

Acute Abdomen



DEFINITION/OVERVIEW

Acute abdomen is an emergency condition characterized by historical and physical examination findings of a tense, painful abdomen. May be due to a life-threatening condition.



ETIOLOGY/PATHOPHYSIOLOGY

- A patient with abdominal pain has pain associated with distension of an organ, inflammation, traction on the mesentery or peritoneum, or ischemia.
- The abdominal viscera are sparsely innervated, and diffuse involvement is often necessary to elicit pain; nerve endings also exist in the submucosa-muscularis layers of the intestinal wall.
- Any process that causes fluid or gaseous distension (i.e., intestinal obstruction, gastric dilation-volvulus, ileus) may produce pain.
- Inflammation produces abdominal pain by releasing vasoactive substances that directly stimulate nerve endings.
- Many nerves in the peritoneum are sensitive to a diffuse inflammatory response.

Systems Affected

Systems affected may depend on severity of pain and underlying disorder.

- Behavioral – trembling, inappetence, vocalizing, lethargy, depression, and abnormal postural changes such as the praying position to achieve comfort.
- Cardiovascular – severe inflammation, ischemia, systemic inflammatory response syndrome (SIRS), and sepsis may lead to acute circulatory collapse (shock). In addition, tachycardia or other arrhythmias may affect capillary refill time and mucous membrane color. Pain may lead to arrhythmias on its own.
- Gastrointestinal – vomiting, diarrhea, inappetence, generalized functional ileus; pancreatic inflammation, necrosis, and abscesses may lead to cranial abdominal pain, vomiting, and ileus.
- Hepatobiliary – jaundice associated with extrahepatic cholestasis from biliary obstruction (including pancreatitis) and bile peritonitis.
- Renal/urologic – azotemia can be due to prerenal causes (dehydration, hypovolemia, and shock), renal causes (acute pyelonephritis and acute kidney injury), and postrenal causes (urethral obstruction and uroperitoneum from bladder rupture).
- Respiratory – increased respiratory rate due to pain or metabolic disturbances.

Blackwell's Five-Minute Veterinary Consult Clinical Companion: Small Animal Gastrointestinal Diseases, First Edition. Edited by Jocelyn Mott and Jo Ann Morrison.

© 2019 John Wiley & Sons, Inc. Published 2019 by John Wiley & Sons, Inc.

Companion website: www.fiveminutevet.com/gastrointestinal



SIGNALMENT/HISTORY

- Dog and cat.
 - Dogs more commonly but can be challenging to identify abdominal pain in feline patients.
- Younger animals tend to have a higher incidence of trauma-related problems, intussusceptions, and acquired diet- and infection-related diseases; older animals have a greater frequency of malignancies.
- Male cats and dogs are at higher risk for urethral obstruction.
- Male Dalmatians in particular have a higher risk of urethral obstruction because of the high incidence of urate urinary calculi.
- German shepherds with pancreatic atrophy have a higher risk of mesenteric volvulus.
- Patients treated with corticosteroids and nonsteroidal antiinflammatory drugs (NSAIDs) are at higher risk for gastrointestinal (GI) ulceration and perforation.

Risk Factors

- Exposure to NSAIDs or corticosteroid treatment – gastric, duodenal, or colonic ulcers.
- Garbage or inappropriate food ingestion – pancreatitis or intestinal obstruction.
- Foreign body ingestion – intestinal obstructions.
- Abdominal trauma – hollow viscus rupture.
- Hernia-intestinal obstruction/strangulation.

Historical Findings

- Trembling, reluctance to move, inappetence, vomiting, diarrhea, vocalizing, and abnormal postures (tucked up or praying position) – signs that the owner may notice.
- Question owner carefully to ascertain what system is affected; for example, hematemesis with a history of NSAID treatment suggests GI mucosal disruption.



CLINICAL FEATURES

- Abnormalities include abdominal pain, splinting of the abdominal musculature, gas- or fluid-filled abdominal organs, abdominal mass, ascites, pyrexia or hypothermia, tachycardia, and tachypnea.
- Once abdominal pain is confirmed, attempt to localize the pain to cranial, middle, or caudal abdomen.
- Perform a rectal examination to evaluate the colon, pelvic bones, urethra, and prostate, as well as the presence of melena, fresh blood or mucus.
- Rule out extraabdominal causes of pain by careful palpation of the kidneys, sublumbar muscles, and thoracolumbar and lumbar vertebrae.
- Pain associated with intervertebral disk disease often causes referred abdominal guarding and is often mistaken for true abdominal pain. Renal pain can be associated with pyelonephritis.



