The Acute Abdomen

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Introduction

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Painful (Abdominal) Plans for tonight…

- General pathophysiology of acute abdomen
- Recognize the clinical syndrome of acute abdomen
- Rapid assessment of acute abdomen
- Therapy considerations
- Define when surgical intervention is necessary
Acute Abdomen

• Definition: Sudden onset of acute abdominal pain

Pathophysiology of Pain:

• Originates via stimulation of type C and A nerve fibers
• Fibers located in the capsules of abdominal viscera, parietal peritoneum, and mesentery
• Pain can be from organ capsule stretch, as well as ischemia and inflammatory mediators (e.g., substance P, histamine, serotonin)

History! It is not always this easy!
“My dog ate a spoon.”

Acute abdomen symptoms:

• Vomiting
• Diarrhea
• Fever
• Anorexia
• Breathing changes
• Distended abdomen
• Abdominal Pain

Examination...Or this easy...

Acute abdomen...
Localization:
- Hepatobiliary
- Gastrointestinal
- Pancreatic
- Splenic
- Urogenital
- Peritoneal

Gastrointestinal
- GD/GDV
- Trauma
- Neoplasia
- GI ulceration
- Intestinal obstruction
- Perforated or strangulated bowel
- Gastroenteritis (HGE, Parvo, garbage enteritis, etc)
- Mesenteric volvulus, avulsion, or thrombosis

Hepatobiliary
- Acute hepatitis
- Hepatic abscess
- Cholecystitis
- Bile duct obstruction
- Biliary rupture
- Neoplasia
- Cholangiohepatitis

Pancreatic
- Pancreatitis
- Pancreatic abscess
- Neoplasia

Urogenital
- Acute renal failure
- Pyelonephritis
- Pyometra or metritis
- Uterine torsion
- Testicular torsion
- Prostatitis or prostatic abscess
- Ureteral or urethral obstruction
- Renal, ureteral, cystic or urethral calculi

Peritonitis
- Chemical
  - Bile
  - Urine
  - Pancreatic
- Septic
  - Ruptured viscous or abscess
  - Penetrating wound
Referred abdominal pain:

- Spinal disorders
- Spinal arthritis
- Discospondylitis
- Soft tissue disease in the abdominal area.

DIAGNOSTICS

- PCV and TS
- Blood glucose
- Azo / BUN
- CBC
- CHEM
- Urinalysis
- Chest Radiographs
- Abdominal Ultrasound

PCV/TP

- PCV and TS
  - ↑PCV ↓TS
  - ↓PCV ↑TS
  - ↓PCV Normal TS

Blood Glucose

- Blood glucose
  - Hypoglycemia
  - Sepsis/SIRS
  - Insulinoma
  - Hyperglycemia
  - Diabetes? DKA?
  - Stress (Cat >>> Dog)
  - Death glucose (Dog)

AZO/BUN

- Azo / BUN
  - Azotemia
  - Pre-Renal
  - Renal
  - Post-Renal

LYTES / LACTATE

- Electrolytes and acid-base
  - Hypochoremic metabolic alkalosis
  - Hyperkalemia
  - Hypernatremia
  - Acidosis? Lactic?
**Lactate & GDV**

- Pre-op lactate levels performed on dogs with GDV was prognostic for the presence of gastric necrosis and survival.
- Dogs with a pre-op lactate of less than 6 mmol/L survived, vs. 58% of dogs with a lactate of > 6.0 mmol/L.
- In addition, dogs requiring gastric resection due to suspected gastric necrosis had a median pre-op lactate of 6.6 mmol/L.

**BLOOD SMEAR**

- Blood smear
  - Leukopenia
  - Sepsis
- Leukocytosis
- Inflammation
- Sepsis
- Left shift?

