# 9 ABDOMINAL PRIMARY CARE

## CORE CONCEPTS

- Identify the four abdominal quadrants and the organs contained in each.
- Summarize the physiology of each abdominal organ.
- Recall the RED FLAG signs and symptoms associated with life-threatening abdominal conditions.
- Demonstrate the proper steps in an abdominal assessment.
- Recognize common epidemiological factors in acute abdominal pain.
- Describe treatment modalities for patients with acute abdominal pain.

## INTRODUCTION

During combat operations, medics may have to assess and treat patients with signs and symptoms of various types of abdominal disorders, including nausea, vomiting, diarrhea, constipation, and pain. These signs and symptoms could indicate a minor abdominal condition or a significant underlying life threat. Some causes of abdominal distress require surgical intervention. If a combat medic fails to identify signs and symptoms of an abdominal condition requiring surgical intervention, the patient could die. Always obtain a thorough medical history, compile accurate vital signs, and conduct a systematic assessment. Evaluating this information greatly reduces the likelihood of overlooking an abdominal life threat.

## ANATOMY AND PHYSIOLOGY OF THE ABDOMINAL ORGANS

### Gastrointestinal Tract

The gastrointestinal tract (also called the GI tract or digestive tract) is composed of the oral pharynx (mouth), esophagus, stomach, small intestine, large intestine, rectum, and anus. It is a long tube that converts food into absorbable nutrients and removes residual waste products.

### Abdomen

The abdominal cavity boundaries are the diaphragm (superior boundary), the anterior abdominal wall, the pelvic bones (inferior boundary), the abdominal muscles (anterior boundary) and flanks, as well as the spinal column and back muscles (posterior boundary). The **peritoneum** is a serous membrane that covers the abdominal cavity and its organs. The **parietal peritoneum** lines the abdominal cavity and the **visceral peritoneum** lines most intra-abdominal organs. The organs are suspended in the abdominal cavity by a double layer of peritoneum known as **mesentery**. Four quadrants make up the abdominal cavity: (1) the right upper quadrant (RUQ), (2) the left upper quadrant (LUQ), (3) the right lower quadrant (RLQ), and (4) the left lower quadrant (LLQ). Figure 9-1 shows the abdominal cavity quadrants and internal organs.

#### *Right Upper Quadrant*

The RUQ includes the following organs:

- liver;
- gallbladder;
- head of the pancreas (**retroperitoneal**);
- part of the colon (hepatic flexure and part of transverse colon);
- a portion of the small intestine composed of **duodenum**, **jejunum**, **and ileum**;
- abdominal aorta along the line separating RUQ from LUQ;
- right kidney (retroperitoneal); and
- right renal artery.

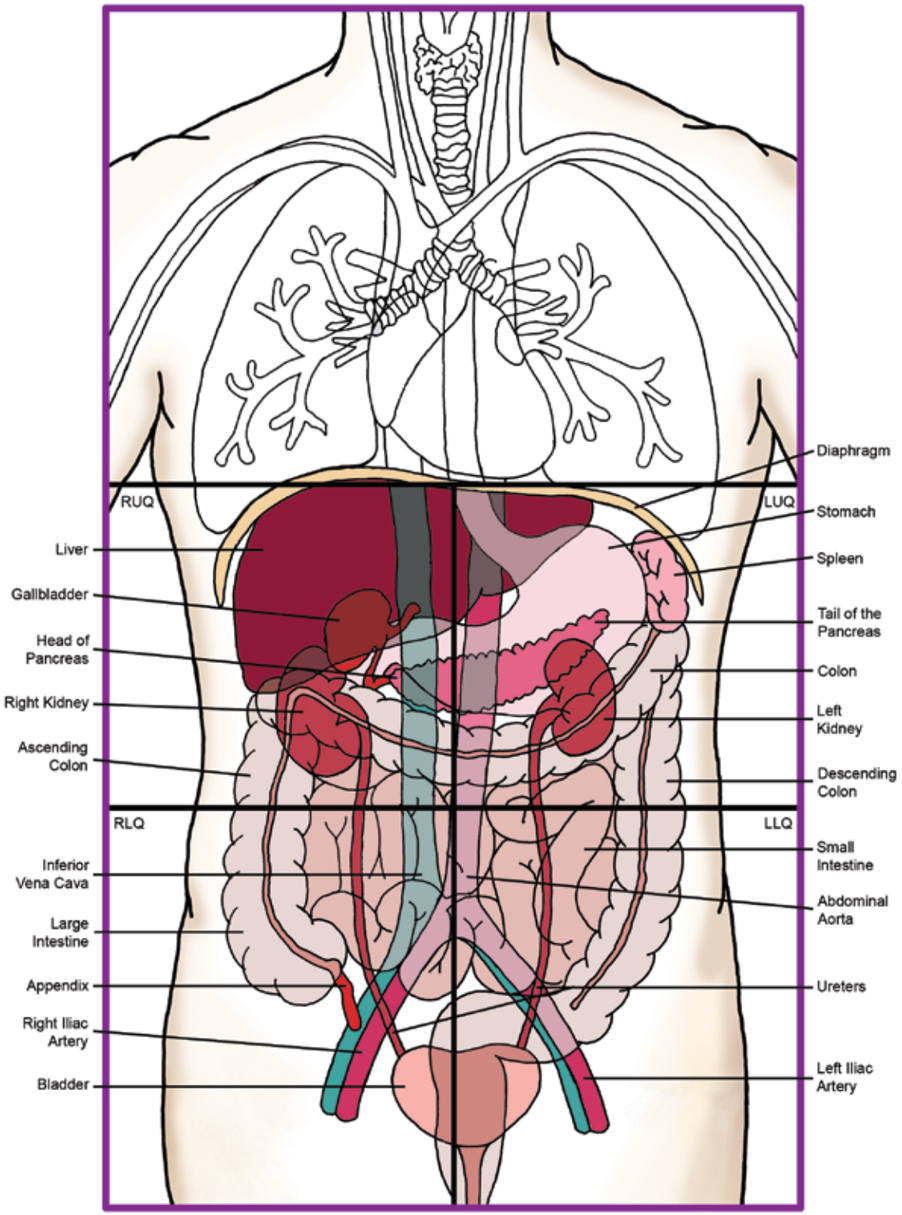


**Figure 9-1.** The abdominal organs. Abdominal quadrants are a common way to describe organ location.





### *Left Upper Quadrant*

The LUQ includes the following organs:

- stomach,
- spleen,
- tail of the pancreas (retroperitoneal),
- part of the colon (**splenic flexure** and portion of the **transverse colon**),
- a portion of the small intestine,
- abdominal aorta (along the line separating the RUQ from the LUQ),
- left kidney (retroperitoneal), and
- left renal artery.

