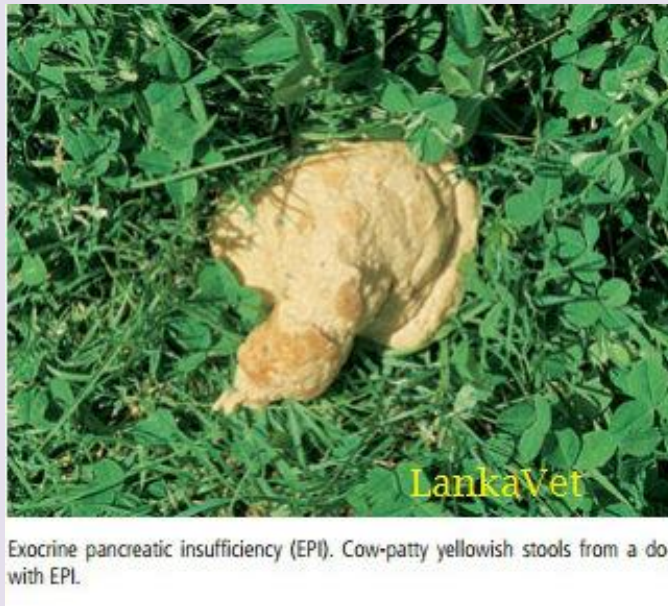


## Question

A 6-year old domestic short hair presents to you with a history of weight loss and steatorrhea. On examination, you can palpate thickened small intestinal loops of bowel. You are suspecting EPI (exocrine pancreatic insufficiency). How would you diagnose this condition?

- Measure plasma cobalamin concentration
- Measure serum cobalamin concentration
- Measure serum fTLI concentration
- Measure serum fPLI concentration
- Measure serum amylase and lipase concentrations

**Explanation** - EPI is characterized by the lack of production of pancreatic digestive enzymes and is best diagnosed by measuring **trypsin-like immunoreactivity**. EPI occurs when **90%** of pancreatic exocrine function is destroyed. **fTLI** concentration is measured from a fasted blood sample and a trypsinogen level less than 8ug/L is diagnostic. Typically **cats with EPI also have concurrent chronic pancreatitis** as well as **low levels of cobalamin (Vitamin B12)**. The exocrine pancreas is responsible for secreting intrinsic factor. Intrinsic factor binds cobalamin to allow for gut absorption. Amylase and lipase concentrations do not provide reliable information regarding pancreatic function in cats.



## Question

What is the surgical treatment of choice for cats with chronic obstipation and megacolon that is refractory to medical therapies?

- Colonoplasty
- Enterotomy and reclosure after removal of feces
- Colostomy

- Subtotal colectomy

**Explanation** - The correct answer is **subtotal colectomy**. This technique usually entails transecting the ascending colon a few centimeters distal to the cecum and the descending colon a few centimeters proximal to the pubis and anastomosing them together, trying to preserve the ileocolic junction. The other procedures listed are not successful therapies for megacolon.



Fig. 1: Excised colon from a cat with megacolon



Fig. 2: Lateral radiograph of a cat with megacolon



Fig. 3: Intraoperative appearance of megacolon in a cat. Ileum is to the left, rectum to the right.



Fig. 5: Completed ileal-colic anastomosis after subtotal colectomy

## Question

Which is not a common cause of gastric ulcers in dogs and cats?

- NSAIDS
- Renal Failure
- Opioids
- Liver Failure

- Corticosteroids

**Explanation** - The answer is opioids. NSAIDs and corticosteroids compromise the mucus-bicarbonate protection of the stomach. Renal disease and the corresponding uremia cause decreased mucosal blood flow and gastric hypersecretion. Liver disease causes gastric ulcers by decreasing mucosal blood flow secondary to portal hypertension and thrombosis. Liver failure is also associated with increased histamine and gastrin levels leading to gastric hypersecretion.

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### Question

What is the permanent dental formula for a cat?

- 2(I3/3 C1/1 P3/3 M1/3)
- 2(I3/3 C1/1 P3/2 M1/1)
- 2(I3/3 C1/1 P2/3 M1/3)
- 2(I3/3 C1/1 P4/4 M2/3)

**Explanation** - The correct answer is 2(I3/3 C1/1 P3/2 M1/1). **With total 30 teeth.**

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### Question

Vascular ring anomalies occur rarely in dogs and cats. They are typically diagnosed early in life. Which of the following is not a typical finding in animals with vascular ring anomalies?

- Poor Body Condition
- Diarrhea
- Aspiration Pneumonia
- Regurgitation

**Explanation** - The correct answer is diarrhea. Animals with vascular ring anomalies usually develop clinical signs shortly after being weaned onto solid foods. Vascular ring anomalies will result in constriction of the esophagus which, in turn, does not allow ingesta to travel through the esophagus. These animals will subsequently **regurgitate**. With enough regurgitation, they can eventually end up with **aspiration pneumonia**. These animals usually have a **voracious appetite**; however, they are in **poor body condition** since they cannot get food past their vascular ring anomaly.

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### Question

A 5-month old female kitten presents with a history of spitting up about 20 minutes after eating. The food comes up in a bolus and appears to be a passive process from what the owner describes. You believe the cat is regurgitating. The owner has been liquefying the diet and elevating her

during and after feedings and it seems she does well with this. Based on this history, which of the following congenital malformations would you be most concerned about?

- Mucopolysaccharidosis
- Persistent right aortic arch
- Peritoneopericardial diaphragmatic hernia
- Myotonia congenita
- Diaphragmatic hernia

**Explanation** - Persistent right aortic arch (PRAA) is reported but pretty rare in cats. It is seen more frequently in dogs, particularly a few predisposed breeds (Irish Setters, German Shepherds, Great Danes). Despite being a relatively uncommon disease, you should have been able to reach the appropriate answer by ruling out the other options because they cause different clinical signs.

This is how PRAA develops: During fetal development, there is a right and left aortic arch. Normally the left aortic arch forms the main artery that extends off the heart and travels to the abdominal region. In cases of PRAA, the right aortic arch develops into the aorta and the esophagus becomes trapped by the ligamentum arteriosum that extends from the pulmonary artery to the aorta. There are several other variants of how the vascular anomaly can occur. Clinical signs commonly are present from a very young age, often near time of weaning. Treatment is surgical and the prognosis with early surgical intervention is good.

Cats born with congenital diaphragmatic hernias often have mild breathing difficulties, especially when the cat is stressed. Sometimes they are incidentally diagnosed years later, although this is less common. In another presentation there may also be mild gastrointestinal upset. In severe cases, there can be respiratory distress, abnormal heart rhythm, muffled heart and lung sounds, and other signs of systemic shock. The abdomen may feel empty when palpated.

Cats born with peritoneopericardial diaphragmatic hernia (PPDH) are usually asymptomatic with discovery being made when diagnostic tests (radiographs, contrast studies, ultrasound) are performed for other reasons. Occasionally, cats will develop vomiting, diarrhea, and abdominal pain or cardiorespiratory signs.

Cats born with mucopolysaccharidosis (usually Siamese cats) have an enzyme deficiency that results in problems with the joints and/or bones.

Cats born with myotonia congenita (very rare) have muscle stiffness and may be heavily muscled with little body fat.

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## Question

A 3-year old male neutered Siamese cat has 6 cm of tissue protruding from his anus. The owner states when they woke up he was like that. She states he has had no diarrhea, constipation, vomiting, or straining that they are aware of but they have been out of town for the last 2 days.

You are unable to reduce the lesion initially with gentle manipulation. The tissue appears grossly healthy and no necrosis is noted. You are not sure if this is a prolapsed rectum or a colorectal intussusception. How can you tell?

- Pour dextrose over the tissue and see if it reduces. If it reduces, it is a prolapse.
- Take a left lateral radiograph of the abdomen and rectal region.
- Do a barium enema and see if the barium goes into the colon. If it does, it is a prolapse.
- Gently slide a thermometer alongside the prolapsed tissue. If it only goes in a short distance, this is a prolapse. If it goes in a significant distance, this would be an intussusception.
- The only way to definitively tell is by exploratory surgery.

**Explanation** - The best way to distinguish is to pass a blunt probe between the protruding mass and anus. If the probe contacts a fornix within a couple of centimeters it is likely a rectal prolapse, but if it passes 5-6 centimeters easily then an intussusception is more likely.

A **dextrose solution** may help to reduce edema associated with the tissue but would not in itself reduce the protrusion.

Exploratory surgery would be indicated and is the recommended treatment for intussusceptions. This would be a definitive way of determining if it is a prolapse vs. intussusception but this is the more invasive way of determining and is not the only way. If it is a rectal prolapse, more conservative therapy should be considered before surgery.

---

## Question

A 2-year-old male neutered domestic short hair cat presents for acutely being anorexic, lethargic, and not passing any stool. The owner reports that the cat was playing with dental floss 2 days ago and may have swallowed it. On physical exam, the cat is depressed, febrile with a temperature of 104.3, and resists abdominal palpation. On oral exam, you see that one end of the dental floss is attached to the base of the ventral side of the tongue. Abdominal radiographs show clumped intestines, loss of serosal detail, and an irregular gas pattern in the abdomen. What should you recommend to the owner?

- Induction of emesis with xylazine
- Endoscopy for linear foreign body removal
- Release the dental floss and allow it to pass through the intestinal tract on its own
- Exploratory laparotomy with linear foreign body removal
- Induction of emesis with apomorphine

**Explanation** - Linear foreign bodies are surgical emergencies. The string is often anchored at the base of the tongue. The peristaltic activity of the stomach and intestines around a string causes bunching of the intestines. With peristaltic movement, the string will often saw through the

intestines, leading to perforation and peritonitis.

Induction of emesis, endoscopy, or release of the string would be unlikely to relieve the bunching of the intestines.

