

Question

An 8-year old male tomcat presents for having a one week history of progressive lethargy, anorexia, occasional sneezing, conjunctivitis, and nasal discharge. On physical exam you see several ulcerations in the mouth. What is the most likely diagnosis?

- Feline herpesvirus
- Feline calicivirus
- Chlamydophila felis
- Foreign body
- Bordetella bronchiseptica

Explanation - The correct answer is feline calicivirus. This is a very typical question. It is important to know some of the major differences in feline upper respiratory infections. We hope you did not fall for the foreign body. If you did don't worry there is hope. Feline calicivirus is known for its ability to cause oral ulceration. Clinical signs associated with this virus include lethargy, anorexia, fever, conjunctivitis, sneezing, nasal discharge, oral ulceration, and, rarely, nasal ulceration. Feline herpes virus presents with conjunctivitis, coughing, sneezing, fever, anorexia, and rarely oral ulceration. You may also see dendritic ulcers in the eye, which is considered pathognomonic for the virus. Cats infected with Chlamydophila will show such signs as conjunctivitis and occasional sneezing. It is usually pretty difficult to distinguish these unless you observe the "red flag" clinical sign such as oral ulcers for FCV.

Question

A 2-year old male neutered domestic shorthair named Copper presents for 2-month history of coughing with occasional wheezing. He is mildly tachypneic when he is active per the owner's observation. Currently no tachypnea or labored breathing are appreciated. Heart and lungs auscult normally. Bloodwork is unremarkable other than a mild eosinophilia. Heartworm and fecal testing are negative. Chest radiographs reveal a mild interstitial pattern with diffuse bronchial wall thickening. Which diagnosis and therapy would be most appropriate?

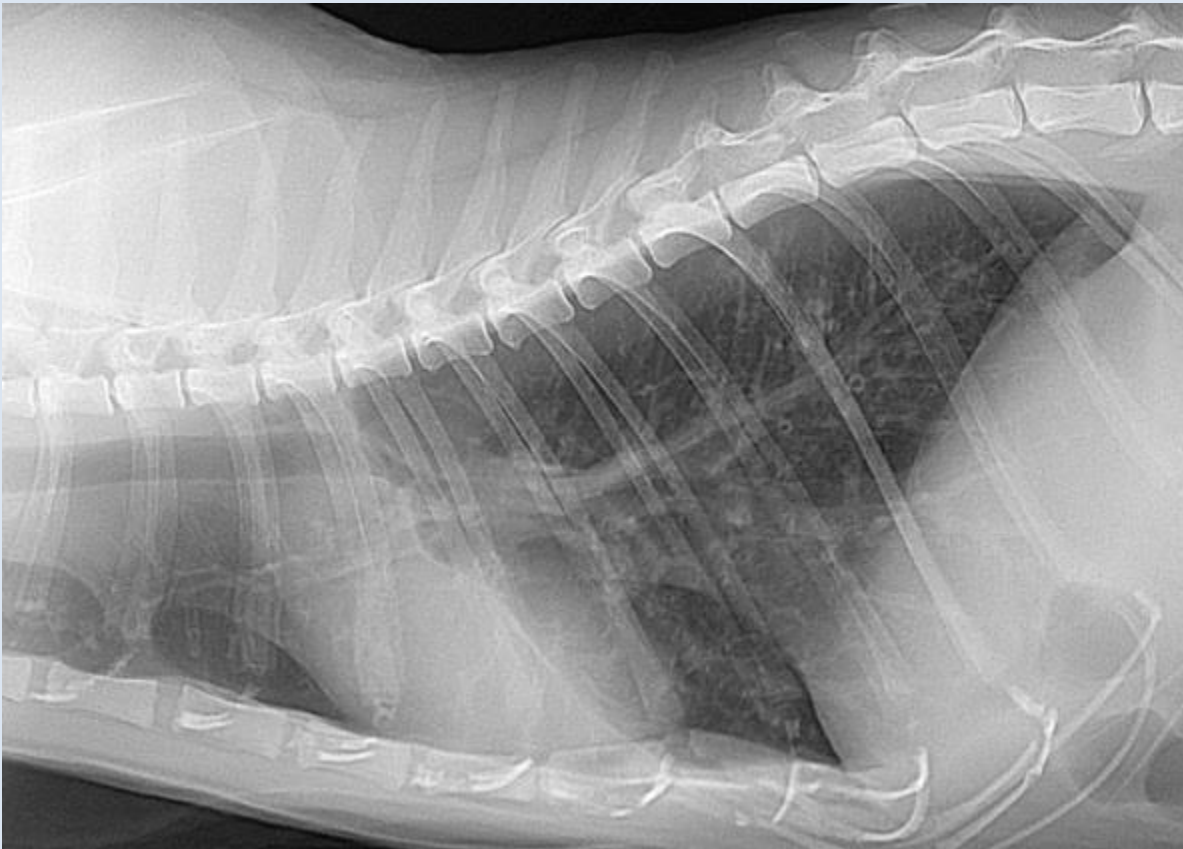
- Pneumonia, broad spectrum antibiotic
- Congestive heart failure, furosemide
- Airway collapse from trauma, no treatment indicated
- Hypertension, amlodipine
- Feline asthma, prednisolone

Explanation - Feline asthma, also known as feline allergic bronchitis, is acute or chronic airway inflammation that occurs due to various stimuli. The triggers of this airway inflammation are largely unknown but underlying **environmental allergens** are suspected. The mainstays of therapy include **corticosteroid administration** and in some cases **bronchodilators**.

In this young indoor cat with a negative fecal and heartworm test, infectious causes are less likely.

Pneumonia typically causes more of a patchy alveolar pattern; most often causes a fever, and would be less likely a chronic condition.

Congestive heart failure in a young cat with no heart murmur is very unlikely.



Inflammation and mucus build up within the airways causing their walls to appear thickened in the radiograph. The terms used for such airway appearance are “**doughnuts**” (when viewing the airway end-on) or “**tramlines**” (when viewing the airway from the side).

Question

A cat presents after having fallen from a high rise. On physical examination, the cat is dyspneic, there is blood and abrasions around the mouth, and there are decreased lung sounds dorsally. What should you do next?

- Thoracic radiographs
- Administer 40 ml/kg of an isotonic crystalloid
- Thoracocentesis
- Debride and clean all skin wounds

