CHAPTER 1

Acute Abdomen

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ACUTE ABDOMEN DIFFERENTIAL DIAGNOSES

Gastrointestinal

Gastric dilatation +/− volvulus
Gastritis/enteritis/ulceration
Gastric/intestinal obstruction
Hemorrhagic gastroenteritis
Intestinal/mesenteric volvulus
Intussusception
Obstipation

Hepatic

Bile duct obstruction/rupture
Gallbladder rupture
Hepatic abscess
Hepatic neoplasia
Hepatitis/cholangiohepatitis
Hepatic lipidosis

Intervertebral Disc Disease

Occasionally dogs with back pain present with clinical signs that mimic abdominal pain

Pancreatitis

Peritonitis

Handbook of Canine and Feline Emergency Protocols, Second Edition. Edited by Maureen McMichael.

www.wiley.com/go/mcmichaelhandbook.

Prostate

Prostatic abscess
Prostatitis

Renal

Acute renal failure
Pyelonephritis
Renal calculi
Ureteral obstruction

Reproductive

Dystocia
Metritis/pyometra
Orchitis/epididymitis
Uterine/testicular torsion

Splenic

Rupture/neoplasia
Torsion

Toxin

Arsenic
Lead
Zinc

Urinary

Bladder rupture
Urethral obstruction/rupture

HEMOABDOMEN

History

If chronic, (neoplasia) often has a history of lethargy with intermittent periods of improvement. Occasionally PU/PD, distended abdomen, and vomiting. If acute, (neoplasia, trauma, and coagulopathy) can present in shock.

Clinical Signs

Pale mucous membranes, tachycardia, may have systolic heart murmur (anemia), bounding or weak pulses, and palpable abdominal fluid wave. May be tachypneic, weak, depressed. **Sudden loss of volume is not often reflected in HCT/TS. A normal HCT with slightly low TS is often encountered on presentation with the HCT dropping as fluid administration and redistribution of body fluid occurs.**

Diagnostics

Minimally: MDB, abdominocentesis (PCV, cytology, fluid analysis).
1st Tier: PT or ACT or coagulation panel, CBC + retic count.
2nd Tier: Blood type and crossmatch, chem panel, CXR (metastasis check), AUS.

Treatment

Oxygen supplementation.
IV catheter (largest catheter possible for rapid replacement).
Administer isotonic crystalloid bolus:

Dogs: 20 ml/kg (up to 90 ml/kg) and then reassess perfusion.
Cats: 10 ml/kg (up to 45 ml/kg) and then reassess perfusion.

Synthetic colloids (HES):

Dogs: 5 ml/kg bolus over 15–20 min and reassess perfusion. Give up to 20 ml/kg total.
Cats: 2–5 ml/kg bolus over 20–30 min and reassess perfusion. Do not bolus colloids rapidly in cats.

Blood:

With clinical anemia (i.e., lethargy, tachycardia, and tachypnea) and normal albumin level, administer crossmatched pRBCs at 6–12 ml/kg over 1–4 h. With clinical anemia and hypoalbuminemia, administer crossmatched fresh whole blood at 10–20 ml/kg over 1–4 h or pRBCs and FFP.

Coagulopathy:

If prolonged PT this may be anticoagulant rodenticide. Although this rarely presents as hemoabdomen (more commonly presents as retroperitoneal bleed or hemothorax), it is most likely in young dogs with significantly prolonged PT. If ACT or aPTT is prolonged and the pet has signs of inflammatory disease, consider DIC. Plasma administration may be helpful to replace coagulation factors.

Monitoring:

End points of fluid/blood/colloid resuscitation are normalizing of HR, pulse quality, mentation, lactate, HCT/TS, CVP, and urine output.

Prognosis

Prognosis depends on the underlying disease. Prognosis is good for trauma that responds to fluid resuscitation (surgery may not be needed). May need surgical correction of lacerated

vessel if not stabilized by transfusion/fluid therapy. Prognosis is guarded to poor for ruptured splenic or liver masses due to hemangiosarcoma. Prognosis guarded for ruptured adrenal masses presenting as hemoabdomen. Approximately 75% of dogs with nontraumatic hemoabdomen on presentation have neoplasia.