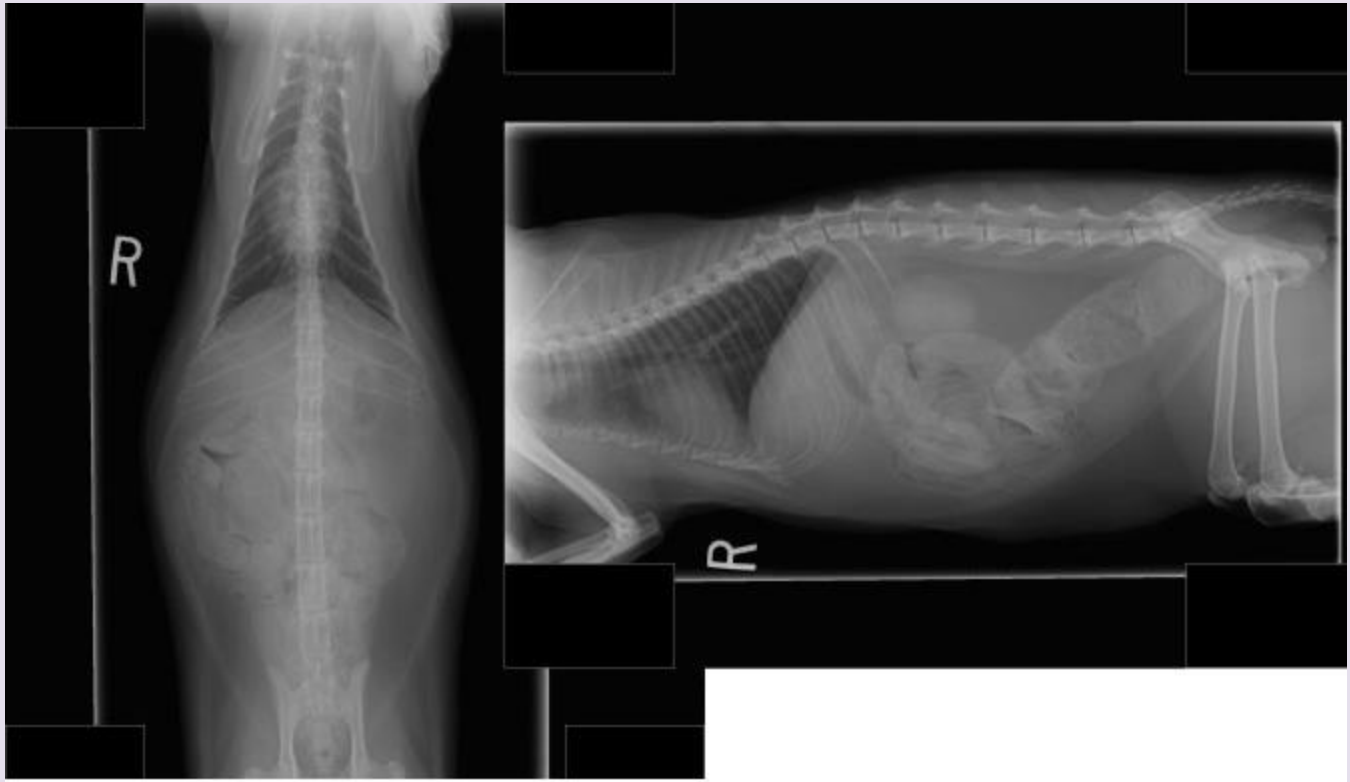


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### Question

A 7-year old male castrated domestic short haired cat presents to you with a chronic history of repeated episodes of vomiting, inappetence, weight loss, and dehydration over the past year. On exam, the cat is 8% dehydrated, HR= 180, RR= 36. The cat is very agitated and resists palpation. You take the abdominal radiograph shown below. Which of the following measures should you recommend for this cat?

- Fluid therapy to correct hydration, medical management with ampicillin and trimethoprim-sulfa
- Fluid therapy to correct hydration, abdominal exploratory surgery for enterotomy and gastrointestinal resection and anastomosis
- Fluid therapy to correct hydration, medical management with cimetidine and sucralfate
- Fluid therapy to correct hydration, medical management with methimazole
- Fluid therapy to correct hydration, medical management with psyllium and cisapride



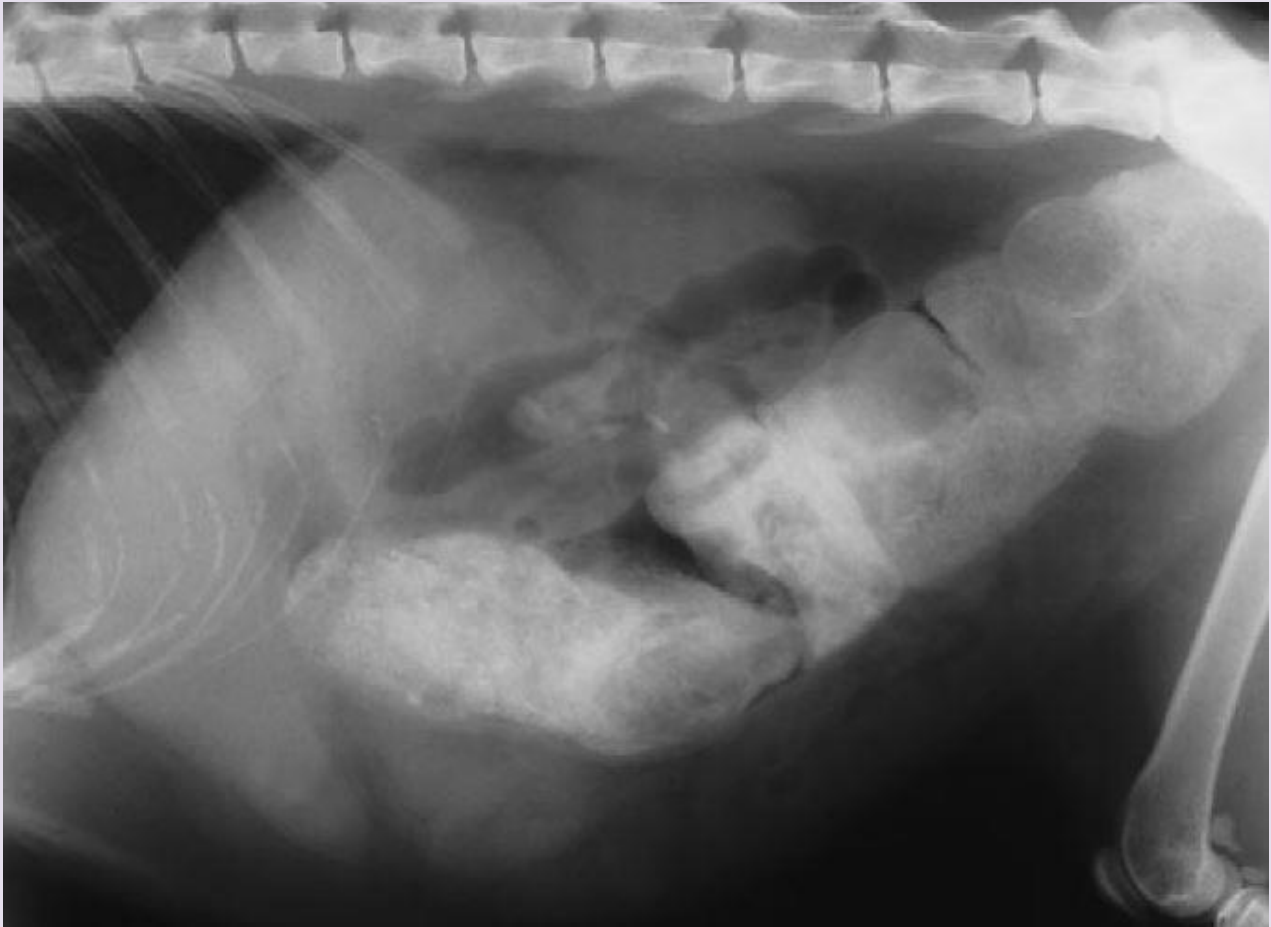
**Explanation** – The correct answer is fluid therapy to correct hydration, medical management with psyllium and cisapride. Based on the radiographs, you should have diagnosed this cat with megacolon and colonic impaction. The components of treatment for this condition are to achieve and maintain optimal hydration, remove impacted feces, dietary fiber and/or laxative treatment and use of colonic prokinetic agents. An enema is probably indicated for this cat but was not part of the answer choices. Cisapride is no longer widely available because of cardiac toxicity in a small number of human patients, but veterinarians obtain cisapride from compounding pharmacists. Psyllium is a non-fermentable fiber that increases the transit rate of ingesta, increasing the frequency of defecation.

An enterotomy would be indicated for a small bowel obstruction but not for the colonic obstruction. Antibiotics as well as cimetidine and sucralfate would not be wrong for this cat but are not the most important aspects of managing this disease. Methimazole is a treatment for hyperthyroidism, which was not diagnosed in this cat.

If the cat does not respond to medical therapy, a sub-total colectomy may be indicated.

## Question

An 8-year old female spayed domestic short hair presented for vocalizing in the litterbox and inappropriate elimination in the house for the past 3 days. The cat is strictly indoors. The cat has previously been healthy and otherwise doing well. On physical exam the patient is bright, alert, and responsive. Heart rate 180 bpm, RR 40 bpm, T 101.3F. The cat becomes agitated on abdominal palpation, and a large amount of rock-hard feces is easily palpated. CBC/Chem/T4 are unremarkable. Abdominal radiographs are available for review (see image). What is the best treatment course and prognosis?



- Immediate surgical removal of the affected organ; grave prognosis
- Surgical evacuation; poor prognosis
- Enema, laxatives, Cisapride; fair prognosis
- IV fluids and laxatives, great prognosis
- Aggressive fluid therapy, multiple enemas; fair to poor prognosis.

**Explanation** – The correct answer is Enema, laxatives, Cisapride; fair prognosis. Megacolon is well documented in cats. The most common cause in Manx cats is a deformity in the caudal spinal cord. In other cat breeds the most common cause is idiopathic. Other potential causes are pelvic fracture malunions (leading to decreased pelvic canal size), dehydration, GI foreign bodies, and thyroid disease.



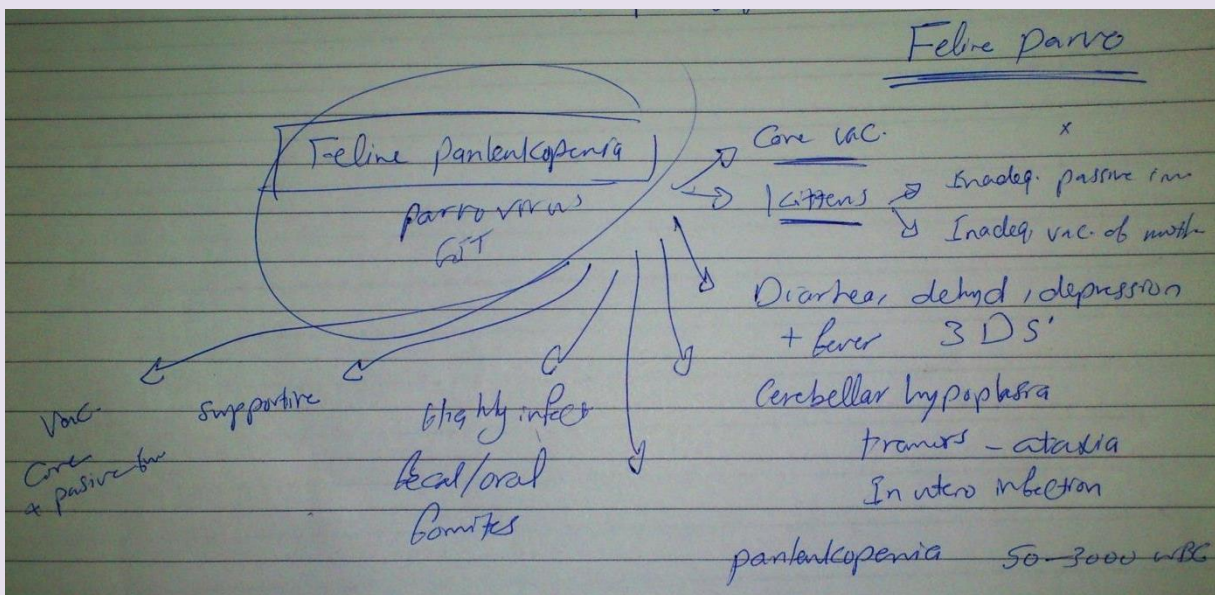
In mild to moderate cases or first cases of constipation, aggressive re-hydration, increased water consumption, and laxatives can appropriately manage the disease. Cisapride is a prokinetic drug which may help with intestinal motility and thus help prevent the formation of fecoliths in cats. Surgical correction with subtotal or total colectomy provides a good to great prognosis in cases which are nonresponsive to medical management, although diarrhea and short bowel syndrome can occur weeks to months afterwards. Many cats that are managed medically eventually need surgical intervention.

**Question**

A 4-month old kitten arrives at your clinic with a 3-day history of anorexia, lethargy, vomiting, and diarrhea. On physical exam the cat is 5% dehydrated and has a temperature of 103.9F. What is your primary differential?