DIFFERENTIAL DIAGNOSIS

- Renal-associated pain, retroperitoneal pain, spinal or paraspinal pain, and disorders causing diffuse muscle pain may mimic abdominal pain; careful history and physical examination are essential in pursuing the appropriate problem.
- Parvoviral enteritis can present similarly to intestinal obstructive disease; fecal parvoviral antigen assay and complete blood cell count (leukopenia) are helpful differentiating diagnostic tests.

Gastrointestinal

- Stomach – gastritis, ulcers, perforation, foreign bodies, gastric dilation-volvulus.
- Intestine – obstruction (foreign bodies, intussusception, hernias), enteritis, ulcers, perforations.
- Rupture after obstruction, ulceration, or blunt or penetrating trauma, or due to tumor growth.
- Vascular compromise from infarction, mesenteric volvulus, or torsion.

Pancreas

- Pain associated with inflammation, abscess, ischemia.
- Pancreatic masses or inflammation obstructing the biliary duct/papilla will cause jaundice.

Hepatic and Biliary System

- Rapid distension of the liver and its capsule can cause pain.
- Gallbladder obstruction, rupture, or necrosis may lead to bile leakage and peritonitis.
- Hepatic abscess.

Spleen

- Splenic torsion, splenic masses, splenic thrombus, splenic abscess.

Urinary Tract

- Distension is the main cause of pain in the urinary tract.
- Lower urinary tract obstruction can be due to tumors of the trigone area of the bladder or urethra, urinary calculi, or granulomatous urethritis.
- Traumatic rupture of the ureters or bladder is associated with blunt trauma and increased intraabdominal pressure.
- Urethral tears can be associated with pelvic fractures from acute trauma.
- Free urine in the peritoneal cavity leads to a chemical peritonitis.
- Acute pyelonephritis, acute renal failure, nephroliths, and ureteroliths are uncommon causes of acute abdomen.

Genital Tract

- Prostatitis and prostatic abscess, pyometra; ruptured pyometra or prostatic abscess can cause endotoxemia, sepsis, and cardiovascular collapse.
- Infrequent causes include rupture of the gravid uterus after blunt abdominal trauma, uterine torsion, ovarian tumor or torsion, and intraabdominal testicular torsion (cryptorchid).

Abdominal Wall/Diaphragm

- Umbilical, inguinal, scrotal, abdominal, or peritoneal hernias with strangulated viscera.
- Trauma or congenital defects leading to organ displacement or entrapment in the hernia will lead to abdominal pain if the vascular supply of the organs involved becomes impaired or ischemic.
- Hernias – intestinal obstruction/strangulation.



DIAGNOSTICS

Complete Blood Cell Count/Biochemistry/Urinalysis

- Inflammation or infection may be associated with leukocytosis or leukopenia.
- Active inflammation will be characterized by a neutrophilic left shift.
- Anemia may be seen with blood loss associated with GI ulceration.

- Azotemia is associated with prerenal, renal, and postrenal causes.
- Electrolyte abnormalities can help to evaluate GI disease (i.e., hypochloremic metabolic alkalosis with gastric outflow obstruction) and renal disease (i.e., hyperkalemia with acute renal failure or postrenal obstruction).
- Hyperbilirubinemia and elevated hepatic enzymes help localize a problem to the liver or biliary tract. These changes may also be seen when associated with sepsis.
- Urine specific gravity (before fluid therapy) is needed to differentiate prerenal, renal, and postrenal problems.
- Urine sediment may be helpful in acute renal failure, ethylene glycol intoxication, and pyelonephritis.

Other Laboratory Tests

- Venous blood gas analysis including lactate concentration may indicate acid–base abnormalities, and increased lactate may be associated with hypoperfusion.
- Canine and feline pancreatic lipase immunoreactivity can be useful in evaluating pancreatitis.

