

Chapter 19, Gastrointestinal and Urologic Emergencies

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1. Introduction to Gastrointestinal and Urologic Emergencies

- This chapter covers **gastrointestinal and urologic emergencies** for EMTs [1].
- It is important to understand the anatomy and physiology of these systems [2].
- EMTs will assess and manage patients with various abdominal complaints [3].
 - These complaints include **abdominal pain**, hypoglycemia, and hyperglycemia [3].
 - They also include shock related to acute or chronic gastrointestinal disorders [3].
 - Hemorrhage, peritonitis, and renal system complications are also covered [3].
- You do not need to determine the exact cause of abdominal pain [7].
- Recognize **life-threatening problems** and act quickly [8].
- Rapid assessment and emotional support are needed for anxious patients in pain [9].

2. Anatomy and Physiology of the Abdominal Cavity

- The abdominal cavity holds solid and hollow organs [9].

- These organs belong to three systems: gastrointestinal, genital, and urinary [10].
- **Solid organ injury** can cause shock and bleeding [11].
- If a **hollow organ perforates**, contents leak and contaminate the abdominal cavity [12].

System	Solid Organs	Hollow Organs
Gastrointestinal	Liver, Pancreas, Spleen [18]	Stomach, Gallbladder, Small Intestines, Colon [15]
Genital	Testicles, Ovaries [28]	Epididymis, Vas deferentia, Seminal vesicles, Prostate gland, Penis, Fallopian tubes, Uterus, Cervix, Vagina [28]
Urinary	Kidneys [31]	Ureters, Bladder, Urethra [31]

- The gastrointestinal system is for digestion [14].
- Digestion starts in the mouth [15].
- The stomach breaks down food with gastric juices [15].
- The liver helps digestion by secreting bile [17].
- It filters toxic substances and produces blood clotting factors [18].
- The gallbladder stores bile [19].
- Food goes to the small intestines with three sections [20].
 - The duodenum mixes digestive juices from the pancreas and liver [21].
 - The pancreas secretes enzymes for starches, fats, and proteins [22].
 - The jejunum absorbs digestive products [23].
 - The ileum absorbs later nutrients and bile acids [25].
- The colon (large intestines) absorbs water and forms stool [26].
- The spleen is in the abdomen but has no digestive function [27].
- The abdominal space also contains reproductive organs [27].
 - Male organs include testicles and penis [28].
 - Female organs include ovaries and uterus [29].
- The urinary system controls waste discharge filtered by the kidneys [30].
- There are two kidneys, one on each side [32].

- Ureters connect kidneys to the bladder [33].
- The urinary bladder is behind the pubic bone [34].
- The bladder empties through the urethra [34].
- Adults normally form 1.5 to 2 liters of urine daily [35].

3. Pathophysiology of Abdominal Conditions

- The peritoneum is a membrane lining the abdominal cavity and covering organs [38].
- The parietal peritoneum lines the cavity walls [40].
- The visceral peritoneum covers the organs [40].
- Foreign material like blood or pus irritates the peritoneum [41].
- This irritation causes **peritonitis** [41].
- **Acute abdomen** is sudden abdominal pain [42].
- It often needs medical attention [43].
- Peritonitis can cause **ileus**, paralysis of intestinal contractions [43].
- Ileus leads to retained gas and feces, causing distension [43].
- The stomach empties by vomiting [43].
- Diverticulitis is inflammation of small pockets in muscle walls [44].
- Cholecystitis is gallbladder inflammation [44].
- Acute appendicitis is inflammation of the appendix [44].

Cause of Acute Abdomen	Signs and Symptoms
Ulcers [49]	Gnawing stomach pain, nausea, vomiting, belching, heartburn [50]
Gallstones [52]	Severe pain in upper right or mid-abdomen, nausea, vomiting, indigestion [54]
Pancreatitis [55]	Severe pain in upper quadrants radiating to back, nausea, vomiting, distension [56]

Appendicitis [58]	Initial dull pain near naval, later radiating to right lower quadrant, nausea [59]
GI Hemorrhage [63]	Vomiting blood (upper GI), bright red stools (lower GI) [65]