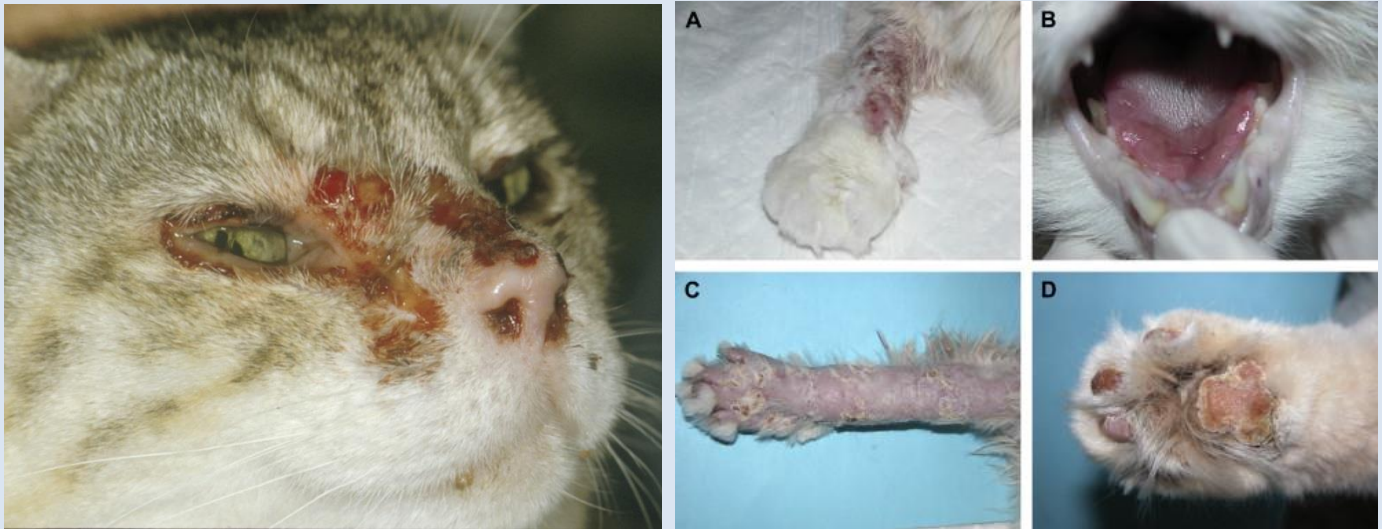
Explanation - The correct answer is thoracocentesis. This cat has **traumatic pneumothorax**. Thoracocentesis is indicated prior to any other treatments or diagnostic tests as the pneumothorax is the cat's most immediately life threatening problem. The other choices would probably all be indicated after the chest tap is performed.

Question

A 5-year old cat presents to you with an acute presentation of marked upper respiratory signs as well as ulcerative and edematous lesions of the skin on the head and limbs. Which of the following viruses can cause this type of syndrome in cats?

- Feline immunodeficiency virus
- Calicivirus
- Feline leukemia virus
- Panleukopenia
- Feline viral rhinotracheitis

Explanation - Typically, feline calicivirus is an upper respiratory pathogen that may cause oral ulcerations +/- conjunctival chemosis. However, outbreaks of highly virulent and often lethal feline calicivirus infections have been seen. This is frequently referred to as "**Virulent systemic feline calicivirus (VS-FCV).**" These infections are characterized by the signs described above; typically cats develop a severe acute upper respiratory tract disease first, followed by characteristic signs of **cutaneous edema** and **ulcerative lesions on the skin and paws**. Edema is located mainly on the head and limbs. Some cats may be **jaundiced** due to hepatic necrosis and/or pancreatitis. Thromboembolism and coagulopathy caused by DIC may be observed including petechiae, ecchymoses, epistaxis or hematochezia.



Question

You finish a spay procedure on a young kitten and she regurgitates upon recovery after her endotracheal tube cuff was deflated. You wipe out her mouth and she appears to recover uneventfully. The surgery otherwise went well. Two days later she presents with a temperature of 103.4, she is a little lethargic, and she has a mild increased respiratory effort. You suspect she may have aspirated and now has pneumonia post-operatively. You perform chest radiographs. Which type of lung pattern is most typical of aspiration pneumonia?

- Bronchiolar pattern with perihilar lymphadenopathy
- Pulmonary edema caudodorsally

- Alveolar pattern mostly involving the right cranial and middle lung lobes
- Interstitial pattern, generalized but mostly left sided

Explanation - Alveolar pattern mostly involving the right cranial and middle lung lobes - Pneumonia is most commonly characterized by an increase of pulmonary densities with a patchy or lobar pattern. Aspiration usually involves the right middle and cranial lung lobes.

One study indicated that the aspiration pneumonia distribution patterns depend on patient position at the time of aspiration. In ventrodorsal, dorsoventral and standing dorsoventral positions, the right cranial, middle, and left cranial lung lobes are prone to aspiration pneumonia.

Caudodorsal pulmonary edema, also known as neurogenic pulmonary edema, is characterized clinically by a rapid onset of respiratory difficulty after a central nervous system insult. The four major causes recognized include head trauma, seizures, electrocution, and upper airway obstruction.

Bronchiolar pattern in cats is most typical of airway disease such as asthma; perihilar lymphadenopathy is more typical of fungal disease or neoplasia.

ALVEOLAR PATTERN

⚙️ Differentials

- ↳ Pneumonia
 - ⊗ Bronchopneumonia
 - ⊗ Aspiration
 - Often ventral right middle lung lobe affected?
 - » **WHY is this lobe commonly affected?**
- ↳ Hemorrhage
- ↳ Edema
 - ⊗ Cardiogenic
 - "Perihilar"
 - ⊗ Non-cardiogenic
 - "Caudodorsal"
- ↳ Neoplasia
- ↳ Atelectasis



Question

A cat presents with dyspnea and coughing. On a routine blood smear you find a *Dirofilaria immitis* microfilaria. How would you treat this cat?

- Surgical removal
- Melarsomine
- Thiacetarsamide
- Ivermectin
- Corticosteroids

Explanation - The correct answer is corticosteroids. Treating with any agent that is an adulticide may potentially result in embolization, release of antigen, and acute death, making this a controversial choice. Corticosteroids work well in reducing inflammation associated with infection and will help alleviate clinical signs. Cats are different than dogs in that heartworms cannot survive as long and the cats are sometimes able to eliminate the worm. Surgical removal has been attempted but is not a common practice and may also result in acute death.

Question

You confirmed chylous pleural effusion in your feline patient and referred to a specialist. The owner wants to discuss treatment options with you. The cat has had an extensive workup and no underlying cause has been found. Medical management has been tried for the last 3 months to no avail. The cat has been on a low fat diet and Rutin with intermittent thoracocentesis when needed. Which of the following treatments would be the best option and be most likely to resolve the effusion?

- Vitamin E and milk thistle supplementation
- Place a chest tube to keep drained consistently for 1 week and this should resolve the fluid
- Chemotherapy
- Ligation of thoracic duct and pericardectomy
- Somatostatin

Explanation - Surgery is the treatment of choice if medical therapy is failing. The best chance for resolution of a chylous effusion is ligating the thoracic duct and pericardectomy. Even with surgery, the effusion can still continue but this is the best chance for a cure.

Somatostatin is a naturally occurring substance in gastric, pancreatic, and biliary secretions. In recent years, analogues of somatostatin have been used to successfully treat chylothorax in humans. The mechanism by which non-traumatic chylothorax may benefit from this treatment is unclear; however, resolution of pleural fluid (chyle and postoperative serosanguineous effusion) in both dogs and cats has occurred after administration of octreotide (somatostatin). It is extremely expensive and not as likely to cure the effusion as surgery would.

Vitamin E and milk thistle supplements are sometimes used in cases of liver disease but not indicated for chylous effusion.

Despite chest tube placement to keep the fluid drained, the effusion will continue to occur because the drain does not stop the fluid from being produced.

Chemotherapy would not be indicated in a case of idiopathic chylous effusion.



Question

This radiograph is of a cat with acute respiratory distress. What is your diagnosis?



- Pneumothorax
- Pneumonia
- Pyothorax
- Pleural effusion
- Heart failure

Explanation - The correct answer is pleural effusion. The effusion may be as a result of heart failure or a pyothorax, but you cannot determine based on just a radiograph. Pleural effusion is evident because of the **severe loss of detail to the thorax and retraction of the lung lobes**. Notice you cannot visualize the heart; it's in the white-out area.

