

**DDx Acute Abdomen**

**Acute Abdomen**

- Rapid onset of abdominal pain
- Acute onset of clinical signs related to abdominal pathology
- Potentially life threatening

Determine quickly whether abdominal surgery is necessary

**DDx Acute Abdomen**

**GI Tract**

**Urogenital Tract**

**Heptaobiliary System**

**Spleen & Lymphatic**

**Other causes**

Things that may mimic acute abdomen

**DDx Acute Abdomen**

**GI Tract**

- Ischemia* – thrombus and/or embolism of mesenteric a or portal vein
- Obstruction* – foreign body, intramural, extra-intestinal, intususception
- Twist* - GDV, mesenteric volvulus, duodeoncolic ligament entrapment, torsion around peduculated mass
- Gastroenteritis* (viral, bacterial, toxic, HGE)
- Pancreatitis*
- Colitis*, Obstipation
- Necrosis* - rupture, ulceration, perforation, surgery dehiscence

**DDx Acute Abdomen**


**Urogenital Tract**

- Pyometra* – ± uterine rupture
- Dystocia* – ± fetal necrosis, ± uterine rupture
- Vaginal rupture* - ± rectovaginal fistula
- Cystic calculi* - ureteral obstruction, urethral obstruction
- Uroabdomen* – ruptured kidney, ureter, bladder
- UTI* – pyelonephritis, renal abscess
- Testicular torsion*

**DDx Acute Abdomen**


**Hepatobiliary**

- Acute hepatitis/cholangiohepatitis*
- Cholecystitis* – ± gall bladder rupture
- Biliary obstruction* – ± gall bladder rupture (stone, mass, mucocoele)
- Hepatic abscess* – ± rupture
- Liver lobe torsion*



### DDx Acute Abdomen Spleen & Lymphatic

- *Rapidly growing splenic mass*
- *Splenic torsion*
- *Splenic rupture* – hemobadomen (trauma, hematoma, neoplasia)
- *Splenic abscess* - ± rupture
- *Mesenteric abscess* – ± rupture



### DDx Acute Abdomen Other Causes

- *Trauma* – evisceration, hemoabdomen, retroperitoneal hemorrhage, penetrating wounds, crushing injury
- *Neoplasia*
- *Strangulated hernia*
- *Pansteatitis*


Any of these things can cause severe abdominal pain and/or peritonitis



### DDx Acute Abdomen Things that Mimic

- *Spinal Pain*
- *Lead poisoning*
- *Hypoadrenocorticism*
- *Anaphylaxis*

Any of these things can cause severe abdominal pain and/or peritonitis



### Assessment of Collapse

Quick Assessment


Life Saving Treatment

Physical Exam

Emergency Diagnostics

History

In House Diagnostics



### Assessment of Collapse

Quick Assessment

Airway


Breathing

Circulation

Vital Signs – TPR & BP

Diagnostic Centesis

thorax, abdomen



### Assessment of Collapse

Life Saving Treatment

Oxygen


IV fluids and colloids

Therapeutic centesis

Thorax, abdomen, pericardium

Normalize temperature


Emergency Surgery



## Assessment of Collapse

**Physical Exam**


- General Exam
- Cardiovascular Exam
- Neurologic Exam



## Assessment of Collapse


**Emergency Diagnostics**

- PCV, TP, glucose, BUN creat
- Blood gases/lytes
- ECG
- Radiographs
  - Lateral thorax
  - Lateral abdomen
- FAST ultrasound



## Assessment of Collapse


- Quick Assessment**
- Life Saving Treatment**
- Physical Exam**
- Emergency Diagnostics**
- History**
- In House Diagnostics**



## Assessment of Collapse


**In House Diagnostics**

- CBC, profile, UA** - Get urine prior to fluid therapy
- Heartworm test in dogs**
- FeLV/FIV in cats**
- Coags** - PT, PTT/ACT, BMBT
- Complete abdomen US**



## Quick Assessment

- [Emergency Exam Form Cat](#)
- [Emergency Dog Exam Form](#)
- [Resuscitation Flow Sheet](#)



## Quick Assessment

**Get samples to run later**

- Blood (8-10cc)
  - EDTA tube
  - Lithium heparin tube
  - Potassium citrate tube
  - Red top clot tube
- urine



## Quick Assessment

### Urinalysis

- If you need a urinalysis later, you need a sample prior to fluid therapy, before specific gravity is diluted
- If fever, you may want urine for possible culture prior to antibiotic therapy
- Use a 5Fr infant feeding tube to catheterize male dog > 75 pounds
- Use US guidance if needed for cystocentesis of small bladder