SPLENIC TORSION

History

Acute: Shocky, painful abdomen, and enlarged spleen. Chronic: Lethargy, anorexia, enlarged spleen, and possibly painful abdomen. Large breeds and Great Danes predisposed.

Clinical Signs

Tachycardia, weak pulses, pale or icteric mucous membranes, painful abdomen, enlarged spleen, and cardiac arrhythmias.

Diagnostics

Minimally: MDB, AXR.

1st Tier: CBC with retic count, platelet count, ACT or coag panel, chem panel, lactate. May see anemia with fragmented RBCs, hemoglobinemia, hemoglobinuria, elevated liver enzymes, elevated bilirubin.

2nd Tier: CXR, AUS. Abdominal ultrasound may reveal enlarged splenic vessels (Figs 1.1 and 1.2).

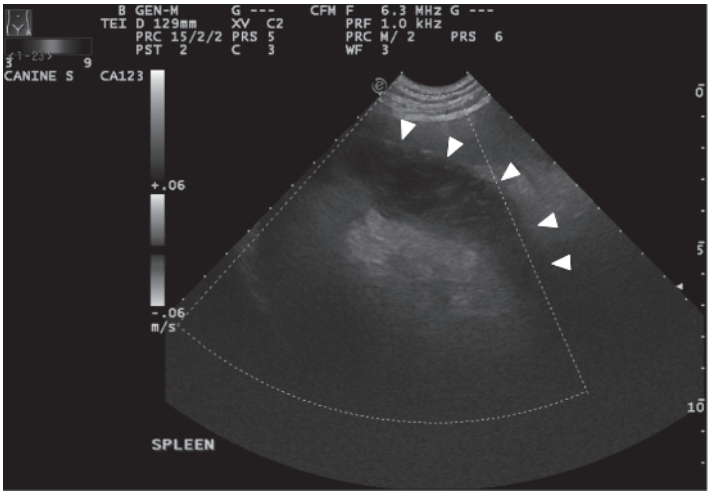

Fig. 1.1. Partial splenic torsion. Ultrasound image of a 4-year-old Great Dane with evidence of a hypoechoic and roughly triangular region (outlined by arrowheads) in the distal tail of the spleen consistent with a partial splenic torsion (courtesy Dr. Robert O'Brien, DVM, DACVS).

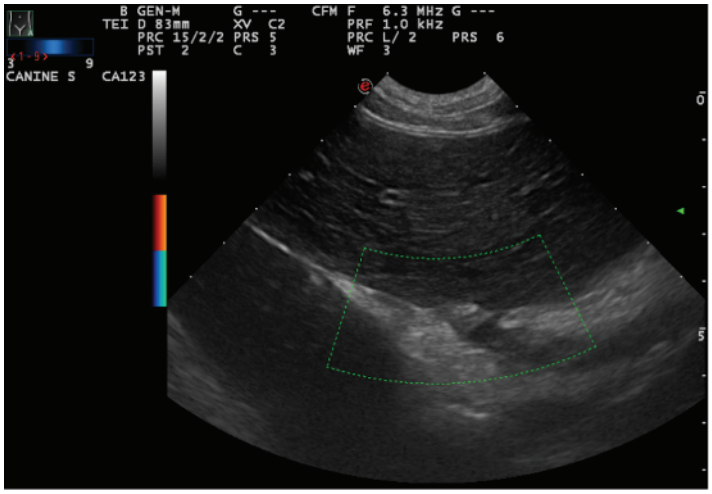

Fig. 1.2. Splenic torsion. Ultrasound image from a 6-year-old Great Dane with a splenic torsion. Note the "lacey" appearance to the spleen with Doppler evidence (green dashed lines) of decreased flow (courtesy Dr. Robert O'Brien, DVM, DACVS).

Treatment

Administer isotonic crystalloid bolus:

Dogs: 20 ml/kg (up to 90 ml/kg) and then reassess perfusion.

Cats: 10 ml/kg (up to 45 ml/kg) and then reassess perfusion.

Synthetic colloids (HES):

Dogs: 5 ml/kg bolus over 15–20 min and reassess perfusion. Give up to 20 ml/kg total.