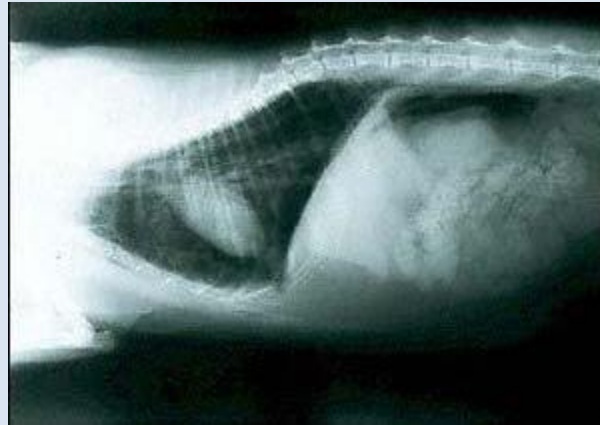
Question

A cat presents to you dyspneic and obtunded after falling from a tall tree. On physical examination, he is painful on manipulation of the jaw. You auscult decreased lung sounds dorsally. What should you do first?

- Skull radiograph
- Place the cat in an oxygen cage
- Chest radiograph
- Thoracocentesis

Explanation - The correct answer is thoracocentesis. The auscultation and history make pneumothorax the most pressing emergency concern for this cat. To confirm this and relieve it, thoracocentesis is necessary. Radiographs can wait and should not be performed until the cat is

stable. Placing the cat in an oxygen cage will allow the pneumothorax to worsen and should only be done after thoracocentesis.



Chest radiograph (X-ray) to look for the presence of air in the chest cavity. Air causes the heart to elevate off the sternum

Question

A 3-year old male DSH cat presents to your clinic for dyspnea. On physical exam the cat is febrile. You identify pleural effusion and obtain a sample. The fluid has a protein of 9 g/dL and is thick. The cellularity is low and the predominant cell type is neutrophils. What is your primary differential?

- Feline infectious peritonitis
- Lymphoma
- Feline leukemia virus
- Thymoma
- Feline immunodeficiency virus

Explanation - The correct answer is FIP. With FIP, the classical lesion is **pyogranulomatous vasculitis due to antigen-antibody complexes depositing in the venular endothelium**, which results in pleural and peritoneal effusion. Usually, the effusion has a high protein (5-12 g/dL) and is low in cellularity. The predominant cells are neutrophils. The fluid may be clear to yellow and contain fibrin clots. Given the low cellularity, neoplasia is lower on your list. FeLV and FIV do not usually present with pleural effusion.

Question

An indoor only 6-year old female spayed domestic short haired cat presents in respiratory distress. The breathing pattern is rapid and shallow and there is no history of trauma. The owner reports she has been breathing more rapidly over the last week. You do not auscult any crackles or wheezes and the heart sounds normal. The lung fields are very quiet overall. You administer oxygen immediately. What should you do first?

- Perform a barium swallow radiographic study
- Lateral and ventrodorsal radiograph

- Furosemide injection
- Thoracocentesis

Explanation - If a cat presents with **rapid shallow breathing, quiet lung sounds**, and a heart that auscults normally, pleural space disease, including effusion or pneumothorax, is the most likely cause of the breathing pattern.

Various types of pleural effusion include blood (**hemothorax**) which could result from trauma or coagulopathy, pus (**pyothorax**) which could be caused by a migrating foreign body or other infection in the pleural space, chyle (**chylothorax**) which occurs from unknown causes or a ruptured thoracic duct, other neoplastic effusions (such as **lymphoma**), or infection (such as **FIP**).

If the chest tap is positive, **thoracocentesis** should be completed in an attempt to stabilize the animal's respiratory status before taking radiographs. The only case in which the fluid should not be removed is hemothorax, if an active bleed into the pleural space is suspected. Cytology and analysis of the fluid collected will be helpful in the diagnosis; it is not always possible to tell the cause of the effusion by gross observation.

In pets that are in distress, it is best to take a dorsoventral radiograph instead of a ventrodorsal view since placing them on their back can cause further distress and could potentially lead to respiratory arrest.

Cats in congestive heart failure may have crackles on auscultation and often have a heart murmur or gallop rhythm.

Diaphragmatic hernia typically has the same breathing pattern, but usually the lung sounds are not as quiet as they are with effusions.

A barium swallow would not be performed first in this case; stabilizing the patient always comes first. If a diaphragmatic hernia were suspected, the patient should be held upright to try and keep the abdominal organs from invading the chest cavity.

Question

Which is contraindicated in cats with chronic feline bronchial disease (feline asthma)?

- Prednisolone
- Theophylline
- Doxycycline
- Atropine

Explanation - The correct answer is atropine. Atropine is contraindicated because it thickens bronchial secretions and encourages mucous plugging of the airway. Theophylline is a bronchodilator used to treat asthma. Corticosteroids are used to reduce airway inflammation in

feline asthma. Doxycycline is sometimes given to cats with feline bronchial disease to treat suspected Mycoplasma infections. Another drug that is contraindicated in cats is any beta-blocker because stimulation of the beta-2 receptors in the smooth muscle of the bronchioles causes bronchodilation; blocking these receptors with a beta-blocker causes bronchoconstriction.

Question

What is the most appropriate way to initially manage a cat with pyothorax from a cat bite wound from several weeks ago after thoracocentesis?

- Perform thoracocentesis whenever the cat becomes dyspneic or tachypneic, appropriate systemic antibiotics for 14 days
- Thoracotomy to explore for abscesses, then place thoracostomy tube and lavage twice daily with saline plus an antibiotic added to the lavage fluid
- Place a thoracostomy tube, lavage three times daily with Lactated Ringer's Solution, appropriate systemic antibiotic for 6 weeks
- Place a thoracostomy tube and place under continuous suction; lavage with an appropriate antibiotic every 6 hours

Explanation - The correct answer is to place a thoracostomy tube, lavage three times daily with LRS, appropriate systemic antibiotic for 6 weeks. If the cause of the pyothorax is identifiable, such as a foxtail, attempts should be made to treat that cause. In this instance, the initial wound is probably no longer visible or treatable. Aggressive management of these patients is necessary. Placement of a thoracostomy tube with continuous suction or intermittent aspiration is necessary. Lavage 2-4 times per day for 1 hour with an isotonic fluid should be performed. There is no advantage to adding antibiotics to the lavage fluid, although heparin is beneficial. Systemic antibiotics based on culture and sensitivity should be administered for a minimum of 4-6 weeks. If there is no improvement in 3-4 days, surgery is indicated to explore for abscesses, foreign bodies, etc. Pyothorax is an accumulation of pus in the pleural space. The fluid is classified as an exudate and the cells usually consist of neutrophils. If it is a bacterial pyothorax such as that from a cat bite, the neutrophils will be degenerate. Fungi and agents such as Actinomyces and Nocardia often cause exudates of non-degenerate neutrophils and macrophages. Reactive mesothelial cells are often seen in the effusion as well.



Question

Which of these is most likely to relieve dyspnea in a cat with feline bronchial disease (feline asthma)?

- Beta-2 agonist
- Beta-2 antagonist
- Alpha-2 agonist
- Alpha-2 antagonist

Explanation - The correct answer is beta-2 agonist. Beta-2 agonists will relax bronchial smooth muscle. The one most commonly used for this purpose is **terbutaline**.

Question

After many days of searching for a new family kitten a young couple adopts one from a large cattery. The kitten they adopted is approximately 4 months old. They had recently read on the internet about feline herpesvirus and feline calicivirus and are concerned about their cat being infected. What is the best preventative measure they can take against these viral diseases?

- Decrease stress levels
- Trifluridine
- Vaccination against feline herpes virus and feline calicivirus
- Amoxicillin with clavulanic acid

Explanation - The correct answer is to decrease stress levels. If the cat is already infected, stress can result in recrudescence of the virus. Additionally you would like to keep them away from other infected cats. However, this can be difficult since there are many cats that shed the virus without showing clinical signs. Treating with any antiviral agent is not effective for prevention and would be expensive. Vaccination provides no long-term protection and may even result in mild clinical signs. However, some believe that if infection results from being vaccinated, this will result in less severe signs. Antibiotics such as amoxicillin with clavulanic acid are ineffective against viruses.