- Foreign body
- Feline infectious peritonitis
- Feline immunodeficiency virus
- Feline panleukopenia virus

**Explanation** - The correct answer is feline panleukopenia virus. These clinical signs most closely correlate with panleukopenia. One must piece together the signalment, history, and clinical findings. Usually a cat with a **foreign body will not have diarrhea and a fever**. It is unlikely for a 4-month old kitten to have FIV due to maternal antibody protection. It is also unlikely for FIP to present in such a manner. With the wet form of FIP, you may see dyspnea due to pleural effusion and abdominal distention due to ascites. With the dry form of FIP it will depend on the organ that is affected. You may see a hepatopathy, splenomegaly, renal failure, etc.



## Question

A 2-year old FS DSH presents with a history of anorexia and vomiting for the last 48 hours. She is dehydrated and when you palpate her abdomen she seems uncomfortable. Bloodwork shows HCT 55%, albumin 4.5 g/dL, sodium 132 mEq/L, otherwise unremarkable. Temperature is 102.5F. You perform abdominal radiographs and see that the intestines appear to be bunched up in accordion-like fashion. The intestines are gas filled and moderately dilated. This plicated appearance is most typical of:

- Aerophagia
- Free gas in the abdomen from a perforation
- Linear foreign body
- Mesenteric volvulus

**Explanation** - The appearance of plicated bowel in a cat that is not eating and is vomiting is typical of a linear foreign body. If a string or linear object is swallowed, it can anchor in the intestinal tract cranially and the intestine can then start to bunch up like an accordion. It is very important to do a good oral exam to ensure that a string is not anchored under the tongue. This appearance on a radiograph warrants **exploratory surgery**, especially when the clinical symptoms support this preliminary diagnosis. The blood values in this case support evidence of dehydration.

Aerophagia appears as gas filled stomach and intestine and does not give the accordion like appearance. It is not painful on palpation.

Free air in the peritoneum comes from viscus rupture or penetrating abdominal wound (including previous surgery). It would appear as gas around the outside of the organs, almost highlighting the edges. Free air would not cause the intestine to appear plicated. A perforation from a linear foreign body cutting through the intestine could cause free air in the abdomen.

Mesenteric volvulus is an immediately life threatening disease, seen mostly in dogs, which is a twisting of the intestines on themselves at the root of the mesentery. It causes severe abdominal pain and shock. It would also cause gas distention and may even cause the intestines to appear bunched up, however, this cat has a 2 day history of illness so the more chronic presentation fits best with linear foreign body.

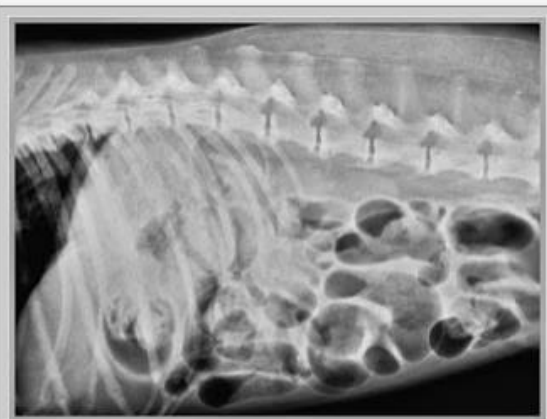


**Figure 5.**

A plicated length of small intestine containing a linear foreign body. Note that the bowel has been packed off from the remainder of the abdomen.



**Fig. 1:** String foreign body in the mouth of a cat



**Fig. 2a:** Lateral abdominal radiograph of a dog with a linear intestinal foreign body.



**Fig. 7:** String foreign body in a cat being removed through an enterotomy

## Question

A 2-year old MN DSH presents for anorexia and vomiting of 2 days duration. Physical examination reveals the cat is dehydrated, but otherwise no abnormalities are noted.

Bloodwork shows the following: BUN 55 mg/dL, creatinine 3.8 mg/dL, sodium 135 mEq/L, potassium 3.1 mEq/L, chloride 85 mEq/L, TCO<sub>2</sub> 38, HCT 60%. Urinalysis: USG 1.058, negative sediment.

You started the cat on 0.9% NaCl IV to treat the dehydration. Based on this history and blood results, what is your top differential diagnosis?

- Acute renal failure
- Urethral blockage
- Upper gastrointestinal obstruction
- Hypoadrenocorticism
- Renal lymphoma

**Explanation** - Because of this cat's history and blood results, an upper GI obstruction is highly suspected. **Hypochloremic metabolic alkalosis** is a classic finding in a pet with an upper GI obstruction and should be ruled out first, especially in a young cat with these clinical signs. **CO2 blood test is really a measure of your blood bicarbonate level.**

Acute renal failure is unlikely since the azotemia appears to be pre-renal (the urine is hyperconcentrated due to dehydration).

Hypoadrenocorticism, or Addison's disease, is very unlikely in a cat. In a pet with Addison's, the most common electrolyte finding would be an elevated potassium level.

A urethral obstruction would likely cause a post-renal azotemia and hyperkalemia. On physical examination, a large and painful bladder would be palpated. A cat having urethral obstruction going on for this period of time would be very critical and have other clinical signs.

Renal lymphoma would be a potential cause of acute renal failure which is unlikely in this young cat with a pre-renal azotemia.

---

### Question

A **9-year** old DSH cat initially presented with a history of decreased appetite and intermittent **vomiting**. On physical exam the cat is approximately **5% dehydrated**. There is no palpable slip noted in the thyroid region. Blood work performed showed a BUN of 44 mg/dL and creatinine of 2.4 mg/dL. PCV is 55. Glucose was 180 mg/dL. Abdominal radiographs showed a questionable pattern in the area of the duodenum but it was not obstructive. A barium series was then performed and did not show any obvious filling defects or delayed emptying. How should you treat this patient?

- Admit patient for fluid therapy and supportive care
- Perform an ultrasound of the urinary tract followed by a nephropyelogram
- Recommend an exploratory laparotomy and obtain biopsies
- Begin patient on amoxicillin/clavulonate

**Explanation** – The correct answer is Admit patient for fluid therapy and supportive care. With the information given, we can be sure that this patient has a mild azotemia which is more than likely pre-renal in origin. With acute renal failure, BUN and creatinine values would be much more increased. There is no indication of an infection and treating blindly with an antibiotic is inappropriate. An exploratory laparotomy would be premature at this time but may be indicated if the patient does not respond to supportive care. It is possible this patient has a mild case of pancreatitis or indigestion. It is best to admit the patient for supportive care and consider performing an abdominal ultrasound.

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### Question

Mousie, a **3-year** old FS DLH, has been **vomiting** once daily for the past week. Clinically, she otherwise acts normally. Bloodwork and radiographs are within normal limits. The owners have seen chunks of **hair** in her vomit. She is currently on no medications and is eating Fancy Feast. Which of the following would you recommend?

- Lactulose
- Laxatone (petroleum/mineral oil gel)
- Maropitant
- Metoclopramide

**Explanation** - This young long-haired cat is apparently having a hairball problem. Frequent brushing, a higher quality diet, and a hairball treatment such as **Laxatone** (petroleum/mineral oil gel) should be recommended for this cat.

**Lactulose** is a stool softener often used to help with constipation.

**Metoclopramide** is an anti-emetic and promotility agent and may be beneficial for hairballs if a high quality diet and laxatone fail to correct the problem.

**Maropitant** (Cerenia) is a central and peripheral acting anti-emetic approved for the use in dogs.

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### Question

A 2-year old MN domestic short-hair named Chopper presents with a 2 day history of lethargy and not eating. The cat **vomited** twice this morning. Temperature is normal and bloodwork is all within normal limits except the **chloride** is 92 mEq/L and **sodium** is 138 mEq/L. Which of the following tests would be the next best step for the most likely diagnosis?

- Abdominal radiographs, upper GI obstruction
- FeLV/FIV test, feline leukemia virus
- Canine parvovirus snap test, feline panleukopenia virus
- Feline corona virus titers, feline infectious peritonitis
- Hypoallergenic diet trial, inflammatory bowel disease

**Explanation** - **Hypochloremia in a young vomiting anorexic animal is most suggestive of an upper GIT obstruction.** The next best diagnostic tool in this case would be abdominal radiographs followed by a barium series if indicated.

While viral diseases and food allergies can also trigger lethargy, dehydration, and vomiting in a young cat, these are less likely. These should be investigated after an upper GI obstruction has been ruled out.

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### Question

An 8-month old kitten with **chronic diarrhea** presents for acute onset of **vomiting** and inappetance. You are currently treating the cat for coccidia since Isospora was identified on the fecal test yesterday. Yesterday the cat was clinically alert and otherwise healthy on examination. You palpate a mid-abdominal mass effect today which was not palpated yesterday and the cat

seems painful upon palpation. Temperature is normal and labwork is unremarkable. Ultrasound is not immediately available. Radiographs show an obstructive pattern with dilated loops of small intestine but no overt mass effect is visible. You are suspicious of which diagnosis and what is proper therapy?

- Feline infectious peritonitis, euthanasia
- Intussusception, exploratory surgery
- Inflammatory bowel disease, hypoallergenic diet trial
- Foreign body obstruction, exploratory
- Resistant coccidian infection and lymphadenopathy, change medication

**Explanation** - Intussusception is an invagination of an intestinal segment into the lumen of the adjacent segment. This occurrence most often happens in **young animals with a history of recent enteritis**. This leads to a mechanical obstruction which can be partial or complete. This condition is more common in dogs but also occurs in cats. It can be **life-threatening and should be corrected surgically**. A barium study may be of benefit in trying to diagnose the problem prior to surgery.

Although possible, it would be unlikely for a lymph node to become that enlarged since the day's previous palpation and typically lymph nodes are not painful upon palpation.

FIP typically presents with a more chronic history; usually a fever is present, and laboratory changes such as hyperglobulinemia is present.

Inflammatory bowel disease would not cause an acute mass in the abdomen.

Foreign body obstruction is also a possibility, especially in a young cat, but due to the history, less likely than intussusception.

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## Question

Which of the following statements is correct regarding the treatment of pancreatitis in cats?

- They should be fed a regular commercial diet if eating
- They should be fed a low-fat diet
- They should be fed through a jejunostomy tube
- They should not be fed until the pancreatitis begins to resolve
- They should be fed a low-protein diet

**Explanation** - The correct answer is feed a **regular commercial diet** if eating. Cats do not require a low-fat nor a low-protein diet and usually do not require a period of being NPO. Withholding food for an extended period may be likely to induce hepatic lipidosis in some cats. Additionally, some studies suggest that stimulation of pancreatic enzymes via feeding is actually necessary in affected cats. A jejunostomy feeding tube may be occasionally recommended in

severe cases of pancreatitis with dogs, but is less likely necessary in cats. If anorectic, usually an esophagostomy feeding tube is sufficient.

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### Question

A 12-year old indoor only Devon Rex presents with a 2 month history of **weight loss**, decreased appetite, and **diarrhea** with occasional **vomiting**. Bloodwork is unremarkable. The closest referral for ultrasound or endoscopy is 2 hours away and the owner is unable to drive for further diagnostics. You perform an abdominal exploratory and take biopsies of the stomach and intestine. The histopathology results show **lymphocytic plasmacytic enteritis** with a moderate number of eosinophils. Which of the following is the best recommendation for this cat?

