Updates in Pancreatitis

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Introduction

- Species differences = underdiagnosis
- Cats usually have chronic disease
- Subtler in cats
Pancreatitis

- **Acute**
  - Severity can range from mild to fatal
  - Little or no permanent pathological change
  - May have repeated bouts of acute pancreatitis

- **Chronic**
  - Fibrosis is present
Pancreatitis

- Both acute or chronic forms may lead to EPI or diabetes mellitus
Etiology

- End-result of pancreatic autodigestion
- Variety of insults can initiate
Possible Etiologies

- **Toxoplasma gondii**
- Flukes
  - *Amphimerus pseudofelineus*
  - *Eurytrema procyonis*
- Panleukopenia
- Bartonella
Possible Etiologies

- FIP
- Blunt trauma
- Organophosphates
- Drugs
High Rise Syndrome
Toxoplasmosis

- 84% of cats with clinical Toxoplasmosis have pancreatic involvement
- Other organs affected in cats:
  - pulmonary
  - CNS
  - hepatic
  - cardiac
  - ocular
Toxoplasmosis

- Cats with elevated fPLI have same seroprevalence for Toxo as cats with normal fPLI
Toxoplasmosis

- Diagnosis of active infection
  - + IgM with - IgG
  - 4x ↑ in IgG over 2-3 weeks
  - consistent clinical signs

- Treatment
  - Clindamycin 10 mg/kg bid x 2-4 weeks
Flukes

- *Amphimerus pseudofelineus* (hepatic fluke)
- *Eurytrema procyonis* (pancreatic fluke)
Bartonella?

- 1/5 of cats with pancreatitis have antibodies against *Bartonella* sp
- 1/5 of cats *without* pancreatitis have antibodies against *Bartonella* sp
Concurrent disorders

- inflammatory bowel disease
- cholangiohepatitis
- hepatic lipidosis
- interstitial nephritis
- diabetes mellitus $\Rightarrow$ DKA
“Triaditis”

- pancreatitis
- IBD
- Cholangiohepatitis
  - pancreatitis tends to be mild
  - IBD tends to be severe
Etiology

Anatomy may explain relationships:
Common terminal bile & pancreatic duct
- allows reflux of bile into pancreas
Etiology cont.

- explains concurrent cholangiohepatitis & pancreatitis
  - earlier studies = 2/3 of cats w/ pancreatitis had cholangiohepatitis
  - More recently only 2 of 49 pancreatitic cats had cholangiohepatitis
  - 2011 study found 60% of cats with cholangitis also had pancreatitis
Bottom line:
As we learn more about feline pancreatitis, there are more questions about the etiology and fewer absolutes about concurrent disorders.
Diagnosis
Clinical presentation

- Usually middle-aged & older
- No breed or sex predilection
- Chronic disease in 65%-90% of cases
- Lethargy
- Anorexia
- Weight loss
Clinical presentation

- Less frequently, cats have acute pancreatitis
- Vomiting
- Abdominal pain
Physical examination

- Nonspecific
- Dehydration
- Depression
- ± Pale or icteric mm
- ± Abd pain or mass
- ± Tachypnea
Diagnosis

- Minimum Data-Base (CBC, Chem, UA)
- Nonspecific findings
- Rule out other diseases
- Find concurrent problems
CBC

- Nonregenerative anemia ~1/4 of cats
- Hemoconcentration from dehydration rarely
- Leukocytosis ~1/2 of cats
- Leukopenia uncommon but may be associated with worse prognosis?
- Thrombocytopenia rare $\rightarrow$ DIC?
Chemistry Panel

- ↑ ALT
- ↑ Alk Phos
- ↑ Bilirubin

\[ \text{\( \frac{1}{2} \text{ of cases} \)} \]

- Concurrent cholangiohepatitis
- Secondary hepatic lipidosis
Chemistry Panel

- Azotemia- Dehydration v. concurrent nephritis (need usg!)
- Hypoalbuminemia
- ↑ Cholesterol (most common abnormality?)
- ↑ BG
- ↓ Calcium (45-65%), Potassium, Phosphorous
Potassium

- Recent study found both hypo- and hyperkalemia to be associated with worse prognosis
  - Stockhaus et al, JAVMA Dec 15, 2013
- Finding differs from previous studies
Diagnostics

- ↓ Calcium in ~1/2
- ↓ ionized Ca also noted
- No clinical signs of hypocalcemia
- Associated with a poorer prognosis in some studies
Diabetes mellitus

- ↑ BG & glucosuria may be noted
- Stress vs. diabetes
  - monitor for ketonuria
  - fructosamine levels
- Chronic pancreatitis may be under-recognized cause of diabetes in cats
Diabetes mellitus

- Transient vs. permanent DM?
- Some cats also present with ↓ BG
Diagnostics

- Amylase & lipase often within normal limits in pancreatitis
- Increased Amylase and Lipase in chronic intestinal disease
- Increased Amylase and Lipase with decreased GFR
Diagnostics

- ↓ Cobalamine and Folate
- Cobalamin is bound to intrinsic factor (IF)
- In cats, IF is produced exclusively by pancreas
Diagnostics

- ↑ TLI – inadequate sensitivity & specificity
- Feline pancreatic lipase immunoreactivity (fPLI) – 100% sensitivity?
pancreatic lipase immunoreactivity

Not Gold Standard

- 100% sensitivity and specificity in moderate-severe cases reported
- With mild disease, only 54% sensitivity
- Specificity only 67% in cats sick with other illnesses
fPLI

- fPLI > 20 µg/L at admission may be associated with worse outcome
2013 paper by Jaensch (Comp Clin Pathol 22:801-803) found that renal insufficiency can result in elevation of FPL without clinical evidence of pancreatic disease.