## Quick Assessment

### Indications for Diagnostic Abdominocentesis

- Palpable fluid wave
- Owner reports abdominal bloating
- Suspect abdominal hemorrhage
  - Acute collapse, pale mucous membranes, weak pulses, low blood pressure,  $\pm$  anemia
- Suspect peritonitis – shock and abdominal pain
- Fluid seen on FAST ultrasound



## Quick Assessment

### Diagnostic abdominal tap technique – 4 quadrants

- R cranial, L cranial, R caudal, L caudal
- Syringe and 18-20g needle are fine
- Put fluid in EDTA and red top tubes for analysis
  - Spin down for cytology
  - Save red top tube for culture if needed
- Run EDTA through CBC machine for cell counts
- Be aware that you can fill the syringe with blood if you hit a normal spleen – try RCr

[Fluid Analysis Handout](#)



## Fluid Therapy

### “Shock/Replacement Fluids”

- Bolus of 10 ml/lb over 10-15 minutes, then reassess
- NO shock fluids if there is anuria or CHF (Angel)
  - Anuria - you can probably get way with one shock dose if the dog hasn't had prior fluid therapy
  - MONITOR URINE OUTPUT AFTER THE SHOCK DOSE



## Fluid Therapy

### “Shock/Replacement Fluids”

- Bolus of 10 ml/lb over 10-15 minutes, then reassess
- Two IV catheters may be necessary in a giant dog
- CAREFUL if hypoalbuminemia
  - If TP low, get albumin ASAP
- Aggressive fluid therapy + hypoalbuminemia = pulmonary edema
- Replace colloids first – hetastarch
- shock fluids may not be necessary, and could even lead to volume overload



## Fluid Therapy

### Maintenance Fluids

- 1-2 ml/lb/hr – fine tune later
- To keep the IV line open while the patient is assessed
- Most patients fall under this category

### No Fluids – if CHF is possible


- Heart murmur
- Auscultable arrhythmia or pulse deficits
- Undiagnosed thoracic effusion or ascites – modified transudate
- Dyspneic animal who has not had chest x-rays yet
  - Be especially careful with cats
  - Fluids, corticosteroids or x-rays can KILL a cat in CHF



## Fluid Therapy

**Colloids**

- Hetastarch 15-20 ml/lb per 24 hours
- Give over 15-20 minutes
- Plasma 5-10 ml/lb/day
- Premedicate with diphenhydramine
- Give over 1-2 hours



## Ascites

**Transudate or Modified Transudate**


- Remove enough fluid to alleviate dyspnea, and allow comfortable chest x-rays & abdominal ultrasound
- Bloodwork and abdominal ultrasound to determine the cause, and treat accordingly
- If cause is congestive heart failure, remove all fluid

**Hemorrhage - usually a surgical problem, unless**

- Coagulopathy is identified and treated
- Traumatic hemorrhage resolves spontaneously

**Non-septic exudate, chyle – tap if dyspneic**

- Imaging determines whether the problem is surgical




## Ascites

**Septic exudate, uroabdomen, bile peritonitis – usually surgical**


- Multiple species of bacteria suggest GI perforation
- Plant material is very strong evidence
- If no bacteria are seen, look for phagocytosed bacteria in WBC, and for toxic changes in the neutrophils

**Abdominal amylase and lipase elevated relative to serum with pancreatitis**

**Abdominal fluid glucose <50 mg/dl is often indicative of bacterial peritonitis**




## History




## History

**Acute collapse over minutes, then acute abdomen**

- Rapid hemorrhage – trauma or spontaneous
- Rupture of abdominal abscess
- Anaphylaxis
  - after insect bite, snake bite, vaccination
  - after heartworm prevention in untested dog (milbemycin)
  - after going outside



## History

**Protracted dysuria, pollakuria**

- Urinary obstruction

**Estrus about a month ago**

- pyometra

**Eating carrion or garbage**


- HGE – hemorrhagic gastroenteritis
- Foreign body obstruction
- Botulism – flaccid paralysis
- Roquefortine toxin – seizures and twitching



## History

### Pattern recognition for prostatitis

- Male dog
- Fever
- Caudal abdominal pain
- Hematuria (especially dripping)
- Hindlimb stiffness or an abnormal gait
- Signs of sepsis
- Pollakuria or even urinary obstruction
- dyschezia