- Fortiflora to restore normal intestinal bacteria
- Hypoallergenic diet and prednisolone for inflammatory bowel disease
- Prednisolone and cisplatin for lymphoma
- Metoclopramide to assist with GI motility and decrease nausea

**Explanation - Lymphocytic plasmacytic enteritis is consistent with inflammatory bowel disease.** The main treatments of this disease include controlling the underlying cause for the disease, controlling inflammation, and controlling bacterial overgrowth when needed. Steroids and **hypoallergenic diet** are the mainstay treatments for this disease. **Prednisolone** and **budesonide** are the two corticosteroids most often used. **Metronidazole** (for SIBO) can also aid in treatment.

Cisplatin is a chemotherapeutic agent that is contraindicated for the use in cats for any disease.

Fortiflora is a probiotic that could possibly help with clinical signs of IBD, however is not necessarily a treatment for the disease itself.

Metoclopramide could potentially help clinical vomiting from underlying IBD, but is a pro-motility agent that could worsen diarrhea and is not a treatment for IBD.

### Question

A 5-month old kitten presents to you with a rectal prolapse, as shown in the photo. What is the most common cause of rectal prolapse in a kitten?



- Trauma
- Dysautonomia
- Panleukopenia
- Gastrointestinal parasites

**Explanation** - The correct answer is gastrointestinal parasites. You should perform a fecal float and smear. This cat probably has severe diarrhea and has been straining. Dysautonomia is possible but very rare. Panleukopenia does not usually result in a rectal prolapse, but is a cause of diarrhea.

---

### Question

Krissy, a 10-year old female spayed Himalayan, has had chronic **constipation** problems over the last year and has been diagnosed with **megacolon**. Today she presents for vomiting and straining to defecate. She is currently taking Lactulose to help with her bowel movements. You palpate hard feces in the colon. You give her an enema and manually evacuate most of the hard stools. Which of the following medications could also be used to help treat and try to prevent this problem in the future?

- Omeprazole
- Prednisolone
- Metronidazole
- Cisapride
- Sulfasalazine

**Explanation** - There are five main treatment objectives for cats with megacolon. These include adequate hydration status, removal of impacted feces, laxative therapy, promotility agents for the colon, and dietary fiber.



This cat may benefit from Cisapride, which is a benzamide prokinetic drug. Due to the chronic stretching of the colon from the feces impactions, the colon can no longer move the feces out of the body in a normal way. This medication has anecdotally been shown to help cats evacuate feces more efficiently, especially in mild or moderate cases. Some cats may also benefit from a fiber source such as psyllium or canned pumpkin.

If the constipation problems continue despite the above mentioned treatments, colectomy should be considered.

Prednisolone is used sometimes in treating inflammatory bowel disease, but for megacolon is not indicated. Metronidazole and Sulfasalazine are antibiotics sometimes used for diarrhea or inflammatory bowel disease.

Omeprazole is a proton pump inhibitor used for prevention of gastric ulcers and upper GI disease and would not be helpful for megacolon.

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### Question

A 7-year old male castrated cat presents to you for difficulty eating. On examination, you see that there are dental lesions on the buccal surfaces of several premolar and first molar teeth. The cat shows signs of discomfort when you palpate around these teeth and the surrounding gingiva appears inflamed. You suspect that the cat has odontoclastic resorptive lesions. You perform dental radiographs which show evidence of endodontic necrosis. Which of the following is the most appropriate treatment recommendation?

- Affected teeth should be extracted and Vitamin D supplementation may reduce the likelihood of development of similar lesions in other teeth
- Affected teeth should be extracted and it is likely that other teeth will be affected in the future
- Affected teeth should be treated by removal of the crown and coronal part of the root with a dental burr followed by suturing the gingiva across the root
- Dental extraction is a less expensive option but restorative dental techniques are effective at stopping progression of disease in most cats
- Administration of an analgesic may provide relief until the lesion spontaneously resolves

**Explanation** – The correct answer is affected teeth should be extracted and it is likely that other teeth will be affected in the future. As described in this case, feline odontoclastic resorptive lesions commonly affects cats with increasing incidence as cats age. One or more lesions are found in about 50% of the domestic cat population over 5 years old. Lesions are often seen at the buccal surfaces of premolars and the first molar teeth at the gingival margin. Canine teeth can also be affected but usually lesions occur in the roots and the crown may appear normal.

There have been many theories about the cause of these lesions including a relationship to plaque-induced inflammation, microfractures of the cemental surface, and mineral deficiencies but most of

these theories are no longer supported. It is now believed that abnormal formation or mineralization of cementum results in cemental resorption. There may be a relationship to high levels of vitamin D.

For treatment, there are reports of using **alendronate**, a bisphosphonate which inhibits demineralization of bone. Also, laser therapy has been used. However, neither of these treatments are currently accepted as standard care of this disease and **extraction is the only current treatment that offers permanent prevention of pain to the patient**. Restorative dental procedures are retained without recurrence in <25% of cats in 2-3 years.

In cases where lesions are entirely confined to the crown with no deep periodontal pockets and no radiographic evidence of endodontal necrosis, one can consider retaining the root. However, in the case described, complete extraction is the most appropriate recommendation. Because the incidence of lesions increases with age, it is likely that the cat in this case will develop lesions in other teeth in the future. Excessive Vitamin D should be avoided but other recommendations for prevention are controversial. Diligent dental care is certainly recommended.

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## Question

An **8-year** old cat presents with a several month history of poor appetite and intermittent **vomiting** and **diarrhea**. A CBC shows a hematocrit of 33%, WBC count of 12,000/uL, and platelet count of 365,000/uL. Chemistry shows Na-148 mEq/L, K-4.2 mEq/L, BUN-22 mg/dL, creatinine-1.3 mg/dL, ALT-37 IU/L, cholesterol-180 mg/dL, GGT- 1.0 IU/L, albumin- 3.2 g/dl, globulin 4.6 g/dl.

An abdominal ultrasound shows mild-to-moderate multifocal-to-diffuse thickening of the muscularis layer of the small bowel. Biopsies from a gastroduodenoscopy show moderate lymphocytic-plasmacytic infiltration and enteritis. Which of the following medications could be used to control the disease in this feline patient?

- Sulfadimethoxine
- Potassium Bromide (KBr)
- Azathioprine
- Budesonide

**Explanation** - Corticosteroids such as **prednisolone** and **budesonide** are the most common medications used for controlling inflammatory bowel disease in cats. Budesonide concentrates its effects in the gastrointestinal tract, thus has fewer systemic side effects as compared to prednisolone.

Sulfasalazine and metronidazole can be used to help the condition by treating **secondary infection bacterial overgrowth (SIBO)**. Other treatments include an easily digestible diet and one with a novel protein source, pro-motility agents or anti-nausea agents such as **metoclopramide** when needed, and vitamins such as **cyanocobalamin** (vitamin B-12) or omega-3 fatty acids may also be of benefit in some cases.

**Sulfadimethoxine** is an anti-parasitic agent used in treating the **coccidia** parasites.

**Azathioprine** is an immunosuppressive agent that can be used to treat **unresponsive IBD in dogs only**. Potassium bromide is an anti-epileptic medication.

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### Question

An 8-year old female spayed domestic short hair cat presents for her yearly physical exam. Your oral exam reveals multifocal lesions of absent dental substance on multiple teeth consistent with feline odontoclastic resorption lesions (FORL). Which of the following statements about FORL is true?



- The lesions can be internal and external, so dental radiographs should be taken to further investigate the extent of the lesions
- The lesions are usually non-painful
- The lesions are usually incidental findings that are not clinically significant and do not need to be treated
- FORL is now a rare clinical finding since commercial diets have become more strictly regulated

**Explanation** - The correct answer is the lesions can be internal and external, so dental radiographs should be taken to further investigate the extent of the lesions. FORL lesions are usually **very painful** and are **more common now than before**. Up to 67% of cats presenting for dental care may be affected. The **exact etiology of FORL is not known**, but studies have shown an association of FORL and **diets low in calcium, magnesium, phosphorus, and potassium**. Periodontal disease is also often found in association with FORL. Treatment should include addressing associated periodontal disease and possibly extraction of teeth affected by deep lesions.

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## Question

A **3-year** old male neutered domestic shorthair cat who is extremely **obese** presents with hepatic lipidosis. His ALP is 520 IU/L and his ALT is 305 IU/L. He stopped eating when his owner left him in a kennel when he went out of town. You need to place a feeding tube in addition to his other treatments since the owner is unable to force feed him and give him medications. You know that nutrition is the mainstay of treatment of hepatic lipidosis. Where is the proper location to place his esophagostomy tube?

- Right side of the neck
- Left paracostal region 2-3 cm caudal and parallel to the last rib
- An esophagostomy tube is not appropriate for this cat due to his obesity and risk of anesthetic
- Left side of neck
- Ventral region of the neck

**Explanation** – The correct answer is left side of neck. Esophagostomy tube placement is typically performed under general anesthesia. The patient is placed in right lateral recumbency and the left lateral and ventral cervical area is clipped and an aseptic preparation performed. The feeding tube is pre-measured from the site of placement to roughly the 12-13th rib. A curved hemostat or right-angled forceps is introduced through the mouth and into the proximal esophagus. Later, pressure is applied to press the tip of the forceps against the skin caudal to the ramus of the mandible. A stab incision is made through the skin and subcutaneous tissue over the tip of the forceps at the **LEFT SIDE** of the neck. The tip of the forceps is then pushed through the small stab incision. Some surgeons prefer to push the forceps through the esophagus and subcutaneous tissue to avoid trauma to the vessels and nerves on the side of the neck. With adequate lateral pressure of the forceps, these structures should be moved away from the tip of the forceps. The end of the feeding tube is grasped with the forceps and pulled into the esophagus and out the mouth. The tip of the feeding tube is then redirected into the esophagus and advanced digitally or with the forceps until it straightens out distal to the entry point into the esophagus. The feeding tube is then advanced to the marked position and secured using a Chinese finger trap pattern. A lateral thoracic radiograph is taken to assess placement of the feeding tube into the distal esophagus and adjustments are made if necessary. Esophagostomy tubes can be placed on the right side if necessary, however the esophagus is thought to be oriented more toward the left and therefore it is preferred to place the tube on the left.

An esophagostomy tube is appropriate for this cat if the cat is clinically stable enough to undergo a brief anesthetic. The other option would be a nasogastric feeding tube.

The left paracostal approach describes a gastrostomy feeding tube placement.

## Question

Suzie-Q, a 6-month old female spayed domestic short hair was recently adopted from the humane society. She has had watery **diarrhea** since adoption. Her fecal float and Giardia ELISA tests were negative. She was treated with **metronidazole** with no clinical improvement. You soak a cotton tip swab with saline and swab the rectum. You see elongated motile oval shaped protozoan organisms that do not look like Giardia lamblia. What organism might this be and what is the appropriate therapy?

- Cryptosporidium, Clindamycin
- Tritrichomonas foetus, Ronidazole
- Paragonimus kellicotti, Praziquantel
- Taenia taeniaformis, Praziquantel

**Explanation** - Tritrichomonas foetus is a flagellated parasite most commonly found in kittens that have had an unresponsive diarrhea. The parasite can be very difficult to diagnose. It is most often responsive to **Ronidazole**.

Paragonimus is a lung fluke. The eggs are typically passed in the feces. Fenbendazole and Praziquantel have been effective against this parasite.

Taenia is a tapeworm and is not a flagellated parasite. It is treated with Praziquantel.

Cryptosporidium is a coccidian that invades the small intestinal villi after ingestion of infected oocysts. It can be diagnosed with PCR. It is treated with clindamycin, azithromycin, or tylosin most commonly. It is usually an opportunist, so evaluation for underlying disease is appropriate.