### *Right Lower Quadrant*

The organs found in the RLQ are:

- part of the colon (ascending colon including **cecum**),
- appendix (attached to cecum),
- a portion of the small intestine,
- part of the bladder and uterus,
- right fallopian tube,
- right ovary, and
- right iliac artery.

### *Left Lower Quadrant*

The LLQ includes the following organs:

- a portion of the small intestine,
- part of the colon (descending and **sigmoid** colon),
- part of the bladder and uterus,
- left fallopian tube,
- left ovary, and
- left iliac artery

## Abdominal Organ Physiology

### *Liver*

The liver (Figure 9-2) stores about 10% of an individual's total blood volume; metabolizes carbohydrates, fat, and protein; stores vitamins and iron; forms various blood clotting factors; and detoxifies, excretes, and metabolizes many different drugs. The liver also forms bile, which breaks down fat for digestion and serves as a means for excreting certain waste products from the blood.

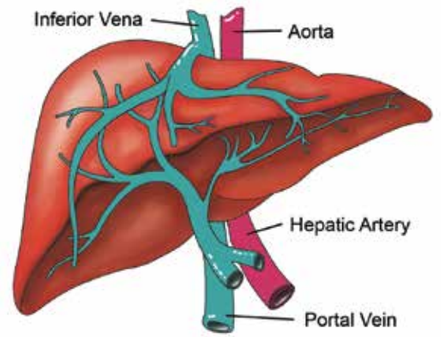


**Figure 9-2.** Liver anatomy.

### *Gallbladder*

The gallbladder (Figure 9-3) stores bile formed by the liver. It empties bile into the first part of the small intestine (duodenum) when an individual consumes a meal high in fat. If "stones" form in the gallbladder, they may obstruct the drainage system (bile duct) to the small intestine.

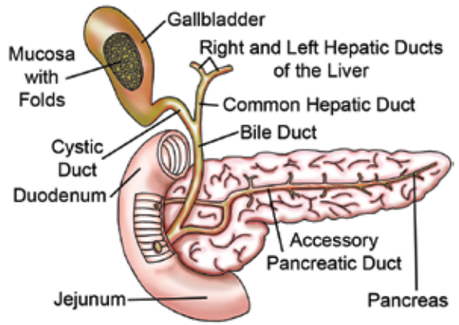


**Figure 9-3.** Pancreas and gallbladder anatomy.

### *Pancreas*

The pancreas (see Figure 9-3) produces and secretes digestive juices into the duodenum via the pancreatic duct. It also produces and secretes hormones (insulin and **glucagon**) into the blood that regulate blood sugar (glucose). Insulin promotes glucose entry into most cells of the body, decreasing blood glucose levels in the blood. Glucagon increases glucose release from the liver into the circulating body fluids, increasing blood glucose levels.

### *Small Intestine*

The small intestine (see Figure 9-1) absorbs carbohydrates, proteins, fats, electrolytes (sodium, chloride, bicarbonate, calcium, iron, potassium), and the water that accompanies them. Most of the water is absorbed in the colon (large intestine).

### *Colon*

The colon, or large intestine (see Figure 9-1), absorbs water and electrolytes (as much as 5–7 L per day) and stores fecal matter until it can be expelled.

### *Stomach*

The stomach (Figure 9-4) stores ingested food as it converts into a soupy mixture (chyme) and empties into the duodenum (first portion of the small intestine). It secretes digestive juices and enzymes. Most absorption occurs in the small intestine, but the stomach absorbs highly **lipid-soluble** substances, such as alcohol and some medications (eg, aspirin).

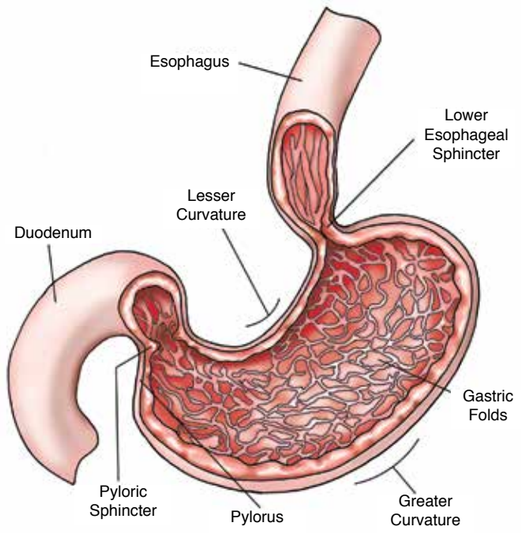


**Figure 9-4.** Stomach anatomy.

### *Spleen*

The spleen (Figure 9-5) is the lymphatic system organ that contains the largest amount of lymphatic tissue in the body. It stores red blood cells and platelets and removes those that are worn out or defective. The spleen carries out immune functions and contains cells involved in fighting infections. It is a highly vascular organ that may result in massive hemorrhage if injured.

**Warning:** Patients with infectious mononucleosis may have inflamed and enlarged spleens. Advise these patients to avoid contact sports for up to 4 weeks after diagnosis to prevent splenic rupture. Although ruptures are rare, they may cause internal bleeding. Refer to an MO.

