Chapter 18 - Gastrointestinal & Urologic Emergencies

1 National EMS Education Standard Competencies (1 of 4)
   Medicine
   Applies fundamental knowledge to provide basic emergency care and transportation based on assessment findings for an acutely ill patient.

2 National EMS Education Standard Competencies (2 of 4)
   • Abdominal and Gastrointestinal Disorders
     – Anatomy, presentations, and management of shock associated with abdominal emergencies
     • Gastrointestinal bleeding

3 National EMS Education Standard Competencies (3 of 4)
   • Abdominal and Gastrointestinal Disorders (cont’d)
     – Anatomy, physiology, pathophysiology, assessment, and management of
     • Acute and chronic gastrointestinal hemorrhage
     • Peritonitis
     • Ulcerative diseases

4 National EMS Education Standard Competencies (4 of 4)
   • Genitourinary/Renal
     – Blood pressure assessment in hemodialysis patients
     – Anatomy, physiology, pathophysiology, assessment, and management of
       • Complications related to
         – Renal dialysis
         – Urinary catheter management (not insertion)
       • Kidney stones

5 Introduction
   • Abdominal pain is a common complaint.
     – Cause of abdominal pain is often difficult to determine.
   • As an EMT:
     – You do not need to determine the exact cause.
     – You should be able to recognize a life-threatening problem and act.

6 Anatomy and Physiology (1 of 4)
   • Abdominal cavity contains:
     – Gastrointestinal system
     – Genital system
     – Urinary system
   • Made up of solid and hollow organs

7 Anatomy and Physiology (2 of 4)
   • Solid organs:
     – Liver
     – Spleen
     – Pancreas
Injury to a solid organ can cause shock and bleeding.

**Anatomy and Physiology (3 of 4)**

- Hollow organs:
  - Gallbladder
  - Stomach
  - Small intestine
  - Large intestine
  - Urinary bladder

- Breach of a hollow organ causes its contents to leak and contaminate the abdominal cavity.

**Anatomy and Physiology (4 of 4)**

**The Gastrointestinal System (1 of 6)**

- Responsible for digestion process
- Digestion begins when food is chewed.
  - Saliva breaks down food
  - Food is swallowed
  - Food travels to stomach
- The stomach is the main digestive organ.

**The Gastrointestinal System (2 of 6)**

- The liver assists in digestion.
  - Secretes bile and aids in digestion of fats
  - Filters toxic substances
  - Creates glucose stores
- The gallbladder is a reservoir for bile.

**The Gastrointestinal System (3 of 6)**

- Small intestine
  - Duodenum
    - Digestive juices from pancreas and liver mix
    - Pancreas releases amylase, bicarbonate, and insulin
  - Jejunum
    - Absorbs digestive products
    - Does most of the work

**The Gastrointestinal System (4 of 6)**

- Small intestine (cont’d)
  - Ileum
    - Absorbs nutrients that were not absorbed earlier
    - Absorbs bile acids so they can be returned to the liver for future use and vitamin B₁₂ for making nerve cells and red blood cells

**The Gastrointestinal System (5 of 6)**
• Colon (large intestine)
  – Food that is not broken down comes here.
  – Peristalsis moves waste through the intestines.
  – Water is absorbed.
  – Stool is formed.

16 The Gastrointestinal System (6 of 6)
• Spleen
  – Located in abdomen
  – No digestive function
  – Part of lymphatic system
    • Assists in filtering blood
    • Develops red blood cells
    • Blood reservoir
    • Produces antibodies

17 The Genital System (1 of 2)
• Male reproductive system:
  – Testicles
  – Epididymis
  – Vasa deferentia
  – Seminal vesicles
  – Prostate gland
  – Penis

18 The Genital System (2 of 2)
• Female reproductive system:
  – Ovaries
  – Fallopian tubes
  – Uterus
  – Cervix
  – Vagina

19 The Urinary System (1 of 3)
• Controls discharge of waste materials filtered from blood by kidneys
• There are two kidneys, one on each side of the body.
  – Lie on the posterior wall of the abdomen
  – Regulate acidity and blood pressure
  – Rid the body of toxic waste
  – Blood flow is high in kidneys.