Question

A cat presents with dyspnea and coughing. On a routine blood smear you find a *Dirofilaria immitis* microfilaria. How would you treat this cat?

- Corticosteroids
- Ivermectin
- Melarsomine
- Surgical removal

Explanation - The correct answer is corticosteroids. Treating with any agent that is an adulticide may potentially result in embolization, release of antigen, and acute death, making this a controversial choice. Corticosteroids work well in reducing inflammation associated with infection and will help alleviate clinical signs. Cats are different than dogs in that heartworms cannot survive

as long and the cats are sometimes able to eliminate the worm. Surgical removal has been attempted but is not a common practice and may also result in acute death.

Question

This 8-week old domestic short hair cat presented with an acute onset of severe chemosis as seen in the photo. The cat is systemically healthy otherwise with no oral or corneal lesions. Which of the following diseases most commonly causes severe chemosis in the absence of other systemic signs?

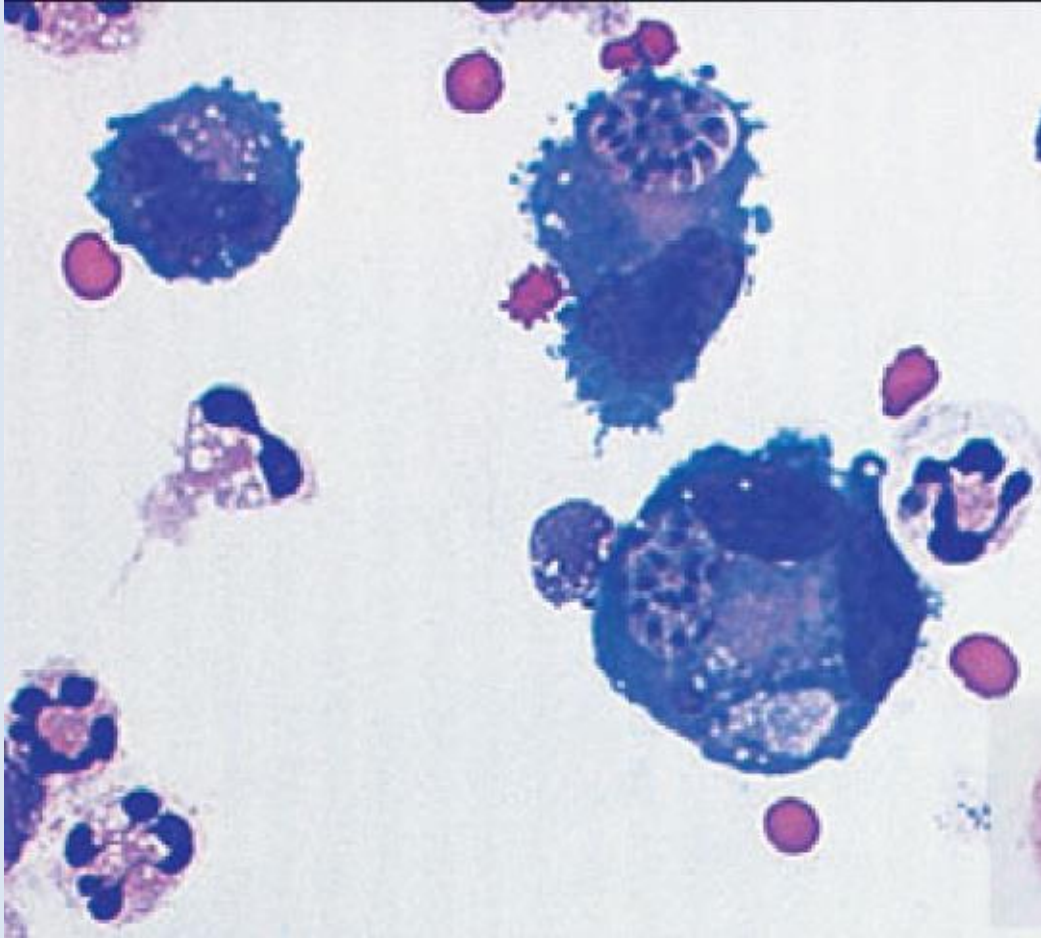


- Chlamydia felis
- Mycoplasma
- Calicivirus
- Herpesvirus

Explanation - The correct answer is Chlamydia felis. The key is to note the severe chemosis which is characteristic of chlamydia infections. This upper respiratory tract pathogen does not cause oral ulcers in cats. Herpes virus will cause ocular, dendritic ulcers, and less commonly cause oral ulcers, and is commonly associated with systemic disease. Calicivirus also causes more systemic disease and can cause oral ulcers. Mycoplasma is not associated with such severe chemosis.

Question

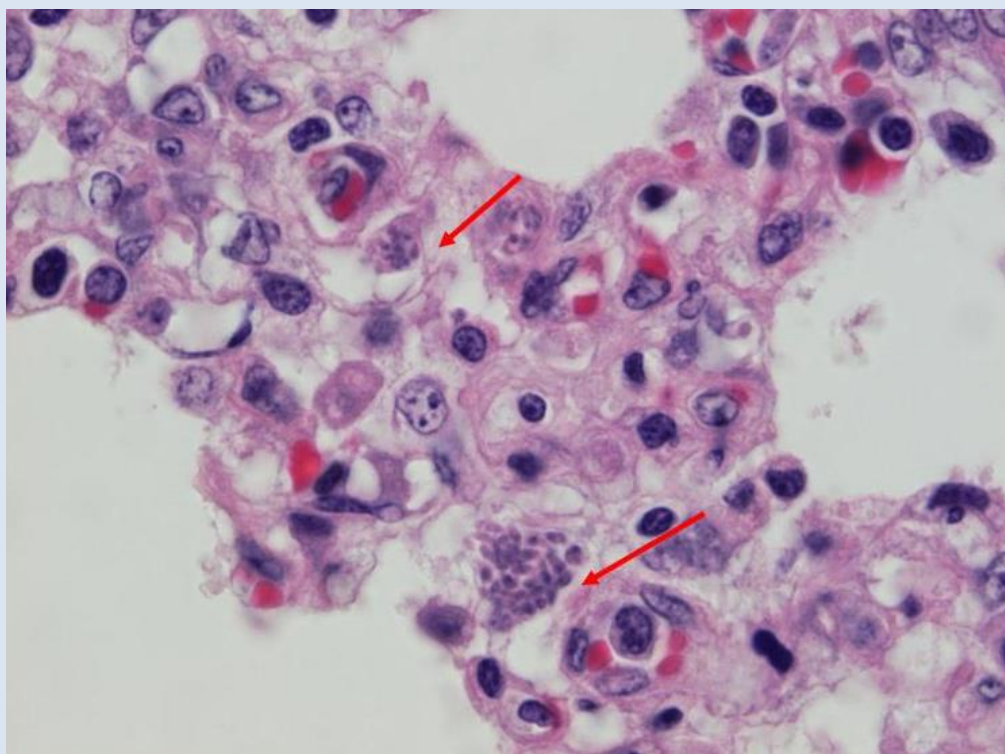
A 3-year old cat presents with fever and dyspnea. On exam, you detect decreased respiratory sounds ventrally. Pleural fluid is obtained and smears are made from the sediment. What is the etiology of this cat's pleural effusion?