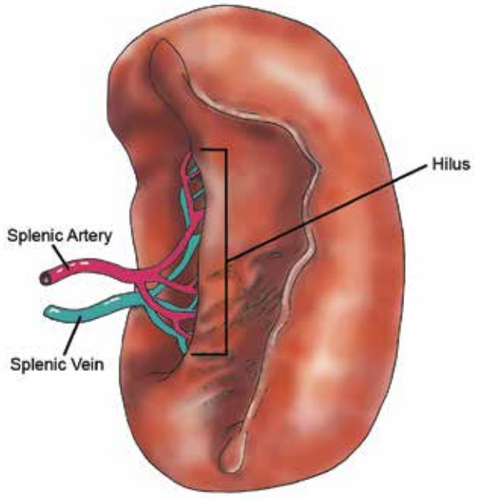


**Figure 9-5.** Spleen anatomy.

### *Kidneys*

The kidneys (Figure 9-6) excrete most of the end products of metabolism through blood filtration and urine formation. They regulate the water, electrolytes, and acid–base content of the blood.

### *Ovaries*

Ovaries are two almond-shaped female reproductive organs located on both sides of the pelvic cavity, next to the opening of the fallopian tubes (called the fimbria) (Figure 9-7). They attach to the uterus by the utero-ovarian ligament. Ovaries produce hormones (estrogen and progesterone) and eggs. An egg fertilized by a male spermatozoon develops sequentially into a zygote, embryo, fetus, and baby.





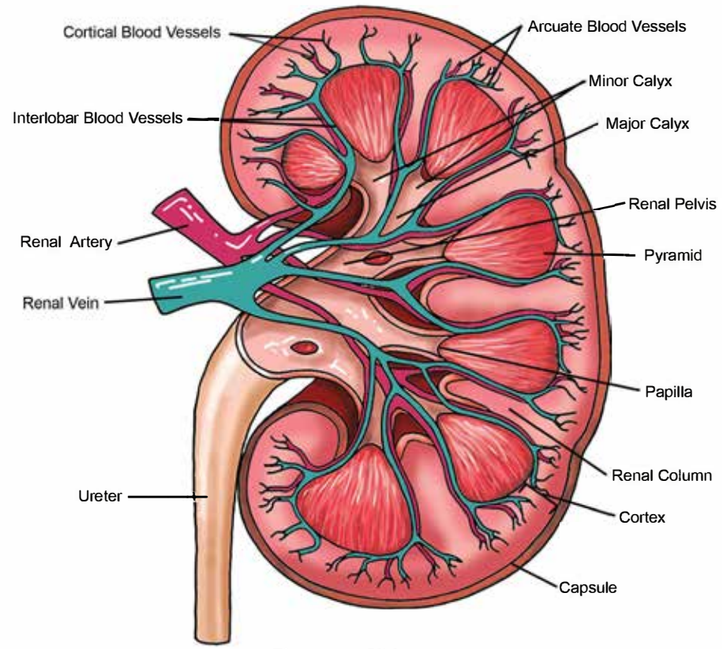


**Figure 9-6.** Kidney anatomy.

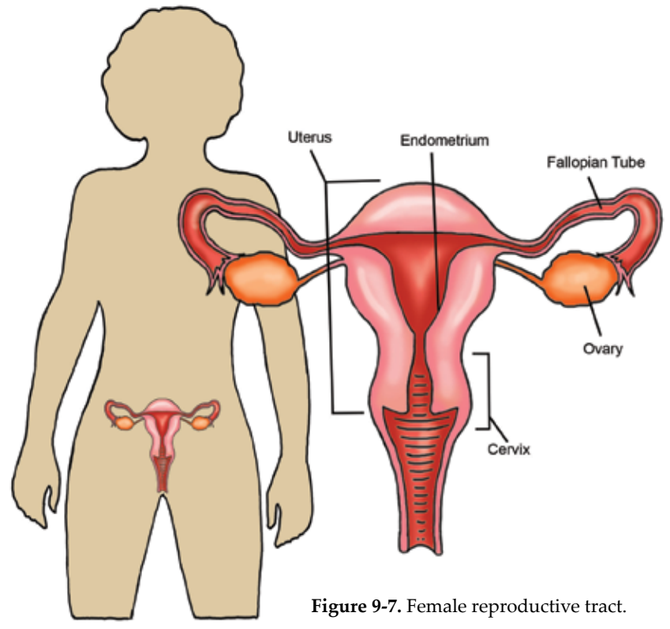


**Figure 9-7.** Female reproductive tract.

### *Fallopian Tubes*

The fallopian tubes are hollow, round tubes that lie in close proximity to the ovaries and extend to the uterus (see Figure 9-7). Fallopian tubes facilitate movement of the ovum (egg) from the ovaries to the uterus and facilitate movement of the spermatozoa from the uterus to the ovaries.

### *Uterus*

The uterus is a muscular, pear-shaped reproductive organ in the middle of the pelvis (between the sacrum and the pubis symphysis) (see Figure 9-7). The uterus provides a stable environment to nourish and grow an embryo (see Figure 9-7).

### Check on Learning

1. List the eight organs located in the left upper quadrant (LUQ).
2. The _____ absorbs water and electrolytes (as much as 5–7 L/day) and stores fecal matter until it is expelled.

## ABDOMINAL ASSESSMENT

All examinations begin with initiating SOAP (subjective, objective, assessment, and plan) note patient documentation on a Standard Form 600, Chronological Record of Medical Care (see Chapter 1, Sick Call and Medical Documentation). During the objective portion of the SOAP note, conduct a proper physical exam.

### Visual Inspection

Expose the patient from the xyphoid process to the symphysis pubis, making sure to keep the patient warm and comfortable. With the patient lying supine with arms at the sides, ask the patient to bend their knees, or support them with a pillow to help relax the abdominal muscles (Figure 9-8). Ask the patient to point to the site of any pain (remember to palpate that area last).