### Emergency Database

- **Complete Blood Count**
  - White cell counts
  - Platelets
- **Chemistry Profile**
  - Amylase and lipase?
  - Renal values
  - Liver values
- **Urinalysis**

### Emergency Database - Fecal

- **Campylobacter**
- **Giardia**

### CPL

- **Diagnostic accuracy of the SNAP and Spec canine pancreatic lipase tests for pancreatitis in dogs presenting with clinical signs of acute abdominal disease**

### Additional Diagnostics

- Radiographs
- Abdominocentesis
- Diagnostic Peritoneal Lavage
- Abdominal Ultrasound
- Radiographic contrast studies
Radiographs

NOT until patient is STABILIZED!!!

- Evidence of obstructive patterns
- Abdominal detail
- Free gas

Radiographs: Not diagnostic?

- Repeat in 3-4 hours
  Change in gas pattern?
- Barium study
- Poor detail?
  Ultrasound?

Loss of detail?

Abdominocentesis - Indications:

Indications:
- Presence of fluid or loss of abdominal detail
- Blunt trauma (HBC)
- Penetrating abdominal trauma
- Possible septic peritonitis
- Undiagnosed painful abdomen or severe shock

Abdominocentesis

- Assess for free fluid
  Abdominal Retroperitoneal
- Guide needle into fluid pocket
  Increases sensitivity
- Not for diagnosing GI obstruction
- To evaluate solid organs

Ultrasonography:
Ultrasonography: FAST

Evaluation of a focused assessment with sonography for trauma protocol to detect free abdominal fluid in dogs involved in motor vehicle accidents

JAVMA, Vol 225, No. 8, October 15, 2004
Samantha R. Bayram, DVM; Elizabeth A. Roszkowski, DVM; Patricia J. Tidwell, DVM; James L. Hahn, DVM; Scott P. Shaw, DVM; John E. Rish; DVM; MS; David J. Seibert.

Original Study

Evaluation of an abdominal fluid scoring system determined using abdominal focused assessment with sonography for trauma in 101 dogs with motor vehicle trauma

Gregory R. Linskens, DVM, DACVS; DAVCO; Michael S. Legzdins, DVM, MS, DACVS; Kelli A. Wood, DVM, MS, DACVS; Geoffrey T.orgen, DVM, PhD, DACVS; Elizabeth G. Philips.

Diagnostic Peritoneal Lavage (DPL):

+ Underutilized – do we need it?
+ Higher sensitivity
  - Detect smaller or pocketed effusions (1-4 ml/kg)
+ More invasive
  - Sedation, local anesthesia
+ Diluted sample – effects cell counts and chemistries
+ Indications?

Abdominal Fluid Analysis

- Cytology
- Culture and sensitivity
- Fluid analysis – cell counts and total protein
- Creatinine, K+
- Bilirubin
- Glucose, lactate, pH

Indications for DPL

- Unsuccessful abdominocentesis
- Suspected inflammatory/septic condition without fluid accumulation

Septic effusion:

- Peripheral blood to abdominal fluid glucose difference of > 20 mg/dl
- Lactate concentration difference of >2mmol/L between abdominal and peripheral blood is also suggestive of septic effusion in dogs

Comparison of Peritoneal Fluid and Peripheral Blood pH, Bicarbonate, Glucose, and Lactate Concentration as a Diagnostic Tool for Septic Peritonitis in Dogs and Cats

Jennifer J. Sonczenski, DVM, LOI, L. Ludwick, DVM, MS; Christopher A. Hall; Linda A. Barton, DVM, Havemeyer; Andrew Loar, DVM, Taplow; and Mark E. Peterson, DVM, Taplow.
Other comparative tests: fluid analysis

- Urohomen?
  - Potassium: AFK+PBK+ ratio > 1.4/1.9:1
  - AFCr:PBCr ratio > 2:1
  - BUN is not an acceptable measurement as it rapidly equilibrates across the peritoneum.

Evaluation of Abdominal Fluid: Peripheral Blood Creatinine and Potassium Ratios for Diagnosis of Uropertoneum in Dogs

Other comparative tests: fluid analysis

- Bile Peritonitis
  - A fluid bilirubin concentration greater than the plasma bilirubin concentration (typically about twice that of plasma) supports bile
  - Bilirubin degrades with exposure to light, so samples should be kept dark prior to analysis.

