

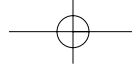
SECTION 4 TRAUMA

Chapter 24 Abdomen Injuries

Objectives

Cognitive

- 4-8.1** Describe the epidemiology, including the morbidity/mortality and prevention strategies for a patient with abdominal trauma. (p 24.6, 24.7)
- 4-8.2** Describe the anatomy and physiology of organs and structures related to abdominal injuries. (p 24.6)
- 4-8.3** Predict abdominal injuries based on blunt and penetrating mechanisms of injury. (p 24.5, 24.8)
- 4-8.4** Describe open and closed abdominal injuries. (p 24.7, 24.8)
- 4-8.5** Explain the pathophysiology of abdominal injuries. (p 24.10)
- 4-8.6** Describe the assessment findings associated with abdominal injuries. (p 24.10)
- 4-8.7** Identify the need for rapid intervention and transport of the patient with abdominal injuries based on assessment findings. (p 24.7)
- 4-8.8** Describe the management of abdominal injuries. (p 24.15)
- 4-8.9** Integrate the pathophysiological principles to the assessment of a patient with abdominal injury. (p 24.12)
- 4-8.10** Differentiate between abdominal injuries based on the assessment and history. (p 24.13)
- 4-8.11** Formulate a field impression for patients with abdominal trauma based on the assessment findings. (p 24.13)
- 4-8.12** Develop a patient management plan for patients with abdominal trauma based on the field impression. (p 24.14)
- 4-8.13** Describe the epidemiology, including the morbidity/mortality and prevention strategies for solid organ injuries. (p 24.10)
- 4-8.14** Explain the pathophysiology of solid organ injuries. (p 24.10)
- 4-8.15** Describe the assessment findings associated with solid organ injuries. (p 24.10)
- 4-8.16** Describe the treatment plan and management of solid organ injuries. (p 24.15)
- 4-8.17** Describe the epidemiology, including the morbidity/mortality and prevention strategies for hollow organ injuries. (p 24.11)
- 4-8.18** Explain the pathophysiology of hollow organ injuries. (p 24.11)
- 4-8.19** Describe the assessment findings associated with hollow organ injuries. (p 24.11)
- 4-8.20** Describe the treatment plan and management of hollow organ injuries. (p 24.15)
- 4-8.21** Describe the epidemiology, including the morbidity/mortality and prevention strategies for abdominal vascular injuries. (p 24.12)
- 4-8.22** Explain the pathophysiology of abdominal vascular injuries. (p 24.12)
- 4-8.23** Describe the assessment findings associated with abdominal vascular injuries. (p 24.12)
- 4-8.24** Describe the treatment plan and management of abdominal vascular injuries. (p 24.15)
- 4-8.25** Describe the epidemiology, including the morbidity/mortality and prevention strategies for pelvic fractures. (p 24.15)
- 4-8.26** Explain the pathophysiology of pelvic fractures. (p 24.16)
- 4-8.27** Describe the assessment findings associated with pelvic fractures. (p 24.16)
- 4-8.28** Describe the treatment plan and management of pelvic fractures. (p 24.16)
- 4-8.29** Describe the epidemiology, including the morbidity/mortality and prevention strategies for other related abdominal injuries. (p 24.7, 24.12)
- 4-8.30** Explain the pathophysiology of other related abdominal injuries. (p 24.9, 24.12)
- 4-8.31** Describe the assessment findings associated with other related abdominal injuries. (p 24.12)
- 4-8.32** Describe the treatment plan and management of other related abdominal injuries. (p 24.15)
- 4-8.33** Apply the epidemiologic principles to develop prevention strategies for abdominal injuries. (p 24.3)



Chapter 24 Abdomen Injuries

4-8.34 Integrate the pathophysiological principles with the assessment of a patient with abdominal injuries. (p 24.13)

4-8.35 Differentiate between abdominal injuries based on the assessment and history. (p 24.13)

4-8.36 Formulate a field impression based upon the assessment findings for a patient with abdominal injuries. (p 24.12)

4-8.37 Develop a patient management plan for a patient with abdominal injuries, based upon the field impression. (p 24.15)

Affective

4-8.38 Advocate the use of a thorough assessment to determine a differential diagnosis and treatment plan for abdominal trauma. (p 24.12)

4-8.39 Advocate the use of a thorough scene survey to determine the forces involved in abdominal trauma. (p 24.13)

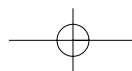
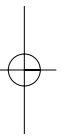
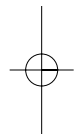
4-8.40 Value the implications of failing to properly diagnose abdominal trauma and initiate timely interventions for patients with abdominal trauma. (p 24.7)

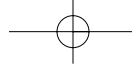
Psychomotor

4-8.41 Demonstrate a clinical assessment to determine the proper treatment plan for a patient with suspected abdominal trauma. (p 24.13)

4-8.42 Demonstrate the proper use of PASG in a patient with suspected abdominal trauma. (p 24.17)

4-8.43 Demonstrate the proper use of PASG in a patient with suspected pelvic fracture. (p 24.17)





Chapter 24 Abdomen Injuries

Recommendations

Support Materials

- Dry erase board and markers or chalkboard and chalk
- PowerPoint projector and screen
- PowerPoint presentation
- PASG for demonstration of application

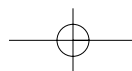
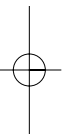
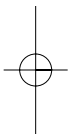
Teaching Tips

- Remember to look, listen, then feel when assessing the abdomen. Although auscultation of bowel sounds is not performed regularly in the prehospital setting, if it is done, it must take place before palpation of the abdomen.
- Always start the palpation of the abdomen in the quadrant farthest away from painful areas.