20 The Urinary System (2 of 3)
• Ureters join each kidney to the bladder.
• The bladder is located behind the pubic symphysis.
• The bladder empties urine outside body through the urethra.
  – 1.5 to 2 L of urine per day

21 The Urinary System (3 of 3)
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Pathophysiology (1 of 4)
- The abdominal cavity is lined by the peritoneum.
  - Also covers abdominal organs
  - Parietal peritoneum lines the walls of the abdominal cavity.
  - Visceral peritoneum covers organs.
- Foreign material such as blood, pus, or bile can irritate the peritoneum.
  - Causes peritonitis

Pathophysiology (2 of 4)
- “Acute abdomen” refers to the sudden onset of abdominal pain.
  - Often associated with severe, progressive problems

Pathophysiology (3 of 4)
- Peritonitis
  - Inflammation of peritoneum
  - Typically causes ileus
- Ileus
  - Paralysis of muscular contractions
  - Retained gas and feces cause distention
  - Stomach empties by emesis (vomiting)

Pathophysiology (4 of 4)
- Diverticulitis
  - Inflammation of small pockets at weak areas in the muscle walls
- Cholecystitis
  - Inflammation of the gallbladder

Abdominal Pain (1 of 2)
- Two types of nerves supply the peritoneum.
- Parietal peritoneum: supplied by the same nerves that supply the skin of the abdomen
  - Perceive pain, touch, pressure, heat, cold
- Visceral peritoneum: supplied by the autonomic nervous system
  - Produces referred pain

Abdominal Pain (2 of 2)

Causes of Acute Abdomen (1 of 7)
- Ulcers
  - Protective layer of mucus erodes, allowing acid to eat into the organ
  - May lead to gastric bleeding
  - Some heal without intervention

Causes of Acute Abdomen (2 of 7)
- Gallstones
  - The gallbladder stores digestive juices and waste from liver.
  - Gallstones may form and block its outlet.
  - Cause pain
  - Lead to cholecystitis
• Causes of Acute Abdomen
  (3 of 7)
  • Pancreatitis
    – Inflammation of the pancreas
    – Caused by obstructing gallstone, alcohol abuse, or other diseases
    – Signs and symptoms include pain in upper left and right quadrants, nausea, vomiting, and abdominal distention
    – Sepsis or hemorrhage may occur.

31 Causes of Acute Abdomen
  (4 of 7)
  • Appendicitis
    – Inflammation or infection in the appendix
    – Nausea, vomiting, anorexia, fever, chills, rebound tenderness
  • Gastrointestinal hemorrhage
    – Bleeding within gastrointestinal tract
    – May be acute or chronic

32 Causes of Acute Abdomen
  (5 of 7)
  • Esophagitis
    – Lining of the esophagus becomes inflamed by infection or acids from the stomach.
    – Pain in swallowing, heartburn, nausea, vomiting, sores in mouth
  • Esophageal varices
    – Capillary network in the esophagus leaks.
    – Fatigue, weight loss, jaundice, anorexia, edema, abdominal pain

33 Causes of Acute Abdomen
  (6 of 7)
  • Mallory-Weiss syndrome
    – Junction between esophagus and stomach tears
    – Principal symptom: vomiting
  • Gastroenteritis
    – Infection from bacterial or viral organisms or caused by noninfectious conditions
    – Principal symptom: diarrhea

34 Causes of Acute Abdomen
  (7 of 7)
  • Diverticulitis
    – Fecal matter becomes caught in colon walls, causing inflammation and infection.
    – Fever, malaise, body aches, chills
  • Hemorrhoids
    – Created by swelling and inflammation of blood vessels surrounding rectum
    – Bright red blood during defecation

35 Urinary System
  • Cystitis (bladder infection) is common.
    – Also called urinary tract infection (UTI)
– Caused by bacterial infection
– Becomes serious if infection spreads to kidneys
– Reports of urgency and frequency of urination

36  Kidneys (1 of 2)
• Play a major role in maintaining homeostasis
  – Eliminate waste from blood
• When the kidneys fail, uremia results.
  – Waste product (urea) remains in blood.
• Kidney stones can grow over time and cause blockage.