- The parietal peritoneum has nerves like skin nerves [46].
 - This helps identify localized pain [46].
- The visceral peritoneum is supplied by the autonomic nervous system [47].
 - These nerves are less able to localize pain [47].
- **Referred pain** results from nervous system connections [48].
- Common causes of acute abdomen include ulcers [49].
 - Ulcers are erosion of the protective lining [49].
 - Most are caused by infection or NSAID use [50].
 - Complications include hematemesis, melena, or peritonitis [51].
- Gallstones can block the gallbladder outlet [52].
 - This can cause gallbladder inflammation [53].
- Pancreatitis can be caused by gallstones or alcohol abuse [55].
 - Complications include sepsis and hemorrhage [57].
- Appendicitis is inflammation or infection of the appendix [58].
 - Signs include dull umbilical pain radiating to the right lower quadrant [59].
 - Nausea, vomiting, fever, and chills may be present [60].
 - Rebound tenderness can occur [61].
 - Complications include abscesses, peritonitis, or shock [62].
- **Gastrointestinal hemorrhage** is a symptom of other diseases [63].
 - It can be acute or chronic [63].
 - It occurs in the upper or lower GI tract [63].
 - Upper causes include esophageal varices or Mallory-Weiss tear [64].
 - Lower causes include inflammation, diverticulitis, cancer, or hemorrhoids [64].
- Esophagitis is inflammation of the esophagus lining [66].
 - GERD is a common cause [67].
 - Symptoms include pain swallowing and heartburn [67].
- Esophageal varices are increased pressure in blood vessels near the

esophagus [68].

- This is often due to liver failure [68].
- Alcohol or viral hepatitis are common causes [69].
- Patients may show signs of liver disease [70].
- Rupture is sudden with vomiting bright red blood, hypotension, and shock signs [71].
- Complication is significant blood loss [72].
- Mallory-Weiss syndrome is a tear at the esophagus-stomach junction [73].
 - Violent coughing or vomiting is a cause [73].
 - Symptoms include shock, upper abdominal pain, hematemesis, and melena [73].
- Gastroenteritis is infection with diarrhea, nausea, and vomiting [73].
 - Non-infectious conditions can also cause it [73].
 - Symptoms include diarrhea, cramping, nausea, vomiting, and fever [73].
 - Complications include dehydration and shock [73].
- Diverticulitis is due to a lack of fiber causing hard stools [74].
 - This increases pressure and causes bulges in the colon walls [75].
 - Fecal matter gets caught, leading to inflammation and infection [76].
 - Pain is often in the left lower quadrant [77].
 - Complications include perforation and shock [78].
- Hemorrhoids are swollen blood vessels around the rectum [79].
 - Increased pressure in the rectum is a common cause [80].
 - Signs are painless, bright red bleeding during defecation [81].

4. Urinary System Emergencies

- **Cystitis** is bladder inflammation, often a UTI [83].
- Bacterial infection is a common cause [84].
- Symptoms include midline lower abdominal pain and blood in the urine [85].
- Urgency, frequency, pressure, and pain around the bladder occur [85].
- Complications include kidney infections [85].
- The kidneys maintain homeostasis [87].
- **Uremia** results when kidneys fail [87].
- Kidney stones can cause blockages [88].

- **Acute kidney failure** is a sudden decrease in function [89].
 - Causes include hemorrhage, dehydration, trauma, and shock [89].
 - Sepsis, heart failure, medications, and drug abuse can cause it [90].
 - Kidney stones are also a cause [90].
 - It may be reversible with prompt treatment [90].
- **Chronic kidney failure** is progressive and irreversible damage [91].
 - Common causes are diabetes and hypertension [92].
 - Symptoms include lethargy, nausea, headaches, and cramps [93].
 - Anemia, seizures, and coma occur later [93].
 - Dialysis is eventually required [93].
 - These patients have an increased risk of heart failure and cardiac arrest [94].
- For end-stage renal disease, **dialysis** is the definitive treatment [131].
- Dialysis filters blood and removes toxins [132].
- Missing treatment can lead to weakness and pulmonary edema [133].
- Dialysis machines function like normal kidneys [135].
- Patients undergoing long-term hemodialysis have a shunt connecting a vein and artery [135].
- This shunt allows blood to flow to the dialysis machine [136].
- Peritoneal dialysis infuses fluid into the abdominal cavity [137].
 - The fluid stays for one to two hours [138].
 - It carries a high risk of peritonitis [138].
- Adverse effects of dialysis include hypotension and dysrhythmias [139].
 - Chest pain, muscle cramps, nausea, and vomiting can occur [139].
 - Hemorrhage from the access site is possible [139].
 - Infection can occur at the access site [140].
- Management of dialysis patients includes ABCs [140].
 - Provide high flow oxygen if needed [140].
 - Manage bleeding from the access site [140].
 - Position the patient sitting up for pulmonary edema or supine for shock [140].
 - Prompt transport is important [140].
- Dialysis patients may have urinary catheters [141].

- Catheters can be a site of infection [141].

5. Other Abdominal Emergencies

- **Gynecologic problems** are a common cause of acute abdominal pain [95].
- Lower quadrant pain may be related to the ovaries, fallopian tubes, or uterus [97].
- The aorta lies behind the peritoneum [99].
- Weak areas can form an **abdominal aortic aneurysm (AAA)** [99].