- If a mass is palpated in the abdominal exam, draw a circle around the circumference of the mass. When the abdomen is assessed a second time during the ongoing assessment, providers will be able to determine if the mass has become larger.
- Remember, do not delay transport. Most treatments can be performed during transport to a health care facility.

Reading and Preparation

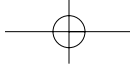
- Review all instructional materials, including **Nancy Caroline's Emergency Care in the Streets**, Sixth Edition, Chapter 24, and all related presentation support materials.



Chapter 24 Abdomen Injuries**Presentation Overview**

Total time: 2 hours 25 minutes

Pre-Lecture		
I. You are the Provider	Small Group Activity/Discussion	10 minutes
Lecture		
I. Introduction Slides 2-4	Lecture/Discussion	5 minutes
II. Anatomy Review Slides 6-14	Lecture/Discussion	15 minutes
III. Physiology Review Slide 15	Lecture/Discussion	5 minutes
IV. Mechanism of Injury Slides 17-25	Lecture/Discussion	15 minutes
V. Pathophysiology Slides 26-29	Lecture/Discussion	10 minutes
VI. Assessment Slides 31-39	Lecture/Discussion	15 minutes
VII. Management Overview Slide 40	Lecture/Discussion	5 minutes
VIII. Pelvic Fractures Slides 41-45	Lecture/Discussion	10 minutes
Post-Lecture		
I. Assessment in Action	Individual/Small Group Activity/Discussion	20 minutes
A. Points to Ponder	Individual/Small Group Activity/Discussion	20 minutes
B. Lesson Review	Discussion	10 minutes
II. Assignments	Lecture	5 minutes



Chapter 24 Abdomen Injuries

Lesson Plan

Pre-Lecture

I. You are the Provider



Time: 10 minutes



Small Group Activity/Discussion

Purpose

This activity is designed to help introduce your students to the content of this chapter.

Instructor Directions

1. Direct students to read the "You are the Provider" scenario found throughout Chapter 24.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions.
3. You may also assign this as an activity and ask students to hand in their comments on a separate piece of paper.

Lesson Plan

Lecture Notes

SLIDE TEXT

Slide 1

Chapter 24

- Abdominal Injuries

Slide 2

Introduction

- Blunt abdominal trauma is the leading cause of morbidity and mortality in all ages.

Slide 3

Abdominal Cavity

- Largest cavity in the body
- Extends from the diaphragm to the pelvis
- Assessment should be made quickly and cautiously.

Slide 4

Prevention Strategies

- Reduction of morbidity and mortality

LECTURE NOTES

I. Introduction



Time: 5 minutes



Slides: 2-4



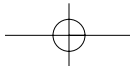
Lecture

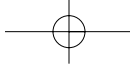
A. Abdominal cavity

1. Largest cavity in the body
2. Contains several vital organ systems
 - a. Digestive
 - b. Urinary
 - c. Genitourinary
3. Vulnerable to trauma
 - a. Location
 - b. Lack of protective structures
 - c. Blunt or penetrating
 - d. Difficult to prevent

B. Injuries

1. Assessments and interventions should be made quickly and cautiously.
 - a. Delays can have disastrous consequences.
2. Trauma is the leading cause of death in people aged 1 to 44 years.
 - a. Blunt trauma is the leading cause of morbidity and mortality in all age groups.





Chapter 24 Abdomen Injuries

SLIDE TEXT

- Safety equipment
- Prehospital education
- Advances in hospital care
- Development of trauma systems

Slide 5

You are the Provider Part 1

- You are dispatched to the home of an older person who has fallen.
- When you arrive, you find the patient between the bed and a wall.
- He is conscious, alert, and orientated, answering all questions and following all commands.

Slide 6

Anatomy Review (1 of 5)

- Anatomic boundaries
 - Diaphragm to pelvic brim
- Divided into three sections
 - Anterior abdomen
 - Flanks
 - Posterior abdomen or back

Slide 7

Anatomy Review (2 of 5)

Slide 8

Anatomy Review (3 of 5)

Slide 9

Anatomy Review (4 of 5)

- Peritoneum
 - Membrane that covers the abdominal cavity

Slide 10

Anatomy Review (5 of 5)

- The internal abdomen is divided into three regions:
 - Peritoneal space
 - Retroperitoneal space
 - Pelvis

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LECTURE NOTES

3. Concerted effort to reduce morbidity and mortality rate

- a. Education of prehospital providers in recognizing the need for rapid transport
- b. Advances in hospital care—improved diagnostic equipment, surgical techniques, and postoperative care

C. You are the Provider



Slide: 5



Lecture/Discussion

1. Present the case study provided on the slide:

- a. You are dispatched to the home of an older person who has fallen.
- b. When you arrive, you find the patient between the bed and a wall.
- c. He is conscious, alert, and orientated, answering all questions and following all commands.
- d. As you are walking into the room, what do you want to be looking for immediately?