37  Kidneys (2 of 2)
• Acute kidney failure
  – Sudden decrease in kidney function
  – Reversible with prompt diagnosis and treatment
• Chronic kidney failure
  – Irreversible
  – Progressive, develops over months/years
  – Eventually dialysis or transplant is required.

38  Female Reproductive Organs
• Gynecologic problems are a common cause of acute abdominal pain.
• Lower quadrant pain may relate to the ovaries, fallopian tubes, or uterus.

39  Other Organ Systems (1 of 3)
• The aorta lies immediately behind the peritoneum.
  – Weak areas can result in abdominal aortic aneurysm (AAA).
  – AAA is difficult to detect.
  – Use extreme caution when assessing or detecting AAA.
• Pneumonia can cause ileus and abdominal pain.

40  Other Organ Systems (2 of 3)
• Hernias can occur.
  – Protrusion of an organ or tissue through an opening into a body cavity where it does not belong
  – May not always produce noticeable mass or lump
  – Strangulation is a serious medical emergency.

41  Other Organ Systems (3 of 3)
• Serious hernia signs and symptoms:
  – A formerly reducible mass that is no longer reducible
  – Pain at the hernia site
  – Tenderness when the hernia is palpated
  – Red or blue skin discoloration

42  Scene Size-up
• Scene safety
  – Consider wearing a gown and disposable protective covers for shoes.
• Mechanism of injury/nature of illness
  – May be the result of violence
  – Pale and sweating patient with tearing pain may have an AAA
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- Characteristic odor of gastrointestinal bleeding

Primary Assessment
- Airway and breathing
  - Abdominal pain may cause shallow, inadequate respirations.
- Circulation
  - Ask about blood in vomit or black, tarry stools.
  - Check pulses in both arms.
- Transport decision
  - Immediate transport is needed if there are signs of significant illness.

History Taking
- SAMPLE history
  - Nausea and vomiting
  - Change in bowel habits and urination
  - Weight loss
  - Belching or flatulence
  - Pain
  - Concurrent chest pain
  - Other signs or symptoms

Secondary Assessment (1 of 2)
- Physical examination
  - Normal abdomen is soft and not tender.
  - Pain/tenderness: signs of acute abdomen
  - Expose and assess abdomen.
  - Palpate gently.

Secondary Assessment (2 of 2)
- Vital signs
  - Check respiratory rate and pulse rate.

Reassessment
- Frequent reassessment is important.
- Assess interventions, including treatment for shock and emotional support.
- Transport the patient in the most comfortable position.

Emergency Medical Care
- You cannot treat causes of acute abdomen.
  - Take steps to provide comfort and lessen effects of shock.
    - Treat for shock even when obvious signs are not apparent.
    - Low-flow oxygen may decrease nausea and anxiety.
- After releasing the patient to hospital staff, clean the ambulance, the equipment, and your hands.

Dialysis Emergencies (1 of 3)
- Dialysis is the only definitive treatment for chronic kidney failure.
  - Dialysis filters blood, cleans it of toxins, and returns it to body.
  - If the patient misses dialysis treatment, pulmonary edema can occur.
- Some services transport patients to and from dialysis centers.

Dialysis Emergencies (2 of 3)
The dialysis machine functions much like normal kidneys.