Treatment

Going back… examination – Primary Survey

- A quick assessment for shock is mandatory
  - Clinical signs of early compensatory shock include:
    - Tachycardia, normal mucous membrane color, rapid capillary refill time (CRT), and bounding pulses.
  - As decompensation occurs, signs may include:
    - Pale mucous membranes, prolonged CRT, weak peripheral pulses, and depression

Treatment plan:

- Vascular access
- Cardiovascular shock – Fluid therapy?
  - Isotonic Crystalloid fluid therapy
    - Normosol-R (Abbott Laboratories, North Chicago, IL)
    - Lactated Ringer’s solution (LRS; Abbott Laboratories)
    - 0.9 % Sodium chloride (Abbott Laboratories)
- Shock bolus - Isotonic Crystalloid:
  - Shock bolus?
    - Isotonic Crystalloid fluid therapy
      - Dog 90 ml/kg, Cat 45-60ml/kg
      - Give ⅓-1/3 as bolus
      - Example – 10kg dog
        - 10kg x 90ml/kg = 900ml (round to 1 liter)
        - Give ⅓ = 250ml
        - How fast? 15 minutes? 20 minutes?
Shock bolus – Colloid:

- Shock bolus?
  - Colloid fluid therapy
    - 6% hetastarch (Baxter Health Care Corp, Deerfield, IL)
    - Dose 3-5ml/kg
    - Example – 10kg dog
      - 10kg x 5ml/kg = 50ml
      - How fast? 15 minutes? 20 minutes?

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Metoclopramide</td>
<td>0.2-0.4 mg/kg SQ q6-8hr 1.0-2.0 mg/kg/day IV CR1</td>
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<tr>
<td>Chlordiazepoxide</td>
<td>0.01 mg/kg IV</td>
</tr>
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<td>Prochlorperazine</td>
<td>0.05-0.25 mg/kg IV TID-QID</td>
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<td>Maropitant (Crenia)</td>
<td>2.8 mg/kg PO, 1mg/kg SQ q 24h</td>
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<tr>
<td>Ondanestron</td>
<td>0.1-0.3 mg/kg SQ, IM, IV q6-12hr</td>
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<td>Dolasetron</td>
<td>0.1-0.3 mg/kg SQ, IM, IV q6-12hr</td>
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Do I need more fluids?

- Re-assessment:
  - Heart rate
  - Pulse quality
  - Mucous membrane color
  - Capillary refill time
  - Respiratory rate
  - Respiratory Effort
  - Blood pressure
  - Urine output
  - Mentation

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<td>0.7 mg/kg q24 hours PO</td>
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<td>Cimetidine</td>
<td>4 mg/kg IV/SQ q6-8hr</td>
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<tr>
<td>Ranitidine</td>
<td>2mg/kg IV q8hr</td>
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<td>requires an acid environment, and should be given 2 hours prior to the H2-blocker</td>
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Other treatment considerations: Antimicrobials:

- Once hypovolemia and decreased tissue perfusion to abdominal viscera are present, compromise of the intestinal wall can lead to translocation of intrauterine bacteria and can predispose patients to septicemia and/or endotoxemia
  - Cefazolin sodium - 22 mg/kg IV tid
  - Ampicillin sodium - 22 mg/kg IV tid
  - Enrofloxacine – 10-20 mg/kg IV sid (in dogs)
  - Metronidazole - 10 mg/kg IV bid
  - Clindamycin hydrochloride – 10 mg/kg IV tid
  - Imipenem – 3-10 mg/IV tid-qid

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Sucralfate requires an acid environment, and should be given 2 hours prior to the H2-blocker

Other treatment considerations: Anti-emetics

- Antiemetic selection should be based on the suspected mechanism of vomiting.
Other treatment considerations:
Analgesia?
- Analgesia is an important element in the treatment of patients with acute abdomen
- Pain → release of stress hormones