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### Question

A 6-year old domestic short hair cat presents for anorexia and lethargy. On physical examination, she has **icteric mucous membranes**. Bloodwork shows a markedly elevated GGT and ALP (ALP-170, GGT-28). Which is the most likely diagnosis?

- Renal failure
- Cholangiohepatitis
- Hyperadrenocorticism
- Hepatic lipidosis

**Explanation** - The correct answer is cholangiohepatitis. Hepatic lipidosis is incorrect due to the elevated GGT, which usually stays normal in these cases. Renal failure is incorrect because it would not cause icterus or liver enzyme elevations. Hyperadrenocorticism is incorrect because it is not

consistent with the clinical signs. Cholangiohepatitis in cats can be due to ascending infection or immune-mediated damage to the liver and is commonly seen in conjunction with inflammatory bowel disease and/or pancreatitis.

NB: ALP and GGT are mainly induced by cholestasis with GGT being more specific.

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### Question

A 3-year old male castrated cat presents to your clinic for **inappetence** and **depression** of 3 days duration. On physical exam, the cat is **febrile** with a temperature of 103.2F and is 5% **dehydrated**. The cat appears **icteric**.

Complete blood count shows:

Hematocrit - 36%

White blood cell count- 23,678/ul

Neutrophils- 20,678/ul

Lymphocytes- 2,300/ul

Platelets- 180,000/ul

Serum chemistry shows:

Creatinine- 1.2 mg/dl

Blood urea nitrogen (BUN)- 24 mg/dl

Glucose- 77 mg/dl

Albumin= 3.3 g/dl

Globulin= 2.5 g/dl

**ALP**- 305 IU/L

**ALT**- 449 IU/L

**GGT**- 22 IU/L

**Total bilirubin**- 4.5 mg/dl

You perform an abdominal ultrasound and find that the liver appears enlarged. The echogenicity of the liver is normal. The wall of the common bile duct is hyperechoic and the duct is distended (6mm). You identify a cholelith that is causing complete obstruction of the common bile duct. The gall bladder is enlarged and the wall is thickened with a layered appearance.

Which of the following treatment plans is most appropriate for this cat?

- Supportive care and fluid therapy plus treatment with prednisolone, vitamin K1, and ursodeoxycholic acid
- Supportive care and fluid therapy plus treatment with neomycin and lactulose
- Supportive care and fluid therapy plus treatment with ampicillin, metronidazole, ursodeoxycholic acid
- Surgical decompression and biliary-to-intestinal diversion (cholecystoduodenostomy or cholecystojejunostomy) after stabilizing the patient with appropriate supportive care and fluid therapy

**Explanation** - The case described is acute cholangiohepatitis secondary to complete biliary obstruction from a cholelith.

Surgical decompression is indicated when discrete choleliths are seen or complete biliary obstruction is identified. In this case, there are both.

If this had been a more typical case of cholangiohepatitis without choleliths or complete biliary obstruction, the treatment of choice would be supportive care and fluid therapy plus treatment with ampicillin, metronidazole, ursodeoxycholic acid.

Choleliths are relatively rare in dogs and cats compared to humans but are seen sporadically.

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## Question

Mickey, a 2-year old male neutered Siamese, presents with a history of weight loss and vomiting occasionally. His blood work shows **ALP** 291 IU/L and **ALT** 272 IU/L. Bile acids are mildly elevated with pre-prandial 3.9 umol/L and post-prandial 39 umol/L. FeLV/FIV testing and toxoplasmosis titers are negative. Ultrasound was normal overall. You perform an exploratory laparotomy and take biopsies of the liver which is mildly yellow in color but normal in texture. The histopathology report shows non-suppurative moderate pleocellular lymphoplasmacytic periportal cholangiohepatitis. Cultures of the liver are negative. Which of the following therapies is the best treatment option?

- Budesonide and metoclopramide
- Pancreazyme powder and weekly cyanocobalamin injections
- Metronidazole and chlorambucil
- Prednisolone, ursodiol
- L-carnitine, Vitamin E, and Vitamin K

**Explanation** - The biopsy results show cholangiohepatitis which is inflammation of the biliary system and liver parenchyma. It can be autoimmune in nature, or may be triggered by underlying infection or neoplasia. Concurrent diseases often include pancreatitis and inflammatory bowel disease.

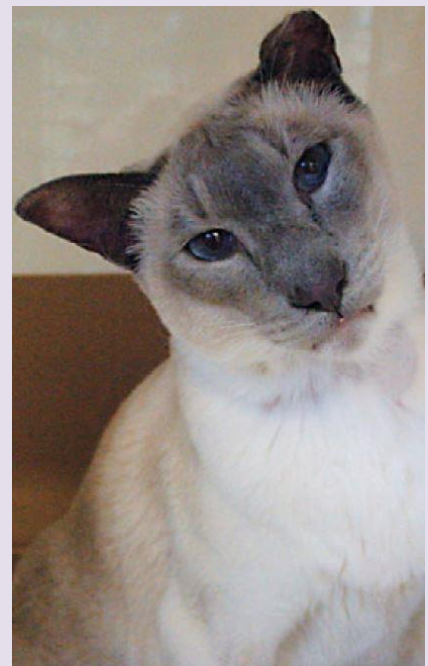
The main treatment of non-suppurative cholangiohepatitis is prednisolone since it is most often immune in origin. Ursodiol is often used for its immunomodulatory, hepatoprotectant, and antifibrotic effects. It helps with the flow of bile through the liver. Other helpful therapies include S-adenosylmethionine (SAME) and Vitamin E.

**Pancreazyme** powder and vitamin B12 injections (cyanocobalamin) can be useful in chronic pancreatitis but would not be the best treatment for cholangiohepatitis.

**Budesonide** is a steroid that may be beneficial for inflammatory bowel disease but would likely not provide enough systemic anti-inflammatory effects for the liver disease.

**Metronidazole or Clavamox** are often used in conjunction with prednisolone if infection is suspected but is not the primary treatment for this disease. Antibiotics are more important in suppurative cases.

**Chlorambucil** is used as an immunosuppressant in refractory cases of cholangiohepatitis when the prednisolone is not enough to control the disease.



**L-carnitine** may be beneficial if hepatic lipidosis is a concurrent problem from the anorexia but is not a treatment for cholangiohepatitis. Vitamin E is a good antioxidant for the liver. Vitamin K may be used in cases of liver failure especially prior to surgery for liver biopsies.

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### Question

Your client raises show rabbits and her cat named Neffer has been eating the rabbit feces. She brings Neffer's fecal matter in for examination and the fecal float reveals Eimeria (see image). Which of the following treatments are indicated for this cat?



- Sulfasalazine
- No treatment is necessary
- Sulfadimethoxine
- Fenbendazole
- Doxycycline

**Explanation** - This coccidian is not parasitic in dogs and cats and no treatment is necessary for the cat. The parasite has shown up on fecal exam because it is merely passing through the digestive tract secondary to coprophagy.

Eimeria is identified as having 4 sporocysts or a distinct micropyle cap. Eimeria are parasitic in birds, reptiles, and herbivores. The owner should be informed of the parasite, and her rabbits should be treated.

Isospora is the infectious coccidian in dogs and cats and is treated with Sulfadimethoxine (Albon).

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### Question

A 6-year old cat is brought to your clinic after falling off of the owner's balcony. The cat is stressed but alert with moderate bleeding noted around the mouth.



Temperature - 102.4 F

Heart rate- 220 beats per minute, no murmurs or arrhythmias

Respiratory rate- 40 breaths per minute, all lung fields clear

Thoracic radiographs are unremarkable. You perform an oral exam and note the mandibular abnormality show in the photo. Which of the following treatment options is most appropriate once the cat is stable?



- Circummandibular cerclage wire placed caudal to canine teeth
- External fixator with 4 Kirschner wires
- Bone screw fixation across mandibular symphysis
- Intramedullary pin placement in the mandibular canal
- Tape muzzle and conservative therapy

**Explanation** - Separations of the mandibular symphysis are seen commonly with "high-rise syndrome" or when cats fall from heights because they frequently are able to rotate in mid-air, landing on all 4 feet to break the fall but often also landing with their lower jaw hitting the ground at the same time. This is sometimes referred to as a symphyseal fracture but it is not a true fracture as the mandibular symphysis never fully ossifies or fuses.

Symphyseal separation occurs with this type of trauma and right and left rami become distracted as is evident in the photo. The standard treatment is circummandibular cerclage wire placed caudal to the lower canine teeth with the wire tightened once the hemi-mandibles are aligned. A hypodermic needle is often used to guide placement of the wire.

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### Question

An 8-year old MN DSH cat presents for anorexia and vomiting of 8 days duration. On physical exam, you notice what is illustrated in the picture below. The cat has a body condition score of 8 out of 9 and is mildly dehydrated and depressed. The remainder of the physical exam is normal. Blood work shows marked elevation in alkaline phosphatase (ALP) and bilirubin. Abdominal ultrasound shows an enlarged and uniformly hyperechoic liver. Aspiration of the liver shows hepatocytes with lipid filled vacuoles. What do you recommend to the owner?

- Treatment with amoxicillin clavulanate
- Treatment with prednisolone
- Surgical removal of the affected liver
- Placement of an esophagostomy tube with tube feedings
- Treatment with insulin therapy



**Explanation** - The cat has hepatic lipidosis. This condition is often seen with obese cats that have become anorexic for several days, causing mobilization of excessive fat stores into the liver. Treatment is aimed at supplying nutrition to the cat to stop the cycle of fat being mobilized into the liver. The most effective way of doing this is with tube feedings.

Prednisolone, antibiotics, insulin therapy and surgery are not warranted specifically with hepatic lipidosis, but may be effective in treating some of the causes that result in the cat becoming anorexic in the first place. Common causes for anorexia leading to hepatic lipidosis include inflammatory bowel disease, cholangiohepatitis, neoplasia, and pancreatitis.

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**Question**

A 6-year old domestic short hair cat presents for anorexia and lethargy. On physical examination, she has a BCS of 8/9 and has icteric mucous membranes. Bloodwork shows an elevated ALT of 320, ALP of 170, and normal GGT of 3. What is the most likely diagnosis?



- Hepatic neoplasia (adenocarcinoma, lymphoma)
- Hyperadrenocorticism
- Hepatic lipidosis
- Cholangiohepatitis

**Explanation** - The correct answer is hepatic lipidosis. This is a classic example of an obese cat that has become anorectic and icteric. The chemistry profile is the key tip-off though, because of the elevations in ALT and ALP with normal GGT. Cholangiohepatitis or neoplasia should elevate both ALP and GGT. These signs are not consistent with Cushing's in a cat and neither is the chemistry profile.

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### Question

A 14-year old domestic short hair cat presented to the clinic for further evaluation of progressive lethargy, inappetence, and intermittent vomiting. On physical examination the patient has a body condition score of 4/9, there is no palpable thyroid slip but the patient is moderately unkempt. The mucous membranes appear to be slightly **icteric** with a capillary refill time of less than 2 seconds. The patient has no audible heart murmur and the lung sounds are clear. The **abdomen is tense** on palpation with no overt masses palpated within the abdomen. A CBC, chemistry panel, and urinalysis has been submitted but the results have not returned.

An abdominal ultrasound is performed and a mass is visualized in the area of the pylorus resulting in marked dilation of the biliary tree. Which of the following serum changes would you expect on a chemistry panel?