Begin assessing from the patient's right. First, inspect the patient's skin, noting the color (eg, pale, flushed, or yellow). Next, look for lesions. If present, describe their location, shape, size, and color (eg, scars, stretch marks, or rashes). Continue the assessment by examining the abdomen contour and symmetry. This may help identify any underlying issues. To make contour changes more obvious, have the patient take and hold a deep breath. Look for a flat or distended abdomen, bulges, masses, swelling, muscle spasms, visible peristalsis, or pulsations. The following are the basic abdomen variations seen on examination:

- flat—common in thin patients with good muscle tone;
- **navicular (scaphoid) abdomen**—a condition in which the anterior abdominal wall is sunken;
- distention or bulging—normal (eg, pregnancy or obesity) or abnormal (eg, infection or internal bleeding) distortion that may be caused by air, fluid, or tissue; and
- **asymmetrical distention** or protrusion—may be caused by a hernia, tumor, cyst, bowel obstruction, or enlargement of abdominal organs.

### Auscultation of Bowel Sounds

Once the visual inspection is complete, warm the stethoscope diaphragm then **auscultate** the patient (Figure 9-9). Listen to all four quadrants (RLQ, LLQ, RUQ, and LUQ). Do not touch the abdomen before completing auscultation, as palpation can alter **bowel sounds**. Note if sounds are present or absent. Remember that the stage of digestion affects their characteristics. Check and categorize bowel sounds as one of the following:

- hypoactive—quiet, slow, sluggish sounds; associated with an acute abdomen or constipation.
- active—frequent clicks and gurgles. Describe as "active" (5–35 times per minute). Do not describe as "normal."
- hyperactive—loud, prolonged gurgles normally associated with hunger. Increased bowel sounds may occur with **gastroenteritis** or early obstruction.
- absent—established only after 5 minutes of continuous listening in each quadrant (it is rare for a combat medic to auscultate the abdomen for this length of time). Auscultate all four quadrants to avoid missing sounds.
- vascular sounds—a bruit (pronounced "broo-ee") is a harsh, blowing sound heard with auscultation that results from turbulent blood flow through an artery. This could be caused by narrowing of an artery or weakening of the artery wall, as in the case of an aneurysm. If you think you hear any other sound besides bowel sounds, alert the medical officer (MO) immediately.





### *Palpation*

Perform palpation at the end of an abdominal examination. A patient with abdominal pain may experience abdominal wall muscle spasms during palpation in an effort to guard against pain. The patient may also attempt to block the examiner from assessing a painful area. Sometimes, during deep palpation of the abdomen, the patient experiences greater pain upon quick release of the examiner's hands than during the actual palpation. This is rebound tenderness and suggests inflammation of the parietal peritoneum. Potential causes of rebound tenderness include **perforated** viscera, such as a ruptured appendix or bowel.

> **Note:** A positive response during a check for rebound tenderness interferes with any subsequent examination.

If the patient is experiencing pain, have them point to the pain site. Palpate that area last. Palpate all quadrants using light, deep, or bimanual palpation (one hand atop the other), beginning with light palpation (Figure 9-10). Lightly depress the abdomen about 1 cm with your fingers to detect **guarding** and tenderness that may be caused by peritonitis. Deeply palpate by pressing into the abdominal wall with the distal half of your fingers. This assesses deeper structures within the abdomen. Use bimanual palpation if deep palpation is difficult because of obesity or muscular resistance. To perform this technique, place one hand atop the other (some examiners prefer this method with all patients).

The five steps of an abdominal physical exam are as follows:

1. Prepare and position the patient.
2. If the patient is experiencing any abdominal pain, have them point to the location of the pain.
3. Perform an inspection of the abdomen.
   a. Utilize the **DCAP-BTLS** acronym when performing a visual and physical inspection of the abdomen.
   b. Inspect the skin.
   c. Inspect contour and symmetry (have the patient take in and hold a deep breath).
4. Auscultate bowel sounds in all four abdominal quadrants. Auscultate the quadrant the patient identified as being painful last.

**Figure 9-8.** A combat medic flexing a patient's legs to relieve pain during an abdominal examination.

**Figure 9-9.** A combat medic auscultating abdominal quadrants during an abdominal exam.

**Figure 9-10.** A combat medic performing bimanual palpation of the patient's abdominal quadrants.

5. Palpate all four abdominal quadrants.
   a. Palpate the painful quadrant (as identified by the patient) last.
   b. Perform light and deep palpation.
   c. Feel for abdominal masses.
   d. Observe for rebound tenderness.
   e. Observe any guarding of the abdomen by the patient.

**Note:** In a field or combat environment, extensive examination is not warranted because it is urgent to move the patient to a treatment facility, where the examination will likely be repeated. However, do make a brief assessment, as the situation allows.

## RED FLAGS

When taking a patient history and performing an abdominal assessment, if any RED FLAG signs and symptoms present, refer the patient to an MO immediately. The following signs and symptoms are RED FLAGS:

- progressive, severe pain that persists without improvement over 6 hours;
- severe abdominal pain with guarding or rebound tenderness, especially in the RLQ;
- history of abdominal surgery within the past 6 months;
- abdominal pain with associated fever;
- abdominal pain with associated tachycardia;
- patient reporting blood in stool (black or tar-like stool);
- vomitus containing blood or having a coffee-ground appearance;
- abdominal pain with dehydration;
- abdominal pain in a pregnant patient; and
- abdominal pain in a female who is late having her menstrual period.

### Check on Learning

3. List 4 of the 10 abdominal assessment RED FLAGS that require immediate referral to an MO.
4. Name the condition in which the anterior abdominal wall is sunken.
5. Auscultate each abdominal quadrant for at least _____ minutes in each quadrant.
6. _____ is a harsh, blowing sound heard with auscultation that results from turbulent blood flow through an artery.
7. What type of palpation technique should you use if deep palpation is difficult because the patient is obese or very muscular?

## ABDOMINAL DISORDERS

### Abdominal Masses

Note the abdomen's consistency, mobility, and movement with respiration. Take care not to confuse normal abdominal structures for abdominal masses. Evaluate rebound tenderness at the end of the examination. Refer the patient to an MO if you detect any abdominal masses.