May also be increased in IBD.
Snap fPL

- Reference spot correlates with upper limit of reference range (3.5 µg/L for cats)
- Sample spot is compared to reference spot
  - Normal if sample spot color is less intense than reference
  - Abnormal if sample is equally or more intense in color
Cannot distinguish gray zone from positive
Diagnostics - Radiographs

- Usually nonspecific
- Loss of detail/decreased contrast
- “Ground Glass” appearance
- Localized dilatation of small intestine/widened angle between pylorus & duodenum
- Soft tissue opacity in area of pancreas
- Hepatomegaly
Diagnostics - Radiographs
Diagnostics - Radiographs

- Pleural effusion
Diagnostics

- **Ultrasound**
  - hypoechoic changes in pancreatic parenchyma
  - hyperechoic fat surrounding pancreas
    - saponification of fat
  - free fluid
  - biliary obstruction
Diagnostics: Ultrasound

- Highly specific
- Low sensitivity – changes in only 1/3 of cases?
- Hypoechoic pancreatic parenchyma
- Hyperechoic fat surrounding pancreas
  - Saponification of fat
- Free fluid
- Biliary obstruction
Irregular, “wavy” duodenum due to pancreatitis
Diagnostics: CT

- Low sensitivity 😞
Diagnostics: MRI

- One study of 10 cats (Marolf et al, J Fel Med Sx 2012) found it to be useful
- Used clinical diagnosis as gold standard
- Investigators not blinded
- Requires general anesthesia
Diagnostics: Endosonography

- Endoscope equipped with an ultrasound transducer at its tip
- Position scope in stomach
- Can examine liver, pancreas, etc.
- Better visualization of pancreas
PD = Pancreatic duct
SV = Splenic vein
Diagnostics: Fluid analysis

- Abdominal fluid
  - serosanguinuous to suppurative
  - Due to pancreatic inflammation, peritonitis, hypoproteinemia, or thromboembolism

- Pleural effusion
  - Due to pancreatic enzymes & inflammatory mediators in systemic circulation
Diagnostics: Histopathology

- “Gold standard”
- Exploratory laparotomy or laparoscopy
- Gross findings: pancreatic hemorrhage or swelling
  - dull, granular capsular surface
  - peripancreatic fat necrosis
Diagnostics: Histopathology

- Inflammation can be very localized
  - Can be missed!

- 2007 study of healthy cats = histopathologic lesions of pancreatitis in 45%!!!
Treatment
Therapy: Fluids

- Correct dehydration
- Ongoing losses
- Monitor electrolytes daily
- Acidosis may be present
Therapy: Plasma

- replaces alpha-macroglobulins
  - protects from proteolytic enzymes
- replaces albumin
  - oncotic support
  - protective against lipase & phospholipase A₂
  - limits pancreatic edema formation
- replaces clotting factors
Therapy: Analgesia

- Cats often stoic :: pain under-reported
- Pain contributes to anorexia
- Injectable opiates
- Fentanyl patches
Therapy: Antiemetics

- Control vomiting
- Treat nausea
Anti-emetics

- Metoclopramide
  - Dopamine antagonist
  - Inhibits vomiting by blocking chemo-receptor trigger zone dopamine receptors
  - Enhances motility in upper GIT

- Ondansetron & Dolasetron
  - Act on serotonin receptors in CRTZ
Anti-emetics

- Maropitant (Cerenia)
  - Off-label in cats
  - NK$_1$-receptor antagonist
  - Controls vomiting
  - May provide visceral analgesia
Therapy: Nutrition

- NPO?
  - Recommendation based on people & dogs
  - Early nutrition in people/dogs beneficial
  - Cats with pancreatitis rarely vomit
  - Secondary hepatic lipidosis often present
  - Feed!
Therapy: Nutrition

- Feeding tube often needed
- Jejunostomy tube ideal
  - bypasses the pancreas
  - Often impractical
- Nasoesophageal and nasogastric tubes short-term
  - 2009 study NG feedings well-tolerated
Nutrition

- Esophagostomy tubes for longer-term
- Enteral nutrition preferred to TPN/PPN
  - Beneficial for enterocyte health
- Parenteral nutrition better than no nutrition!
- Don’t worry about fat content
Therapy

- Diabetics will require insulin
  - rule out stress hyperglycemia
  - insulin as necessary
  - monitor carefully following resolution of pancreatitis
Therapy: Antibiotics?

Bacteria does not cause feline pancreatitis

*Use Abx if:*

- Concurrent dz incl. cholangiohepatitis
- Suspect Abscess
- Patient is febrile, has marked leukocytosis, has hematemesis or other evidence of breakdown of GI barrier
Therapy: Other

- Dopamine within 12 hr of experimentally inducing pancreatitis
- Surgery
  - abscesses & infected necrosis
  - biliary obstruction
  - allows biopsy & placement of feeding tube
  - poor anesthetic risks
  - avoid hypoxia, hypotension to pancreas
Therapy

- Antiinflammatories?
  - Inflammatory bowel disease
- Antacids?
  - Work in people does not indicate a benefit
- Peritoneal lavage?
Chronic pancreatitis

- In addition to controlling dehydration, nausea, vomiting and pain, may also need appetite stimulant
  - Mirtazapine
  - Cyproheptadine
Therapy

- Cobalamin supplementation
- 250 micrograms weekly x 6 wk
Therapy

- Corticosteroids?
- Used to be thought to be cause of pancreatitis
- Often necessary to treat comorbidities
- Need to be examined whether of benefit to treat pancreatitis
Prognosis

- Depends on severity
Thank you!