- Decreased alanine aminotransferase (ALT)
- Elevated direct bilirubin

- Decreased alkaline phosphatase (ALP)
- Hypercholesterolemia
- Hypocholesterolemia

**Explanation** – The correct answer is Elevated direct bilirubin. Direct bilirubin is formed by the liver, and is elevated in hepatic or biliary disease. Highest levels of direct bilirubin are seen in obstructive liver diseases. Its concentration in the blood is normally very low (0-0.2 mg/dL) and slight increases can be significant.

In post-hepatic obstruction, you should expect to see elevated serum liver enzymes (ALT, ALP, GGT, AST) due to hepatocellular damage and cholestasis.

### Question

A 9-year old male castrated cat presents to you with a primary complaint of inappetance over 5 days. On physical examination, you find T-102.1F, HR-190, RR-30, **BCS 8/9**. The sclera appear **icteric** and there is mild cranial organomegaly detected on abdominal palpation. You perform diagnostic tests and find the following results:

Complete blood count shows:

Hematocrit - 28%

White blood cell count- 13,155/ul

Neutrophils- 10,100/ul

Lymphocytes- 2,055/ul

Monocytes- 500/ul

Eosinophils- 500/ul

Platelets- 370,000/ul

Serum chemistry shows:

Creatinine- 1.3 mg/dl

Blood urea nitrogen (BUN)- 22 mg/dl

Glucose- 96 mg/dl

Albumin= 2.5 g/dl

Globulin= 4.6 g/dl

**ALP- 846 IU/L**

**ALT- 731 IU/L**

**GGT- 7 IU/L**

**Total bilirubin- 6.4 mg/dl**

You perform an abdominal ultrasound and find that the liver appears subjectively enlarged with hyperechoic hepatic parenchyma. The gall bladder is normal in appearance. No other abnormalities are seen.

You perform an ultrasound guided liver aspirate which shows clusters of hepatocytes with cytoplasmic lipid droplets.

Which of the following is the most important treatment for this condition?

- Neomycin and lactulose

- Surgical decompression and biliary-to-intestinal diversion (cholecystoduodenostomy or cholecystojejunostomy)
- Ampicillin, metronidazole, and ursodeoxycholic acid for at least 2 months
- Prednisolone, vitamin K1, and ursodeoxycholic acid
- Tube feeding

**Explanation** - The case described is very consistent with feline hepatic lipidosis (fatty liver syndrome). This condition is usually seen in older obese cats (mean age 8-9 years) consistent with the age and body condition of the cat described. The keys to diagnosis of hepatic lipidosis over cholangiohepatitis or other feline liver diseases are the biochemical parameters; cats with lipidosis often have markedly elevated ALP, ALT and bilirubin without such a large elevation of GGT. The liver is frequently hyperechoic. The liver aspirate cytology with cytoplasmic lipid droplets confirm what you should have already suspected.

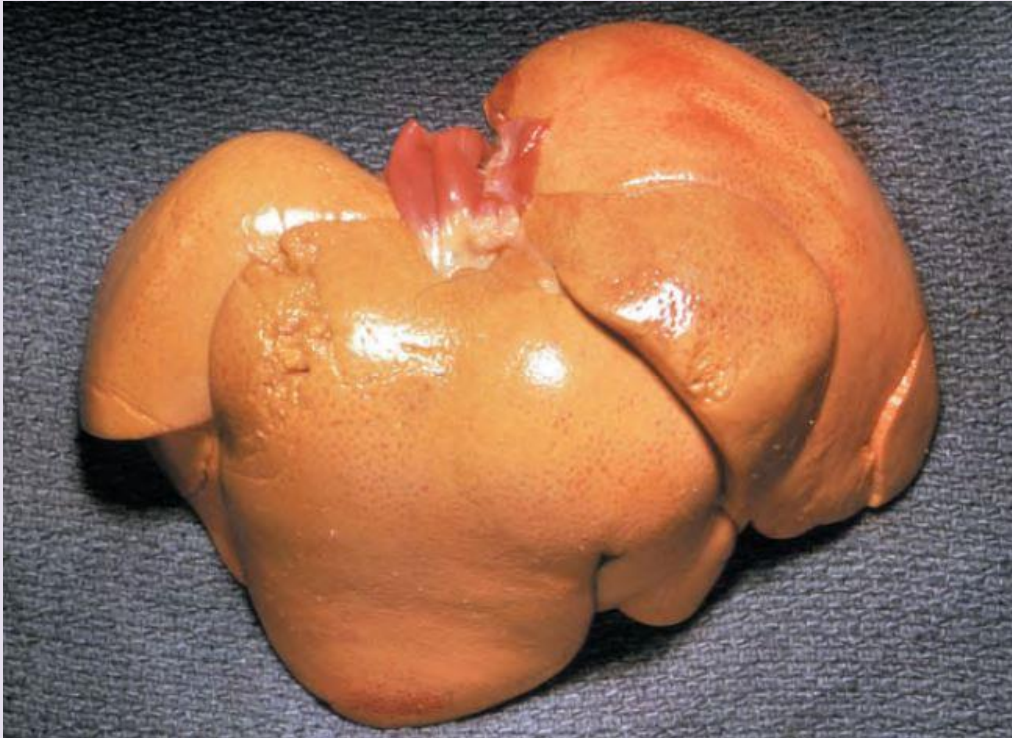
Enteral feeding, usually by nasogastric, esophagostomy, or gastrostomy tube, is considered the cornerstone of therapy for hepatic lipidosis. Other management considerations include management of electrolyte imbalances (not described in this case), particularly hypokalemia. Some internists recommend supplementation of L-carnitine to cats with hepatic lipidosis.

Prednisolone is sometimes used in treatment of inflammatory liver disease. Vitamin K1 is indicated when liver disease causes coagulopathy. Neomycin and lactulose may be used in animals that develop signs of hepatic encephalopathy.

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### Question

A 12-year-old female spayed domestic long hair cat presents for inappetence and lethargy. She is free fed with two other cats in the household but the owner thinks her appetite has been decreasing since moving to a new house 2 weeks ago. On physical exam she is slightly icteric and has a body condition score of 7 out of 9. The cat continues to be anorexic, declines further, and she is eventually euthanized. On necropsy, you remove the liver, which is shown in the image below. What changes would you expect to see on a chemistry panel due to this disease process?



- Moderately elevated ALP, mildly elevated ALT, elevated bilirubin
- Moderately elevated ALP, normal GGT, elevated bilirubin
- Moderately elevated ALP, elevated GGT, elevated bilirubin
- Normal ALP, normal ALT, elevated bilirubin

**Explanation** – The correct answer is moderately elevated ALP, normal GGT, and elevated bilirubin. Based on the clinical signs and history, this cat likely has hepatic lipidosis. The finding of a greater magnitude of elevation of ALP compared with GGT is highly suggestive of hepatic lipidosis. GGT is typically normal. Other feline cholestatic diseases generally will cause an elevation in both GGT and ALP. An elevated ALP and ALT is fairly non-specific but can suggest hyperadrenocorticism if supported by appropriate clinical signs. Typically, there is a greater increase in ALP than ALT. This disease is uncommon in cats and the clinical signs and history do not support the diagnosis. The icterus is caused by a hepatic hyperbilirubinemia.

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### Question

A 4-year old domestic short haired male cat presents for an acute onset of vomiting and anorexia of one day duration. On physical exam you note the cat is depressed and approximately 5% dehydrated. Radiographs show an abnormally increased amount of plication of the small intestines. What is your most likely diagnosis?

- String foreign body
- Lymphoma

- Panleukopenia
- Hepatic lipodosis
- Pancreatitis

**Explanation** - The correct answer is string foreign body. The radiographic description is classic for string foreign bodies. Panleukopenia is not likely because of the radiographic findings, and you would also expect more systemic signs such as respiratory disease and fever. With pancreatitis cats do not vomit as commonly as dogs. They usually show vague nonspecific signs. Hepatic lipodosis would not result in an acute onset of vomiting.



### Question

A 4-year-old domestic short-haired cat presents for anorexia and weight loss of 1 week. Physical exam reveals a body condition score of 7/9, jaundice of the skin and sclera, and dehydration of 4%. Temperature is normal. Bloodwork shows ALT=303, GGT=1.8, ALP=1170, bilirubin=3.0. Radiographs show an enlarged liver. What is the most important treatment for the cat's likely diagnosis?

- Parenteral vitamin K injections
- Oral S-adenosylmethionine for at least 1 month
- Esophagostomy tube feeding
- Oral clavulanic acid and amoxicillin for 4 weeks

**Explanation** – The correct answer is Esophagostomy tube feeding. The cat described likely has hepatic lipodosis. Cats that are greater than 2 years of age and obese are at the greatest risk for hepatic lipodosis. Often these cats are indoor-only and have had a recent stress in their life. An obese cat that is not eating with the above symptoms is most likely to have hepatic lipodosis.

## Question

A 10-year old male castrated cat presents for inappetence and depression of one week in duration. On physical exam, the cat appears to be in good condition (BCS 4/9). T: 101.2F, HR: 180, RR: 30. You note that the sclera appear slightly **icteric**. Remainder of the physical exam is unremarkable.

You perform bloodwork which shows:

### Complete blood count:

Hematocrit - 27%  
White blood cell count- 16,678/ul  
Neutrophils- 7,278/ul  
Lymphocytes- 8,300/ul  
Eosinophils- 600/ul  
Platelets- 264,000/ul

### Serum chemistry shows:

Creatinine- 1.4 mg/dl  
Blood urea nitrogen (BUN) - 29 mg/dl  
Albumin= 2.4 g/dl  
Globulin= 6.6 g/dl  
**ALP- 476 IU/L**  
**ALT- 349 IU/L**  
**GGT- 21 IU/L**  
**Total bilirubin- 2.6 mg/dl**

You take thoracic radiographs which are unremarkable.

You perform an abdominal ultrasound and find that the liver appears enlarged with normal echogenicity. The gall bladder is mildly distended, no choleliths are seen. You perform an aspirate of the liver and obtain a bile sample for culture and sensitivity which shows growth of aerobes and anaerobes that are sensitive to ampicillin, trimethoprim-sulfa, amoxicillin, chloramphenicol, and tetracycline.

You diagnose the cat with cholangiohepatitis and institute therapy. Which of the following antibiotic plans is most appropriate?

- Trimethoprim-sulfa for 2-4 months
- Amoxicillin for 3-4 weeks
- Tetracycline for 1-2 weeks
- Chloramphenicol for 6 months
- Ampicillin for 2-3 months

**Explanation** - Cats with cholangiohepatitis should be treated with antibiotics for at least 2 months. The antibiotic chosen should also be excreted unchanged in the bile. All of the antibiotics listed undergo biliary excretion unchanged except for trimethoprim-sulfa which is primarily excreted through the kidneys and undergoes hepatic metabolism.

Therefore, the best answer is ampicillin for 2-3 months.



## Question

An 8-year old male castrated cat presents to your clinic for a decreased appetite and slight weight loss over the past 2 months. Physical examination is unremarkable except for mild cranial organomegaly detected on abdominal palpation. You perform diagnostic tests and find the following results:

Complete blood count shows:

Hematocrit - 26%

White blood cell count- 18,155/ul

Neutrophils- 12,100/ul

Lymphocytes- 5,055/ul

Monocytes- 300/ul

Eosinophils- 700/ul

Platelets- 270,000/ul

Serum chemistry shows:

Creatinine- 1.2 mg/dl

Blood urea nitrogen (BUN)- 22 mg/dl

Glucose- 138 mg/dl

Albumin= 3.4 g/dl

Globulin= 6.2 g/dl

ALP- 85 IU/L

ALT- 214 IU/L

GGT- 9 IU/L

Total bilirubin- 0.9 mg/dl

You perform an abdominal ultrasound and find that the liver appears subjectively enlarged. The echogenicity of the liver is normal and the gall bladder is normal in appearance. No other abnormalities are seen.