### Gastroenteritis

Gastrointestinal disorders are one major source of abdominal discomfort, and gastroenteritis is chief among these conditions. Gastroenteritis occurs when the stomach or intestines become inflamed. It is usually caused by infection (commonly viral), has rapid onset, and is self-limited to a few days. In severe cases, gastroenteritis is complicated by dehydration.

Gastroenteritis is commonly spread through contaminated food or water. Improper hand washing can spread bacteria or virus from person to person. Common signs and symptoms include:

- cramping,
- abdominal pain,
- nausea,
- vomiting,
- diarrhea, and
- fever ( ≥ 100.4 °F).

In serious cases, a physical examination may reveal a swollen abdomen.

Treatment of gastroenteritis is limited to treating the symptoms (no antibiotics). Use bismuth subsalicylate (eg, Pepto-Bismol [The Procter & Gamble Company, Cincinnati, OH] or Kaopectate [Chattem, Inc, Chattanooga, TN]) to help bind up and remove bowel contaminants. Antispasmodic medications, such as dicyclomine, in conjunction with bismuth subsalicylate, can alleviate cramping pain. The patient should avoid foods and beverages likely to upset the gastrointestinal tract (fried, fatty, greasy, and spicy foods; alcoholic beverages). A BRAT (bananas, rice, applesauce, and toast) diet may be recommended. Encourage increased liquid intake once the patient is able to tolerate oral intake.

**Note:** Bismuth subsalicylate may cause the stool to appear black and tarry and may be confused with a gastrointestinal bleed.

### Gastroesophageal Reflux Disease

Gastroesophageal reflux disease (GERD) occurs when pressure is greater in the stomach than in the lower esophagus, causing stomach contents, including destructive acidic gastric juices, to reflux into the esophagus. The lower esophageal sphincter (a band of smooth muscle tissue where the esophagus meets the stomach) normally prevents gastric contents from moving up the esophagus. It controls the gradient of air pressure in the lower esophagus relative to the air pressure in the stomach. Usually air pressure in the lower esophagus is greater than the pressure in the stomach, creating the tendency for stomach contents to remain in the stomach.

Diagnosis is usually made based on symptoms and the absence of findings that would suggest other causes. The most common symptom of GERD is a burning sensation, or heartburn, so named because of the proximity of the esophagus to the heart. GERD affects about 20% of adults, who report at least weekly episodes of heartburn, and up to 10% complain of daily symptoms. Patients with GERD may have a history of heartburn aggravated by meals, bending, or lying down. Patients may report relief after taking antacids.

**Note:** These symptoms could also be the result of a stomach ulcer, gallstones, or angina pectoris (chest pain due to coronary artery disease).

Physical examination is usually normal in uncomplicated cases. Examine the heart and lungs, as with other patients. Special diagnostic tests may be necessary. Although most patients have mild disease, up to 50% develop esophageal mucosal damage (**reflux esophagitis**) and a few develop more serious complications. Refer patients to an MO for diagnosis and treatment. Consult with an MO for previously diagnosed patients who require symptomatic treatment.

GERD is a lifelong disease, managed by lifestyle modifications. Recommendations include the following:

- avoid lying down within 3 hours of eating a meal,
- lose weight,
- quit smoking,
- avoid foods and beverages known to precipitate symptoms, and
- avoid activities known to precipitate symptoms.

Over-the-counter antacids usually provide rapid, though short-term, symptomatic relief. These antacids include aluminum hydroxide/magnesium hydroxide (eg, Maalox [Novartis Corporation, Parsippany, NJ]), aluminum hydroxide/magnesium hydroxide/simethicone (eg, Mylanta [McNeil Consumer Pharmaceuticals Co, Ft Washington, PA]), milk of magnesia, and the H2 receptor agonist, cimetidine (eg, Tagamet [GlaxoSmith-Kline, London, UK]). The over-the-counter version of Tagamet is half the dose strength of the prescription form. Prescription acid-blocking medications are typically required on a daily basis to minimize the severity and reduce the frequency of GERD symptoms.

### Peptic Ulcer Disease

Peptic ulcer disease (PUD) is a gastrointestinal disorder caused by a break in the mucosa (lining) of the stomach or first part of the small intestine (duodenum). It usually presents with pain or aching and burning in the middle upper abdomen (**dyspepsia**). PUD occurs more commonly in smokers and patients taking anti-inflammatory medications, such as ibuprofen or aspirin, for prolonged periods. Increased use of alcohol can aggravate PUD. *Helicobacter pylori* bacteria also cause PUD.

Before an ulcer develops, patients may experience dyspepsia for an extended period. Pain may or may not be associated with eating or drinking.

The physical examination of the abdomen will reveal tenderness to palpation in the middle upper abdomen (mid-epigastric area). A rectal examination may reveal blood in the stool and the patient may report black, tarry-looking stools (melena). A fecal occult blood test may reveal hidden blood in the stool. Refer PUD cases to an MO. Advise patients who smoke to quit. Avoid foods, alcoholic beverages, and medications that aggravate symptoms.

### Hepatitis

Another common gastrointestinal ailment is liver inflammation (hepatitis A, B, and C). A variety of agents, including viruses, bacteria, and physical or chemical agents (drugs and alcohol), cause hepatitis. Among soldiers, viral and alcoholic hepatitis are most common.

Signs and symptoms of hepatitis include:

- jaundice (yellowing of skin, nails, and sclera),
- anorexia (loss of appetite),
- nausea and vomiting,
- **malaise**, and
- fever.

Physical examination of the abdomen will reveal pain when palpating the liver, which may be enlarged and tender.

**Note:** Some patients may state they have chronic hepatitis, which is mild inflammation from the same causes, but usually without the obvious signs and symptoms listed above.

**Note:** Patients with hepatitis may experience serious complications. Refer them to an MO.

### Appendicitis

Another common cause for gastrointestinal complaint occurs when the appendix is obstructed by a fecalith (hardened feces), inflammation, intestinal worms, foreign body, swollen lymph nodes, or neoplasm (cancerous process) (Figure 9-11). The obstruction leads to increased pressure within the appendix, congestion of venous blood, infection, and thrombosis (clotting) of blood within the appendix wall. If untreated, gangrene and perforation can develop within 36 hours.