Condition	Description	Signs/Symptoms (General)	Signs of Strangulation
Abdominal Aortic Aneurysm (AAA) [99]	Weak area in the aorta behind the peritoneum [99]	Difficulty detecting, tearing back pain [100]	Massive hemorrhage if tears or ruptures [102]
Hernia [103]	Protrusion of organ/tissue through a hole [103]	May not have a noticeable mass [106]	No longer reducible, pain, discoloration [109]

- AAA is difficult to detect [100].
- Signs can include back pain with a tearing sensation [101].
- Use extreme caution when assessing for AAA [101].
- If an aneurysm tears or ruptures, massive hemorrhage can occur [102].
- A **hernia** is a protrusion of an organ or tissue [103].
- It goes through a hole or opening into another body cavity [104].
- Causes include congenital defects or weak areas like the groin [105].
- Reducible hernias can be pushed back and pose little risk [107].
- **Strangulation** is a serious injury [108].
- Blood supply is compromised by compressed tissues [108].
- Signs include a mass that is no longer reducible [109].
- Pain and tenderness at the hernia site occur [110].
- Red or blue skin discoloration over the hernia indicates strangulation [110].

6. Patient Assessment for Abdominal Emergencies

- Patient assessment starts with scene size-up [112].
- Use standard precautions [112].
- Determine the mechanism of injury or nature of illness [113].
- Acute abdomen can result from trauma [113].
- Develop suspicion for life threats based on assessment [113].
- Primary assessment's priority is to identify and treat life threats [114].
- Form a general impression [115].
- Assess ABCs and Ds [115].
 - Airway and breathing may be shallow due to pain [115].
 - Assess for major bleeding during circulation assessment [116].
 - Ask about blood in vomit or stools [116].
 - Pulse rate and skin condition indicate shock [117].
 - Check pulses in both feet [117].
 - Different pulse strengths may indicate aortic dissection [118].
- Immediate transport is needed for signs of significant illness [119].
- Take a SAMPLE history [120].
 - Ask about nausea, vomiting, and bowel changes [120].
 - Ask about urination, weight loss, or belching [120].
 - Ask about pain, other symptoms, or chest pain [120].
- Secondary assessment includes patient positioning [121].
 - Positioning may give clues about the illness [121].
- The physical exam involves assessing the abdomen [121].
 - A normal abdomen is soft and not tender [121].
 - Pain and tenderness are common symptoms [122].
 - Localized pain can indicate the problem [122].
 - Abdominal muscles may be rigid (guarding) [123].
- Take vital signs [124].
 - High respiratory rate with normal pulse/BP may mean improper ventilation [125].
 - High respiratory rate and pulse with shock signs may indicate septic or hypovolemic shock [126].

- Avoid blood pressure in an arm with a dialysis shunt [126].
- Frequent reassessments are important [127].
 - Assess interventions like shock treatment [127].
 - Provide emotional support [127].
 - Transport in a comfortable position [127].
- Consider advanced life support [128].
- Communication and documentation are important [128].

7. Emergency Care and Management

- You cannot treat the causes of pain, but you can provide comfort [128].
- Lessen the effects of shock [128].
- Treat for shock even without obvious signs [128].
- Position vomiting patients to maintain their airway [129].
- Contain vomit to prevent infectious disease spread [129].
 - Use biohazard bags [129].
 - Wear gloves, eye protection, gown, and mask [129].
- Clean the ambulance and equipment after patient release [130].
- Wash your hands even after wearing gloves [130].
- Provide low flow oxygen [130].
 - This may decrease nausea and anxiety [130].

8. Review and Key Concepts

- Q: The blank lies in the retroperitoneal space.
- A: The pancreas, kidneys, and ovaries [143].
- Q: Which of the following is not a solid organ?
- A: The gallbladder [145].
- Q: A 34 year old woman with a recent history of pelvic inflammatory disease presents with this acute, severe abdominal pain. Her abdomen is distended and diffusely tender to palpate. Based on your findings thus far, you should suspect:
- A: Peritonitis [148].
- Q: Most patients with an acute abdomen present with tachycardia. Which of the following signs and symptoms would you be least likely to find within a

patient with acute abdomen?

- A: Non-soft, non-distended abdomen [\[152\]](#).
- Q: A common condition, and persons experiencing a lack of appetite is called:
- A: Anorexia [\[152\]](#).
- Q: A medical term for inflammation in the urinary bladder:
- A: Cystitis [\[153\]](#).
- Q: The hernia is so greatly compressed that the circulation is compressed, the hernia is said to be:
- A: Strangulated [\[154\]](#).
- Q: A 70 year old man presents with an acute onset of severe tearing abdominal pain that radiates to his back, his blood pressure is low, heart rate's high, and respirations are high. Treatment of this patient includes:
- A: Rapid transport to the hospital [\[155\]](#).
- Q: In which position do most patients with acute abdominal pain prefer to be transported?
- A: On their side with their knees flexed [\[157\]](#).