- Cryptococcus
- Streptococcus
- Toxoplasma
- Feline infectious peritonitis (FIP)

Explanation - In addition to the neutrophils seen cytologically, you should have seen **toxoplasma gondii** tachyzoites multiplying within macrophages and neutrophils (see lower right corner of image).

Cryptococcus is a thin-walled yeast surrounded by a clear capsule. Streptococcus appears as small, round bacterial cocci. FIP effusion is typically characterized by a nonseptic exudate.



Question

What breathing pattern is the hallmark of feline asthma?

- Expiratory push
- Restrictive breathing
- Obstructive breathing
- Labored breathing

Explanation - Asthma causes **expiratory dyspnea, or a marked abdominal push seen on expiration with normal inspiration**. This occurs as a result of collapse of the lower airways during expiration. This occurs in asthmatics because negative intrathoracic pressure (exerted during expiration) can more easily cause collapse of the thickened and weak bronchial walls. This traps air inside the alveoli. During the next inspiratory cycle, there is decreased fresh air exchange and increasing hypoxemia.

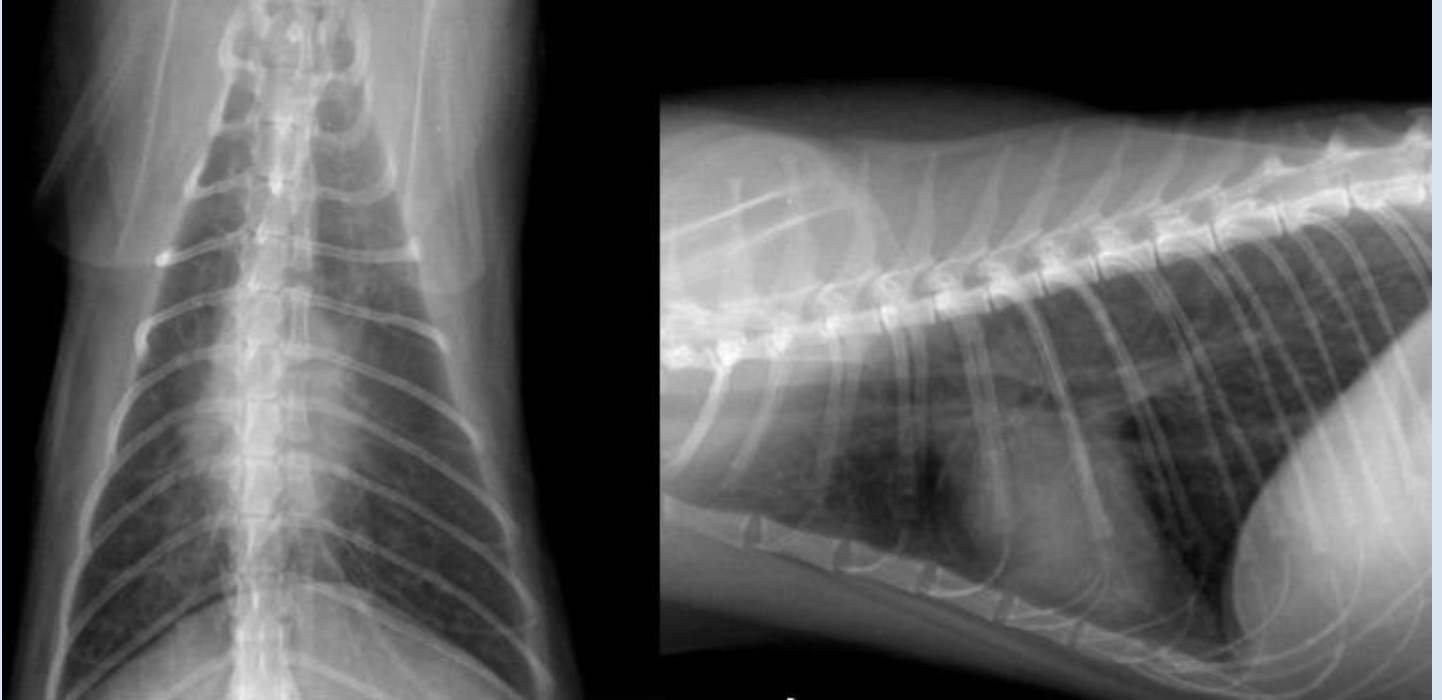
Obstructive breathing is characterized by long slow inspirations and can be accompanied by stridor or stertor. This occurs as a result of **upper airway disease** such as laryngeal paralysis, brachycephalic airway syndrome etc.

Restrictive breathing occurs as a result of **pleural space disease** and causes short, shallow and rapid breathing.

Labored breathing is a catch-all phrase to describe short rapid and deep breathing. This generally occurs with pulmonary parenchymal diseases such as pulmonary edema or pneumonia.

Question

A 10-year old female spayed cat presents to your emergency clinic with an **acute onset** of coughing and dyspnea. On physical exam, you detect open mouthed breathing, a marked **abdominal effort**, and a respiratory rate of 54 breaths per minute. Her temperature is 102.7F, and her chest radiographs appear as below. What is the most appropriate next step for this cat?



- Parenteral terbutaline with supplemental oxygen
- Thoracocentesis to remove fluid from the pleural space
- Thoracocentesis to remove air from the pleural space
- Parenteral ampicillin and enrofloxacin with supplemental oxygen
- CBC, Chemistry panel, urinalysis and a heartworm test

Explanation - The correct answer is parenteral terbutaline with supplemental oxygen. The history, physical exam, and radiographs are consistent with a diagnosis of **feline asthma**. The radiographic findings in this case are a **diffuse bronchial pattern** consisting of airway thickening appearing as so called "**tracks and doughnuts**." Terbutaline is a beta-2 agonist that allows bronchial smooth muscle relaxation and along with oxygen, are two important aspects of the emergency management of a cat in acute respiratory distress from asthma. In reality, you probably should have administered these therapies prior to radiographs as the stress of handling a cat in acute respiratory distress can be dangerous. Along those lines, restraining this cat to pull blood is similarly contraindicated until she has been stabilized. Thoracocentesis for pleural effusion or pneumothorax are inappropriate, as this cat does not have either of those problems at this time.

Question

You are presented with a cat that is coughing at home, and you perform a bronchoalveolar lavage (BAL) or endotracheal wash. Which cell type, when present in BAL or endotracheal wash cytology, is suggestive of feline asthma?

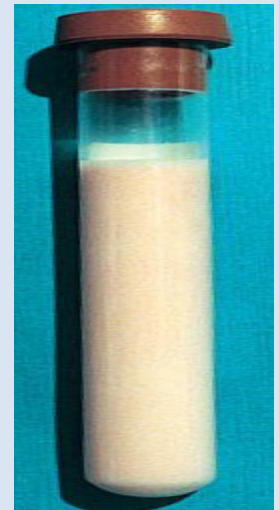
- Neutrophils
- Lymphocytes
- Basophils
- Monocytes
- Eosinophils

Explanation - The diagnosis of feline asthma is based on lower airway cytology with an increased number or percent of **eosinophils**. The other cell types, especially neutrophils, can be found, but are not suggestive of asthma. Bacterial infection should be ruled out with a culture of the BAL fluid. The treatment of feline asthma involves the use of corticosteroids and bronchodilators, along with evaluation of a thorough history for any environmental triggers of the immune system.

Question

A 4-year old female spayed tabby cat presents for labored breathing over the last 2 weeks. You suspect pleural effusion based on exam, and thoracocentesis produces a milky fluid (see image). The cat's temperature is 102.0 F and bloodwork is unremarkable. You suspect the fluid to be chyle. How would you confirm this suspicion?