Signs and symptoms of appendicitis include:

- pain (early in the course) around the navel region,
- pain that migrates to the RLQ,
- loss of appetite,
- nausea,
- vomiting,
- extreme constipation,
- low-grade fever, and
- elevated white blood cell count.

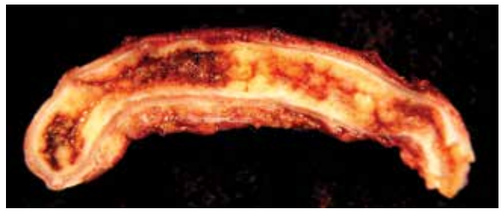

**Figure 9-11.** Acute appendicitis in a 10-year-old boy. This patient's appendix was removed before it could rupture and cause further complications. Photograph by Ed Uthman. Reproduced from Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Acute_Appendicitis.jpg.

Physical examination of the abdomen will reveal pain that localizes to the RLQ, frequently with guarding and rebound tenderness. Refer appendicitis patients to an MO. The appendix typically is surgically removed (appendectomy).

### Constipation

Constipation is a common abdominal complaint caused most frequently in the service member population by inadequate fluid and dietary fiber intake. Normal frequency of bowel movements varies. "Normal" is defined as 3 per week by some and 12 per week by others. The following patient complaints are common:

- cannot move bowels when they feel the urge to do so;
- cramping pain due to peristalsis;
- tearing pain or straining during bowel movements that produce firm, hard stools;
- abdominal pain (uncommon unless the constipation is severe); and
- slight blood noticed on the toilet tissue after passing a hard stool.

Physical examination of the abdomen is usually unremarkable unless there is severe constipation, in which case the examiner may palpate a firm mass in the LLQ.

To reduce the likelihood of future constipation, advise patients to increase fluid and dietary fiber intake (eg, whole grain cereals) and encourage daily exercise. Fiber supplements like psyllium (eg, Metamucil [Procter & Gamble Company, Cincinnati, OH]), methylcellulose (eg, Citrucel [GlaxoSmithKline, London, UK]), or polycarbophil (eg, FiberCon [Pfizer Inc, New York, NY]) taken on a daily basis will help the patient maintain regular bowel habits. Stool softeners, such as docusate sodium (eg, Colace [Avrio Health LP, Stamford CT]) taken by mouth for several days, and short-term use of a stimulant laxative such as bisacodyl (eg, Dulcolax [Boehringer Ingelheim Pharmaceuticals, Inc, Ridgefield, CT]) are beneficial. Refer patients with persistent constipation or significant abdominal pain or discomfort to an MO.





### Diarrhea

Diarrhea is the frequent passage of unformed, watery stool. It can range in severity from an acute, self-limiting episode to a life-threatening illness. It is helpful to distinguish acute from chronic diarrheas because treatments differ.

### Acute Diarrhea

Viruses, bacteria, bacterial toxins, and parasites commonly cause acute diarrhea. Infection frequently results from consuming unpurified water or improperly stored or prepared food. Noninfectious causes include medications (such as antibiotics) and food allergies. Signs and symptoms of diarrhea (infectious or noninfectious) include the following:

- acute onset;
- persists for up to 3 weeks;
- frequent loose or watery stools that may contain blood, mucus, or pus;
- fever;
- abdominal pain, tenderness, cramping;
- history of travel outside the continental United States (because of the possibility of consuming water from an unapproved source);
- history of field exercise;
- orthostatic hypotension (tilts); and
- weight loss (especially if symptoms are chronic).

**Note:** Orthostatic hypotension (tilts) is a drop in blood pressure when a patient changes position from lying to sitting (≥10 mm Hg after 1–3 min) or from lying to standing (≥20 mm Hg after 1–3 min). A patient feeling dizzy or lightheaded upon standing may indicate a fluid volume deficit (dehydration).

**Note:** Do not give antidiarrheal medication if the patient is experiencing fever or bloody stool.

Some viral illnesses that present with diarrhea also have head, eyes, ears, nose, and throat (HEENT) signs and symptoms. Conduct a physical HEENT examination. Physical examination of the abdomen will reveal tenderness to palpation. Treatment includes fluid resuscitation (intravenous or oral fluid and electrolyte replacement) and antidiarrheal medications. For simple or minimal diarrhea, treat with loperamide (eg, Imodium [McNeil Consumer Pharmaceuticals Co, Ft Washington, PA]) or bismuth subsalicylate (eg, Pepto-Bismol or Kaopectate [Chattem, Inc, Chattanooga, TN]).

Antibiotic therapy is recommended for moderate to severe bacterial diarrhea with fever or with bloody stools (eg, "traveler's diarrhea" when deployed). Consult with an MO. Put the patient on a liquid diet at first, and progress to a bland diet (avoiding caffeine, dairy products, and raw fruits and vegetables). The patient should only consume food and water from approved sources. Refer the patient to an MO if the diarrhea does not resolve with the above treatment.

### Chronic Diarrhea

Chronic diarrhea persists longer than 3 weeks. It may be bacterial, viral, or parasitic. Diarrhea not caused by infections could be attributed to a number of motility, secretory, inflammatory, or **malabsorption** disorders. Some chronic infections, systemic conditions, or medications may cause chronic diarrhea. Sometimes the cause of chronic diarrhea remains unknown. Refer all patients with chronic diarrhea to an MO for diagnosis and treatment.

### Hemorrhoids

Hemorrhoids are varicose (blood engorged) veins in the lower rectum or anus that are caused by straining during a bowel movement, constipation, prolonged sitting, pregnancy, and a diet low in fiber. Signs and symptoms of hemorrhoids include:

- itching,
- irritation,
- pain with bowel movement, and
- blood in the toilet or on toilet paper (typically bright red).