II. Anatomy Review



Time: 15 minutes



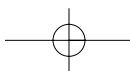
Slides: 6-14

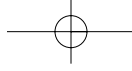


Lecture

A. Overview

1. Abdominal cavity
 - a. Extends from the dome-shaped diaphragm to the pelvic brim
2. Three sections
 - a. Anterior abdomen
 - b. Flanks
 - c. Posterior abdomen
3. Quadrant system
 - a. Right upper quadrant
 - b. Right lower quadrant
 - c. Left lower quadrant
 - d. Left upper quadrant
 - e. Periumbilical area
4. Peritoneum
 - a. Membrane that lines the abdominal cavity
5. Mesentery
 - a. Membranous double fold of tissue in the abdomen
 - b. Attaches various organs to the body wall
6. Internal abdomen (three regions)
 - a. Peritoneal space
 - b. Retroperitoneal space
 - c. Pelvis
7. Intraperitoneal structures
 - a. Liver
 - b. Spleen
 - c. Stomach





Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 11

Abdominal Organs (1 of 4)

- Three types of organs
 - Solid
 - Hollow
 - Vascular

Slide 12

Abdominal Organs (2 of 4)

Slide 13

Abdominal Organs (3 of 4)

Slide 14

Abdominal Organs (4 of 4)

LECTURE NOTES

- d. Small bowel
- e. Colon
- f. Gallbladder
- g. Female reproductive organs

8. Retroperitoneal structures

- a. Aorta
- b. Vena cava
- c. Pancreas
- d. Kidneys
- e. Ureters
- f. Portions of the duodenum and large intestines

9. Pelvic structures

- a. Rectum
- b. Ureters
- c. Pelvic vascular plexus
- d. Major vascular structures
- e. Pelvic skeletal structures
- f. Reproductive organs

B. Abdominal organs

1. Liver

- a. Largest organ in the abdomen
- b. Right upper quadrant
- c. Detoxifies the blood and produces bile

2. Spleen

- a. Left upper quadrant
- b. Partially protected by the left lower rib cage
- c. Clears bloodborne bacteria

3. Gallbladder

- a. Lies on the lower surface of the liver
- b. Reservoir for bile

4. Pancreas

- a. Middle of the abdomen
- b. Secretes enzymes into the bowel that aid digestion
- c. Secretes insulin

5. Stomach

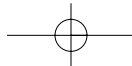
- a. Left upper quadrant
- b. Esophagus opens into the stomach.
- c. Secretes an acid that assists in the digestive process

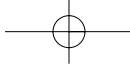
6. Small and large intestines

- a. Run from the end of the stomach to the anus
- b. Digest and absorb water and nutrients
- c. Duodenum
- d. Pylorus

7. Organs of the urinary system

- a. Kidneys: filter blood and excretory body wastes in the form of urine (Chapter 32)
- b. Urinary bladder: stores urine until it is excreted
- c. Ureters: carry urine from the kidneys to the urinary bladder





Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 15

Physiology Review

- The spleen and liver are the organs most commonly injured during blunt trauma.
- Few signs and symptoms may be present.
- Must have a high index of suspicion.

Slide 16

You are the Provider Part 2

- The patient is complaining of pain to his right leg.
- You are able to place a backboard under him to facilitate moving him away from the bed.
 - With the patient complaining of leg pain, after you have moved him, what do you want to look for?

LECTURE NOTES

8. Organs of the female reproductive system

- a. Uterus: allows the implantation, growth, and nourishment of a fetus during pregnancy
- b. Ovaries: produce the precursors to mature eggs and hormones that regulate reproductive function

9. Organs of the male reproductive system

- a. Penis: the male external reproductive organ
- b. Testes: produce sperm and secrete male hormones
- c. Scrotum: pouch of skin and muscle that contains the testes

10. Diaphragm

- a. Separates the thoracic cavity from the abdominal cavity

III. Physiology Review



Time: 5 minutes



Slide: 15



Lecture

A. Overview

1. Places where enough blood can be lost to cause shock

- a. Abdomen
- b. Retroperitoneal space
- c. Muscle compartments of the proximal lower extremities
- d. Accommodate large amounts of blood (few signs and symptoms of the trauma)

2. Organs most frequently injured after a blunt trauma

- a. Spleen
- b. Liver: because of its size it is most frequently injured in penetrating trauma.
- c. Both can easily be crushed.
- d. Both have a large blood supply.

3. Hollow organs are more resilient to blunt trauma and less likely to be injured by trauma unless they are full.

- a. When full, they can burst.
- b. Hold toxins (urine, bile, or stomach acids) that can spill into abdominal cavity
- c. Peritonitis: inflammation of the lining of the abdomen

B. You are the Provider (Continued)



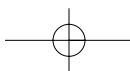
Slide: 16



Lecture/Discussion

1. Continue reading the case study provided on the slide:

- a. The patient is complaining of pain to his right leg.
- b. You are able to place a backboard under him to facilitate moving him away from the bed.
- c. With the patient complaining of leg pain, after you have moved him, what do you want to look for?
- d. You should be looking to see if there is any rotation of the leg. If there is, is it laterally or medially? Remember the old saying “DIFO”: dislocation in/fracture out.



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 17

Mechanism of Injury (1 of 2)

- Eight percent of all significant trauma involves the abdomen.
- Unrecognized abdominal trauma is the leading cause of unexplained deaths due to a delay in surgical intervention.

Slide 18

Mechanism of Injury (2 of 2)

- Two types of abdominal trauma
 - Blunt
 - Penetrating

Slide 19

Blunt Trauma (1 of 2)

- Two thirds of all abdominal injuries
- Most are due to motor vehicle crashes
- Injuries are the result of compression or deceleration forces.
 - Crush organs or rupture them

Slide 20

Blunt Trauma (2 of 2)

- Three common injury patterns
 - Shearing
 - Crushing
 - Compression

Slide 21

Penetrating Trauma

- Most commonly from low velocity impacts (i.e., gunshots or stab wounds).
- An open abdominal injury
 - Skin is broken.
 - Results in laceration of deeper structures

LECTURE NOTES

IV. Mechanism of Injury



Time: 15 minutes



Slides: 17-25



Lecture

A. Overview

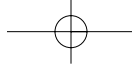
1. Eighty percent of all significant trauma involves the abdomen.
2. Unrecognized abdominal trauma is the leading cause of unexpected deaths.