- Spin down the fluid to see if it will separate; if it won't separate, it is chyle
- Glucose on fluid less than 20 mg/dL
- Total protein of effusion greater than 6.0 mg/dL
- Cytology of effusion showing no bacteria
- Measure triglycerides on the effusion as compared to peripheral blood



Explanation - Chyle has a high triglyceride content and if the effusion has a higher triglyceride value than the concurrent peripheral blood sample, this is most diagnostic.

Other than pyothorax, cytology of effusions do not typically show bacteria. This does not aid in the diagnosis but may help to rule out pyothorax.

Protein content of the effusion is not helpful due to the interference of the refractive index by the high lipid content of the fluid.

Question

A 7-year old spayed DSH cat presents to your clinic with a history of chronic respiratory and ocular disease. You notice nasal discharge, facial swelling, and distortion of the nose (sort of like a "roman nose"). Additionally, there is moderate submandibular lymphadenopathy. Radiographs of the head reveal increased opacity and turbinate destruction. What is the diagnosis?

- Cryptococcosis
- Coccidioidomycosis
- Aspergillosis
- Blastomycosis
- Squamous cell carcinoma

Explanation - The correct answer is cryptococcosis (*Cryptococcus neoformans*), a yeast-like fungus which has narrow based budding. In a cat, the respiratory, central nervous system, eyes, and skin are usually the areas that you will see affected. Most of the cases will have nasal involvement characterized by facial swelling, distortion, chronic snuffling and discharge, and granulomatous masses seen coming out of the nostril. Squamous cell carcinoma of the nasal planum will usually present in the form of ulcerative lesions and is seen in older cats. Coccidioidomycosis rarely causes lesions in cats and they will present as skin lesions if it does. Cats are rarely affected by *Blastomyces* or *Aspergillus*.

Question

Which of the following agents is the cat in the photograph most likely affected with?

- Herpesvirus
- *Chlamydia felis*
- *Mycoplasma*
- Calicivirus

Explanation - The correct answer is calicivirus. This upper respiratory tract pathogen is known for causing oral ulcers in cats along with nasal discharge, chemosis, and other upper respiratory signs. Herpes virus will cause ocular, dendritic ulcers, and less commonly cause oral ulcers. *Mycoplasma* and *Chlamydia* are not associated with oral ulceration.



Question

A man presents his middle aged female spayed indoor/outdoor cat for having difficulty breathing. Her gums are pink but she has moderate tachypnea and temperature is **104.1 F**. The lung sounds are quiet. You perform a thoracocentesis and retrieve a pleural effusion that is white with a yellow tinge. It has a foul odor when you empty the syringe. What treatment do you advise?

- Drain the fluid via thoracocentesis, start a low fat diet and benzopyrone (Rutin)
- Culture the fluid and start antibiotics, the fluid will resorb after the infection is treated
- Euthanasia due to the cat likely having FIP and the prognosis is grave
- Place a chest tube to drain and lavage chest and administer IV antibiotics
- Drain the effusion via thoracocentesis and start furosemide for congestive heart failure

Explanation - This cat has pyothorax which is an accumulation of pus within the pleural cavity. In cats, the most common cause is a **bite wound** that introduces bacteria into the chest cavity. It can also be seen with **migrating foreign body**, or **extension of pneumonia** into the pleural space. At minimum, hospitalization with chest tube, drainage and lavage of the pleural space, and antibiotics are needed. Sometimes surgical exploration is required.

While this cat could have FIP, the foul odor and presence of bacteria indicate a suppurative infection which is not typical for FIP.

Congestive heart failure can present as pleural effusion in cats, but fever and this type of effusion are not typical of heart failure.

Culturing the fluid is important. However, the fluid will not resorb and the fluid must be removed and the pleural space lavaged.

A low fat diet and Rutin are treatments for pleural effusion caused by chylothorax which is an accumulation of lymphatic fluid within the pleural space.

Question

An 8-month old male neutered domestic shorthair presents for ptyalism and decreased appetite. His temperature is normal. He has received his first set of vaccines from the Humane Society prior to adoption by this owner. Humane Society records indicate he was treated recently for upper respiratory symptoms. Upon oral examination you note severe gingivitis and stomatitis and multiple lingual ulcerations. FeLV and FIV testing were negative prior to adoption. Which of the following causes is suspected and which is the best treatment option listed?

- Feline leukemia, Clavamox drops and chlorhexidine oral rinse
- Herpes virus, L-Lysine and prednisolone
- Calicivirus, methylprednisolone injection once monthly until remission
- Bartonella henselae, doxycycline tablets and chlorhexidine oral rinse
- Calicivirus, clindamycin and sucralfate

Explanation - Calicivirus is a common virus that can cause upper respiratory symptoms as well as oral ulcerations and stomatitis in cats. The stomatitis is often associated with concurrent bacterial infection of the mouth. An antibiotic such as clindamycin, doxycycline liquid, or amoxicillin-

clavulanic acid (Clavamox) should be administered. Sucralfate in a slurry can help to coat the ulcerations for quicker healing. An analgesic, such as buprenorphine, should also be considered. An esophagostomy tube may be useful in severe cases when the cat will not eat on his own despite initial therapy.

A recent study found that 88% of cats with stomatitis were shedding both feline calicivirus and feline herpes virus-1, making these two viruses highly suspicious in playing a role in feline stomatitis.

Feline immunodeficiency virus (FIV) and feline leukemia virus (FeLV) do not appear to play as much of a role in this disease. Immunosuppression from these viruses make concurrent infection with calicivirus and herpesvirus more common.

A cause-effect relationship between Bartonella and feline stomatitis has not been proven but has been suspected in some cases. Doxycycline tablets should be avoided in cats due to risk of esophageal stricture.

There has been some controversy regarding the use of corticosteroids for stomatitis. Mostly, they have been used in cases of lymphocytic plasmacytic stomatitis that do not respond to other therapies and as a last resort. In general, the use of corticosteroids for stomatitis is not widely accepted.

Question

A 5-year old male neutered cat presents with a 2 month history of coughing. He has also vomited several times per week for the last month. His heartworm antibody test is positive and echocardiogram confirms presence of *Dirofilaria immitis*. Which of the following treatments may be recommended?

- Immiticide
- Prednisolone and Heartgard
- Doxycycline liquid for 2 weeks
- Meloxicam daily for 6 months
- Milbemycin oxime

Explanation - Heartworm adulticidal drugs can be life-threatening in cats and immiticide is contraindicated in this species.

Infected cats are frequently managed with supportive treatment, especially when they are symptomatic. The best therapy for the disease is to control the underlying inflammation associated with the infection with corticosteroids. Bronchodilators and anti-emetics may also be beneficial in some cases. Heartgard can be used as a slow kill for adult heartworms. The most common complication concerning heartworms in general is an embolism to the lung and sudden death associated with respiratory failure.

Milbemycin (Interceptor) kills microfilaria but does not kill adult heartworms. It kills microfilaria faster than ivermectin and thus carries a greater risk of anaphylaxis.

Surgical remove the adult heartworms is recommended in some cases.

Wolbachia, a symbiotic bacterium, has been found within filarid parasites and their microfilaria. It is essential for filarial reproduction and well-being. It has been hypothesized that antigens from these bacteria are pro-inflammatory and treatment with doxycycline can be beneficial.

Meloxicam would not be as effective as steroids at reducing inflammation, and is not safe for long term use in cats.

Question

You have a cat that needs to stay on inhalation anesthesia and remain recumbent following a major surgery. What pulmonary complication is likely to occur from prolonged recumbency and anesthesia in this patient?