Ensure vital signs do not indicate the presence of severe hemorrhaging. Physical examination will reveal an obvious external hemorrhoid, or internal hemorrhoids on rectum inspection. If there is no obvious source of bleeding, refer the patient to an MO for further examination. Otherwise, encourage the patient to consume a

diet high in fiber (vegetables, fruits, grains) and increase water intake to promote soft, formed, regular bowel movements. Soaking in a sitz bath for 15 minutes 3 times per day reduces pain and swelling. Medications may include daily stool softener (eg, docusate sodium) by mouth and a bulk-forming laxative. Pain can be controlled with nonsteroidal anti-inflammatory drugs (eg, ibuprofen) or other analgesics (eg, acetaminophen), and topical anesthetics (eg, dibucaine). Patients with hemorrhoids should avoid straining (eg, performing sit-ups or heavy-lifting tasks).

**Female Reproductive Tract Disorders**

Since female reproductive organs are located in the RLQ and LLQ (see Figure 9-7), be aware that some abdominal complaints may be related to reproductive tract disorders.

***Premenstrual Syndrome***

Premenstrual syndrome has a variety of symptoms, but abdominal pain is common. Use nonsteroidal anti-inflammatory drugs (eg, ibuprofen) or other over-the-counter medications specifically for premenstrual syndrome to alleviate pain.

***Endometriosis***

Another common disorder is endometriosis, which occurs when endometrial cells that normally line the uterus grow outside of the uterus. The most common signs and symptoms are:

- severe (even debilitating) premenstrual cramps,
- very long or heavy periods,
- migraines, and
- lower back pain.

Several symptoms are similar to those of other abdominal disorders. They include:

- nausea,
- diarrhea,
- constipation,
- bloody urine,
- rectal bleeding, and
- bloating.

Refer to an MO for diagnosis (imaging or lab tests) and treatment.

***Pelvic Inflammatory Disease***

Sexually transmitted bacteria that spread from the vagina to other reproductive organs typically cause pelvic inflammatory disease (PID). Symptoms may include:

- lower abdominal pain,
- irregular vaginal discharge,
- abnormal uterine bleeding,
- painful urination, and
- fever.

PID may be asymptomatic in some cases. Prevention includes practicing safe sex and treating sexually transmitted infections early. Refer to an MO if you suspect PID.

***Uterine Fibroids***

Uterine fibroids are noncancerous growths in the uterus. Symptoms may include:

- pelvic pain,
- heavy bleeding,
- long menstrual periods,
- frequent urination,
- difficulty emptying the bladder, and
- constipation.

Some cases are asymptomatic. If suspicious of uterine fibroids, refer to an MO for diagnosis and treatment.

***Ectopic Pregnancy***

An ectopic pregnancy is any pregnancy where the fertilized ovum implants outside of the uterus. The ectopic pregnancy can occur in the peritoneum; however, it mostly occurs in the fallopian tubes. Ectopic pregnancy signs and symptoms include abdominal pain, a delay in the menstrual cycle, and vaginal bleeding (usually a spotting type of bleeding). An ectopic pregnancy may start as a dull pain that worsens into sharp, stabbing pain as the fallopian tube stretches. If the tube ruptures, excruciating pain will be present throughout the abdomen.[1]





## URINARY DISORDERS

**Cystitis**

Cystitis (also known as a urinary tract infection or UTI) is caused by an infection of the urinary bladder. It is more common in women than in men and often occurs after sexual intercourse. It is also more common in soldiers in a field environment because of dehydration (infrequent urination prevents contaminant washout). Signs and symptoms of cystitis include:

- painful urination (dysuria),
- frequent urination,
- urinary urgency,
- discomfort in the suprapubic area, and
- obvious blood in the urine (gross hematuria).

Physical examination is usually unremarkable, with the possible exception of tenderness to palpation of the suprapubic area. Urinalysis commonly reveals the presence of blood and bacteria. If treatment is delayed, pathogens can migrate up the ureters and cause a kidney infection.

Refer all patients with cystitis to an MO for antibiotic therapy. Patients can benefit from increasing oral fluid intake. To prevent recurrence, encourage patients to urinate after sexual intercourse, which will flush any bacteria introduced into the urethra. Advise females to wipe from front to back after urinating to prevent wiping bacteria toward the urethra.

**Pyelonephritis**

Delayed treatment for cystitis can allow the infection to migrate to the kidneys, causing **pyelonephritis** (kidney infection). It may occur in males, though it is uncommon.

Signs and symptoms of pyelonephritis include the following:

- back pain in the region of the affected kidney (flank pain),
- **costovertebral angle** tenderness that is elicited when the examiner taps a fist over the location of the patient's kidney,
- nausea and vomiting,
- fever with tachycardia,
- shaking (tremors) and chills,
- pain with urination (dysuria),
- frequent urination (polyuria), and
- urine that appears bloody (gross hematuria).

Refer any patient with a suspected kidney infection to an MO. Patients usually need antibiotic therapy and sometimes must be hospitalized.

**Nephrolithiasis**

Nephrolithiasis (kidney stones) occurs three times more often in men than women and tends to occur more often during hot, summer months. Kidney stones (Figure 9-12) are common in hot, desert environments.

**Figure 9-12.** Electron micrograph of the surface of a kidney stone. Photograph by Kempf, EK. Reproduced from Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Surface_of_a_kidney_stone.jpg

The patient usually presents with obvious cramping and intermittent pain, and will often be restless and constantly moving. Constant movement is unique and contrasts with those patients presenting with surgical problems such as peritonitis or appendicitis. The pain is typically severe and colicky (comes and goes or varies in intensity in a rhythmic nature) and usually develops suddenly, sometimes awakening the patient from sleep. Pain onset is usually in the flank and migrates as the stone makes its way through the urinary tract. Pain may be referred to the testicles. Other signs and symptoms include gross hematuria, fever (common), and tenderness to palpation near the stone. Always refer the patient to an MO for treatment. A narcotic pain medication, antibiotics, and close observation are required.

Most kidney stones will pass through the urinary tract on their own. Provide the patient with increased fluid (sometimes intravenously) and appropriate pain control medications until the stone passes. Prevention centers on ensuring adequate fluid intake, especially in hot climates.