You perform an ultrasound guided liver biopsy. Histopathology indicates infiltration of lymphocytes and plasma cells but not neutrophils into portal areas but not into bile ducts.

With treatment, what is the cat's prognosis?

- Poor, mean survival is < 6 months
- Fair, mean survival is about 1 year
- Good, mean survival is greater than 2 years
- Grave, mean survival is < 2 months

**Explanation** – The correct answer is Good, mean survival is greater than 2 years. The case described is consistent with **lymphocytic portal hepatitis**. Clinically, this condition can appear similar to chronic cholangiohepatitis in terms of signalment, clinical signs and laboratory findings. The key to this **diagnosis is the liver biopsy**. Typical findings for lymphocytic portal hepatitis is infiltration of lymphocytes and plasma cells but not neutrophils into portal areas. This is in contrast to chronic **cholangiohepatitis which typically has neutrophils in portal areas**.

Chronic cholangiohepatitis carries a fair prognosis with about half of cats doing poorly (dead or euthanized within 3 months) and half of cats responding favorably to treatment with long term

survival. For cats with lymphocytic portal hepatitis, although treatment can be challenging, the disease is very slowly progressive and the reported mean survival is approximately 3 years.

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### **Question**

A 3-year old male castrated cat presents to your clinic for inappetence and depression of 3 days duration. On physical exam, the cat is febrile with a temperature of 103.6F and is 8% dehydrated.

Complete blood count shows:

Hematocrit - 36%  
White blood cell count- 25,678/ul  
Neutrophils- 21,678/ul  
Lymphocytes- 3,300/ul  
Monocytes- 200/ul  
Eosinophils- 500/ul  
Platelets- 210,000/ul

Serum chemistry shows:

Creatinine- 1.8 mg/dl  
BUN- 30 mg/dl  
Glucose- 70 mg/dl  
Albumin= 3.2 g/dl  
Globulin= 2.8 g/dl  
ALP- 95 IU/L  
ALT- 349 IU/L  
GGT- 12 IU/L  
Total bilirubin- 1.1 mg/dl

You perform an abdominal ultrasound and find that the liver appears subjectively enlarged. The echogenicity of the liver and spleen are normal. The gall bladder appears mildly enlarged; no choleliths are seen. The pancreas does not appear sonographically enlarged or abnormal. The kidneys and the remainder of the abdomen appear unremarkable.

You perform an ultrasound guided liver biopsy. Histopathology indicates fibrosis associated with portal triads, bile duct proliferation, and centrilobular accumulation of bile with casts in canalicular areas.

With treatment, what is the cat's prognosis?

- 90% chance of surviving greater than 3 months but only a 25% chance of surviving greater than 1 year
- 10% chance of surviving greater than 3 months
- 90% chance of long term survival although the cat will be predisposed to similar episodes in the future
- 50% chance of long term survival, 50% chance of dying within 3 months

**Explanation** – The correct answer is 50% chance of long term survival, 50% chance of dying within 3 months. The case described is very consistent with acute cholangiohepatitis. This condition is usually seen in younger cats (mean age 3-3.5 years) and is more common in males than females. This is in contrast to chronic cholangiohepatitis which occurs in older cats (mean age 9 years). Acute cholangiohepatitis patients are more likely to be depressed, dehydrated and febrile.

Bloodwork in cholangiohepatitis often shows a neutrophilia with or without a left shift. Mild increases in bilirubin and ALP are common, often with more severe elevations of ALT. The sonographic and biopsy findings are also consistent with the diagnosis of acute cholangiohepatitis and make other differentials such as hepatic lipidosis or lymphocytic portal hepatitis less likely.

Treatment of choice for this disease includes antibiotics with aerobic and anaerobic coverage that are excreted unchanged in the bile. Examples of antibiotics excreted unchanged in the bile include tetracyclines, ampicillin, amoxicillin, erythromycin, chloramphenicol, and metronidazole. Usually erythromycin, tetracycline, and chloramphenicol are not the first choices unless they are indicated based on culture and sensitivity because erythromycin is not effective against gram negative bacteria, tetracycline is hepatotoxic, and chloramphenicol may cause anorexia. Ampicillin or amoxicillin with clavulanic acid are good choices and metronidazole may be used to expand the anaerobic coverage. Ursodeoxycholic acid (Actigall) is useful in all types of inflammatory liver disease because of its anti-inflammatory and anti-fibrotic properties on the liver. It also increases fluidity of biliary secretions.

With treatment, it is thought that the response of acute and chronic cholangiohepatitis cases is similar with about half of animals dying or being euthanized within 90 days and half of them having prolonged survival.

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### Question

A 3-year old male castrated cat presents to your clinic for inappetence and depression of 3 days duration. On physical exam, the cat is febrile with a temperature of 103.6F and is 8% dehydrated.

Complete blood count shows:

Hematocrit - 36%  
White blood cell count- 25,678/ul  
Neutrophils- 21,678/ul  
Lymphocytes- 3,300/ul  
Monocytes- 200/ul  
Eosinophils- 500/ul  
Platelets- 210,000/ul

Serum chemistry shows:

Creatinine- 1.8 mg/dl  
Blood urea nitrogen (BUN)- 30 mg/dl  
Glucose- 70 mg/dl  
Albumin= 3.2 g/dl  
Globulin= 2.8 g/dl

ALP- 95 IU/L  
ALT- 349 IU/L  
GGT- 12 IU/L  
Total bilirubin- 1.1 mg/dl

You perform an abdominal ultrasound and find that the liver appears subjectively enlarged. The echogenicity of the liver and spleen are normal. The gall bladder appears mildly enlarged; no choleliths are seen. The pancreas does not appear sonographically enlarged or abnormal. The kidneys and the remainder of the abdomen appear unremarkable.

You perform an ultrasound guided liver biopsy. Histopathology indicates fibrosis associated with portal triads, bile duct proliferation, and centrilobular accumulation of bile with casts in canalicular areas.

Which of the following treatment plans is most appropriate for this cat?

- Supportive care and fluid therapy plus prompt placement of an esophagostomy tube and enteral feeding
- Supportive care and fluid therapy plus treatment with prednisolone, vitamin K1, and ursodeoxycholic acid
- Supportive care and fluid therapy plus treatment with ampicillin, metronidazole, ursodeoxycholic acid
- Supportive care and fluid therapy plus treatment with neomycin and lactulose
- Surgical decompression and biliary-to-intestinal diversion (cholecystoduodenostomy or cholecystojejunostomy) after stabilizing the patient with appropriate supportive care and fluid therapy

**Explanation** - The case described is very consistent with **acute cholangiohepatitis**. This condition is usually seen in younger cats (mean age 3-3.5 years) and is more common in males than females. This is in contrast to chronic cholangiohepatitis which occurs in older cats (mean age 9 years). Acute cholangiohepatitis patients are more likely to be depressed, dehydrated and febrile.

Bloodwork in cholangiohepatitis often shows a neutrophilia with or without a left shift. Mild increases in bilirubin and ALP are common, often with more severe elevations of ALT. The sonographic and biopsy findings are also consistent with the diagnosis of acute cholangiohepatitis and make other differentials such as hepatic lipidosis or lymphocytic portal hepatitis less likely. Treatment of choice for this disease includes antibiotics with aerobic and anaerobic coverage that are excreted unchanged in the bile. Examples of antibiotics excreted unchanged in the bile include tetracyclines, ampicillin, amoxicillin, erythromycin, chloramphenicol, and metronidazole. Usually erythromycin, tetracycline, and chloramphenicol are not the first choices unless they are indicated based on culture and sensitivity because erythromycin is not effective against gram negative bacteria, tetracycline is hepatotoxic, and chloramphenicol may cause anorexia. Ampicillin or amoxicillin with clavulanic acid are good choices and metronidazole may be used to expand the anaerobic coverage. **Antibiotics should be administered for at least 2 months.** Ursodeoxycholic acid

(Actigall) is useful in all types of inflammatory liver disease because of its anti-inflammatory and anti-fibrotic properties on the liver. It also increases fluidity of biliary secretions.

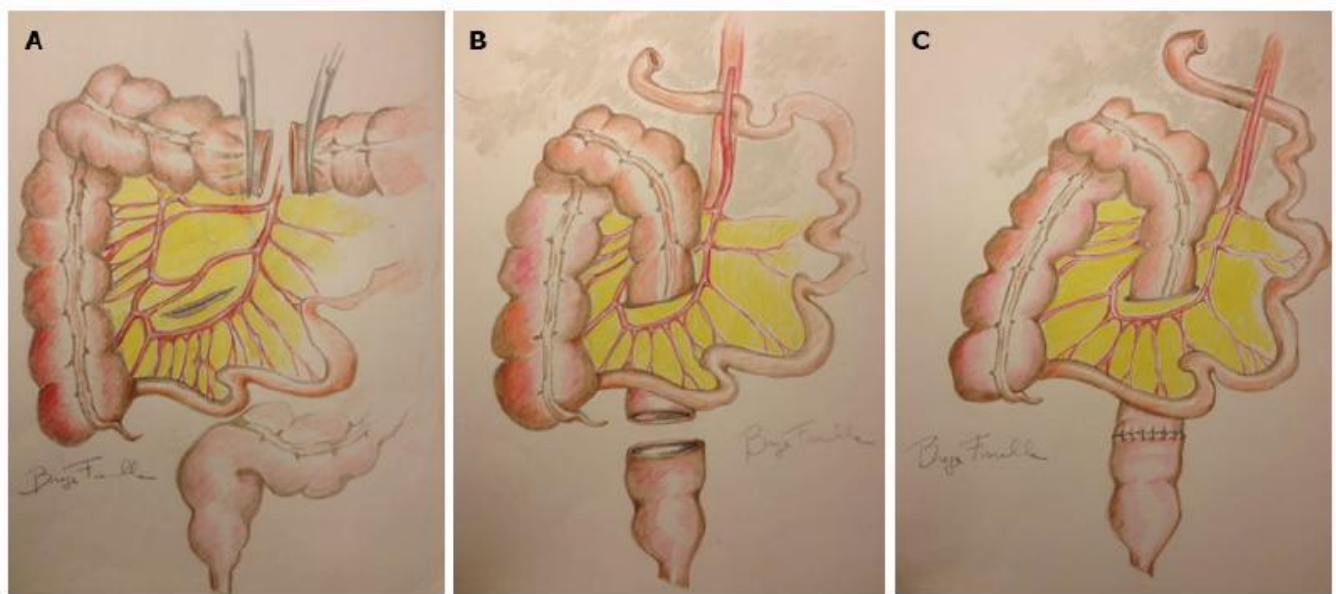
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### Question

When performing a subtotal colectomy on a feline patient, what blood vessel limits the amount of colon that you are able to remove?

- Left colic artery
- Ileocolic artery
- Caudal mesenteric artery
- Pudental artery

**Explanation** - The correct answer is ileocolic artery. The site for colonic resection is limited by tension on the ileocolic artery when trying to suture your new end of colon to the rectum. Sometimes the tension is too great and instead of a colocolic anastomosis, an ileocolic anastomosis must be performed. Essentially you are trying to connect a section of ascending colon to the rectum. Now that can be pretty far! Performing an ileocolic anastomosis is not ideal because you eliminate the ileocecal valve, and that may predispose the animal to bacterial overgrowth. The caudal mesenteric artery gives branches to the rectum and descending colon. The left colic artery also feeds the descending colon. The pudental artery supplies the external genitalia. The ileocolic artery provides blood supply to the ascending and transverse colon.