- Pulmonary mineralization
- Atelectasis
- Lobar consolidation
- Pulmonary contusions

Explanation - The correct answer is atelectasis. Atelectasis or the incomplete expansion of a lung due to loss of air from alveoli is a common complication of **prolonged recumbency** and **inhalation anesthesia**. Lobar consolidation differs from atelectasis in that it refers to filling of airways with fluid. This occurs usually in inflammation. Pulmonary mineralization occurs from inflammation, infection, or neoplasia in the lung parenchyma. Pulmonary contusions are usually from trauma. The other main cause of atelectasis is **decreased pulmonary surfactant in newborns or in ARDS or near drownings**. Incidentally, another good answer to this question would be aspiration pneumonia.

Question

A 6-year old male Siamese cat presents to you for evaluation of respiratory difficulty, chronic cough, lethargy, and decreased appetite.

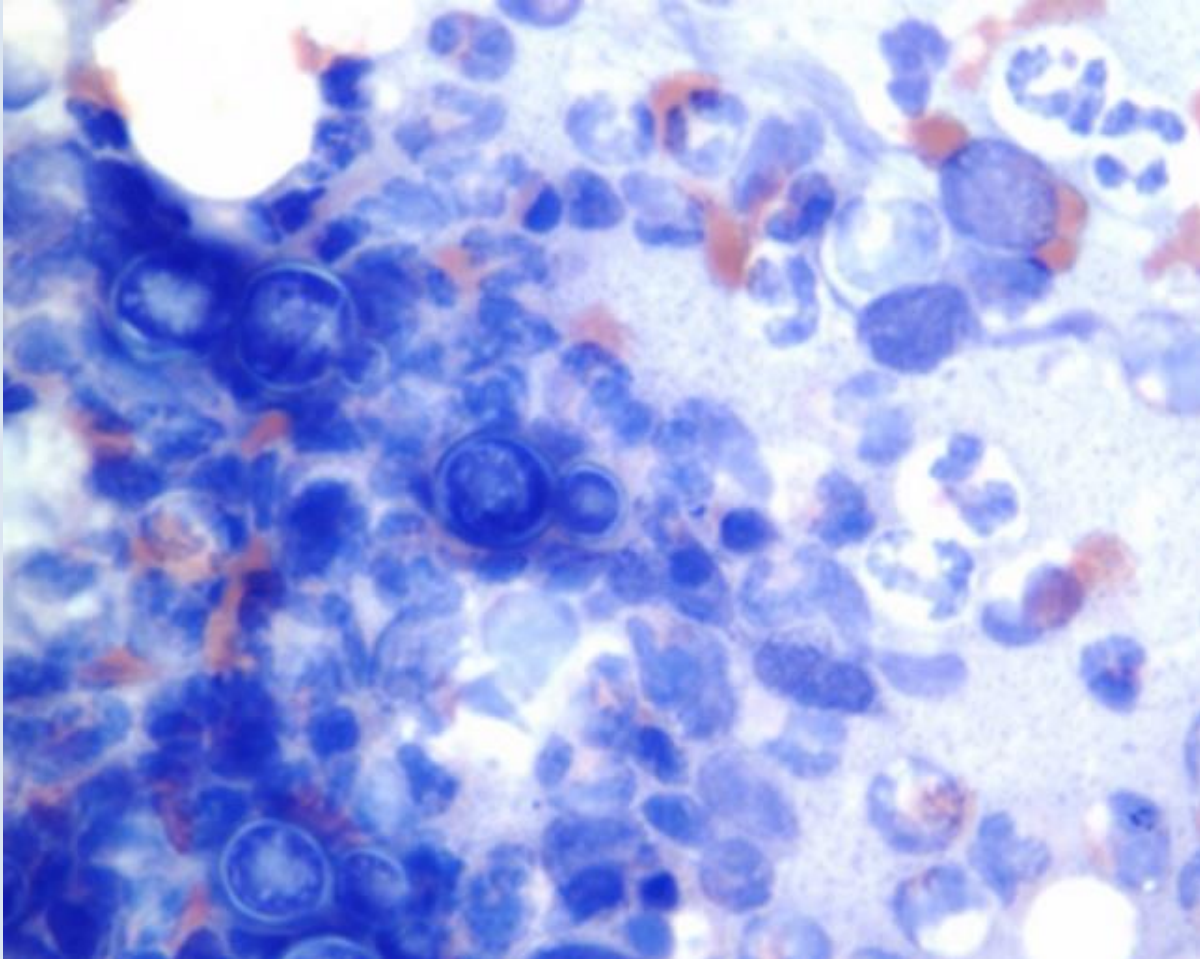
On your exam, the cat is quiet and 5% dehydrated. T-103.4F, HR-180 bpm, RR- 40. Body condition score is 3/9. The cat has harsh lung sounds and coughs occasionally. You note mild peripheral lymphadenopathy.

A CBC shows:

HCT- 39%
WBC-17,300/ul
Neutrophils- 13,800/ul
Bands- 600/ul
Lymphocytes-1,900
Monocytes- 600/ul
Eosinophils- 400/ul

You perform a needle aspirate from an enlarged lymph node. A representative cytology is shown in the image below. What is your diagnosis?

- Cryptococcosis
- Metastatic sarcoma
- Lymphoma
- Histoplasmosis
- Blastomycosis
- Metastatic carcinoma



Explanation - Blastomycosis, caused by *Blastomyces dermatitidis*, is a systemic fungal disease that primarily affects dogs, humans, and cats. It is a dimorphic soil fungus that is found in the Mississippi, Missouri, and Ohio River valleys and also the mid-Atlantic states and the Canadian provinces of Quebec, Manitoba and Ontario.

Infection occurs primarily through inhalation. This is a systemic infection that can cause damage to any organ or system including the central nervous system but the most common clinical signs and physical exam findings include:

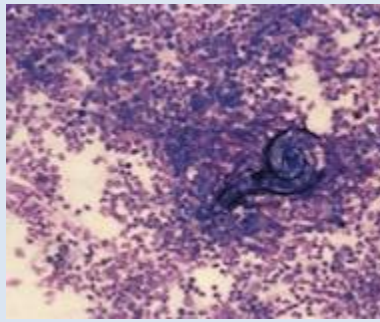
Depression, anorexia, weight loss, fever, lameness, lymphadenopathy, harsh lung sounds, draining skin lesions, chorioretinitis, uveitis, and cough.

Clinical signs may be suggestive of disease but definitive diagnosis depends on identification of the organism. As seen in the image, Blastomyces appears as a **round to ovoid broad based budding yeast** measuring 8-25 μm . It is pale pink when stained with H & E with a refractile, double-contoured wall. They have single broad-based buds.

Blastomyces is treated with systemic antifungal therapy, usually itraconazole.

Question

A 3-year-old male intact cat presents with a progressive history of coughing for the past 3 months. The cat lives indoors and outdoors and is not on any medications. Blood work shows a moderately elevated neutrophil count with a mild lymphopenia. Chest radiographs demonstrate a moderate bronchointerstitial pattern. The owners consented to a laryngeal exam, bronchoscopy, and a transtracheal wash. The image below is from the transtracheal wash. What is this organism and what is the treatment for it?



- Strongylus edentatus and fenbendazole
- Toxocara gati and fenbendazole
- Spirocerca lupi and ivermectin
- Aelurostrongylus abstrusus and ivermectin

Explanation - The **feline lungworm** in cats is **Aelurostrongylus abstrusus**. Treatment with ivermectin and fenbendazole have been reported to be successful.