Surgical?
- If then deemed surgical…

Absolute surgical indications:
Uncontrollable abdominal hemorrhage and inability to stabilize medically

Absolute surgical indications:
Free gas on plain abdominal radiographs (provided previous surgery has not been performed, and gas was not introduced via abdominocentesis)

Absolute surgical indications:
GDV

Absolute surgical indications:
Intracellular bacteria, fecal or vegetable material in abdominal fluid
Absolute surgical indications:
Bilirubin in abdominal fluid higher than peripheral serum levels

Absolute surgical indications:
Complete bowel obstruction or linear foreign body

Absolute surgical indications:
Evisceration or Abdominal Impalement

Absolute surgical indications:
Splenic torsion

Absolute surgical indications:
Mesenteric volvulus

Absolute surgical indications:
Gunshot wound to abdomen
Absolute surgical indications:

So we take them to surgery and resolve the problem…

Post-operatively

- Fluid balance
- Acid-base / electrolyte balance
- Pain management
- Oxygenation / Ventilation
- Nutrition
- Anti-emetics? H2 blockers?
- Antibiotics?

CASE REVIEW

- Ranger
- 6yo MC German Shepherd dog
- No past medical history
- UTD on vaccines
- No current Rx, OTC, or homeopathic medications
- HW/Flea / Tick
- Earlier today was outside playing, normal

Ranger

- Presenting Complaint
  - Lethargy and Anorexia
  - Vomiting x 2 since dinner
  - Slightly tense abdomen
  - Didn’t want to lay down

Physical Examination

- Temp 102F (38.9C)
- HR 160, no murmurs, fair synchronous pulses
- Mm pale, CRT 3 sec
- Lungs clear, rate/effort normal
- 5% dehydration
- Abdomen tense, uncomfortable cranial-mid, mid-abdominal mass
- Neuro: alert/appropriate
Ranger – Problem list

- Tachycardia
- Pale MM, prolonged CRT
- 5% dehydration
- Abdominal pain
- Vomiting / Lethargic

Ranger – Dx Plan

- IV Catheter
- Extended database
- PCV/TP/BG/LYTES
- Lytes / Lactate / Blood smear
- Blood pressure
- ECG

Ranger – Results

- EDB
  - PCV 45%, TS 6.5, BG 1403, Azo 5-15
  - pH 7.12, PCO2 30.5, HCO3 20, BE – 8.9
  - Na 145, K 3.8, Cl 111, Lactate 6.4
- Blood Pressure
  - 90/390, MAP 52
- ECG
  - Sinus Tachycardia

Ranger – Updated Concerns

- Acute abdomen
- Hypotensive / Shock
- Metabolic Acidosis, lactate vs other

Ranger – Additional Dx

- Bloodwork
  - CBC, Chemistry Panel, Coagulation Panel
- Imaging
  - Abdominal Radiographs
  - Chest Radiographs
  - Abdominal Ultrasound

Ranger - Tx

- Received 750 ml Norm-R bolus
- Recheck HR 110
- Recheck BP 113/67, MAP 86
- Looked more BAR when owners came back to visit before leaving
**Ranger**

**AXR and Ultrasound**
- Enlarged, displaced spleen
- Hypoechoic, diffusely mottled
- No blood flow seen on color doppler imaging

**Clinical Diagnosis**
- Splenic Torsion
- Relation to Clinical Signs?

**Plan**
- Abdominal Exploratory
- Splenectomy
- Gastropexy

**Acute Abdomen**

**Summary:**
- Better able to recognize syndrome of AA
- Quick assessment including diagnostics
- Therapy options
- To determine the cause
- Medical vs. surgical disease?

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- January 17-21 - NAVC Orlando, Fl
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**Dr. Garret Pachtinger**
- October 13-16 – Atlantic Coast Veterinary Conference. Atlantic City, NJ
- Oct 24-26 - Ralph Lee’s Great Smokies Veterinary Conference, Asheville, N/C
- January 17-21 - NAVC Orlando, Fl
- February 15-19 – WVC, Las Vegas

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Questions?

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