## History

### Profuse and frequent vomiting


- Foreign body obstruction
- Pancreatitis

### PU-PD

- Sepsis, DKA, pyelonephritis, Addison's

### Melena


- Gut necrosis
- GI mass
- Bleeding ulcer



## Physical Exam

### Heart Rate


- Sinus Bradycardia – confirm with lead II ECG
  - Impending death
  - Increased vagal tone –
    - increased CSF pressure
    - abdominal disease
    - tracheal trauma
    - increased IOP
  - retching
- Give atropine or glycopyrrolate and recheck



## Physical Exam

### Heart Rate


- Sinus Tachycardia – confirm with lead II ECG
  - Pain or anxiety
    - give pain meds
  - Hypovolemic shock
    - increase the fluid rate
  - Heart failure
  - Pericardial tamponade
    - Tap and give IV fluid bolus



## Physical Exam

### Mucous Membrane Color


- Cyanosis
  - Respiratory failure – airway obstruction, alveolar disease or pleural/pericardial disease (air/fluid/organs)
  - Congestive heart failure
  - Pulmonary hypertension
- Differential cyanosis
  - Pink in front, blue in back (Reverse PDA or FATE)
- Brick red mucous membranes
  - Sepsis – do CBC, and albumin
  - HGE (hemorrhagic gastroenteritis in dogs)
  - SIRS



## Physical Exam

### Mucous Membrane Color

- Icterus – yellow mucous membranes
  - Check CBC first to rule out hemolysis
  - If anemic, check saline test for autoagglutination
  - If anemic, check blood smear cytology for Mycoplasma haemofelis
  - If not anemic, you are left with hepatic disease (including sepsis) or bile obstruction
    - No point doing bile acids if bilirubin is high (you know they are high)
    - Abdominal US is more helpful




## Physical Exam

### Mucous Membrane Color

- Pallor
  - Pain
  - Cardiovascular shock
  - Anaphylactic shock
  - Anemia
  - Hypovolemia – hemorrhage, hypoproteinemia


**CRT >2 sec means poor peripheral perfusion**



## Physical Exam

### Respirations


- Minimal chest excursions can indicate LMN paralysis or severe shock
- Exaggerated chest excursions
  - Cardiovascular failure
  - Respiratory failure – lung disease, airway disease, third space disease
    - Aspiration pneumonia due to vomiting-regurgitation
  - Anemia or other oxygen carrying problem
  - Metabolic acidosis



## Physical Exam

### Pulses


- Jugular pulses
  - Hepatojugular reflux
    - apply pressure to the liver for 5-10 seconds
    - Filling of the jugular veins indicates right heart failure or pericardial disease
- Peripheral Pulses
  - Weak pulses
    - CHF
    - Pericardial disease
    - Shock of any kind, especially hypovolemic
    - Hypertension



## Physical Exam

### Pulses


- Peripheral Pulses
  - Bounding pulses - Big difference in pressure between systole and diastole
    - Fever/Sepsis (vasodilation makes diastolic pressure lower)
    - PDA (back flow during systole)
    - Aortic endocarditis (back flow during systole)
    - Extreme bradycardia (volume overload)
    - Anemia (low blood viscosity)
  - Pulsus paradoxus – absent during peak inspiration
    - Pericardial effusion or hernia
  - No pulses in only one area
    - Thromboembolic disease



## Physical Exam

### Skin


- Hemorrhages might indicate coagulopathy – do coags
  - Ecchymoses and petechiae
- Peripheral edema
  - Right heart failure
  - Vasculitis, venous or lymphatic obstruction
  - Hypoalbuminemia
  - Infiltrative tumor such as myxosarcoma can look like edema



## Physical Exam

### Abdominal Palpation


- Distension
  - Obesity, pendulous abdomen
  - Pregnancy, pyometra - ultrasound
  - Balotte fluid wave – tap
  - Palpate organomegaly – ultrasound
    - Relieve urinary obstruction or express bladder
  - Abdominal mass – ultrasound
    - If cystic masses, may not be safe to aspirate
    - Can aspirate solid masses later
    - Aspirate homogeneous enlarged spleen (MCT, Lymphoma)



## Physical Exam

### Abdominal Palpation


- Distension
  - Gut distended with gas – radiograph
  - Pass stomach tube if gastric
  - Pneumonoperitoneum can cause some gas in the abdomen
  - Tympanic abdomen in a large dog is usually GDV