Cats: 2–5 ml/kg bolus over 20–30 min and reassess perfusion. Do not bolus colloids rapidly in cats.

Blood products:

With clinical anemia (i.e., lethargy, tachycardia, and tachypnea) and normal albumin level, administer crossmatched pRBCs at 6–12 ml/kg over 1–4 h. With clinical anemia and hypoalbuminemia, administer crossmatched fresh whole blood at 10–20 ml/kg over 1–4 h or pRBCs and FFP.

Analgesia:

Multimodal analgesia is ideal and should include a pure μ-opioid agonist along with additional analgesics. Options include fentanyl at 2–6 μg/kg/h or morphine at 0.12–0.36 mg/kg/h or hydromorphone at 0.024–0.072 mg/kg/h along with lidocaine at 25–50 μg/kg/min (dogs) +/or ketamine at 2–5 μg/kg/min. Other options include methadone at 0.25–0.75 mg/kg IV/IM/SC q4 h (dogs) or methadone at 0.05–0.5 mg/kg IV/IM/SC q4 h (cats) or Gabapentin at 5–10 mg/kg PO q8–12 h.

Surgery should be performed as soon as the patient is resuscitated.

Monitoring

End points for fluid and blood product resuscitation include normalization of HR, lactate, mentation, and urine output. These are temporary as surgery is the only corrective measure.

Prognosis

Good if surgery is corrective and there is no predisposing underlying cause (i.e., neoplasia).

PERITONITIS

History

May have history of previous surgery, penetrating wound, pregnancy, previous cystocentesis, pyometra, or no prior history (perforated intestinal neoplasia).

Clinical Signs

Pale or muddy mucous membranes, tachycardia (except cats, see bradycardia), weak or bounding pulses, painful abdomen (cats may not have abdominal pain with peritonitis), fever, or hypothermia (cats – hypothermia).

Diagnostics

Minimally: MDB, AXR (check for loss of detail, free gas), abdominocentesis (intracellular bacteria are hallmark of septic peritonitis, and also can check lactate, blood glucose, creatinine, bilirubin, and lipase on the fluid in addition to cytology and culture). Abdominal effusion glucose <50 mg/dl and/or an effusion to venous lactate of >4.6 mmol/l are highly indicative of bacterial peritonitis. **It is best to do radiographs before abdominal tap, as the latter can introduce free gas into the abdomen and confuse radiographic interpretation**.

1st Tier: lactate (may be increased with hypoperfusion), CBC (look for left shift, toxic changes in leukocytes), chem panel (may see hypoglycemia).

2nd Tier: ACT/coagulation panel, CXR, AUS (Figs 1.3 and 1.4).

Treatment

Oxygen.

Administer isotonic crystalloid bolus:

Dogs: 20 ml/kg (up to 90 ml/kg) and then reassess perfusion.

Cats: 10 ml/kg (up to 45 ml/kg) and then reassess perfusion.

Synthetic colloids (HES):

Dogs: 5 ml/kg bolus over 15–20 min and reassess perfusion. Give up to 20 ml/kg total.

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Antibiotics:

Broad-spectrum antibiotics (ticarcillin/clavulanate or imipenim) ideally after culture and susceptibility have been submitted. Enrofloxacin may convert Strep canis to a highly

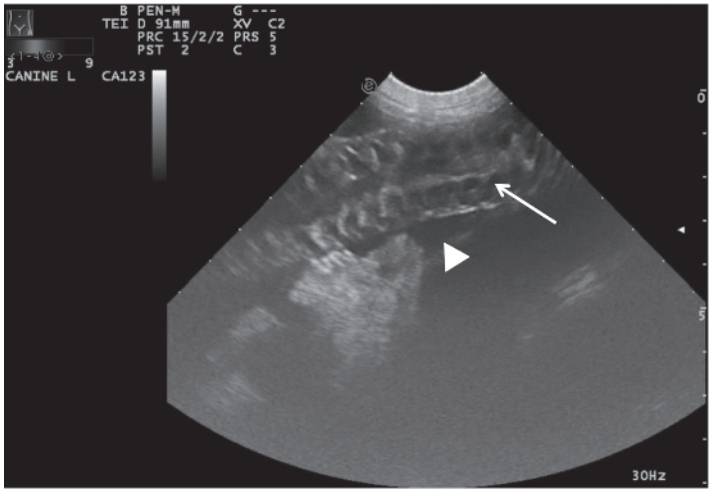

Fig. 1.3. Peritonitis. Ultrasound image of a 5-year-old Coonhound with peritonitis secondary to a uroabdomen. Note the abdominal free fluid (arrowhead) and severe corrugation of the intestinal loop (arrow) (courtesy Dr. Robert O'Brien, DVM, DACVS).