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### Question

When performing an enterotomy in a cat, it is best to cut \_\_\_\_\_.

- Lateral to antimesenteric border
- Lateral to mesenteric border
- On the antimesenteric border
- On the mesenteric border

**Explanation** - The correct answer is antimesenteric border. Cutting on this part of the intestine will minimize the likelihood of hitting blood vessels and will thus decrease the chances of bleeding.

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### Question

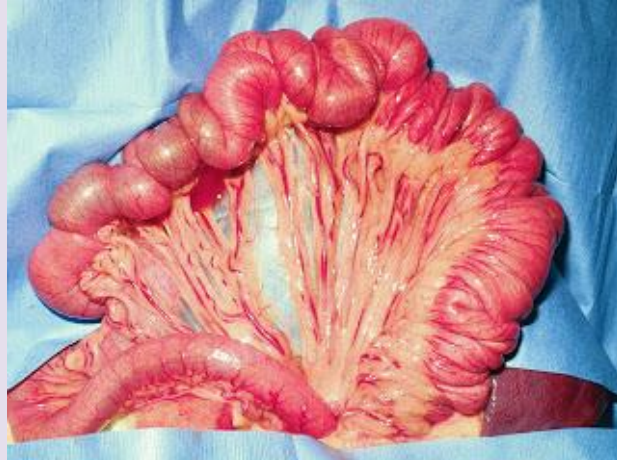
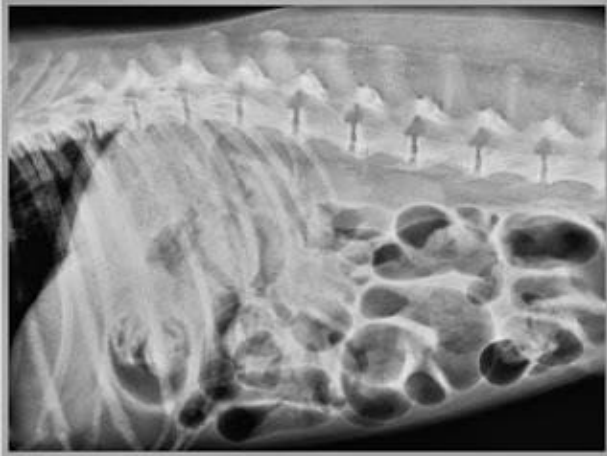
A cat presents for **vomiting** of 7 days duration. On physical exam, you are able to see a string attached to the base of the tongue. Abdominal radiographs show pleating of the intestinal tract but no evidence of perforation. What is the treatment of choice?

- Pull the string out through the mouth
- Cut the string and let it pass through the intestines
- Feed a hairball medication
- Surgery

**Explanation** - The correct answer is surgery. A string that has been present for more than a couple of days or one with evidence of pleating of the intestines should not be pulled or cut because the risk of intestinal perforation is high. Abdominal surgery to remove the string foreign body is the best treatment.



Fig 1 - String foreign body in the mouth of a cat



If a linear foreign body is suspected and an upper GI series is necessary to confirm the diagnosis, use a water-soluble contrast agent such as iohexol instead of barium because of the risk of leakage from intestinal perforations. Barium leakage into the peritoneal cavity worsens septic peritonitis by inhibiting phagocytosis of bacteria and causing a foreign body reaction.

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### Question

This is an intra-operative image of the jejunum of a 2 year-old female spayed domestic short hair cat. What is the likely cause for this finding?



- Administration of atropine
- Intestinal lymphoma
- Administration of metoclopramide
- Linear foreign body

**Explanation** - This image is depicting plication as occurs with linear foreign bodies. More than likely, this patient has ingested some type of string material. Atropine is a parasympatholytic and would not cause any significant plication. No medication is known to induce plication; however, there are drugs that may increase or decrease intestinal motility. An example of a medication that increases intestinal motility would be metoclopramide.

Intestinal lymphoma can have several different characteristics but usually involves thickening of the walls of the intestines along with mesenteric lymphadenopathy. Plication is not observed with intestinal lymphoma.

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### Question

A 6-month old cat presents for having ptyalism and for being underweight. On physical examination, you note a bright copper color to the cat's iris bilaterally. What is this suggestive of?



- Portal systemic shunt
- Hemolytic anemia
- Toxoplasmosis
- Polycystic kidney disease

**Explanation** - The correct answer is a portal-systemic shunt. **Ptyalism** is a sign commonly seen with **PSS in cats but not dogs**, and the **copper-colored iris** is a striking and almost pathognomonic finding in conjunction with other clinical findings. Hemolytic anemia could cause icterus but not the change in iris color. Animals with polycystic kidney disease would not have a copper-colored iris. Toxoplasma can cause ocular signs such as uveitis but would not have a copper iris.

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### Question

A 3-month old kitten presents for **mucoïd diarrhea** and anemia. You have recently seen several other puppies and kittens with similar clinical signs that were infected with *Strongyloides stercoralis*. What is the best way to confirm this diagnosis in this cat?

- Fecal sedimentation



- Direct fecal smear
- Fecal flotation
- Baermann fecal technique

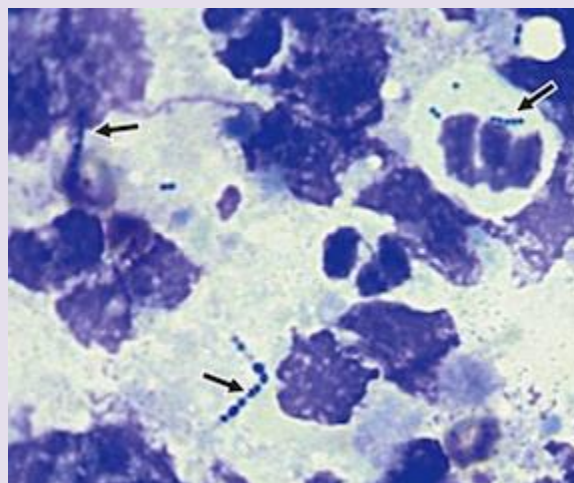
**Explanation** - The correct answer is Baermann fecal technique. Strongyloides are parasites of carnivores and man. *Strongyloides tumefaciens* the **feline intestinal threadworm** and *S. stercoralis* mainly causes a **mucoïd diarrhea** and possibly **anemia** in puppies and kittens. It passed in the feces in the L1 larvae form. The best technique for recovering larvae is the **Baermann technique**. Fecal flotations are good for eggs that float. Fecal sedimentation is good for eggs that sink, such as most fluke eggs. A direct fecal smear can find any type of egg or larva passed in feces but does not concentrate the sample to improve the yield in finding the eggs or larvae.



First stage larva (L1) of *S. stercoralis*

### Question

A 14-year old spayed female cat presents to you with a 24-hour history of lethargy. No vomiting or diarrhea have been observed. On physical examination, the abdomen is tense and painful on palpation. An abdominal mass can be palpated. A brief abdominal ultrasound shows ascites, and abdominocentesis is performed. A slide is available for review. What is the most likely diagnosis?



- Disseminated carcinomatosis
- Disseminated mast cell tumor
- Septic abdomen
- Normal abdominal fluid

**Explanation** - The slide demonstrates activated and degenerate macrophages and neutrophils that have phagocytized bacteria. Note the arrows pointing at the cocci.

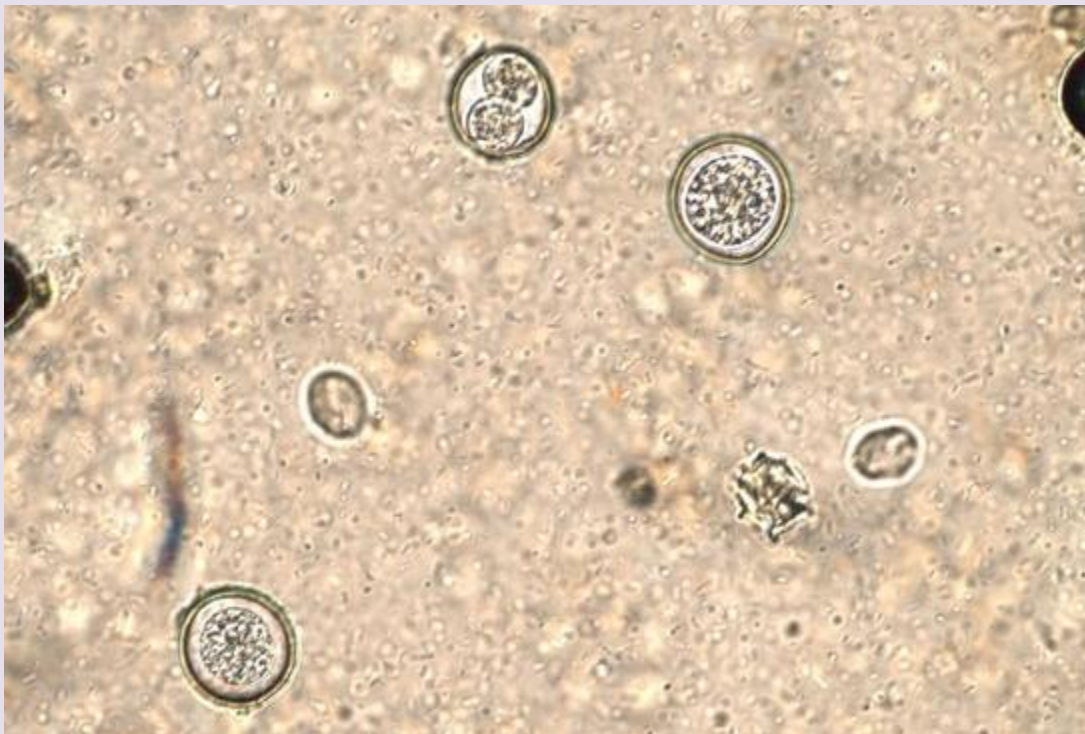
A mast cell tumor would have the appearance of round cells with granular material in the background as a result of mast cell degranulation. Cytologic evidence of pleomorphic mesothelial cells is not present, and if it were present, a biopsy would be necessary to confirm the presence of carcinomatosis.

Even though a mass is present, one should not jump to the conclusion that the mass is neoplasia; for example this could be an abscess. Alternatively, this may be neoplasia that has resulted in a septic process, such as a mass that resulted in intestinal perforation.

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### Question

An **8-week** old Abyssinian cat recently obtained from a cattery presents to you for an examination and the owner reports that the cat has had **diarrhea**. On fecal float, you find multiple eggs like the one shown in the photo (see image). What should you treat the cat with?



- Sulfadimethoxine (Albon)
- Selamectin (Revolution)

- Pyrantel (Strongid)
- Metronidazole (Flagyl)
- Amoxicillin and clavulanate (Clavamox)
- Praziquantel (Droncit)

**Explanation** - This is an image of Isospora from a cat. Isospora are parasitic coccidia that can cause diarrhea as this cat is showing. Treatment for coccidia is usually with sulfonamides such as **sulfadimethoxine** or **trimethoprim sulfa**.

For the other drugs listed:

Droncit- Primarily for cestodes (tapeworms)

Revolution- For fleas, heartworms, hookworms, roundworms, and ear mites

Strongid- Primarily for roundworms and hookworms

Clavamox- A broad spectrum antibacterial

Metronidazole- Primarily for anaerobes, also used for giardia

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