## Physical Exam

### Abdominal Palpation


- Severe abdominal pain is often surgical, especially if the pain is focal
  - Think peritonitis when you have shock and severe abdominal pain
  - If a pyometra is painful, think peritonitis
  - Uroabdomen painful only if infected or acute
- How do you diagnose peritonitis and decide to go to surgery?
  - Get some abdominal fluid , spin down, look for bacteria
  - Diagnostic peritoneal lavage if necessary
  - Most but not all animals with peritonitis have ascites



## Physical Exam

### Diagnostic Peritoneal lavage


- Place a large bore IV catheter into the abdomen on the ventral midline
- Collect samples for fluid analysis, culture
- Attach IV set and infuse 5-10 ml/lb sterile isotonic fluids
- Remove catheter, palpate abdomen
- let sit for 30 minutes
- Do single or 4 quadrant abdominocentesis
- Drain out as much fluid as possible, saving some for cytology, culture



## Physical Exam

### Differentiating abdominal pain from spinal pain


- If neck pain, palpate the lower neck from ventral
- Gently check range of motion of neck in all 4 directions
- Palpate along the dorsal spinous processes without touching the abdomen
- Lift the tail
- Check for neurologic deficits
- Crying out when picked up is more often due to spinal pain than abdominal pain



## Physical Exam

### Hemoabdomen

- Pressure wrap on the cranial abdomen can slow hemorrhage
- Can collect the blood, run it through a blood administration set and give it back to the IV compartment



## In House Diagnostics

### Emergency Bloodwork

- CBC with platelets
- General health profile – include P, Ca<sup>++</sup>, albumin and triglycerides
- Electrolytes and blood gases
- Urinalysis





## Drug Therapy

### Broad spectrum IV antibiotics

- As soon as sepsis is suspected or identified
- Ampicillin + cefixotin
- Ampicillin + enrofloxacin
- Ampicillin + amikacin (if not hypovolemic)
- Can substitute metronidazole for ampicillin, but give slowly, and it is less broad spectrum



## Drug Therapy

### Heparin

- If DIC – 75 U/kg SC TID

### Corticosteroids

- Use for sepsis is controversial
- Single moderate dose is best
- Not with NSAIDs

### Neupogen (Granulocyte Colony Stimulating Factor)

- If neutrophilia is acute, this can improve survival



## Imaging

### Abdominal rads

- Superior to US for finding intestinal obstruction or foreign body
- Better than US for evaluating gas in the abdomen
- DDx Pneumoperitoneum:
  - Rupture of hollow viscus
  - Gas forming bacteria
  - Therapeutic abdominocentesis or recent surgery/laparoscopy – days to weeks
  - Penetrating injury



## Imaging

### Abdominal Ultrasound - FAST

#### •Focused Assessment with Sonography in Trauma

- early recognition of intraperitoneal blood
- rapid, safe and sensitive
- can be repeated if the patient's status changes
- help prioritize initial management in patients with multiple penetrating injuries or an unknown missile trajectory
- Sensitivity for determining need for surgery is 50% in people



## Imaging

### Acute Abdomen Surgery

- Collect peritoneal fluid for analysis & culture/sensitivity
- Identify and resolve sources of acute hemorrhage
- Identify, debride, remove, **lavage** necrotic tissues
- Identify and resolve GI/urinary obstruction
  - Run the gut
- Assess and treat for generalized or localized peritonitis
  - Contain the evil spirits
- Collect diagnostic samples



## Imaging

### Diagnostic Surgery – Canine Samples

- Liver
- Stomach, duodenum, jejunum, ileum
- Mesenteric lymph node
- Aspirate spleen for cytology
- Evaluate and sample if abnormal:
  - Spleen, kidneys, colon, bladder, prostate, ovaries/uterus
  - Other lymph nodes (hepatic, sublumbar)
  - Pancreas, gall bladder and adrenals only if absolutely necessary



## Imaging

### Diagnostic Surgery – Feline Samples

- Liver
- Stomach, duodenum, jejunum, ileum
- Pancreas
- Mesenteric lymph node
- Aspirate spleen for cytology
- Evaluate and sample if abnormal:
  - Spleen, kidneys, colon, bladder (repro organs)
  - Other lymph nodes (hepatic, sublumbar)
  - Gall bladder and adrenals only if absolutely necessary



## Handouts

- [PowerPoint Presentation](#) – after the gold tab
- [Clinic Handouts](#)
  - Coagulopathy Diagnostic Chart
  - CPR Flow Sheet
  - Emergency Exam Cat
  - Emergency Exam Dog