Adverse effects of dialysis:
- Hypotension
- Muscle cramps
- Nausea and vomiting
- Hemorrhage from access site
- Infection at access site

**Dialysis Emergencies (3 of 3)**

- Emergency care:
  - Manage ABCs
  - Provide high-flow oxygen if indicated
  - Manage bleeding from the access site
  - Position
    - Sitting up in case of pulmonary edema
    - Supine if patient is in shock
  - Transport promptly

**Review**

1. The ___________ lies in the retroperitoneal space.
   - A. liver
   - B. pancreas
   - C. stomach
   - D. small intestine

**Answer:** B

**Rationale:** The pancreas, kidneys, and ovaries lie in the retroperitoneal space, which is behind the peritoneum, and are often the cause of acute abdominal pain. The liver, stomach, and small intestine are all found within the true (anterior) abdomen.

**Review (1 of 2)**

1. The ___________ lies in the retroperitoneal space.
   - A. liver
     - Rationale: The liver is found in anterior abdomen.
   - B. pancreas
     - Rationale: Correct answer

**Review (2 of 2)**

1. The ___________ lies in the retroperitoneal space.
   - C. stomach
     - Rationale: The stomach is found in the anterior abdomen.
   - D. small intestine
     - Rationale: The small intestine is found in the anterior abdomen.

**Review**

2. Which of the following is NOT a solid organ?
   - A. Liver
   - B. Kidney
   - C. Spleen
   - D. Gallbladder
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57  **Review**

Answer: D

Rationale: The gallbladder is a hollow organ that concentrates and stores bile, which is produced by the liver. Other hollow organs include the stomach and intestines. The liver, spleen, and kidney are all solid organs.

58  **Review**

2. Which of the following is NOT a solid organ?
   - A. Liver
     Rationale: The liver is a solid organ.
   - B. Kidney
     Rationale: The kidney is a solid organ.
   - C. Spleen
     Rationale: The spleen is a solid organ.
   - D. Gallbladder
     Rationale: Correct answer

59  **Review**

3. A 34-year-old woman with a recent history of pelvic inflammatory disease presents with acute severe abdominal pain. Her abdomen is distended and diffusely tender to palpation. Based on your findings thus far, you should suspect:
   - A. peritonitis.
   - B. pancreatitis.
   - C. appendicitis.
   - D. cholecystitis.

   Answer: A

   Rationale: Peritonitis—an inflammation of the thin membrane that lines the abdominal cavity—typically presents with acute abdominal pain. Causes of peritonitis include infection and blunt or penetrating abdominal trauma. The pain caused by peritonitis is typically diffuse (widespread), whereas appendicitis, pancreatitis, and cholecystitis (inflammation of the gallbladder) typically present with pain that is localized to a particular area.

60  **Review (1 of 2)**

3. A 34-year-old woman with a recent history of pelvic inflammatory disease presents with acute severe abdominal pain. Her abdomen is distended and diffusely tender to palpation. Based on your findings thus far, you should suspect:
   - A. peritonitis.
     Rationale: Correct answer
   - B. pancreatitis.
     Rationale: Pancreatitis is usually a localized pain (in one specific area).

61  **Review (2 of 2)**

3. A 34-year-old woman with a recent history of pelvic inflammatory disease presents with acute severe abdominal pain. Her abdomen is distended and diffusely tender to palpation. Based on your findings thus far, you should suspect:
   - C. appendicitis.
     Rationale: Appendicitis is usually a localized pain (in one specific area).
   - D. cholecystitis.
     Rationale: Cholecystitis is usually a localized pain (in one specific area).
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Review

4. MOST patients with an acute abdomen present with:
   A. dyspnea.
   B. diarrhea.
   C. hypotension.
   D. tachycardia.

Review

Answer: D
Rationale: Tachycardia (heart rate > 100 beats/min) is commonly seen in patients with an acute abdomen; it is usually the result of severe pain. Hypotension is not seen in all patients with an acute abdomen; if the patient is hypotensive, you should suspect internal bleeding or a severe infection (sepsis). Many patients with an acute abdomen have increased respirations (tachypnea); however, dyspnea (a feeling of shortness of breath) is not common.