**Check on Learning**

8. What is the treatment consideration for acute diarrhea?
9. What information from the patient indicates a possible hemorrhoid problem?
10. Explain how cystitis (urinary tract infection) can develop into pyelonephritis (kidney infection).
11. Why would urinating after sexual intercourse help reduce the chances of developing cystitis?
12. How does a patient experiencing nephrolithiasis (kidney stones) present differently than patients with other abdominal problems, such as appendicitis?

## SUMMARY

Combat medics may assess and treat patients with abdominal complaints ranging from minor illnesses to immediate life threats. The ability to identify RED FLAGS, requiring immediate referral to an MO, could mean the difference between life and death.

## KEY TERMS AND ACRONYMS

**Asymmetrical distention.** Uneven distention.
**Auscultate.** To examine by listening to sounds emitting from the body.
**Bowel sounds.** The normal sounds associated with movement of the intestinal tract.
**Cecum.** A blind pouch or cul-de-sac that forms the first portion of the large intestine, located below the entrance of the ileum at the ileocecal valve.
**Costovertebral angle.** An angle at the base of the rib cage (12th rib) and the top of the lumbar vertebrae, in the area of the kidneys.
**DCAP-BTLS.** Deformities, contusions, abrasions, punctures, burns, tenderness, lacerations, and swelling.
**Duodenum.** The first part of the small intestine, between the pylorus and the jejunum.
**Dyspepsia.** Upper abdominal discomfort, often chronic or persistent, generically referred to as indigestion.
**Gastroenteritis.** Inflammation of the stomach and intestinal tract.
**Glucagon.** A hormone secreted by the pancreas that causes an increase in blood glucose levels by stimulating the liver to release stored glucose, known as glycogen.
**Guarding.** The body's defense method to prevent movement of an injured part.
**Ilium.** The last (third) part of the small intestine, extending from the jejunum to the opening of the large intestine
**Jejunum.** The second portion of the small intestine, extending from the duodenum to the ileum.
**Lipid-soluble.** The characteristic of dissolving in fats.
**Malabsorption.** Inadequate absorption of nutrients in the small intestines.
**Malaise.** A subjective feeling of discomfort, fatigue, and weakness.
**Mesentery.** The peritoneal fold that encircles the small intestine and connects to the posterior abdominal wall.
**Navicular (scaphoid) abdomen.** A condition in which the anterior abdominal wall is sunken, having a concave rather than a convex contour. Also called scaphoid abdomen.
**Parietal peritoneum.** The serous peritoneal membrane that lines the abdominal cavity.
**Perforated.** Pierced or punctured.
**Peritoneum.** The serous membrane lining the abdominal cavity and reflecting over the viscera.
**Pyelonephritis.** Infection of the kidneys, which usually results from a migrating bladder infection (cystitis).
**Reflux esophagitis.** Inflammation of the esophagus due to acid reflux.
**Retroperitoneal.** Behind and outside the peritoneal cavity.
**Sigmoid.** An "s"shape. The sigmoid colon bends medially at the left iliac crest.
**Splenic flexure.** The junction of transverse and descending colon. It bends on the left side, near the spleen.
**Transverse colon.** The middle part of the large intestine that extends from right to left below the stomach.
**Visceral peritoneum.** The serous peritoneal membrane that lines the organs in the abdominal cavity.





## CHECK ON LEARNING ANSWERS

1. List the eight organs located in the left upper quadrant (LUQ).

   *Stomach, spleen, tail of the pancreas (retroperitoneal), part of the colon (splenic flexure and portion of the transverse colon), a portion of the small intestine, abdominal aorta (along the line separating the RUQ from the LUQ), left kidney (retroperitoneal), and left renal artery.*

2. The _____ absorbs water and electrolytes (as much as 5–7 L/day) and stores fecal matter until it is expelled.

   *Colon (large intestine).*

3. List 4 of the 10 abdominal assessment RED FLAGS that require immediate referral to an MO.

   *Any four of the following:*
   - *Progressive, severe pain that persists without improvement for more than 6 hours.*
   - *Severe abdominal pain with guarding or rebound tenderness, especially in the RLQ.*
   - *History of abdominal surgery within the past 6 months.*
   - *Abdominal pain with associated fever.*
   - *Abdominal pain with associated tachycardia.*
   - *Patient reporting blood in stool, black or tar-like stool.*
   - *Emesis (vomitus) containing blood or having a coffee-ground appearance.*
   - *Abdominal pain with dehydration.*
   - *Abdominal pain in a pregnant patient.*
   - *Abdominal pain in a female who is late having her menstrual period.*

4. Name the condition in which the anterior abdominal wall is sunken.

   *Navicular abdomen (scaphoid abdomen).*

5. Auscultate each abdominal quadrant for at least _____ minutes in each quadrant.

   *Five.*

6. _____ is a harsh, blowing sound heard with auscultation that results from turbulent blood flow through an artery.

   *Bruit.*

7. What type of palpation technique should you use if deep palpation is difficult because the patient is obese or very muscular?

   *Bimanual palpation.*

8. What is the treatment consideration for acute diarrhea?

   *Antibiotics; bland diet; and avoidance of caffeine, dairy products, raw fruits, and raw vegetables.*

9. What information provided by the patient indicates a possible hemorrhoid problem?

   *Itching, irritation, pain with bowel movements, and blood on toilet paper or in toilet.*

10. Explain how cystitis (urinary tract infection) can develop into pyelonephritis (kidney infection).

    *Delayed treatment for cystitis (UTI) can result in the infection migrating up into the kidneys.*

11. Why would urinating after sexual intercourse help reduce the chance of developing cystitis?

    *It will flush any bacteria that was introduced into the urethra.*

12. How does a patient experiencing nephrolithiasis (kidney stones) present differently than patients with other abdominal problems, such as appendicitis?

    *Patients with nephrolithiasis will be restless and constantly moving; patients with medical conditions such as appendicitis will not want to move at all.*

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