B. Blunt trauma

1. At least two thirds of all abdominal injuries involve blunt trauma.
2. Compression or deceleration forces
 - a. Closed abdominal injury: soft-tissue damage occurs inside the body, but the skin remains intact.
3. Three common mechanisms of injury
 - a. Shearing: rapid deceleration forces, internal organs continue forward motion, causing organs to tear at their points of attachment to the abdominal wall (liver, kidneys, small and large intestines, and spleen)
 - b. Crushing: abdominal contents are crushed between the anterior abdominal wall and the spinal column (kidneys, liver, and spleen)
 - c. Compression: direct blow or external compression from a fixed object (deforms hollow organs)

C. Penetrating trauma

1. Most commonly results from low-velocity gunshot or stab wounds
 - a. Open abdominal injury: break in the surface of the skin or mucous membrane that exposes deeper tissue to potential contamination
2. In general, gunshot wounds cause more injury than stab wounds.
 - a. Gun shot: small bowel, colon, liver, and vascular structures (less predictable)
 - b. Stabs: liver, small bowel, diaphragm, and colon
3. Extent of damage is often a function of the energy that has been imparted to the body.



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 22

Motor Vehicle Collisions

- Five patterns
 - Frontal
 - Lateral
 - Rear
 - Rotational
 - Rollover

Slide 23

Motorcycle Falls

- Less structural protection
- Rider protective devices
 - Helmet
 - Gloves
 - Leather pants and/or jacket
 - Boots

Slide 24

Falls

- Usually occur during criminal activity, attempted suicide, or intoxication
- Note or observe position or orientation of the body at the moment of impact.

Slide 25

Blast Injuries

- Commonly associated with military conflict
- Seen in mines, chemical plants, and with terrorist activities
- Four different mechanisms
 - Primary blast
 - Secondary blast
 - Tertiary blast
 - Miscellaneous blast injuries

LECTURE NOTES

4. The velocity delivered is divided into three levels.
 - a. Low velocity: knife, ice pick, or hand gun
 - b. Medium velocity: 9-mm gun or shotgun
 - c. High velocity: high-powered sporting rifle or military weapon
5. The trajectory the projectile traveled and the distance it had to travel, as well as the profile of the bullet, contribute to the extent of injury.

D. Motor vehicle collisions

1. Five typical patterns of impact
 - a. Frontal
 - b. Lateral
 - c. Rear
 - d. Rotational
 - e. Rollover
2. Chapter 17
3. A rear impact collision patient is less likely to have an injury to his or her abdomen if he or she has been restrained properly.
4. Rollover impact presents the greatest potential to inflict lethal injuries.

E. Motorcycle falls or collisions

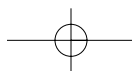
1. No structural protection
2. Helmets
 - a. Transmit any impact to the cervical spine so they do not protect against severe cervical injury

F. Fall from heights

1. Usually occurs in the context of criminal activity, attempted suicide, or intoxication
2. Position or orientation of the body helps determine the types of injuries sustained and their survivability.
3. Surface
 - a. Plasticity: degree to which the surface can deform

G. Blast injuries

1. Can generate fragments traveling at 4,500 feet per second
 - a. Extensive and disruptive damage to tissue
2. Four different mechanisms of injury
 - a. Primary blast injury: from the pressure wave
 - b. Secondary blast injury: debris or fragments from the explosion
 - c. Tertiary blast injury: victim is propelled through the air and strikes another object.
 - d. Miscellaneous blast injury: burns and respiratory injuries from hot gases or chemicals



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 26

Pathophysiology

- Hemorrhage is a major concern in abdominal trauma.
- Hemorrhage can be
 - Internal
 - External

Slide 27

Injuries to Solid Organs

- Liver
- Kidney
- Spleen (Kehr's sign)
- Pancreas
- Diaphragm

Slide 28

Injuries to Hollow Organs

- Small/large intestine
- Stomach
- Bladder

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LECTURE NOTES

V. Pathophysiology



Time: 10 minutes



Slides: 26-29



Lecture

A. Hemorrhage

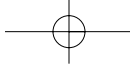
1. Major concern in abdominal trauma
2. External or internal blood loss
3. Estimation of volume of blood lost is difficult.
4. Signs and symptoms will vary greatly depending on the volume of blood lost and the rate at which the body is losing blood.
5. Hypovolemia
 - a. As it increases, patient will have initial agitation and confusion.
 - b. The heart compensates early for this loss by an increased heart rate and stroke volume.
 - c. Ischemia and heart failure
6. Injuries to hollow or solid organs
 - a. Spillage of contents into abdominal cavity
 - b. Localized pain (contamination confined)

B. Injuries to solid abdominal organs

1. Liver injuries
 - a. Suspected in all patients who have right-sided chest trauma as well as abdominal trauma
 - b. Releases blood and bile into the peritoneal cavity
2. Spleen injuries
 - a. Easily ruptured if enlarged (mononucleosis or other underlying disease)
 - b. Blood spills into the peritoneum
 - c. Nonspecific signs and symptoms
 - d. Pain in the left shoulder (Kehr's sign)
3. Pancreas injuries
 - a. Rare
 - b. Relatively well protected
 - c. Subtle or absent signs and symptoms initially
 - d. Spillage of enzymes into the retroperitoneal space
 - e. Localized blow to the midabdomen
 - f. Patients have been known to develop a form of diabetes after a severe injury to the pancreas.
4. Diaphragm injuries
 - a. Primary role in ventilatory process
 - b. Any injury will cause signs and symptoms of ventilatory compromise.
 - c. Not isolated incidents: thoracic, abdominal, head, and extremity injuries
 - d. Rare
 - e. Lateral impact during a motor vehicle crash

C. Injuries to hollow intraperitoneal organs

1. Injuries to the small and large intestines
 - a. Commonly from penetrating trauma
 - b. Spill their contents (fecal matter and a large amount of bacteria)



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 29

Retroperitoneal Injuries

- Grey Turner's sign
- Cullen's sign
- Vascular injuries
- Duodenal injuries

Slide 30

You are the Provider Part 3

- The patient has a lateral rotation of the leg and the leg appears to be shortened.
- You find and palpate a weak pedal pulse.
 - What should you suspect? What do you want to look out for?