Review (1 of 2)

4. MOST patients with an acute abdomen present with:
   A. dyspnea.
      Rationale: Some patients may have increased respirations, but they typically do not have difficulty breathing.
   B. diarrhea.
      Rationale: Diarrhea may be a symptom of some abdominal problems but not in most patients.

Review (2 of 2)

4. MOST patients with an acute abdomen present with:
   C. hypotension.
      Rationale: Hypotension is not seen in most patients, and shock should be suspected when it is present.
   D. tachycardia.
      Rationale: Correct answer

Review

5. Which of the following signs or symptoms would you be LEAST likely to find in a patient with an acute abdomen?
   A. Rapid, shallow breathing
   B. Soft, nondistended abdomen
   C. Tachycardia and restlessness
   D. Constipation or diarrhea

Review

Answer: B
Rationale: Signs and symptoms of an acute abdomen include, but are not limited to, rapid and shallow breathing, a tense and distended abdomen, tachycardia, restlessness, and constipation or diarrhea.

Review (1 of 2)

5. Which of the following signs or symptoms would you be LEAST likely to find in a patient with an acute abdomen?
   A. Rapid, shallow breathing
      Rationale: This is a common sign of an acute abdomen.
   B. Soft, nondistended abdomen
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Rationale: Correct answer

Review (2 of 2)
5. Which of the following signs or symptoms would you be LEAST likely to find in a patient with an acute abdomen?
   C. Tachycardia and restlessness
      Rationale: These are common signs of an acute abdomen.
   D. Constipation or diarrhea
      Rationale: These are common signs of an acute abdomen.

Review
6. A condition in which a person experiences a loss of appetite is called:
   A. Ileus.
   B. Colic.
   C. Emesis.
   D. Anorexia.

Answer: D
Rationale: Anorexia is defined as a loss of appetite. It is a nonspecific symptom but is often associated with gastrointestinal diseases and abdominal pain. Ileus is the paralysis of the muscular contractions that normally propel material through the intestine. Colic is a severe, intermittent cramping pain. Emesis is the proper medical term for vomiting.

Review (1 of 2)
6. A condition in which a person experiences a loss of appetite is called:
   A. Ileus.
      Rationale: Ileus is the paralysis of the muscular contractions that normally propel material through the intestine.
   B. Colic.
      Rationale: Colic is a severe, intermittent cramping pain.

Review (2 of 2)
6. A condition in which a person experiences a loss of appetite is called:
   C. Emesis.
      Rationale: Emesis is also known as vomiting.
   D. Anorexia.
      Rationale: Correct answer

Review
7. The medical term for inflammation of the urinary bladder is:
   A. Cystitis.
   B. Nephritis.
   C. Cholecystitis.
   D. Diverticulitis.

Answer: A
Rationale: Cystitis is the medical term for inflammation of the urinary bladder. Nephritis is inflammation of the kidney. Cholecystitis is inflammation of the gallbladder. Diverticulitis is a condition in which small pouches in the colon (large intestine) become inflamed.

Review (1 of 2)
7. The medical term for inflammation of the urinary bladder is:
   A. cystitis.
   Rationale: Correct answer
   B. nephritis.
   Rationale: Nephritis is the inflammation of the kidney.

**Review (2 of 2)**
7. The medical term for inflammation of the urinary bladder is:
   C. cholecystitis.
   Rationale: Cholecystitis is inflammation of the gallbladder.
   D. diverticulitis.
   Rationale: Diverticulitis is inflammation of part of the large intestine.

8. If a hernia is incarcerated and the contents are so greatly compressed that circulation is compromised, the hernia is said to be:
   A. reducible.
   B. ruptured.
   C. strangulated.
   D. congenital.

