic bones
- Lower part of retroperitoneal space
- Contents
 - Rectum
 - Bladder
 - Urethra
 - Iliac vessels
 - In women, internal genitalia



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Retroperitoneal Space

- Potential space
- Behind "true" abdominal cavity
- Contents
 - Abdominal aorta
 - Inferior vena cava
 - Most of duodenum
 - Pancreas
 - Kidneys
 - Ureters
 - Ascending and descending colon

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Mechanisms of Abdominal Injury

- Blunt trauma
 - Compression or crushing forces
 - Shearing forces
 - Deceleration forces



Marks of impact sustained by the front-seat passenger in a car crash

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Mechanisms of Abdominal Injury

- Degree of injury related to:
 - Quantity and duration of force
 - Abdominal structure injured
 - Fluid filled
 - Gas filled
 - Solid
 - Hollow

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Blunt Trauma

- Motor vehicle collisions
- Motorcycle collisions
- Pedestrian injuries
- Falls
- Assault
- Blast injuries

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Penetrating Trauma

- Energy imparted to body
 - Low velocity: Knife, ice pick
 - Medium velocity: Gunshot wounds, shotgun wounds
 - High velocity: High-power hunting rifles, military weapons
- Ballistics
- Trajectory
- Distance

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Solid and Hollow Organs

- | | |
|---|---|
| <ul style="list-style-type: none">• Solid organs<ul style="list-style-type: none">➢ Liver➢ Spleen➢ Pancreas➢ Kidneys➢ Adrenals➢ Ovaries (female) | <ul style="list-style-type: none">• Hollow organs<ul style="list-style-type: none">➢ Stomach➢ Intestines➢ Gallbladder➢ Urinary bladder➢ Uterus (female) |
|---|---|

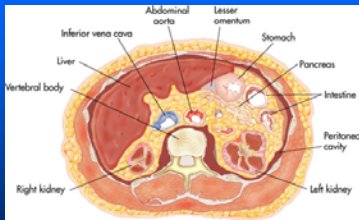
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Hollow, Solid, and Retroperitoneal Organs



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Hollow, Solid, and Retroperitoneal Organs



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Liver

- Largest organ in abdominal cavity
- Right upper quadrant
- Injured from trauma to:
 - Eighth through twelfth ribs on right side of body
 - Upper central part of abdomen

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Liver

- Suspect liver injury when:
 - Steering wheel injury
 - Lap belt injury
 - Epigastric trauma
- After injury, blood and bile leak into peritoneal cavity
 - Shock
 - Peritoneal irritation

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Spleen

- Upper left quadrant
- Rich blood supply
- Slightly protected by organs surrounding it and by lower rib cage
 - Most commonly injured organ from blunt trauma
 - Associated intraabdominal injuries common

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Spleen

- Suspect splenic injury in:
 - Motor vehicle crashes
 - Falls or sports injuries involving was an impact to the lower left chest, flank, or upper left abdomen
- Kehr's sign
 - Left upper quadrant pain radiates to left shoulder
 - Common complaint with splenic injury

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Stomach

- Not commonly injured by blunt trauma
- Protected location in abdomen
- Penetrating trauma may cause gastric transection or laceration
 - Signs of peritonitis from leakage of gastric contents
- Diagnosis confirmed during surgery
 - Unless nasogastric drainage returns blood

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Colon and Small Intestine

- Usually injured by penetrating trauma
- May be injured by compression forces:
 - High-speed motor vehicle crashes
 - Deceleration injuries associated with wearing personal restraints
- Bacterial contamination common

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Retroperitoneal Organ Injury

- Blunt or penetrating trauma to:
 - Anterior abdomen
 - Posterior abdomen
 - Particularly flank
 - Thoracic spine

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Kidneys

- High on posterior wall of abdominal cavity in retroperitoneal space
 - Held in place by renal fascia
 - Cushioned by layer of adipose tissue
 - Partially protected by lower rib cage

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Kidneys

- Injuries may involve fracture and laceration
 - Resulting in hemorrhage, urine extravasation, or both
- Contusions usually self-limiting
 - Heal with bed rest and forced fluids
- Fractures and lacerations may need surgical repair