Slide 31

Assessment

- Look for evidence of hemorrhage.
- Have a high index of suspicion.
- Priorities begin with adequate tissue perfusion.
- Evaluation must be systematic.
- Prioritize injuries.

LECTURE NOTES

2. Stomach injuries

- a. Penetrating trauma
- b. Spillage of acidic material into the peritoneal space

3. Bladder injuries

- a. The fuller the bladder, the greater the opportunity for injury.
- b. Usually associated with pelvic injuries

D. Retroperitoneal injuries

1. Grey Turner's sign

- a. Ecchymosis of the flanks

2. Cullen's sign

- a. Ecchymosis around the umbilicus

3. Vascular injuries

- a. The descending aorta, the superior phrenic artery, the inferior vena cava, and the mesenteric vessels
- b. Abdominal aortic aneurysm (Chapter 27)
- c. Active hemorrhage

4. Duodenal injuries

- a. Ruptured duodenum
- b. Spill its contents into the retroperitoneum

E. You are the Provider (Continued)



Slide: 30



Lecture/Discussion

1. Continue reading the case study provided on the slide:

- a. The patient has a lateral rotation of the leg and the leg appears to be shortened.
- b. You find and palpate a weak pedal pulse.
- c. What should you suspect? What do you want to look out for?
- d. You should suspect a fractured pelvic area. You want to be concerned about any other internal injuries associated with this injury.

VI. Assessment



Time: 15 minutes



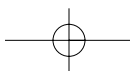
Slides: 31-39

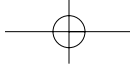


Lecture

A. Overview

1. Look for evidence of hemorrhage (shock) or spillage of bowel contents (pain or tenderness).
2. High index of suspicion
3. Intra-abdominal injuries are likely with trauma to the chest or abdomen.
4. Priorities in resuscitation
 - a. Adequate tissue perfusion
 - b. Oxygen delivery





Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 32

Scene Size-Up

- Scene safety
- Number of patients
- Need for additional help

Slide 33

Initial Assessment

- Mental status
- Patient's airway, breathing, and circulatory status
- Prioritizing the patient

Slide 34

Focused History and Physical Exam (1 of 4)

- Expose the abdomen.
- Inspect for signs of trauma.
 - DCAP-BTLS
- Percuss the abdomen.
- Palpate the abdomen.

Slide 35

Focused History and Physical Exam (2 of 4)

- In blunt trauma, determine
 - The types of vehicles involved
 - The speed they were traveling
 - Collision patterns
 - Use of seatbelts
 - Air bag deployment
 - The patient's position in the vehicle

Slide 36

Focused History and Physical Exam (3 of 4)

- In penetrating trauma caused by gunshot, determine
 - Type of weapon used
 - Number of shots
 - Distance from victim

LECTURE NOTES

5. Systematic evaluation

- a. Hemoperitoneum: collection of blood in the abdominal cavity
- b. Examine the abdomen closely for bruising, road rash, localized swelling, lacerations, distention, or pain.
- c. Look for symptoms of shock not proportional to obvious external evidence or estimated blood loss.
- d. Retroperitoneal hemorrhage: damaged muscle, lacerated or avulsed kidneys, and injuries to the vessels of the supporting mesentery

B. Scene size-up

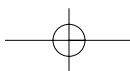
1. Scene safety
2. Some external force caused this injury

C. Initial assessment

1. Mental status, airway, breathing, circulation, and prioritizing the patient

D. Focused history and physical exam

1. Inspection of the abdomen
 - a. Expose the abdomen.
 - b. Inspect for signs of trauma (DCAP-BTLS).
 - c. Decreased or absent abdominal sounds (fluids)
2. Percussion and palpation
 - a. Tenderness and signs of peritonitis
3. Obtain as many details as possible.
 - a. Trauma patients should be transported to the hospital quickly.
 - b. Get details on how the injury occurred.
 - c. Blunt trauma caused by motor vehicle collision: determine the types of vehicles involved, the speed at which they were traveling, and how the cars collided (as well as seatbelts, deployment of air bags, and patient's position in the vehicle).
 - d. Penetrating trauma: type of weapon used (type of gun and number of shots, or type of knife, possible angle of the entrance wound, and number of stab wounds)
4. Abdominal evisceration
 - a. Displacement of an organ outside the body
 - b. Protruding through a wound
5. Impaled objects
 - a. Stabilize and transport in the position they were found.
 - b. Sterilize to prevent infection.
6. Injury to the diaphragm
 - a. Focus on the airway, breathing, and circulatory status.
 - b. Examine the patient's neck and chest (trachea, symmetry of the chest during expansion, and absence of breath sounds).



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 37

Focused History and Physical Exam (4 of 4)

- In penetrating trauma caused by stabbing, determine
 - Type of knife
 - Possible angle of entrance wound
 - Number of stab wounds

Slide 38

Detailed Physical Exam

- Should be conducted en route to hospital
- Assess the same structures as a rapid trauma exam.
 - Cullen's sign
 - Grey Turner's sign

Slide 39

Ongoing Assessment

- Repeat initial exam.
- Retake vital signs.
- Check interventions.