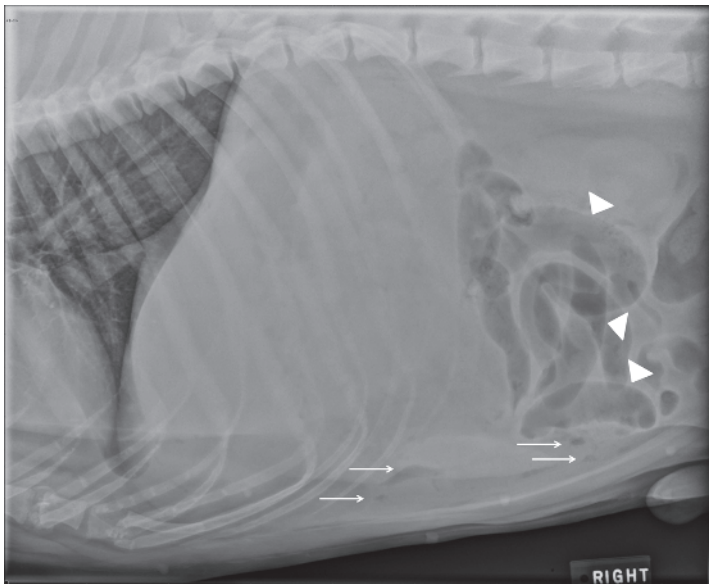

Fig. 1.4. GI Septic peritonitis with free gas. Lateral radiograph from a 6-year-old Labrador Retriever with septic peritonitis. Note the multiple small gas bubbles in the ventral aspect of the abdomen (arrows). Loss of serosal detail is also present. Some loops of bowel in the mid-ventral abdomen are gas distended (arrowheads) (courtesy Dr. Robert O'Brien, DVM, DACVS).

pathogenic form seen in Strep toxic shock syndrome and necrotizing fasciitis; therefore, should be used cautiously (or not at all) in septic canines.

Coagulopathy:

If prolonged ACT/coag panel, consider vitamin K_1 (2.5 mg/kg SC), fresh frozen plasma, or fresh whole blood.

Surgery:

Emergency surgery should be performed as soon as the animal is resuscitated (not necessarily stabilized). The goals of resuscitation and throughout surgery are HCT $\geq$ 25%, TS $\geq$ 4.0 (artificial colloids register at 4.5 g/dl on refractometer), normal coagulation panel, systolic blood pressure >90 mmHg, urine output >1 ml/kg/h, pulse ox >95%, and adequate analgesia.

Analgesia:

Multimodal analgesia is ideal and should include a pure μ-opioid agonist along with additional analgesics. Options include fentanyl at 2–6 μg/kg/h or morphine at 0.12–0.36 mg/kg/h or hydromorphone at 0.024–0.072 mg/kg/h along with lidocaine at 25–50 μg/kg/min (dogs) +/or ketamine at 2–5 μg/kg/min. Other options include methadone at 0.25–0.75 mg/kg IV/IM/SC q4 h (dogs) or methadone at 0.05–0.5 mg/kg IV/IM/SC q4 h (cats) or Gabapentin at 5–10 mg/kg PO q8–12 h.

Prognosis

There is a very brief window where volume resuscitation will improve parameters but expect decompensation within 1–3 h after improvement if definitive correction (surgery) is not performed. Guarded to poor depending on cause and systemic complications that may develop several days postop (ARDS, DIC, aspiration pneumonia, sepsis, etc.).

Further Reading

Drobatz KJ. Acute abdominal pain. In Silverstein DC, Hopper K (eds): Small Animal Critical Care Medicine, 1st ed. St. Louis, Saunders Elsevier, 2009, p. 534.