Imaging

Abdominal Radiography

- May see abdominal masses or changes in shape or shifting of abdominal organs.
- Loss of abdominal detail with abdominal fluid accumulation is an indication for abdominocentesis.
- Free abdominal gas is consistent with a ruptured GI viscus or infection with gas-producing bacteria and is an indication for emergency surgery. Use caution when interpreting radiographs following abdominocentesis with an open needle. Free gas may be introduced with this technique.
- Use caution when evaluating postoperative radiographs; free gas is a normal postoperative finding.
- Ileus is a consistent finding with peritonitis.
- Characterize ileus as functional (due to metabolic or infectious causes) or mechanical (due to obstruction).
- Foreign bodies may be radiopaque.
- Upper GI barium contrast radiographs are useful in evaluating the GI tract, particularly for determination of GI obstruction.
- Loss of contrast and detail in the area of the pancreas can be observed with pancreatic inflammation.

Abdominal Ultrasound

- A sensitive diagnostic tool for the detection of abdominal masses, abdominal fluid, abscesses, cysts, lymphadenopathy, and biliary or urinary calculi.
- FAST (focused assessment with sonography in trauma) may be used for rapid assessment.

Abdominal Computed Tomography (CT)

- Very sensitive diagnostic tool that may be utilized especially when surgeon requires additional information preoperatively.

Diagnostic Procedures

Abdominocentesis/Abdominal Fluid Analysis

- Perform abdominocentesis on all patients presenting with acute abdomen. Using a four-quadrant approach may improve yield. Fluid can often be obtained for diagnostic evaluation even when only a small amount of free abdominal fluid exists, well before detectable

radiographic sensitivity. Ultrasound is much more sensitive than radiography for the detection of fluid and can be used to direct abdominocentesis. Abdominal fluid analysis with elevated white blood cell count, degenerate neutrophils, and intracellular bacteria is consistent with septic peritonitis and is an indication for immediate surgery.

- Diagnostic peritoneal lavage can be performed by introducing sterile saline (10–20 mL/kg, warmed to approach body temperature) and performing abdominocentesis.
- Measurement of glucose concentration in abdominal effusion may aid in the diagnosis of septic abdomen.
- Pancreatitis patients may have an abdominal effusion characterized as a nonseptic (sterile) peritonitis.
- Creatinine concentration higher in abdominal fluid than in serum indicates urinary tract leakage.
- Similarly, higher bilirubin concentration in abdominal fluid than in serum indicates bile peritonitis.

Sedation and Abdominal Palpation

- Because of abdominal splinting associated with pain, a thorough abdominal palpation is often not possible without sedation; this is particularly useful for detecting intestinal foreign bodies that do not appear on survey radiographs.

Exploratory Laparotomy

- Surgery may be useful diagnostically (as well as therapeutically) when ultrasonography is not available or when no definitive cause of the acute abdomen has been established with appropriate diagnostics.



THERAPEUTICS

- Inpatient management with supportive care until decision about whether the problem is to be treated medically or surgically. Early intervention with surgery is important when indicated.
- Aggressive therapy and prompt identification of the underlying cause are very important.
- Many causes of acute abdominal pain require emergency surgical intervention.

Drugs of Choice

- Pain medication may be indicated for control of abdominal discomfort and provide some sedation.

Opioids

- Fentanyl: 2–5 µg/kg as initial IV bolus, 2–10 µg/kg/h as constant rate infusion (CRI).
- Hydromorphone: 0.05–0.2 mg/kg SQ, IM, IV q 4–6 h.
- Morphine: 0.5–2 mg/kg SQ, IM, q 4–6 h.
- Buprenorphine: 0.01–0.02 mg/kg SQ, IM, IV q 4–6 h.
- Methadone: 0.1–0.4 mg/kg SQ, IM, IV q 6 h.

Histamine H2 Antagonists

- Reduce gastric acid production.
- Famotidine: 0.1–0.2 mg/kg IV, SQ or IM q 12 h.
- Ranitidine: 2 mg/kg IV q 8 h.

Proton Pump Inhibitor (PPI)

- Pantoprazole: 0.5–1 mg/kg IV as a CRI over 12–24 h.

Protectants

- Sucralfate: 0.25–1 g PO q 8 h.

Antiemetics

- Metoclopramide: 0.2–0.4 mg/kg IV q 6–8 h (or 24-hour CRI).
- Maropitant: 1 mg/kg SQ q 24 h dogs, 0.5 mg/kg SQ q 2–4 h cats.
- Ondansetron: 0.5–1 mg/kg IV slowly q 6–12 h.
- Dolasetron: 1 mg/kg IV qd.