Slide 40

Management

- Open airway with spinal precautions.
 - Oxygen via NRB mask
 - Two large-bore IVs
 - Monitor
- Minimize external hemorrhage.
- Do not delay transport.
- Use of pain medications is somewhat controversial.

LECTURE NOTES


E. Detailed physical exam

1. Abdominal trauma and significant MOI
 - a. Conducted en route to the emergency department
 - b. More methodical examination

F. Ongoing assessment

1. Reassessment of the initial assessment and vital signs

VII. Management Overview

 Time: 5 minutes

 Slide: 40

 Lecture

A. Abdominal trauma

1. Straightforward
 - a. Ensuring an airway
 - b. Administer high-concentration oxygen.
 - c. Establish IV access (do not delay transport to initiate IV therapy).
 - d. Apply pressure dressings (minimize external hemorrhage).
 - e. Apply a cardiac monitor.
 - f. Transport the patient to the appropriate hospital or regional trauma center.
2. Evisceration
 - a. Do not attempt to place the organ back into the body.
 - b. Cover it with a sterile dressing moistened by saline.
3. Pain medication
 - a. It may mask symptoms.
 - b. Consult medical direction en route.

Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 41

Pelvic Fractures (1 of 4)

- The majority are a result of blunt trauma
- Suspect multi-system trauma.

Slide 42

Pelvic Fractures (2 of 4)

- Signs and symptoms
 - Pain to pelvis, groin, or hip
 - Hematomas or contusions to pelvic region
 - Obvious bleeding
 - Hypotension without obvious external bleeding

Slide 43

Pelvic Fractures (3 of 4)

- Types of MOIs in pelvic fractures
 - Anterior-posterior compression in head-on collisions
 - Lateral compression in side impacts
 - Vertical shears in falls from heights
 - Saddle injuries from falling on objects

Slide 44

Pelvic Fractures (4 of 4)

Slide 45

Assessment and Management

- Search for entrance and exit wounds in penetrating trauma.
- Quick transport and treatment of hypotension
- In open-book fractures
 - Splint the hips at the level of the superior anterior iliac crests.
 - PASG is a controversial treatment.

LECTURE NOTES

VIII. Pelvic Fractures



Time: 10 minutes



Slides: 41-45



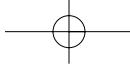
Lecture

A. Pelvis

1. Best thought of as a ring, with its sacral, iliac, ischial, and pubic bones held together by ligaments
 - a. Large forces are required to damage this ring.
 - b. Blunt trauma from motor vehicle collisions
2. Suspect multisystem trauma
 - a. Urethral disruptions
 - b. Bladder rupture
 - c. Abdominal, thoracic, and head trauma
3. Signs and symptoms
 - a. Pain in the pelvis, groin, or hips
 - b. Hematomas or contusions
 - c. Obvious external bleeding
 - d. Hypotension without external bleeding
4. Anteroposterior compression
 - a. May lead to an “open-book” pelvic fracture
 - b. Increase in volume of the pelvis (patient may lose a large amount of blood)
5. Lateral compression
 - a. Generally does not result in an unstable pelvis
6. Vertical shear
 - a. Falls from heights
 - b. Increased pelvic volume
7. Saddle injuries
 - a. Fall on an object
 - b. Fractures of the bones directly under genitalia

B. Assessment and management

1. Never delay quick transport and treatment.
2. SAM sling
 - a. Patented “autostop” buckle to provide the correct circumferential force to close and stabilize open-book pelvic fractures
3. Pneumatic antishock garment (PASG)
 - a. Controversial treatment
 - b. Used to stabilize the pelvis during rapid transports
 - c. Potentially decreases pain by causing less movement of the fractured bones
 - d. Decreases bleeding by reducing pelvic volume
 - e. May put pressure on pelvic vessels (increasing bleeding)
 - f. Chapter 18, Bleeding and Shock



Chapter 24 Abdomen Injuries

SLIDE TEXT

Slide 46

You are the Provider Summary

- The pelvis is a ring, with its sacral, iliac, ischial, and pubic bones held together by ligaments.
- It takes a large amount of force to damage this area.

Slide 47

Summary

- Anatomy review
- Mechanism of injury
- Pathophysiology
- Assessment and management
- Pelvic fractures

LECTURE NOTES

C. You are the Provider Summary



Slide: 47



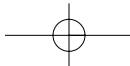
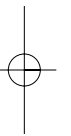
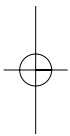
Lecture/Discussion

1. Continue reading the case study provided on the slide:

- a. The pelvis is a ring, with its sacral, iliac, ischial, and pubic bones held together by ligaments.
- b. It takes a larger force to damage this area.
- c. You should be concerned with the patient possibly having some kind of bone disorder. Generally a fall from bed will not break this bone; however, the bones of geriatric patients often are not strong. Diseases such as osteoporosis will cause weakening of bones.

D. Summary

1. Anatomy overview
2. Mechanism of injury
3. Pathophysiology
4. Assessment and management
5. Pelvic fractures



Chapter 24 Abdomen Injuries

Lesson Plan

Post-Lecture Activities

I. Prep Kit Activities



Time: 65 minutes



Note: This section contains various student-centered end-of-chapter activities designed as enhancement to instructor's preparation. As time permits, these activities may be presented in class. They are also designed to be used as outside homework/activities.

A. Assessment in Action



Time: 20 minutes



Individual/Small Group Activity/Discussion

Purpose

This activity is designed to assist students in gaining a further understanding of the chapter content. This activity allows students an opportunity to analyze an emergency care scenario, develop responses, and integrate what they have learned.