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Ureters

- Hollow organs
- Rarely injured in blunt trauma
 - Flexible structure
- Injury from penetrating abdominal or flank wounds (stab wounds, firearm injuries)

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Pancreas

- Solid organ in peritoneal space
- Blunt injury usually from crushing injury between spine and a steering wheel, handlebar, or blunt weapon
- Most pancreatic injuries are due to penetrating trauma

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Duodenum

- Lies across lumbar spine
- Seldom injured due to location in retroperitoneal area, near pancreas
- May be crushed or lacerated when great force of blunt trauma or penetrating injury occurs
 - Usually associated with pancreatic trauma

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Pelvic Organ Injury

- Usually from motor vehicle crashes that produce pelvic fractures
- Less frequent causes
 - Penetrating trauma
 - Straddle-type injuries from falls
 - Pedestrian accidents
 - Some sexual acts

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Urinary Bladder

- Hollow organ
- Ruptured by blunt or penetrating trauma or pelvic fracture
 - Rupture more likely if bladder is distended at time of injury
- Suspect bladder injury in inebriated patients subjected to lower abdominal trauma

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Vascular Structure Injury

- Intraabdominal arterial and venous injuries may be life threatening
- Usually occur from penetrating trauma
- Also from compression or deceleration forces applied to abdomen
- Often presents as hypovolemia
- May be a palpable abdominal mass

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Vascular Structure Injury

- Major vessels most frequently injured:
 - Aorta
 - Inferior vena cava
 - Renal, mesenteric, and iliac arteries and veins

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Pelvic Fractures

- Disruption of pelvis from:
 - Motorcycle crashes
 - Pedestrian-vehicle collisions
 - Direct crushing injury to pelvis
 - Falls from heights greater than 12 feet
- Blunt or penetrating injury may result in:
 - Fracture
 - Severe hemorrhage
 - Associated injury to urinary bladder and urethra

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Pelvic Fractures

- Suspicion of pelvic injury should be based on:
 - Mechanism of injury
 - Presence of tenderness on palpation of iliac crests
- Direct or indirect force
- Assessment findings
- Management

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Evisceration

- Protrusion of internal organ through wound
 - Common with stab wounds
- Do not replace organs into abdomen
 - Protect from damage
 - Cover with sterile saline dressing



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Focused History and Physical

- Head injury, drugs, alcohol mask signs and symptoms
- Hemoperitoneum (solid organ/vascular injuries)
 - Adult abdomen holds 1.5 L with no distention
 - May have normal abdominal exam
 - Unexplained shock
 - Shock out of proportion to known injuries

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Peritonitis—Signs and Symptoms

- Pain (subjective symptom from patient)
- Tenderness (objective sign with percussion/palpation)
- Guarding/rigidity
- Distention (late finding)
- Abrasions
- Ecchymosis
- Visible wounds
- Mechanism of injury
- Unexplained shock

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Critical Findings

- Rapid assessment and transport
- Detailed assessment
- Ongoing assessment

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Noncritical Findings

- Focused history and physical examination
- Other interventions and transport considerations

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Comprehensive Assessment

- Vital signs
- Inspection
- Auscultation
- Percussion
- Palpation

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Comprehensive Assessment

- Absence of signs and symptoms does not rule out abdominal injuries
- Remember to examine the back
- Differential diagnosis
- Continued management

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Management/Treatment Plan

- Surgical intervention only effective therapy
- Rapid evaluation
- Shock resuscitation
- Rapid packaging and transport to nearest appropriate facility
 - Facility must have immediate surgical capability
- Crystalloid fluid en route (per protocol)

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Indications for Rapid Transport

- Critical findings
 - Surgical intervention required to control hemorrhage and/or contamination
 - High index of suspicion for abdominal injury
 - Unexplained shock
 - Physical signs of abdominal injury

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Indications for Rapid Transport

- Hemorrhage
- Survival related to time from injury to surgical control of hemorrhage
 - Any delay in the field negatively affects this time period

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Conclusion

Abdominal trauma is often difficult to evaluate in the prehospital setting. Therefore the paramedic must exercise a high degree of suspicion based on the mechanism of injury and kinematics. Death from abdominal injury usually results from hemorrhage and delayed surgical repair.

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Questions?

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