Antibiotics

- Antibiotics may be indicated if signs of infection (fever, elevated white blood cell count, positive culture) are seen.
- Broad spectrum for gram positive, gram negative, and anaerobic bacteria.
- Gram stain and cultures prior to treatment if possible.

Precautions/Interactions

- Gentamicin and most NSAIDs can be nephrotoxic and should be used with caution in hypovolemic patients and those with renal impairment.
- Do not use metoclopramide if GI obstruction is suspected.

Appropriate Health Care

- Keep patient NPO if vomiting, until a definitive cause is determined and addressed.
- Intravenous fluid therapy is usually required because of the large fluid loss associated with an acute abdomen; the goal is to restore the normal circulating blood volume.
- If severe circulatory compromise (shock) exists, supplement initially with isotonic crystalloid fluids (90 mL/kg dogs; 45–60 mL/kg cats) over 1–2 h; hypertonic fluids or colloids may also be beneficial.
- Evaluate hydration and electrolytes (with appropriate treatment adjustments) frequently after commencement of treatment.

Nursing Care

- Patients usually require intensive medical care and frequent evaluation of vital signs and laboratory parameters.

Diet

- Most patients will be NPO during assessment until a diagnosis can be made. Dietary decisions should be made with consideration of the underlying disease and required therapy. Diets designed for tube feeding may also be required.

Activity

- Activity levels will be dictated by underlying disease and required procedures.

Surgical Considerations

- Many different causes of an acute abdomen (with both medical and surgical treatments) exist; make a definitive diagnosis whenever possible prior to surgical intervention.
- This can prevent both potentially unnecessary and expensive surgical procedures and associated morbidity and mortality.
- It will also allow the surgeon to prepare for the task and to educate the owner on the prognosis and costs involved.



COMMENTS

Client Education

- Discussions with client should be based on presenting problem and differential diagnoses as well as diagnostic and therapeutic plan.
- Financial investment and prognosis are based on underlying disease, signalment, and required therapeutic interventions.

Patient Monitoring

- Dependent on underlying disease.
- Dependent on required therapeutic interventions.
- Dependent on in patient or out patient monitoring.

Expected Course and Prognosis

Prognosis is based on underlying disease, signalment and required therapeutic interventions.

Synonyms

Colic, but not commonly used in small animal patients.

Abbreviations

- | | |
|---|--|
| ■ CRI = constant rate infusion | ■ NSAID = nonsteroidal antiinflammatory drugs |
| ■ FAST = focused assessment with sonography in trauma | ■ PPI = proton pump inhibitor |
| ■ GDV = gastric dilation-volvulus | ■ SIRS = systemic inflammatory response syndrome |
| ■ GI = gastrointestinal | |

See Also

- | | |
|--|--------------------------------|
| ■ Biliary Duct or Gallbladder Rupture and Bile Peritonitis | ■ Gastrointestinal Obstruction |
| ■ Gastric Dilation and Volvulus Syndrome | ■ Intussusception |
| ■ Gastroduodenal Ulceration/Erosion | ■ Pancreatitis, Canine |
| | ■ Pancreatitis, Feline |

Internet Resources

Google Search:

- Acute abdomen in dogs and cats.
- Abdominal pain in dogs and cats.

Suggested Reading

- Beal MW. Approach to the acute abdomen. *Vet Clin North Am Small Anim Pract* 2005;35:375–396.
- Heeren V, Edwards L, Mazzaferro EM. Acute abdomen: diagnosis. *Compend Contin Educ Pract Vet* 2004;26:350–363.
- Heeren V, Edwards L, Mazzaferro EM. Acute abdomen: treatment. *Compend Contin Educ Pract Vet* 2004;26:3566–3673.
- Mazzaferro EM. Triage and approach to the acute abdomen. *Clin Tech Small Anim Pract* 2003;18:1–6.
- Strombeck DR, Guilford WG. *Small Animal Gastroenterology*, 2nd ed. Davis: Stonegate Publishing, 1990:81–86.

Acknowledgments: The author and editors acknowledge the prior contributions of Dr Juan Carlos Sardinas, Dr Albert E. Jergens, and Elizabeth M. Streeter.

Author: Steven L. Marks BVSc, MS, MRCVS, DACVIM (SAIM)