Instructor Directions

1. Direct students to read the "Assessment in Action" scenario located in the Prep Kit at the end of Chapter 24.
2. Direct students to read and individually answer the quiz questions at the end of the scenario. Facilitate a class review and dialogue of the answers, allowing students to correct responses as may be needed. Use the quiz question answers noted below to assist in building this review.
3. You may also wish to assign these as individual activities and ask students to turn in their comments on a separate piece of paper.

Answers to Multiple-Choice Questions

You are dispatched to a motor vehicle collision at an intersection. When you arrive, you find two vehicles, one that is broadsided on the driver's side. The driver is still in the vehicle and the fire department is in the process of extricating her. You notice that the damage to the driver's side door is significant with extensive damage to the B post. There is approximately an 18-inch intrusion.

The driver is conscious, alert, and oriented. She is complaining only of pain in the left upper quadrant of her chest, just below her rib cage. Her vital signs are: respirations, 20 breaths/min; pulse, 130 beats/min; blood pressure, 100/60 mm Hg; and pulse oximetry, 98% on room air. The patient's c-spine is immobilized and she is removed from the vehicle. In the ambulance, you perform a complete assessment. Everything is unremarkable except she has pain on palpation to her left upper quadrant and pain in her left shoulder. Her abdomen is soft, and she is not guarding it. You initiate two large-bore IVs, apply oxygen, and transport the patient to the nearest trauma-designated hospital.

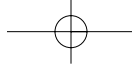
1. What type of injury should you suspect?

- a. Lacerated liver
- b. Ruptured spleen
- c. Contusion of the heart
- d. Ruptured appendix

Answer: B. You should suspect a spleen injury. The spleen is located in the upper left quadrant. The spleen is one of the most frequently injured abdominal organs, injured in approximately 50% of cases involving abdominal trauma. Because the spleen is a solid organ, it has a large blood supply and can bleed profusely.

2. What type of impact did this patient receive?

- a. Frontal impact
- b. Rear impact



Chapter 24 Abdomen Injuries

- c. Lateral or side impact
- d. Rotational impact

Answer: C. Lateral impact will occur when the vehicle is struck from the side. The occupant nearest to the point of impact is struck by the door as the interior of the vehicle begins to collapse around him or her.

3. Which are solid organs of the abdomen?

- a. Liver, spleen, kidneys, and pancreas
- b. Liver, spleen, and pancreas
- c. Large intestine, small intestine, and kidneys
- d. Liver, spleen, kidneys, and intestines

Answer: A. The solid organs of the abdomen are the liver, spleen, kidneys, and pancreas. When a solid organ in the abdomen is injured during blunt or penetrating trauma, it releases blood into the peritoneal cavity, which can cause nonspecific signs such as tachycardia and hypotension.

4. On-scene care of a patient who has signs of shock from abdominal injury should include which of the following?

- a. Comprehensive physical exam
- b. Initiation of IV fluid therapy
- c. Ongoing assessment
- d. Oxygen administration

Answer: D. Oxygen should be administered on the scene to any patient who has an abdominal injury and shows signs of shock. The initial exam can also be done on the scene. Further examination and IV therapy may be performed en route to the hospital.

5. When the spleen ruptures, blood spills into the:

- a. duodenum
- b. peritoneum
- c. stomach
- d. pylorus

Answer: B. Blood will spill into the peritoneum, which can cause shock and death. The signs and symptoms of splenic rupture are nonspecific, and as many as 40 percent of patients have no symptoms.

6. Some patients who have a splenic injury may report only left shoulder pain. This is called:

- a. Cullen's sign.
- b. Grey Turner's sign.
- c. peritoneal's sign.
- d. Kehr's sign.

Answer: D. Left shoulder pain that may indicate a ruptured spleen is called Kehr's sign.

7. The abdominal cavity is lined with a membrane called the:

- a. retroperitoneal space
- b. pylorus
- c. peritoneum
- d. periumbilical

Answer: C. The peritoneum is a membrane in the abdomen encasing the liver, spleen, diaphragm, stomach, and transverse colon.

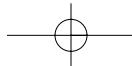
8. The spleen is a highly vascular organ that lies in the _____ quadrant.

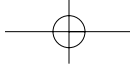
- a. right upper
- b. left lower
- c. left upper
- d. right lower

Answer: C. The spleen lies in the left upper quadrant and is partially protected by the left lower rib cage. It functions to clear bloodborne bacteria.

9. Rupture of an organ can lead to hemorrhage and:

- a. peritoneum.
- b. peritonitis.
- c. hemoperitoneum.
- d. internal bleeding.





Chapter 24 Abdomen Injuries

Answer: B. Peritonitis is a life-threatening inflammation of the peritoneum (the lining around the abdominal cavity). It results from blood or organ contents spilling into the abdomen.

- 10. True or false? Patients without abdominal pain or abnormal vital signs are unlikely to have serious intra-abdominal injuries.**

- a.** True
b. False

Answer: B. Peritonitis can take hours to days to develop. Nonspecific symptoms such as hypotension, tachycardia, and confusion may not develop until the patient has lost 60% of his or her circulating blood volume. Always maintain a high index of suspicion in any patient who has an MOI consistent with abdominal trauma.