**Review**
Answer: C
Rationale: A strangulated hernia occurs when a hernia is incarcerated and compressed by the surrounding tissues. It is a serious medical emergency and requires immediate surgery to repair the hernia, remove dead tissue, and return oxygen to the tissues. When the mass can be placed back into the body, it is considered reducible. Hernias are not at risk of rupturing. A congenital hernia is one that is present at birth and is usually present around the umbilicus.

**Review (1 of 2)**
8. If a hernia is incarcerated and the contents are so greatly compressed that circulation is compromised, the hernia is said to be:
   A. reduced.
   Rationale: This is a mass or lump that will disappear back into the body cavity in which it belongs.
   B. ruptured.
   Rationale: This is a mass or lump that bursts from internal pressure.

**Review (2 of 2)**
8. If a hernia is incarcerated and the contents are so greatly compressed that circulation is compromised, the hernia is said to be:
   C. strangulated.
   Rationale: Correct answer
   D. hypoxemic.
   Rationale: This is a decrease in arterial oxygen levels.

**Review**
9. A 70-year-old man presents with an acute onset of severe, tearing abdominal pain that radiates to his back. His BP is 88/66 mm Hg, pulse rate is 120 beats/min, and respirations are 26 breaths/min. Treatment for this patient should include:
   A. rapid transport to the hospital.
   B. firm palpation of the abdomen.
C. placing him in a sitting position.
D. oxygen at 4 L/min via nasal cannula.

84 Review
Answer: A
Rationale: Severe, tearing abdominal pain that radiates to the back is typical of an abdominal aortic aneurysm (AAA); it commonly occurs in older patients—especially those with hypertension. Treatment includes high-flow oxygen and rapid transport. If the patient has signs of shock, place him or her supine. Do not vigorously palpate the patient’s abdomen; doing so may cause the aneurysm to rupture.

85 Review (1 of 2)
9. A 70-year-old man presents with an acute onset of severe, tearing abdominal pain that radiates to his back. His BP is 88/66 mm Hg, pulse rate is 120 beats/min, and respirations are 26 breaths/min. Treatment for this patient should include:
   A. rapid transport to the hospital.
   Rationale: Correct answer
   B. firm palpation of the abdomen.
   Rationale: A firm or vigorous palpation is contraindicated in patients with severe and sudden-onset abdominal pain.

86 Review (2 of 2)
9. A 70-year-old man presents with an acute onset of severe, tearing abdominal pain that radiates to his back. His BP is 88/66 mm Hg, pulse rate is 120 beats/min, and respirations are 26 breaths/min. Treatment for this patient should include:
   C. placing him in a sitting position.
   Rationale: Hypotension is treated by elevating the patient’s legs into the shock position.
   D. oxygen at 4 L/min via nasal cannula.
   Rationale: High-flow oxygen is indicated in the treatment of shock.

87 Review
10. In which position do most patients with acute abdominal pain prefer to be transported?
   A. Sitting, with their head elevated 45°
   B. Supine, with their legs elevated 12 inches
   C. On their side, with their knees flexed
   D. Fowler’s position, with their legs straight

88 Review
Answer: C
Rationale: Most patients with acute abdominal pain prefer to lie on their side with their knees flexed (and usually drawn up into their abdomen). This position takes pressure off the abdominal muscles and may afford them pain relief. The other positions do not allow the pressure to be relieved and may cause further discomfort.

89 Review (1 of 2)
10. In which position do most patients with acute abdominal pain prefer to be transported?
   A. Sitting, with their head elevated 45°
   Rationale: This is also known as the semi-Fowler’s position.
   B. Supine, with their legs elevated 12 inches
   Rationale: This position will not relieve pressure from the abdomen.

90 Review (2 of 2)
10. In which position do most patients with acute abdominal pain prefer to be transported?
C. On their side, with their knees flexed  
   Rationale: Correct answer

D. Fowler’s position, with their legs straight  
   Rationale: This is when the patient is sitting straight up.