Toxocara gati is a roundworm (ascaris) in which cats become infected by ingesting larvated eggs. The life cycle is complicated and involves migration through the liver and lungs. Eventually the larvae come up the mucociliary apparatus and are then swallowed where they develop in the small intestine. Eggs can readily be found in the feces, while adults can be visualized within the small intestine. Clinical signs in the kittens include poor body condition and a pot-bellied appearance. Vomiting may also be present. Diagnosis is best made via a fecal flotation and a transtracheal wash is unlikely to be as rewarding. Treatment options include selamectin, fenbendazole, pyrantel pamoate, milbemycin oxime, and moxidectin. It has been recommended that all kittens be dewormed beginning at 2 weeks of age until they are approximately 8 weeks old, at which point they should be transitioned to a heartworm preventative that is also effective against ascarids.

Strongylus edentatus is one of the large strongyles of horses found in the large intestines. Treatment includes ivermectin, moxidectin, pyrantel, and fenbendazole.

Spirocerca lupi is an esophageal worm found in dogs. They are found in the esophageal, aortic, and

gastric walls of dogs that have eaten infected dung beetles, chickens, reptiles, or rodents. Chronic infection may cause neoplastic transformation of the surrounding tissues into sarcomas or rupture and life-threatening hemorrhage of the aorta. Treatment is with ivermectin or doramectin.

Question

A cat presents to you with a history of unilateral mucopurulent nasal discharge and a proliferative soft tissue mass over the bridge of the nose. On physical exam, you note aqueous flare as well as the abnormalities listed above. Lung sounds are normal. What is the most likely diagnosis?

- Squamous cell carcinoma
- Aspergillosis
- Bacterial rhinitis
- Cryptococcosis
- Nasal adenocarcinoma

Explanation - The correct answer is cryptococcosis. Cats are commonly affected by *Cryptococcus neoformans*. Most common clinical signs are mucopurulent discharge and a proliferation on the nose ("Roman nose"). Ocular and CNS involvement may also be seen. It is an important differential for uveitis in a cat. *Aspergillus* is uncommon in cats and shouldn't cause uveitis. Squamous cell carcinoma is common on the nose of cats, especially white ones exposed to the sun but is usually an ulcerated rather than a proliferative lesion.



A slit lamp photo of a patient with anterior uveitis and resultant **Aqueous flare**, which is diagnostic of anterior uveitis (arrowheads). Breakdown of the blood-aqueous barrier results in increased protein concentration of the aqueous humor, and the resultant turbidity (scattering of light) can be seen on oblique illumination of the anterior chamber.

Question

On a cat's annual exam, the owner complains about a chronic cough. You perform a routine fecal flotation and see double operculated eggs with asymmetric terminal plugs. What are these?

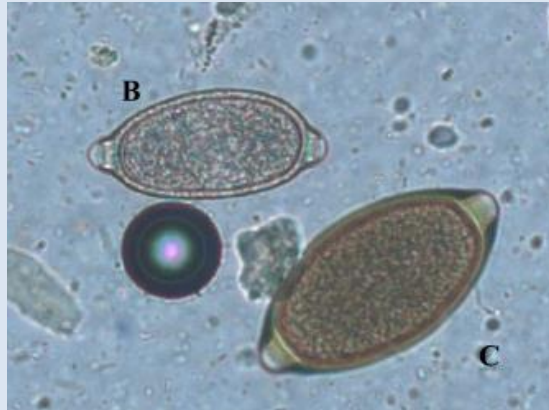
- *Paragonimus ova*
- *Trichuris ova*
- *Capillaria aerophila* eggs

- Aelurostrongylus ova

Explanation - The correct answer is Capillaria aerophila eggs. Capillaria ova look similar to Trichuris eggs but are **smaller** and have **asymmetric terminal plugs**. Most cases of Capillaria are asymptomatic but chronic cough may be seen.

Paragonimus is found by fecal floatation and have a single operculum.

Aelurostrongylus larvae are recovered by Baermann.



Eggs of *Capillaria aerophila* (B) and *Trichuris vulpis* (C) detected by light microscopy examination.

[Parasite Review in Small Animals](#)

Question

A cat owner comes home to find her 2-year old female spayed domestic medium haired indoor only cat on the ground and bleeding from the mouth. She rushes the cat into the clinic and you see the lesions shown in the photograph. On examination, the cat is now alert and you note ulcerations around the mouth, lips, and tongue. Which of the following diagnostic test would you recommend to screen the most important and common complication associated with these injuries?



- Thoracic radiographs
- Abdominal ultrasound
- Skull computed tomography
- FELV/FIV testing
- Complete blood count

Explanation - These signs are most consistent with electrical cord bite and trauma. Such trauma commonly causes burns and ulcerations on the mouth, lips, and tongue. Due to the effect of electrical current on capillaries, **non-cardiogenic pulmonary edema** is an important complication to monitor for. **Thoracic radiographs** should be recommended to screen for this. Fracture is less likely since these lesions are less likely to have been caused by a blunt trauma. Pleural effusion and viral infections also would not be expected to occur in association with acute presentation and oral lesions.

Question

A 10-year old feline domestic short hair presents to you in respiratory distress. A chest radiograph reveals rounded lung lobes and a significant bilateral pleural effusion. A sample of this fluid is milky white with an elevated triglyceride:cholesterol ratio. What is your immediate treatment choice for this cat?

- Discuss the poor prognosis with the owners and offer euthanasia
- Tap both sides of the chest to evacuate as much fluid as possible
- Hospitalize this cat and place it in an oxygenated cage for medical treatment
- Tap one side of the chest only to reduce likelihood of complications with tapping

Explanation - The radiographs describe significantly rounded lung lobes which suggests that the fluid has caused some fibrosing pleuritis. Sheets of fibrous connective tissue often times will cause pocketing of fluid on the right and left sides of the chest. Thus, it is important to **tap both sides of the chest to adequately drain enough fluid to relieve dyspnea**. The immediate life-saving procedure will be to remove the fluid that is causing the respiratory distress. **Chylothorax** is usually idiopathic in origin and rarely may resolve spontaneously in 1-2 months. Most cases ultimately require surgery which is usually a combination of ligation of the thoracic duct and a sub-total pericardiectomy.

Question

A 10-year male neutered feline domestic shorthair cat presents to your clinic. One month previously, the cat was hit by a car and sustained a bilateral sacroiliac luxation, a left coxofemoral joint luxation, and a right ischial fracture. These were surgically repaired, and his tail was amputated. Recently, there has been an onset of dyspnea. You take a thoracic radiograph which is shown below. What is the best therapeutic plan?



- Diaphragmatic hernia repair
- Fracture repair
- Thoracocentesis
- Exploratory laparotomy

Explanation - There are two gas bubbles in the caudal thorax that indicate a viscous in the pleural space. Additionally, there is no normal hepatic outline or a visible stomach in the cranial abdomen. The colon is positioned very close to the diaphragm. There is moderate pleural effusion with retraction of the lung lobes. These findings indicate a diaphragmatic hernia, likely sustained at the time of the initial trauma.

Question

A 1-year-old male neutered cat is transferred to you in the morning after seeing an emergency service for electrical cord bite trauma. You anesthetize the cat to address numerous oral burns and ulcers and note frothy pink fluid accumulating in the endotracheal tube (see image). What is the likely cause of this?



- Congestive heart failure secondary to electrical cord bite
- Non-cardiogenic pulmonary edema
- Pleural effusion
- Tracheal tear

Explanation - Electrical cord trauma commonly causes burns and ulcerations of the mouth, lips, and tongue. Due to the effect of electrical current on capillaries, non-cardiogenic pulmonary edema is an important complication to expect and monitor for. Although electrical cord bites can cause cardiac arrest, congestive heart failure would not be an expected complication.