Challenging Questions

You are dispatched to the local bar for an assault victim. On arrival you find a 38-year-old man on the ground, conscious, alert, and orientated to person, place, and time. He is in the right lateral recumbent position. You notice a large pool of blood under him. He has a weak radial pulse and his skin is cool, pale, and diaphoretic. His vital signs are: respirations, 40 breaths/min; pulse, 120 beats/min with sinus tachycardia on the monitor; systolic blood pressure, 80 mm Hg; and pulse oximetry, 92% on room air. He is complaining of pain to his stomach and is becoming very agitated. There is a 12-inch knife lying next to him. You check his back for wounds and then quickly logroll him onto a backboard and provide c-spine precautions. On examination of the abdomen, you see a stab wound to the upper right quadrant. You immediately move the patient to your ambulance.

- 11. What type of injury should you suspect?**

Rationale: Knowing the anatomy of the abdomen is very helpful here. You should suspect a lacerated liver. The liver is the largest organ in the abdominal cavity. Because of its location, it is commonly injured from trauma to the eighth through twelfth ribs on the right side of the body and from trauma to the upper central part of the abdomen.

- 12. What are the major complications of a lacerated liver?**

Rationale: After injury, blood and bile escape into the peritoneal cavity, producing signs and symptoms of shock and peritoneal irritation.

- 13. What is your further treatment for this patient?**

Rationale: Emergency care of patients with abdominal trauma is usually limited to stabilizing the patient and rapid transport to the closest Level 1 trauma center. The most important on-scene care is a thorough scene size-up to identify the force involved in the injury, rapid evaluation of the patient and mechanism of injury, airway maintenance with c-spine stabilization, administration of high-flow oxygen, ventilatory support as needed, application of a pressure bandage to stop bleeding, fluid replacement with volume expanders, possible PASG application (per protocols), and cardiac monitoring. Continuous reassessment of the patient's condition is necessary. While you are en route to the hospital, the detailed physical exam should take place. Your assessment should never delay transport to the hospital.

B. Points to Ponder



Time: 20 minutes



Individual/Small Group Activity/Discussion

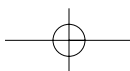
This activity addresses the affective objectives of the chapter, allowing you to help students probe the more difficult situations that they face. Use this as an opportunity to allow them to express differences of opinion and approach, while directing them to be thorough and decisive in their answers. Encourage challenges.

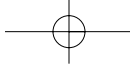
Purpose

To allow students an opportunity to apply critical thinking analysis to a given case study.

Instructor Directions

1. Direct students to read the "Points to Ponder" scenario found in the Prep Kit at the end of Chapter 24.
2. You may wish to assign students to a partner or a group and direct them to review the discussion question at the end of the scenario and prepare a response. Facilitate a class dialogue centered on the discussion point.





Chapter 24 Abdomen Injuries

3. You may also ask students to complete this activity on their own and hand in their comments on a separate piece of paper.
4. Personally review the scenario and discussion question based on your experience and knowledge as an emergency care worker. Develop your own key points for guiding this discussion.

Scenario

You are called to the scene of a minor car collision in which a car has hit a telephone pole. When you arrive, you immediately notice that the driver is not inside the car. The air bag has deployed, but the windshield appears intact. The steering wheel appears slightly deformed. Bystanders say the car was not traveling very fast when it hit the pole. They do not think the driver was wearing a seatbelt.

You approach the driver to ask him about the crash. He is sitting on the grass, with no apparent external injuries. Even though it is early afternoon, you smell what you think is alcohol as you speak with him. He tells you he doesn't know how the crash happened, but he insists he is fine and doesn't want to be examined or questioned. Though you can see no injuries, he is guarding his abdomen, and grimaces as though he's in pain as you're speaking. The more you try to encourage him to be examined by either you or a doctor, the more defensive and angry he gets. You tell him the risks of not being examined, and tell him he can sign a consent form to not be treated. He agrees to let you take his vital signs and then signs the consent form to refuse treatment. His blood pressure is 80/60 mm Hg; pulse, 130 beats/min; and respirations, 27 breaths/min.

When you find this, what do you do?

Issues

Thorough Scene Size-up, Thorough Assessment, Patient Refusal.

Discussion

You suspect, given the scene of the collision and the patient's behavior, that he is injured. You know after taking the patient's vital signs that he probably has a significant abdominal injury. You suspect he is afraid of treatment because he may have been drinking and there was an accident. You also know you cannot treat anyone against his or her will, and that he has the right to refuse treatment. It is your responsibility to tell him all the risks associated with refusal of treatment, as well as what you think his injuries are and how significant they are. Assure him if he still refuses treatment that he can call an ambulance at any time, or go to the emergency department for treatment.

II. Lesson Review



Time: 10 minutes

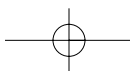


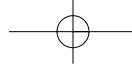
Discussion



Note: Facilitate the review of this lesson's major topics using the review questions as direct questions or overhead transparencies. Answers are found throughout this lesson plan. Each question includes a reference to the slide where the information is covered.

1. What is the leading cause of morbidity and mortality in all age groups? (Lecture I-A.)
2. Why should abdominal assessments should be made quickly and cautiously? (Lecture I-B)
3. What factors have reduced morbidity and mortality? (Lecture I-B)
4. The internal abdomen is divided into what three spaces? (Lecture II-A)
5. List the solid organs found in the abdominal cavity. (Lecture II-B)
6. What are the three common injury patterns found in abdominal trauma? (Lecture IV-B)
7. What protective devices are available to motorcycle riders? (Lecture IV-E)
8. What is Kehr's sign? (Lecture V-B)
9. What is ecchymosis of the flanks known as? (Lecture V-D)
10. What is Cullen's sign? (Lecture V-D)





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III. Assignments



Time: 5 minutes



Lecture

1. Review all materials from this lesson and be prepared for a lesson quiz to be administered (date to be determined by instructor).
2. Read Chapter 25: *Musculoskeletal Injuries* for the next class session.

